

Econometric Modelling of Rural Farm Household Credit Allocation in Kakamega County, Kenya

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Abstract

Enhanced household access to credit is essential in boosting the performance of small and medium enterprises in developing nations. Despite the role played by micro-finance in enhancing access to credit among poor rural households, there is dearth information on factors determining credit allocation. This study sought to fill the gap by investigating determinants of household allocation of credit accessed to different enterprises. Stratified multiple sampling approaches were used to select 179 smallholder farmers in Kakamega County. The study used semi-structured questionnaires to collect data which was then analysed using Seemingly Unrelated Regression Model (SUR). The results revealed that; gender of household head, land ownership and role played by an individual in socio-economic group were positive and significant determinants of credit allocation on farm enterprises. Moreover, access to training and ownership of off-farm enterprises were negative and significant. Concerning allocation of credit obtained on off-farm non-agriculture enterprises, off-farm income was positive and significant while membership and role played in group was negative and significant. On the other hand, age of household head, ownership of off-farm enterprise and off-farm income were positive and significant determinants of household allocation of credit on off-farm agriculture related enterprises. However, access to training and land ownership were negative and significant. The study recommends the adoption of policy measures aimed at encouraging farmers to diversify their income through engaging in sustainable off-farm activities. It also points out the need to empower women in order to enable them to own productive assets.

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1. Introduction

Agriculture plays a significant role in enhancing food security and economic development in Sub-Saharan Africa (Conceição *et al.*, 2016). In order to improve productivity and profitability of the sector, there is a need to increase agricultural investment. In line with this, enhancing access to credit among farm households can boost the performance of farm and off-farm enterprises. However, high interest on loans offered by commercial banks limits rural farm household from accessing credit. A study by Mariyono (2019) points out the importance of micro-credit services in eliminating the barriers that hinder rural farm households from accessing credit.

According to Dutta and Banerjee (2018), microfinance sector has contributed towards minimizing credit constraints by enabling poor households to access credit. For instance, poor households can be able to obtain credit through formation of groups. In this case, group members act as guarantors for a member who applies for credit (Kanake & Mahesh, 2018). In addition, access to credit from the micro-finance can enable poor households to save by using borrowed funds to invest and commit themselves to repay later on (Singh & Abate, 2018).

Microfinance does not only help to enhance household access to financial services but also helps to reduce borrower's risks (Nwibo *et al.*, 2019). This is because micro-finance embraces group borrowing hence all members within a group are held responsible for the loan offered. Micro-finance is therefore considered as a tool that can be used to eradicate poverty among low income households. However, enhanced household access to credit does not necessarily guarantee eradication of poverty among rural farm households (Banerjee & Mullainathan, 2010). This is because borrowers usually encounter trade-offs which may interfere with the expected outcome. For instance, if the credit accessed is used to meet short-term needs or repay previous debts, households may become over-indebted.

In Kenya, credit market is made up of both formal and informal lending institutions (World Bank, 2018). The market has been growing at a higher rate since the year 2012. The growth is attributed to enhanced technology which supports digital access to credit. In addition, digital credit market is supported by both commercial banks and telecommunication companies. Furthermore, informal lending sector acts as an alternative source of credit for individuals who cannot access credit from the formal sector (Kibet *et al.*, 2015). The sector is made up of SACCOS, micro finance institutions, table banking, and merry go round among others. It is recognized by the law hence informal lending institutions are registered (Omino, 2005). These institutions have greatly contributed towards the success of small-scale enterprises in the country. Particularly, they have contributed towards meeting the demand for credit by low income earners who are usually excluded in the credit market by the formal lending sector (Okibo

& Makanga, 2014).

Kakamega; one of the 47 counties of Kenya provides micro-credit services to its residents. The micro-credit program was launched in 2015 in order to eliminate credit barriers among rural households hence boost the performance of small and medium enterprises (CGoK, 2015). Research has indicated that enhancing household credit access leads to increased productivity. However, credit access alone is not a sufficient condition for better performance of small-scale enterprises. The credit accessed must be allocated properly in order to realize a positive outcome (McIntosh *et al.*, 2013). In line with this, limited studies have been done on determinants of household credit allocation hence this study fills the knowledge gap. The study focuses on factors determining household allocation of credit accessed to different enterprises. In addition, it provides insight on proper resource allocation. The remaining part of the paper organized into different sections. Section 2 focuses on the study area, sampling technique, data collection and analytical framework. Section 3 presents the results and discussion. Finally, section 4 presents conclusion and policy recommendations.

2. Methodology

2.1 Study area

The study was conducted in Kakamega; the county which initiated a micro-credit programme. The county covers an approximate area of **3051.3 kilometres square** (KNBS, 2017). It has an approximate population of **1,660,651 residents**. The county has favourable agricultural conditions with two rain seasons per year. Its main economic activities include agriculture and operation of small scale businesses. It has two ecological zones namely the Lower Medium and the Upper Medium. The Lower Medium covers a substantial portion of the southern part of the county which includes Kwhisero, Matungu, Butere and Mumias. Sugar cane production is the main economic activity in this zone. However, some farmers engage in maize, ground nuts, tea, sweet potatoes and cassava production.

On the other hand, the Upper Medium covers the Northern and the Central parts of the county which includes Ikolomani, Lurambi, Shinyalu and Malava that intensively deals with beans, maize and horticultural production mainly in small scale. It also includes Likuyani and Lugari which majorly deal with large scale farming. Other agricultural enterprises practiced in the county include poultry and dairy farming. On the other hand, off farm enterprises practiced in the county includes; operation of market stalls, shops, carpentry, welding, mobile banking, brick making, barber and saloon and Bodaboda enterprises among others. The county credit programme was established not only to boost existing small scale enterprises but also help in starting up new ones.

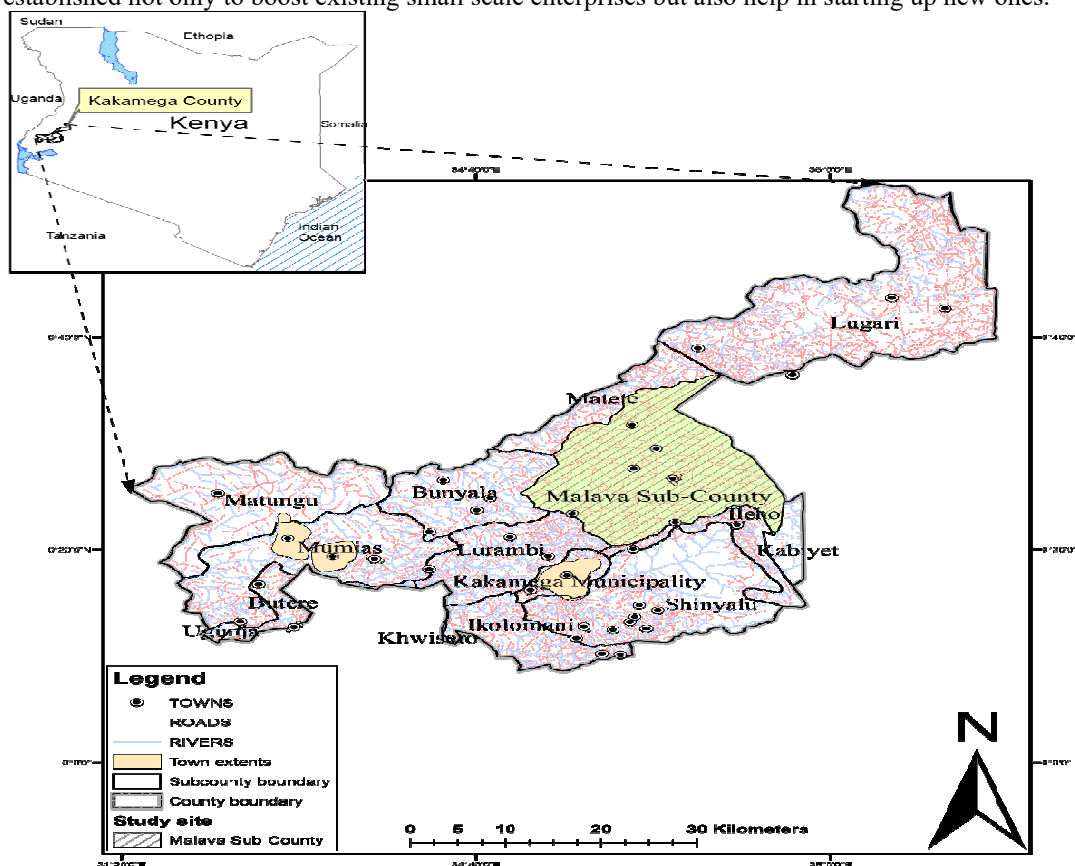


Figure1: Map of Kakamega County showing study area (CGoK, 2018).

2.2 Sampling design and techniques

Stratified multi-stage sampling technique was used the selection of respondents. The first stage entailed purposive selection of Kakamega County and two sub-counties; beneficiary and non-beneficiary. In this case, Malava Sub-county was selected since it had highest number of beneficiary groups compared to the other sub-counties. Additionally, Lwandeti and Chevaywa wards of Lugari sub-counties were selected to serve as a control for the study since no group from the wards benefited from the credit program. The second stage entailed purposive selection of all beneficiary groups in Malava sub-county and non-beneficiary groups in the two wards of Lugari sub-county. Systematic sampling was then used to select 83 respondents from a randomized list of 105 beneficiaries from all groups. The approach was used to select respondents proportionately basing on beneficiaries' type of enterprise that was financed by credit borrowed. This helped in distributing the respondents across different enterprises. In the final step, systematic sampling was used to select 96 respondents from a randomised list of 127 farmers from all registered agribusiness groups in the two wards of Lugari Sub-county to give a total sample size of 179 respondents. The list of the groups was obtained from the county micro-credit office. The sample size for the study was determined using a finite population correction formula (Yamane, 1967).

2.3 Data collection

Data collection was done in July 2019 using semi-structured questionnaires. The questionnaires were administered through personal interview by the help of well-trained enumerators. Both qualitative and quantitative data was collected. The data collected included whether or not a household had access to credit, the amount obtained and how it was allocated to different enterprises. All gathered data was then entered in a computer and analysed using STATA software.

2.4. Analytical framework

2.4.1 Descriptive analysis

Descriptive statistics were used to characterize the institutional and socio-economic factors of rural farm households basing on their credit access status. In addition, it was used in profiling different types of enterprises that benefited from the credit accessed by rural farm households. The results were presented using tables of frequencies and percentages.

2.4.2 Determinants of household allocation of credit to different types of enterprises

Household allocation of credit accessed depends on their perception of the available investment options in terms of the returns expected and the risks entailed (Bartolini, Andreoli & Brunori, 2014). For instance, a household may allocate credit to enterprises that guarantee high returns regardless of the risks incurred. This study postulates that households that access credit have three options of investments. These include; on-farm, off-farm and a combination of both on-farm and off-farm enterprises. When allocating credit accessed to different enterprises, a household aims at maximizing utility. The amount allocated to a specific enterprise should therefore enable a household to maximize returns. Ordinary Least Squares (OLS) can be used to determine the factors influencing household allocation of credit to different enterprises. However, this model is only suitable for a single linear model. It will not be suitable in this case because of several linear system equations entailed. Another model that would be appropriate is the multinomial regression but it will lead to biased estimates due to the assumption that the error terms are independent (Taddy, 2015).

The best approach involved using a Generalized Least Square analysis (Wooldridge, 2002). This study adopted Seemingly Unrelated Regression (SUR) model which is one of the GLS system equations models. The model provided efficient estimates by combining information across the three equations and accounting for potential correlation among the error terms. The first assumption is that household allocation of credit to different enterprises is influenced by the same explanatory variables. This implies that the decision to allocate credit to on-farm, off-farm or both enterprises basing on the explanatory variables is not independent. Treating each equation independently will therefore give inconsistent and inefficient results due to the possible correlation between the stochastic terms arising from on-farm, off-farm and on & off-farm enterprise equations of individual households (Greene, 2012). Following Wooldridge (2002) and Greene (2012), the SUR model for the study can be specified as shown below;

$$\begin{cases} Y_1 = \beta_1 X_1 + \mu_1 \\ Y_2 = \beta_2 X_2 + \mu_2 \dots\dots\dots(1) \\ Y_3 = \beta_3 X_3 + \mu_3 \end{cases}$$

Where Y_1 , Y_2 and Y_3 represents amount of credit allocated to on farm, off-farm non-agricultural and off-farm Agriculture related enterprises respectively. The amount of credit allocated to different enterprises was measured using a ratio scale. Using a matrix form, this can be modelled as shown below;

$$Y = \beta X + \mu$$

Where X represents the independent variables across the equations while β represents the coefficients.

The second assumption is that the expected values of X and μ are zero. This implies that X does not incorporate endogenous variables hence it is strictly exogenous.

For this model, error terms of the three equations are assumed to be uncorrelated across observations. However, they are actually supposed to be correlated across the three equations. This would imply that;

$$E[\mu_i \mu_j | X_1, X_2, X_3] = \sigma_{ij} I_T = \Omega = \begin{pmatrix} \sigma_{11}I & \sigma_{12}I & \sigma_{13}I \\ \sigma_{21}I & \sigma_{22}I & \sigma_{23}I \\ \sigma_{31}I & \sigma_{32}I & \sigma_{33}I \end{pmatrix} \dots\dots\dots(2)$$

Where I is an identity matrix and σ_{ij} refers to cotemporaneous correlation between error terms. In this case, the correlation of stochastic terms between on-farm, off-farm and on & off-farm allowed the implementation of a joint estimation procedure which is more efficient and better than separate Least Square Estimation (Hill *et al.*, 2012). This implies that;

$$Cov(\mu_1, \mu_2, \mu_3) = \sigma_{123} \text{ and } \sigma_{123} \neq 0 \dots\dots\dots(3)$$

The indication of this equation is that the error terms are contemporaneously correlated. The three error terms consist of the effect of household specific factors omitted from the three equations. The reason why the errors are correlated is because households who engage in the different types of enterprises are the same. SUR model therefore accounted for differences in variances of error terms and the possible correlation between the equations. The general SUR model can be specified as follow;

$$Y = \beta_0 + \beta_1 HHS + \beta_2 Mrts + \beta_3 GendHH + \beta_4 AgeH + \beta_5 EDHH + \beta_6 FrmS + \beta_7 OccHH + \beta_8 AccInf + \beta_9 Lnd + \beta_{10} GrpMemb + \beta_{11} DistCr + \beta_{12} DistMkt + \beta_{13} OffInc + \beta_{14} FrmExpr + \beta_{15} AgeEntr + \beta_{16} Trng + \mu \dots\dots\dots(4)$$

Where Y refers to the amount allocated to different enterprises and μ refers to the error term. Table1 provides the variables that were used in the SUR model.

Table1. Description of variables to use in SUR model

Variable	Description	Measurement	Expected sign
Dependent variable			
Amnt farm	Amount allocated to farm enterprises	Continuous	None
Amnt Off-farm	Amount allocated to off-farm non- agricultural enterprises	Continuous	None
Amnt Farm rel	Amount allocated to off-farm agricultural related enterprises	Continuous	None
Independent variable			
HHS	Household size	Continuous	±
GendHH	Gender of household head 0=Female;1= Male	Binary	±
MrtsS	Marital status; 1=Single, 2=Married, 3=Separated, 4=Divorced, 5=Widowed	Discrete	±
AgeH	Age of house housed head	Continuous	±
Edhh	Years of schooling	Continuous	±
FrmExpr	Farming experience (number of years)	Continuous	±
OccH	Occupation of household head		±
Extcont	Number of extension contacts	Descriptive Continuous	±
Farm	Farm size in acres	Continuous	±
DistCr	Distance to credit source	Continuous	±
DistMkt	Distance to the market	Continuous	±
Rgrp	Membership and role played in groups. 1=Member and leader; 0 otherwise	Binary	±
Lnd	Land ownership; 1= Inherited, 2= Purchased 3= Rented 4= Borrowed 5=Community 6=Government 7=Others	Discrete	±
AgeEntr	Age of the enterprise	Continuous	±
Off inc	Off-farm income	Continuous	±
Trng	Number of trainings (agricultural and financial training)	Continuous	±

3. Results and discussions

3.1 Descriptive statistics

Table2 presents the mean difference of household characteristics by farmer credit access status for continuous variables.

Table2. Continuous characteristics of sampled households

Variable	No Credit access =96		Credit access =83		Aggregated mean =179	t-test
	Std. Dev.	Mean	Std. Dev.	Mean		
Household size	2.81	6.38	3.53	7.07	6.70	-1.4703
Age of household head(years)	13.82	46.82	11.53	49.58	48.10	-1.4351
Schooling years of household head	3.62	10.50	3.29	10.18	10.35	0.6143
Farming experience	13.86	19.15	14.09	24.05	21.42	-2.342**
Farm size(acres)	1.83	2.28	1.80	2.25	2.27	0.1242
Land area cultivated (acres)	1.53	1.96	1.66	1.99	1.97	-0.0922
Number of groups	1.88	2.20	1.63	2.88	2.51	-2.5657**
Distance to the nearest formal credit source	3.31	3.22	3.03	4.54	3.88	-2.6166***
Distance to the nearest market centre	1.42	1.85	2.93	2.12	2.12	-1.7090*
Number of trainings(per year)	1.56	1.49	1.35	1.6	1.54	-0.5138
Number of extension contacts(per year)	2.90	1.74	2.14	1.58	1.58	0.8858
Land use period(Years)	13.38	17.88	14.60	19.75	18.74	-0.8947
Off-farm income(KE)	333084.10	269888.40	519628.70	321257.20	293707.50	-0.7976
Household income (KES)	392749.60	293353.00	543258.00	551927.80	413250.80	-3.6821**

Note: ***, **, * denote significance at 1%, 5% and 10% respectively

The aggregate mean of farming experience was 21 years. This consisted of a mean of 19 years among the group that did not access credit and 24 years among the group which accessed credit. The t-test results indicated that the difference in the years of experience between the two groups of farmers was significant at 5%. The results indicated that farmers with less years of farming experience were less likely to access credit as compared to those with high farming experience. This is because an increase in farming experience greatly improves productivity thus boosting farm income (Chandio *et al.*, 2017). In this case, increase in farm income increases a farmers' financial ability thereby enabling them to easily access credit.

The aggregate mean number of groups a member belonged to was 3. However, the mean number of groups for households that had access to credit was 3 while their counterparts had a mean of 2 groups. The t-test results show a statistical difference on the number of groups at 5% level. In line with this, households that had membership in a few groups were less likely to access credit as compared to those that had membership in many groups. This is because having membership in several groups probably increases individuals' social network which in turn enables them to easily access useful information concerning available credit opportunities (Hananu & Zakaria, 2015).

The aggregate mean of distance to the nearest formal credit source in the study area was 2.51km. On the other hand, the mean distance to the nearest credit source among the group that accessed credit was 5km while that of their counterpart group was 3km. The t-test result shows a significant difference in distance to the nearest formal credit source at 1% level between the two categories of respondents. Distance to the credit source plays a significant role in determining household access to credit. Long distance to credit source minimizes the chances of accessing credit among rural households (Kiplimo *et al.*, 2015).

The aggregate mean of distance to the nearest market centre was 2km. The mean distance to the nearest market of households that had access to credit and their counterpart was 2km. There was a significance difference in the distance to the nearest market at 10% level. Long distance to the market may increase transaction costs of transporting farm produce to the consumers hence reduce household income which in turn may limit them from borrowing (Bocher, Alemu & Kelbore, 2017).

The aggregate mean of household incomes among the sampled respondents was KES 413,250.80. Additionally, the mean household income of the group that accessed credit was KES 551,927.80 while that of their counterpart group was KES 293,353. The t-test results indicated that; the difference in household income between the two groups of farmers was significant at 5% level. In line with these observations, access to credit generally leads to improved household incomes (Seng, 2018). This is because the credit accessed can be invested in farm and off-farm enterprises which in turn generate income.

The results in Table3 present categorical characteristics of sampled households. There was a significant association between the main occupation of household head and access to credit at 5% significance level. The major occupation of household head in the study area was farming which consisted of 49.16%. In addition, 13.97% of household heads were employed in public sector, 3.91% mainly worked in private sector, 0.56% earned wages from on-farm work, 28.49% operated businesses and 2.79% were benefiting from pension while 1.12% engaged in other occupations. Among those who accessed credit, 40.96% mainly engaged in farming, 13.25% were employed in public sector, 2.41% mainly worked in private sector, 37.35% operated businesses and 6.02% benefited from pension schemes. However, there was no household head who earned wage from on-farm work. On the other hand, among those who did not access credit, 56.25% mainly practised farming, 14.58% worked in

public sector, 5.21% earned salary from private sector, 1.04% earned wage from on-farm work, and 20.83% operated businesses while 2.08% were engaged in other occupations. However, there was no household head that was benefiting from pension scheme. Main occupation of household head greatly influences household access to credit. In line with this, salaried individuals may easily access credit due to their ability to repay (Sekyi, 2017). On the other hand, they may not need credit since they can finance their budgets using their salaries.

The Chi-square test revealed that there was a significant association between group membership and household access to credit at 1% level. Majority (88.83%) of rural households in the study area had membership in socio-economic groups while 11.17% did not have membership in any group. All individuals who accessed credit were members of an economic group. On the other hand, among the group that had no access to credit, 79.17 % belonged to at least one socio-economic group while 20.83% did not belong to any group. It is worth noting that group membership plays a significant role in enhancing household credit access. Hananu & Zakaria (2015) argues that members of a group may guarantee each other when applying for credit.

Table3. Categorical characteristics of sampled households

Variable	No credit access %	Credit access %	Aggregate %	Chi-square
Gender of household head	Female	32.29	28.92	0.2384
	Male	67.71	71.08	
Main occupation of household head	Farming	56.25	40.96	15.7024**
	Salaried public sector	14.58	13.25	
	Salaried private sector	5.21	2.41	
	Wage, on-farm	1.04	0.00	
	Business	20.83	37.35	
	Pension/retired	0.00	6.02	
	Others	2.08	0.00	
Marital status of household head	Single	6.25	6.02	0.8798
	Married	83.33	79.52	
	Divorced	1.04	2.41	
	Widowed	9.38	12.05	
Ownership of off-farm enterprise	No	37.50	26.51	2.4564
	Yes	62.50	73.49	
Group membership	No	20.83	0.00	19.4667***
	Yes	79.17	100.00	
Role played in a group	No	59.38	34.94	10.6477***
	Yes	40.63	65.06	
Access to training	No	32.29	25.30	1.0554
	Yes	67.71	74.70	
Land ownership	Inherited	71.88	69.88	0.7192
	Purchased	21.88	20.48	
	Rented	6.25	9.64	

Note: ***, **, * denote significance at 1%, 5% and 10% respectively

There was a significant association between role played by an individual in socio-economic group and household access to credit at 1% level. In addition, the results revealed that 51.96% of households in the study area had members who undertook leadership roles in their socio-economic groups while 48.04% had members who did not assume any role in their groups. Among households which accessed credit, 65.06% had members who assumed leadership roles in groups while 34.94% had members who were not leaders in their groups. On the other hand, among households that did not access credit, 40.63% consisted of those whose members were leaders in their socio-economic groups while 59.38% entailed those whose members did not play any leadership role. Taking leadership role in a group provides an individual with an opportunity to influence decision on how the credit obtained by a group should be shared (Iyanda *et al.*, 2014).

Table4 presents different types of enterprises which benefitted from credit accessed.

Table4: Showing type of enterprises which benefited from the credit accessed

Type of enterprise	Frequency	Sample size	Percentage
Farm	55	83	66.27
Off-farm agriculture related	29	83	34.94
Off-farm non agricultural	47	83	56.63

Basing on the table, 66.27% of farm households allocated the credit obtained on farm enterprises which included dairy, poultry, sugarcane, maize, beans and vegetable farming among others. In addition, 34.94% allocated the credit obtained of off-farm agriculture related enterprises. Furthermore, 56.63% allocated the credit obtained credit on off-farm non-agricultural enterprises.

3.2 Factors influencing household allocation of credit accessed on farm and off-farm enterprises

The enterprises which benefited from the credit accessed by rural farm households were placed into three categories namely on-farm, off-farm agriculture related and off-farm non-agricultural enterprises. The results obtained by the SUR model are presented in Table5, in which columns 1, 2 and 3 provides the estimates for amount allocated on-farm enterprise, off-farm non-agricultural enterprises and off-farm agriculture related enterprises respectively. The results indicated that variations in the independent variables used in model explained 36 to 76% of the variation observed in the credit allocation among different enterprises. The un-explained variation of credit allocation could be attributed other factors which are not considered in the study. These could include household perceptions concerning different enterprises, political factors and historical factors.

Table5: Showing the SUR model results

	Amount allocated on-farm		Amount all on off-farm non-agric		Amount all on off-farm agric related	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Gender of household head	0.1211*	0.0630	0.0254	0.1290	-0.0900	0.0929
Age of household head	-0.0055	0.0051	-0.0048	0.0103	0.0151**	0.0075
Education level of household head	0.0012	0.0096	0.0161	0.0196	-0.0196	0.0141
Farming experience	0.0066	0.0046	-0.0128	0.0095	-0.0059	0.0068
Household size	-0.0010	0.0078	0.0117	0.0160	0.0050	0.0115
Main occupation of household head	-0.0070	0.0119	0.0332	0.0244	-0.0256	0.0176
Marital status	0.0150	0.0432	-0.0511	0.0885	0.0716	0.0637
Group membership and role played	0.1199**	0.0574	-0.2660**	0.1176	0.0187	0.0847
Distance to credit source	-0.0028	0.0091	0.0106	0.0187	-0.0107	0.0134
Distance to the nearest market	-0.0003	0.0097	0.0270	0.0200	-0.0224	0.0144
Number of trainings	-0.0508*	0.0290	0.0330	0.0594	-0.0799*	0.0428
Access to extension services	0.0066	0.0143	-0.0113	0.0293	0.0205	0.0211
Farm size	-0.0064	0.0690	0.0768	0.1413	-0.0219	0.1017
Land ownership	0.1055**	0.0437	0.0785	0.0895	-0.1315**	0.0645
Land area cultivated	0.0344	0.0741	-0.1476	0.1519	0.0525	0.1093
Ownership of off-farm enterprise	-0.6092***	0.0725	0.1390	0.1486	0.2958**	0.1070
Age of enterprise	-0.0011	0.0030	0.0008	0.0061	-0.0046	0.0044
Off-farm income	0.0000	0.0000	0.0000*	0.0000	0.0000**	0.0000
_cons	0.3965	0.2778	0.4864	0.5691	-0.0310	0.4097
Observations(parameters)	83(20)		83(20)		83(20)	
R-square	0.76		0.37		0.36	
Chi ² (probability)	270.49(0.0000)		48.97(0.0003)		45.71(0.0009)	

***, **, * denote Significant at 1%, 5% and 10% respectively

The result in the first column (amount allocation on farm enterprise) indicates that gender of household head is significant at 5% level. Male headed household were more likely to allocate credit received on farm enterprises. This can be attributed to the fact that men headed household have more access and control over productive resources such as land hence can make decisions aimed at enhancing on-farm enterprises. Mason *et al.* (2015) reported that, unlike men, women have limited access to not only information but also land and other resources due to cultural social barriers hence they are less likely to allocate resources on farm enterprises. For instance, in some cultures, widows are denied rights to inherit land hence limiting their ability to allocate their resources on farm enterprises (Dillon & Voena, 2017). Similar findings were reported by Ayodele, Fasina and Awoyemi (2016) who indicated that limited access to production resources constrains agricultural productivity among female headed households. In addition, some cultures, restrict women from engaging in specific farm enterprises such as owning livestock since it is treated as a 'men's enterprise'. Such traditions may limit female headed household from engaging in diversified farm enterprises. However, some studies have indicated that female-headed households are more likely to allocate their financial resources in enhancing farm production since they do most of farm work as compared to men who opt to stay in urban areas (Baten & Khan 2010).

Households whose members did not only belong to socio-economic groups but also assumed leadership roles in the groups were more likely to allocate the credit accessed on farm enterprises. In line with this, the association between the role played by a household in a socio-economic group and amount of credit allocated on farm enterprises was significant at 5% level. Taking leadership roles in a group enables individuals to access useful

information such as new technology that can enhance farm production and how to overcome some challenges associated with farming. According to Mignouna *et al.* (2011), farm households who belong to a group are likely to benefit from important investment and technology information that could be shared by members within the group. However, the role played by a household member in socioeconomic group had a negative significant relationship with allocation of credit obtained on off-farm non-agricultural enterprises at 5% level. The result implied that most socio economic groups in the study area were agriculturally oriented.

The number of trainings received by farmers had a negative and significant effect in determining household allocation of credit accessed on farm and agriculture related enterprises at 10% level. Increase in number of trainings received by farmers reduced the probability of allocating the credit accessed on farm and agriculture related enterprises. This could be attributed to the fact that most of the trainings received by households focussed on enhancing financial and business skills. This in turn resulted into shifting of resources from farm in order to finance off-farm activities. Beyene (2008) reported that attending trainings which focuses on promoting off-farm enterprises and enhancing variables of human capital significantly increased farmers' participation in off-farm activities. This is because attending trainings enabled household members to gain knowledge and skills which in turn enabled them to engage in operating off-farm enterprises. However, access to agriculture related trainings could increase the probability of allocating resources on farming activities among rural farm households.

Land ownership increased the chances of allocating credit accessed by households on farm enterprise at 5% significance level. Farmers owning purchased or rented land were more likely to invest credit obtained on farm enterprises. This could be attributed to the fact that farmers had full rights of land ownership usage hence they could make decision to initiate long term farm projects. On the other hand, farmers who had rented land were more likely to invest their borrowed resources on farm enterprises due to limited time associated with this type of land. A study by Kokoye *et al.* (2013) indicated that having full rights of land ownership acted as incentive for farmers to invest their scarce resources in long term and risky farm enterprises. In line with this, farmers could use financial resources to acquire new technology aimed at enhancing agricultural productivity.

On the other hand, land ownership had a negative significant effect on allocating credit obtained on off-farm agriculture related enterprises at 5% level. Individuals who owned land through purchase or inheritance; were less likely to allocate the credit accessed on off-farm agriculture related enterprises as compared to those who used rented in land. Owning land probably increased the tendency of specialising in farming among the rural farm households. These results concur with the findings of Awoniyi & Salman (2011) reported that ownership of land reduced the likelihood of engaging in off-farm enterprises among rural households. This was attributed to the fact that individuals who owned land allocated more resources on farm enterprises as compared to off-farm enterprises. However, the results contradicts the findings of Ullah & Shivakoti (2014) who reported a positive relationship between land ownership and allocation of resources on off-farm enterprises.

There was a significant positive relationship between off-farm income and allocation of credit accessed on off-farm agricultural related and off-farm non-agricultural enterprises at 10% level. Increase in off-farm income increased the chances of allocating credit obtained on off-farm enterprises. The implication of the result is that; households preferred to allocate their scarce resources on off-farm enterprises that had higher returns. In line with this, increase in off-farm income acted as an incentive for farmers to invest their financial resources on off-farm enterprises. Kohansal *et al.* (2008) reported that; income obtained from previous investments was significant in determining the farmer's credit use behaviour. Farmers were likely to invest in farm and off-farm enterprises that had proved to be profitable previously.

Age of household head had a positive significant influence on the amount allocated on off-farm agriculture related enterprises at 5% level. These results indicated that older household heads were more likely to invest their borrowed resources in off-farm agriculture related enterprises as compared to young household heads. This may be attributed to the fact that these enterprises require large initial capital to start which may act as a barrier to young household heads. In addition, older household heads may probably have more experience in operating off-farm agriculture related enterprises as compared to young household heads hence they preferred investing their resources in these enterprises. These results concurs with the findings of Khatun and Roy (2012) who indicated that older people were more likely to engage in agriculture related activities as compared to young people.

4. Conclusion and recommendation

The study revealed that 66.27% of rural households in the study area allocated the credit obtained on farm enterprises, 34.94% allocated it on off-farm agriculture related enterprises and 56.63% allocated it on off-farm non-agricultural enterprises. In addition, gender of household head, land ownership and role played by an individual in socio-economic group were positive and significant determinants of credit allocation on farm enterprises. In line with this, male headed households were more likely to invest on farm enterprises as compared to female headed households due to cultural constraints in the study area which inhibit females from owning land. Moreover, access to training and ownership of off-farm enterprises were significant and negative. Concerning allocation of credit obtained on off-farm non-agriculture enterprises, off-farm income was positive and significant

while membership and role played in group was negative and significant. On the other hand, age of household head, ownership of off-farm enterprise and off-farm income were positive and significant determinants of household allocation of credit on off-farm agriculture related enterprises. However, access to training and land ownership were negative and significant.

Basing on the results, the study recommends the adoption of policies measures aimed at encouraging farmers to diversify their income through engaging in sustainable off-farm activities. This will help to boost household income thereby improve farmers' welfare. In line with this, government and other stakeholders should create a favourable environment that promotes the growth of small and medium enterprises. There is also a need to adopt policies measures that seek to empower women in order to enable them own productive assets such as land hence compete favourably with men. In addition, there is a need to adopt policies aimed at empowering young farmers in order to enable them compete favourably with their counterparts who are resource endowed. It is also imperative for extension officers and other stakeholders to provide regular trainings to farmers in order to enhance farm productivity. Finally, future studies should use panel data to investigate determinants of household credit allocation and the potential effects on household income in order to capture the change in farmers' credit allocation behaviour over a long period of time.

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