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Analysis of the Coexistence of Conventional and Unconventional Credit Markets in the Agribusiness Sector in Kenya

By Philip Ngare

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Abstract

The study aims to examine reasons for agribusiness proprietors seeking unconventional loans, where conventional lenders offer loans at lower interest rates. Using cross-sectional data analysis, the study revealed the type of clients served by unconventional lending sector: Households that are excluded from conventional sector or (and) households that prefers unconventional loans because of lower transaction costs or lower risk. A unique modeling and statistical methods is developed to establish economies of scope enjoyed by unconventional lenders. Also, the study determined how best to measure and track agriculture-led economic transformation. Assess the role that inclusion of (women, youth), network data, plays in ensuring sustainable agriculture-led economic (transformation) growth and credit repayments. The study not only revealed that educational level is an important element that has a positive impact on agribusiness entrepreneur's demand for credit but also that if the conventional financial sector is subjected to repressive regulations by government, such as interest rate ceiling, which limit their capability and incentive of screening borrowers by designing credit contracts, the unconventional lenders will serve a larger credit market.

Keywords: Agribusiness financing, Micro-credit, Market equilibrium, Multinomial logit regression

JEL Codes Classification: C5, C8

1.0 Introduction

In recent time, there has been an increase in the global uptake of credit from financial institutions by poor and low-income earners. This can be contributed to the emergence of technology, resulting to increased competition among financial providers: commercial banks and other credit providers to offer an efficient and reliable facility.

Several studies (including Conning & Udry, 2005 and Ray, 1998) has established existence of unconventional credit market alongside a conventional market where interest rates are substantially lower. However, in the era of credit capping in Kenya, there has been a significant drop in the uptake of agribusiness loan from conventional credit providers. This not only can be attributed to banks not interested in funding risky projects but also to farmers turning to unconventional credit providers. The puzzle is that most of credit from unconventional providers are generally expensive, but their demand has increased. Using cross-sectional data analysis, the study aims to establish a shift on demand for credit during the pre-and post-interest rate capping period in the agribusiness sector in Kenya.

The study findings are supported by a 2016 survey of Micro, Small and Medium Establishment (MSME) by Kenya national bureau of statistics, that established that the cost of credit and lack of adequate collateral are major challenge to uptake of credits by majority MSMEs. Hence the need to tailor financial products to meet the credit needs of MSME operators in areas such as agribusiness. This study therefore aims to establish reasons why unconventional financial institutions succeeds where conventional institutions has failed in the SME agribusiness set-up in Kenya.

1.1 Study problem

A large number of Kenyan entrepreneurs are small scale agribusiness, who often does not meet a high interest rate and transaction costs as a

requirement of conventional credit market. However, in the wake of credit capping, there has not been substantial increase uptake of loan from small-scale agribusiness sectors. This could be attributed to banks not interested in funding risky projects but also to agribusiness proprietors turning to unconventional credit providers. The puzzle is that, most of credit from unconventional providers are generally expensive. The study, therefore, examines key features of conventional and unconventional credit market that makes them attractive for investors in the agribusiness sector. Also, the study seeks to establish if recent interest rate capping has influenced credit uptake in the two market segments.

1.2 Study Objectives

The main objective of the study is to analyze the coexistence of conventional and unconventional credit markets in the small-scale agribusiness sector in Kenya.

Specifically, the study aims:

- To identify what influences conventional and unconventional credit flows to key sectors of the economy such as agriculture.
- To estimate the extent of influence of factors established in (i).
- To establish how interest rate capping has influenced credit uptake dynamics among the conventional and unconventional credit providers.

1.3 Key hypothesis to be tested

The study tests the following main hypothesis: The differences in the lending terms and conditions between conventional and unconventional credit institutions significantly determine the access to and the choice of credit sources by small-scale agribusiness in Kenya.

1.4 Significance of the study

The study has greater significance in providing mechanisms for making banks more resilient and competitive in evolving regulation and participants' environment.

2.0 Literature reviews

In 2017, Zhao & Liu studied the coexistence of the formal and informal reciprocal loans in developing countries. In the study and other previous literature formal finance refers to collagenized loans from banks, credit cooperatives, and government agencies whereas typical informal finance includes loans from money lenders without collaterals requirements but relatively high interests' charges and a small collateral-free and interest free loans from friends and relatives.

Their study developed investment model capable of comparing the financing costs of different financing alternatives. It notable realize that the reciprocal future of interest-free loans from friends imposes and agnostic on the borrower and generate implicit financing costs. This study slightly differs from that of Zhao and Liu in that other than studying the coexistence of reciprocal loans on both types of financial institutions, it gets to find out other factors that contribute to the loaning terms and thus examines whether they form part of the coexistence of unconventional and conventional credit markets.

Mukherjee (2013), on his study, assess the underlying causes of existence of informal credit along with the available subsidized formal credit in rural areas in India, the study empirically tested that the decision of the entrepreneurs is formed, basically, by the interaction between the cost of access to formal credit and the relative efficiency of formal and informal lending mechanisms. The study also concluded that institutional credits can't be effective served and unless a proper interlink credit policy couple with default management strategies and conditions with branch networks. This study will extend to assess the underlying causes for the coexistence unconventional and conversional credit

markets on the agribusiness sector in a case study in Kenya and investigate other factors that may contribute to such existence of the two types of credit markets.

In the study of understanding of the coexistence of formal and informal credit markets in Peru (Guirkinger, 2008), a panel data econometric analysis reveals that the informal sector serves various types of clients wich reveals their preference for informal loans because of lower transaction rates and lower risks associated. Extensive examination of agreement terms and credit advancements allows a precise comparison of powerful advance expenses and legally binding danger crosswise over segments and uncovers that nearness and economies of degree delighted in by informal loan specialists empower them to substitute information concentrated screening and monitoring for authoritative hazard and supply these different sorts of clients. This study will further analyze the existence of competition on the informal loan sector as well as input and output markets while as well trying to investigate other terms that exist in both type of credit markets and their influence in lenders decision especially in agribusiness sector.

Floro & Ray (2002), studied the links between informal and formal financial institutions. Their studies cover the expansion of formal credit to informal lenders with the hope to improve loan terms for borrowers who are shut out of the formal sector. Their study argues that the effects of stronger vertical link that exist depends on the lending competitions and if the relationship between lenders is sustains by threats of reprisal in a repeated setting then the expansion of formal credit may worsen the term faced by informal lenders. In this study we further investigate whether such lending terms that exits in formal credit markets has resulted to the coexistence between the conventional and unconventional credit markets and whether the choice of informal lenders are based basically on the terms or there exist other factors that trigger their decision while making choice on type of credit institution.

The following is key financing theory that will be useful in the interpretation of results of the study: ***Pecking order theory;*** The theory states that firms avoid external financing when they have internal financing available (Murray and Goyal (2005)). That is, the most preferred source of finance is internal source which is the retained earnings or personal savings from informal sector entrepreneurs. The second preferred source is debt followed by equity. It can be deduced from the pecking order theory that newer firms will have less time to accumulate resources hence will borrow more than older firms. Also, we clarify that conventional credit market are traditional/ formal credit suppliers while unconventional are credit suppliers with measures aimed at easing financing conditions.

3.0 Modeling the coexistence of conventional and unconventional credit market

SME financing suffers from information asymmetry to the extent that most SMEs are family owned and can only provide less collateral. Unconventional lenders usually have "soft information" about SME borrowers.

3.1 Model Set-up

Consider a credit market with a large number of potential SME borrowers. Each borrower has and investment project with different risk profiles. The gross return of each project is a random variable. We assume each borrower have different capabilities to raise collateral: that is

- Type k borrowers have project with low risk and able to raise sufficient collateral,
- Type m borrowers have project with high risk and able to raise sufficient collateral.
- Type n borrowers have project with low risk but cannot raise enough collateral

Suppose there are two types of credit providers; The conventional lender and unconventional lender. The conventional lenders use interest rates and collateral to screen the potential borrowers. Unconventional lenders use soft information they have in place of collateral hence they only charge interest.

The study assumes that there are many conventional and unconventional lenders in the credit market and unconventional

lenders can enter freely. The potential SME borrowers make a choose that will maximize their expected utility of wealth. Suppose that a utility burst is received only at the time when a gain or a loss is realized. The utility can be normalized so that gains and losses contribute positive and negative utility, respectively. The Borrower i is said to bankrupt if

$$U(x_i+C^i-R^i)<0,$$

where x_i is the return from investment X_i and C^i is the collateral required by banks and R^i is the repayment rates. A typical bank return is

$$\tau_i(R,C) = \min\{R, x_i + C\}$$

and the net expected profits of the bank is

$$E\tau_i(R,C) - \tau,\ i = k,m,n$$

where τ is the cost of offering one unit loan by the bank. We assume the expected rate return from investment $E(x_i) > \tau$.

The borrower's gain is

$$л_i=x_i-R-z_iC,$$

where z_iC, is the costs that borrower i faces to raise collateral C, z_i is a positive integer. Let $л_i$ be the opportunity income of borrower i.

That is, if $EU\ [л_i(R,C)] < U\ (л_i)$ for all contracts that bank offer then the potential borrower i will not take credit.

By defining credit market equilibrium as a contract that yields zero net expected profits, to the conventional credit provider. A similar definition can be used with $C=0$ for the case of unconventional lender. In both cases $л_i(R)$ is a convex function in x_i and $\tau_i(R)$ is a concave function in x_i. The study supposes that in credit market with both conventional and unconventional lenders, borrowers can choose where to apply loans so as to maximize their own expected utilities. Hence conventional and unconventional lenders compete with each other to attract borrowers. That is the net expected profits for both lenders can only be zero in equilibrium.

In the next section, we show empirically that credit allocation will be efficient when there is coexistence between conventional and unconventional lenders. That is, if the conventional financial sector is subjected to repressive regulations by government, such as interest rate ceiling, which limit their capability and incentive of screening borrowers by designing credit contracts, the unconventional lenders will serve a larger credit market.

4.0 Data collection and analysis

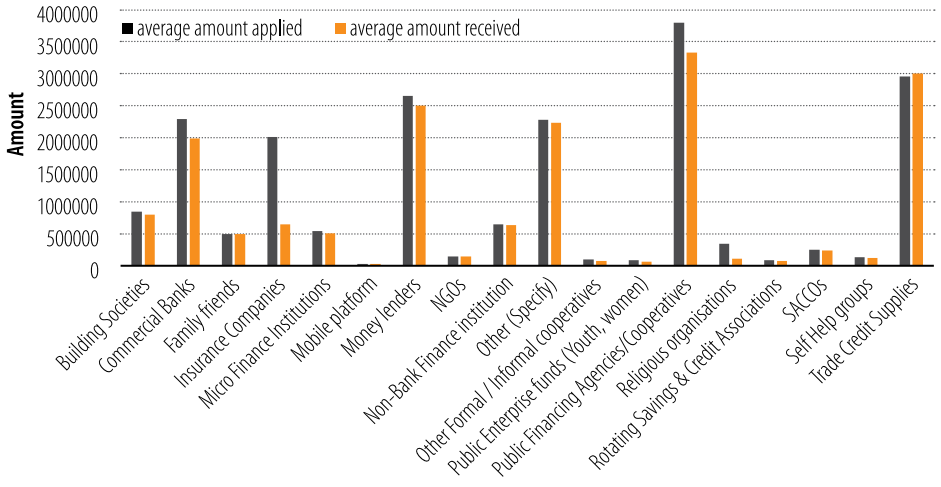
The study uses secondary data from Fin access household survey, 2016. Among the main credit sources considered in this study are given in the table 1 below and categorized either as conventional or unconventional based on their effects on the lenders' decision to rational applicants which differ between the two market segments (Zeller, 1994). The issues that were considered for motivations behind agricultural credit market operations were as per the following: the application systems, zones of loan specialist activities and also the terms and conditions for getting credit, for example, interest charged, and the security required.

Table 1: Inclusion criteria for loan methods

Financial Entity	Category
Bank	Conventional
SACCO	Conventional
Microfinance	Conventional
Insurance Company	Conventional
Mobile money provider (M -Pesa,Airtel money etc)	Conventional
Informal Money lender	Unconventional
Shylock	Unconventional
Insurance agents	Conventional
Bank agents	Conventional
Mobile money agents	Conventional
ASCA/ROSCA/Chama	Unconventional
Hawala	Unconventional
Mshwari/KCB Mpesa	Conventional

The loan application methods fluctuated regardless of whether one was managing the unconventional which is also considered casual or conventional credit advertise. There was a realization of application procedure for credit in the unconventional credit market being quite simpler compare to conventional credit sources. The borrower talked personally to the lender about his/her financial needs. Thus, neither filling loan application forms, undertaking, interviews, presenting land title deeds nor paying loan fees was undertaken. Since the lenders and borrowers knew one another the lender accepted or rejected the request immediately. Again, the most application for credit loan in the conventional sectors were being turned down based on a number of regulations from each institution. Type of institution in which the business account is run also contributed to the choice of credit loan. For example, the Cooperative Bank of Kenya granted credit to only cooperative societies and unions for forward lending to their members that is for the cooperatives to be eligible for credit they had to be members of the Cooperative Bank.

Figure 1: Credit amount applied vs Amount received



source MSME 2016

From the bar graph, Figure 1, there is an indication that most credit loans in unconventional institutions gives almost close or exact to what the applicant made compared to conventional institutions, for example those who borrowed loan of average sh. 141916.66 from NGOS received an average of sh.141825. Although it is clear that the amount received was not adequate to meet the demand for credit.

4.1 Summary Statistics for exogenous variables

Exogenous Variable	Description	Mean (Std Deviation)
Gender	Dummy (0 – Female)	
Marital Status	Dummy (0 - Single)	
Education Level	Dummy (0 - None)	
Have mobile Phone	Dummy (0 - No)	
Location	Dummy (0 – Rural)	
Age of respondent	Continuous	37.2 (16.57)
Family Size	Continuous	4.4 (2.5)
Monthly Income (Ksh)	Continuous	16,092 (181,685)

Table 3: Continuous variables distribution properties

	N	mean	Sd	median	Skew	Kurtosis
Age	8665	37.20	16.57	33	1.04	0.59
Family size	8665	4.39	2.49	4	0.76	0.94
Income	8665	16092	181685	6000	73.31	5805.16

From **Table 3** above, income has high values of skewness. The variable is not normally distributed and had to be log transformed in order to be used for regression analysis. Respondents had a family size on average four individuals. Respondents were on average of 37 years old.

4.2 Demographic Statistics

From the Table 4, most respondents were females, representing 60.9% of the total participants

interviewed. Most of them were married or living with a partner representing 60.4% while 23.5% had some primary education. A significantly large number of participants indicated to use a mobile phone for loaning purposes which represented 4% of the total participants. The total sample size for the cross -sectional study was 8,665 participants. This sample size enables the study to have a high power for generalization of study findings.

Table 4: Categorical variables demographics

	Conventional		Unconventional		Total	%
	Count	%	Count	%		
Gender						
Male	1811	20.9	1573	18.2	3384	39.1
Female	2263	26.1	3018	34.8	5281	60.9
Marital Status						
Single	1120	12.9	937	10.8	2057	23.7
Divorced	194	2.2	260	3	454	5.2
Widowed	308	3.6	589	6.8	897	10.4
Married/Living with	2446	28.2	288	32.2	5234	60.4
partner	6	1	17	0.2	23	0.3
Don't Know/Refused to answer						
Education level						
None	325	3.8	1236	14.3	1561	18
Some Primary	755	8.7	1282	14.8	2037	23.5
Primary complete	866	10	962	11.1	1828	21
Some secondary	569	6.6	476	5.5	1045	12.1
Secondary complete	888	10.2	483	5.6	1371	15.8
Post-secondary	417	4.8	113	1.3	530	6.1
technical training	254	2.9	39	0.5	293	3.4
University degree						
Have mobile phone						
Yes	3379	39	3029	35	6408	74
No	695	8	1562	18	225	26

Location						
Rural	1977	22.8	2875	33.2	4852	56
Urban	2097	24.2	1716	22.8	3813	44

4.3 Correlation matrix and plot for continuous variables

Table 5: Correlation matrix

	Age	Dependants	Income
Age	1.00	-0.11	0.02
Dependants	-0.11	1.00	-0.03
Income	0.02	-0.03	1.00

Figure 4: Correlation plot

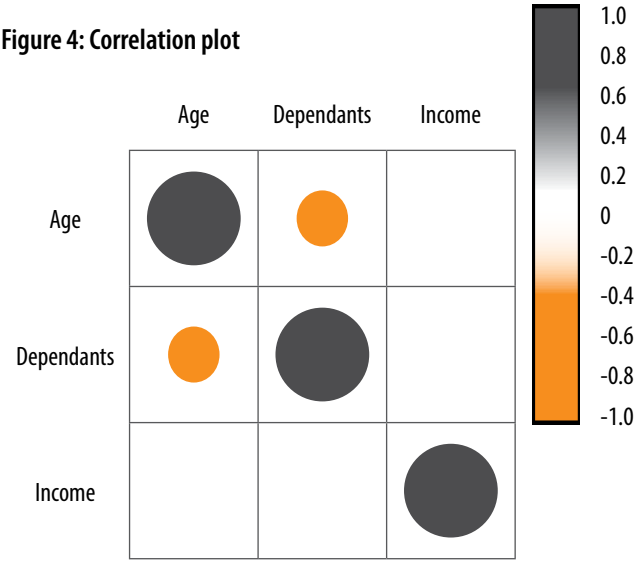


Figure 4 shows that there exists very low correlation among variables of interest and this satisfies the assumption of autocorrelation among variables. Age and Income are positively correlated with a low coefficient of 0.017. From the **Table 6**, based on the generalized variance

inflation factor estimates, none is above 5 and hence we ruled out possibility for multicollinearity in the model and thus proceeded to fit and publish the results for policy purposes. The estimates are therefore free from multicollinearity. This satisfies the assumptions of multicollinearity and autocorrelation among variables.

Table 6: Variance Inflation Factor for continuous variables

Variable	GVIF	Df	GVIF^(1/(2*Df))
Age	1.642898	1	1.281756
Family size	1.120448	1	1.058512
Income (log)	1.251588	1	1.118744

5.0 Model specification

In this study, we assume a multivariate logistic regression model to investigate causal relation among identified variables.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7$$

Where y – (Conventional – 1, Unconventional – 0)

X_1 – Gender
X_2 – Age
X_3 – Marital Status
X_4 – Education Level
X_5 – Family size
X_6 – Monthly Income in Ksh
X_7 – Have mobile phone
X_8 – Location

5.1 Justification for the model

A multivariate logistic regression model is suitable for this study because the outcome is a binary variable. The outcome variable is the loan methods used by the respondents which is classified as either Unconventional or conventional.

Table 9: Multivariate Logistic regression with loan category

Predictors	crude OR(95%CI)	adj. OR(95%CI)	P(Wald's test)	P (LR-test)
Gender: ref. = Females	0.65 (0.6,0.71)	0.85 (0.77,0.94)	0.001	0.001
Age in Years	0.99 (0.9902,0.9954)	1.01 (1.0045,1.0119)	< 0.001	< 0.001
Marital Status: ref.= Single				0.03
• Divorced/Separated	0.63 (0.51,0.77)	0.88 (0.7,1.1)	0.265	
• Widowed	0.44 (0.38,0.52)	0.9 (0.72,1.12)	0.337	

• Married/Living with partner	0.73 (0.66,0.81)	0.86 (0.76,0.98)	0.022	
• Don't Know/Refused to answer	0.29 (0.11,0.74)	0.3 (0.11,0.81)	0.018	
Education: ref.= None				< 0.001
• Some Primary	2.24 (1.92,2.61)	2.23 (1.91,2.62)	< 0.001	
• Primary Completed	3.41 (2.92,3.97)	3.15 (2.67,3.73)	< 0.001	
• Some Secondary	4.5 (3.78,5.35)	4.46 (3.68,5.41)	< 0.001	
• Secondary Completed	6.93 (5.87,8.18)	5.72 (4.75,6.9)	< 0.001	
• Post-Secondary Technical training	13.93 (10.92,17.76)	10.66 (8.2,13.86)	< 0.001	
• University Degree	24.79 (17.25,35.62)	16.5 (11.27,24.16)	< 0.001	
Family size	0.95 (0.93,0.97)	1.02 (1,1.05)	0.017	0.016
Monthly Income	1.39 (1.34,1.43)	1.16 (1.11,1.2)	< 0.001	< 0.001
Mobile Phone: ref. = No	2.48 (2.24,2.75)	1.3 (1.15,1.46)	< 0.001	< 0.001
Location: ref. = Rural	1.76 (1.62,1.92)	1.16 (1.05,1.28)	0.003	0.003

Crude OR – are the univariate Odds Ratios. Having not adjusted for the other variables.
adj. OR – are the estimates (Odds Ratios) after adjusting for the other variables. These are the ones interpreted.
95%CI – are the 95% confidence intervals.
P (Wald's test) – these are the P-values for individual categories estimates and continuous variables
P (LR – test) – these are the P-values of the Likelihood Ratio test of significance for the variable.
(Unconventional – 0, Conventional – 1) as outcome

5.2 Interpretation of Results

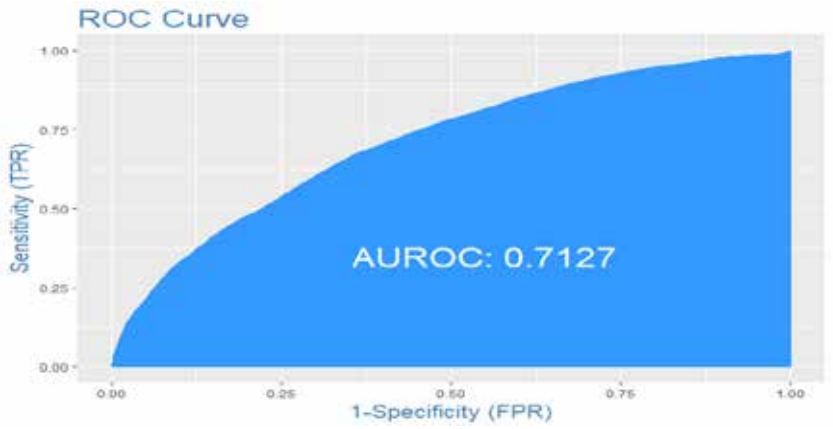
From the **Table 9**, adjusting for age, marital status, education level, family size, monthly income and usage of mobile phone, males are 15% less likely to choose a conventional loan method to unconventional method relative to females. Gender is thus a significant determinant of choice of loan method. Adjusting for gender, marital status, education level, family size, monthly income and usage of mobile phone an increase in age by one year increases the likelihood of choosing a conventional loan method by 1% as compared to an unconventional method. Adjusting for the other variables, those who are married or living with a partner are 14% less likely to choose conventional methods to unconventional methods while those who didn't know or refused to answer are 70% less likely with reference to their single counterparts. Being divorced or widowed has no effect on the choice of loan method with reference to the singles.

Adjusting for the other variables and with reference to those with no education, those with some primary education, completed primary, have some secondary education, completed secondary, have post-secondary technical training and have a university degree are 2 times, 3 times, 5 times, 6 times, 11 times and 17 times more likely to choose a conventional loan method to unconventional loan method. This shows the higher the education level, the more the likelihood that an individual would choose a conventional loan method. Education is thus a significant determinant of choice of loan method.

Adjusting for the other variables, an increase in family size by one individual increases the likelihood that one would choose a conventional loan method as compared to unconventional loan method by 2%. Adjusting for the other variables, an increase in the monthly income by one unit increases the likelihood to choose a conventional loan method as compared to unconventional loan method by 16%. Adjusting for the other variables, having a mobile phone increases the likelihood to choose a conventional loan method by 30% relative to having no phone. Adjusting for the other factors, an individual from an urban area is 16% more likely to choose conventional loan method over the unconventional method as compared to an individual from a rural setting.

5.3 Predictability of the model (ROC curve)

Figure 5: Predictability of the model (ROC curve)



The concordance which measures how well a set of bivariate data is fitted, is at 71.3% which indicates that our results from the model are well fit and therefore valid for generalizability.

5.4 Coexistence of conventional and unconventional loan types

Figure 6: Coexistence of loan methods

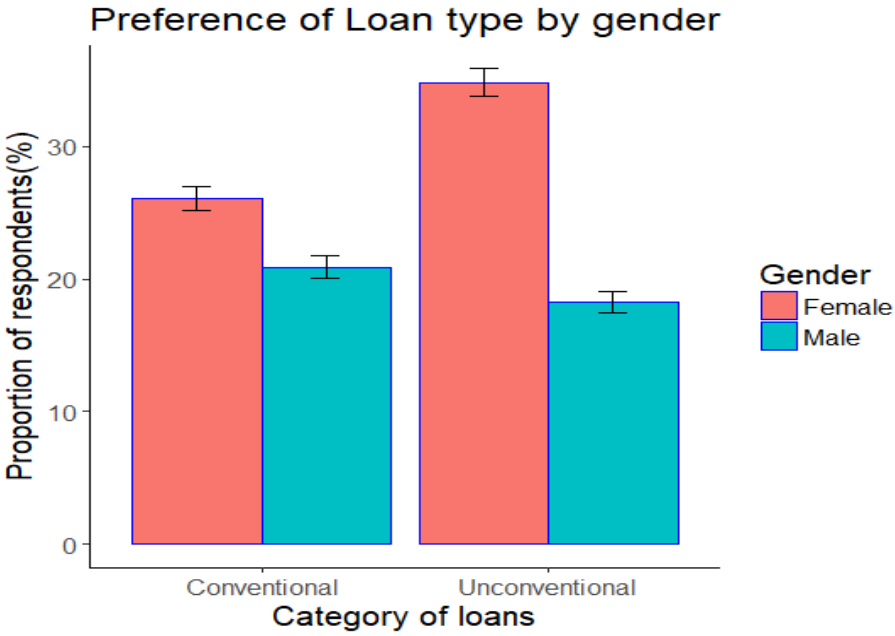


Figure 6 above shows the proportions of choice of loan method among the participants by gender. There seems to be almost no significant difference between the males in either of the loan methods as the confidence intervals of the proportions almost overlap. There seems to be however a significant difference between women who choose either of the loan methods based on the un - overlapping confidence intervals. This shows that both conventional and unconventional loan methods co – exist. That there is no a big significant difference among the participants on the choice of the loan method. Thus, none is a monopoly and they are both used throughout.

6.0 Conclusion and Recommendations

The study's first objective was to identify factors influencing conventional and unconventional credit flows to key sectors of the economy such as agriculture: The empirical findings of this study supports the coexistence of the two types of credit markets. The findings of descriptive statistics and consequent multivariable logistic regressions supports the hypothesis that the differences in the lending terms and conditions between conventional and unconventional credit institutions significantly determine the access to and the choice of credit sources by small-scale agribusiness in Kenya. On coexistence of loan methods: A graph of the proportion of choice of loan method by gender showed there is no significant difference on choice of either a conventional or un-conventional method. Out of the 8,665 respondents, 47% chose a conventional loan method out of which 26.1% were females while the remaining 53% chose an un-conventional loan method of which 34.8% were females. This therefore points to the co-existence of the two loan methods in the market.

Moreover, although the choice for credit market by entrepreneurs may heavily be influence by interest rate and other lending terms of both conventional and unconventional sources, there are still several factors that contributes to the choice of credit source. Through a multivariable logistic regression method to predict the magnitude to which several factors influence the choice of loan method; Gender, age in years, marital status, education level, family size, monthly income, having a mobile phone and the location of an individual (either rural or urban) were statistically significant predictors of choice of loan method.

In addition, males were less likely to choose conventional loan method (OR = 0.85, p-value =0.001) relative to their female counterparts. Education level was found to be an important element that has a positive impact on agribusiness entrepreneur's demand for credit. The strength of its impact is shown to increase with educational attainment so that entrepreneurs with higher education were more inclined to seek for conventional credit. The likelihood increased gradually at each additional stage of education level. Those with the highest education level, a university degree, were 16.5 times more likely to choose a conventional loan method as compared to those with no education (OR = 16.5, p-value <0.001) while those with the least, some primary education were 2 times more likely (OR = 2.23, p-value < 0.001). As one progress with education the more likely one is enlightened on the new formal ways to borrow and engage in more diverse business prospects. Monthly income significant influenced choice of credit. An increase in income would increase the likelihood to choose a conventional loan method as compared to

Un-conventional loan method (OR = 1.16, p-value = <0.001). Some potential borrowers could not get access to formal sources because of high lending rates and transaction and many other disadvantages that arise due to their low-income status. Therefore, to capture all the potential borrowers, there is need to improve access to institutional credit across all the income levels. Those in urban areas were more likely to choose a conventional loan method as compared to their rural counterparts (OR = 1.16, p-value = 0.003). This is quite likely due to the fact that individuals at the urban areas are able to access to information on most conventional methods which are mostly based in these areas. Those in the rural areas would use non-formal methods which are mostly common in these areas. As one gets older, they are more likely to consider a conventional loan method (OR = 1.01, p-value < 0.001). Family size was a significant factor on choice of loan method where an increase in family size by one individual increases the likelihood of the family head to borrow from a conventional method (OR = 1.02, p-value = 0.017).

Having a mobile phone increases the likelihood to borrow from a conventional loan method (OR = 1.3, p-value < 0.001). This can be linked to the access to information on new conventional methods usually relayed to customers from time to time by the mobile service providers. The study also noted an efficient credit fund allocation when unconventional lenders are allowed to coexist with conventional lenders. It therefore follows that if conventional lenders are subjected to interest rate ceiling which limits their incentive to screen borrowers, unconventional lenders will serve a large, small scale agribusiness credit market in Kenya.

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