Effect of use of different financial service providers on farm performance in Kenya

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Abstract

The purpose of this paper was to evaluate effect of use of different financial services providers on agricultural performance among small scale farmers in Kenyas' Nyandarua County. The authors used both descriptive and quantitative approach. Descriptive statistics were used to characterize users of different financial services providers while gross margin analysis was used to estimate farm performance. Analysis of variance was used to test the differences in gross margins among users of different financial services providers. The results reveal that households using agent banking services had highest gross margin per acre in their crops enterprise as compared to those using convectional banks outlets and mobile phone based money transfer services as their financial services provider. Although the authors have shown that choice of a financial service provider has an effect on agricultural performance, the study only concentrated on crops enterprise. Thus, results might not hold for other farm enterprises. Furthermore, the conditions for agricultural production in Kenya could be unique therefore making the results change for different country contexts.

Keywords: Financial services provider, financial inclusion, agent banking, convectional baking, and Mobile phone based money transfer services.
Paper type: Research paper

Introduction

Expanding the availability of agricultural finance has been widely used in developing countries as a policy to accelerate agricultural and rural development. Rural financial services is about providing financial services including secure savings, credit, financial transactions, money transfer services for remittance and insurance-in rural areas with a view of facilitating investments in agriculture. However, access to basic banking services in Sub-Saharan Africa is limited lagging far behind other parts of the developing world (Kendall et al. 2010).

Access to rural agricultural finance has been considered as a powerful instrument to fight poverty and create income opportunities for the low income population, particularly in developing countries. Extensive economic and financial sector reforms have been experienced in the last few decades in many Sub-Saharan African countries. However, in comparison to other developed economies and developing economies in other part of the world, many Sub-Saharan African countries are still faced by severe financial sector development gaps. The major obstacles of the disadvantaged in accessing formal financial services include asymmetric information, weak institutions and the absence of basic infrastructures necessary for banking. However, with growth in information communication technology, new models for delivering financial services to the rural areas have come up arousing interest of commercial banks in rural agricultural finance.

In Kenyas' rural regions, agriculture is the most important sector where more than 70 percent of the rural population derives their livelihood directly from it (GoK, 2010). Despite the great importance of this sector, it has experienced low productivity in the past decades where small scale farmers in lack working capital and operate at low liquidity limiting their ability to adopt productivity enhancing inputs (Nyoro, et al., 2002). Adoption of new technology by farmers has been argued to significantly influence agricultural productivity therefore improving agricultural production and farm profitability (Hassan and Bauer, 2013). According to World Bank (2009), rural finance is important in achieving pro-poor growth and poverty reduction. According to Kibaara (2005), access to financial services increases the farmers' working capital enabling them to buy productivity enhancing inputs such as good quality seeds, fertilizers and chemicals.

However, farming was perceived a highly risky enterprise by the formal banking sector therefore giving it little attention making it difficult for farmers to finance inputs and capital investment (GoK, 2010). Microfinance institutions operating in the rural areas tended to increase the cost of provision financial services while their outreach was limited to a small proportion of smallholder farmers. The major causes of failure of formal financial markets in the rural areas is the transaction costs which are high particularly among smallholder farmers due to poor communication and transportation facilities, lack of production and market information, as well as security (Poulton et al, 1998; Kibaara, 2005). Most smallholder farmers were left with the option of depending on traditional informal financial systems which are poorly developed (Financial Sector Deepening (FSD), 2006).

In recognition of the association between access to financial services and poverty reduction the government of Kenya has been pushing for financial sector revolution. In the Kenyas vision 2030, the government seeks to upgrade financial services to world class standards with a view of promoting savings, lower the cost of capital and increase the supply of investible funds. To achieve this, formal banks are to be encouraged to increase their outreach by opening branches in the rural areas, encourage adoption of ICT in provision of financial services in order to reduce transaction costs and promote other quasi banking institutions like microfinance institutions, savings and credit organisations (SACCO) and rotating savings and credit associations (ROSCAs). The Central Bank of Kenya partnered with Financial

Sector Deepening (FSD) Kenya and other financial sector players and stakeholders under the private-public partnership arrangement in order to monitor and measure levels of access to financial services.

Growth in Information Communication Technology (ICT) has ignited some excitement due to the significant role it can play in improving access of poor households to formal financial services. This situation has changed dramatically in the last few years with the introduction of mobile phone-based money transfer (MMT) services (Orozco, 2003) including Mpesa, Orange Money, and Airtel money. Another ICT based innovation is the agent banking model which is a partnership between a bank and nonbank outlets including grocery stores, pharmacies, seed and fertilizer retailers, and gas stations, kiosks among others to offer financial services on behalf of the bank to its customers. Through agent banking, financial institutions are able to achieve business differentiation, increase customer base and market share, increase outreach with low cost even in regions with low volume of transactions in addition to having additional revenues (Cohen, 2002). Clients benefit from lower transaction cost, convenience in terms of closer services, longer operation hours, shorter queues, and more accessibility especially for illiterates who feel intimidated in banking halls. These emerging banking models have been argued to reach a higher proportion of the rural population who were previously unreached.
In presence of such dynamics in financial provision modes, farmers would be faced with a decision to choose among the available alternative. While there could be many factors that drive farmers into using different financial services provision options, Tambi et al. (1999) acknowledged that differences in choice and use are due to differences in utility levels exhibited by the farmers. The major concerns for a rural agricultural household may be convenience, reliability, cost, flexibility and simplicity of use of a given specific financial service provision option while other factors may be due to attributes embedded in the characteristics of those alternatives. There exists a paucity of knowledge on the factors that influence farmers' decision to use a specific financial provision option. The objectives of this study are to:

(i) Characterize users of different financial services provision options
(ii) Analyze the effect of choice of financial services provision option of farm profitability
(iii) Examine the factors affecting the choice of a financial services provision option.

Survey design and model specification

The study was carried out in Nyandarua County where three administrative Sub Counties including Olkalau, Ol-Joro-orok, and Ndaragwa were covered during the study. A multistage sampling procedure was followed. The first stage involved purposive selection of Nyandarua County which was ranked among the counties with low financial inclusion according to FinAccess survey (2009). The second stage involved random selection of three Sub Counties while in the third stage involved random selection of two locations from each Sub County. Fourth stage involved random selection of two sub-locations in each location while in fifth stage two villages from each sub-location were selected. In the final stage, sixteen farmers from each village were randomly selected for interview. A list of all farming households in the sampled village was generated with the help of village heads. Due to good rainfall, agriculture is the most important sector in Nyandarua County with over 85% of the population depending directly or indirectly on agriculture. On sectoral contribution to household income, agriculture contributes 70 percent , rural self employment 5 percent, wage employment accounts for 10 percent while urban self employment account for 3 percent of the household income. This region has only 7 bank branches in total while the physical infrastructure is a big challenge where only 77 kilometres of the total 1306.7 kilometres of road network being tarmaced.

Both descriptive and econometric model were used in the data analysis. A budgetary approach technique was used to estimate household gross margin as a proxy for profit by estimating the farm cost of

production and revenues. Due to difficulty associated to estimation of fixed cost, only total variable costs were estimated and hence the use of gross margin as a proxy for profit. The equation below was used to estimate gross margin;

$$Profit = Total\ Revenue(TR) - Total\ Variable\ Cost(TVC)$$

Where $TR = P * Q$ given that TR is the total farm revenue per acre of ith household in Kshs, TVC is the total variable cost per acre in Ksh, this include the cost of fertilizer, pesticide, labour cost, cost of planting materials pesticides and herbicides, P is the price of a unit of output while Q is the output per acre in kg/acre. The analysis of variance (ANOVA) was used to test the hypothesis that the gross margins for farmers using different financial services provision options were different. This involved computation of the F ratio given by;

$$F = \frac{Variance\ between\ the\ sample\ means}{Variance\ within\ the\ samples}$$

Multinomial logit (MNL) was used to analyze the factors that influence the use of agent banking services by small scale farmers in Nyandarua County. The model was preferred since it permits the analysis of decision across more than two categories in the dependent variable therefore making it possible to determine choice probabilities of different FSPOs. In addition, MNL is simpler to compute compared to multinomial probit which poses a challenge in computing multivariate normal probabilities for any dimensionality above 2 (Greene, 2002).

The individual is assumed to have preferences defined over a set of alternatives. The choice variable has more than two unranked options. A farmer chooses to use agent banking, mobile banking, conventional banking, microfinance or ROSCAs. For each sample, the data for each farmer consists of the following; a) FSMP: 0 = agent banking, 1 = mobile banking, 2 = conventional banking, 3 = microfinance and 4 = ROSCAs b) regressors: education, gender, marital status, land size, social capital among other factors.

Mathematically the model is formulated as follows

$$\text{Prob}(Y_i = j|x_i) = \frac{e^{\beta_j' x_i}}{1 + \sum_{k=1}^{J} e^{-\beta_k' x_i}} for\ j = 0, 2 \dots, J, \beta_0 = 0$$

The above equation provides a set of probabilities for J+1 choices for a decision maker with characteristics x_i while Y denotes FSPOs alternatives or choices. x is a 1* k vector with first element unity and β_j is a k * 1 vector with j = 1,….., J.

Prob ($Y_i = j|x_i$) is determined once the probabilities for all j = 1, 2, …., J are known and the probability must sum up to unity. For the parameter estimates to be consistent and unbiased, it requires that the probability of using one FSPO by a given farmer be independent of the probability of choosing another FSPO. This means p_j / p_k should be independent of the remaining probability which is referred to as independence from irrelevant alternatives (IIA).
The parameter estimates of the MNL model only provide the direction of the effect of the independent variables on the dependent (choice) variable; thus the estimates represent neither the actual magnitude of change nor the probabilities. Marginal effects are used to measure the expected change in probability of a particular FSPO being chosen with respect to a unit change in an independent variable from the mean (Greene, 2002). The following empirical model was used;

$$FPM\ choice = \beta_0 + \beta_1 Gender + \beta_2 Age + \beta_3 Age + \beta_4 Education + \beta_5 HhSize + \beta_6 GroupYrs + \beta_7 NoneMember + \beta_8 OfficcialMember + \beta_9 ExtensionContact + \beta_{10} Land + \beta_{11} lnIncome + \beta_{12} lnWealth + \beta_{13} AgentDistance + \beta_{14} BankTransport + \varepsilon_i$$

Where FPM choice is the financial provision used by the farmer (agency banking, convectional banking, or mobile-phone based money transfer services, MMT), while $\beta_1 \ldots\ldots \beta_{13}$ are coefficients associated with each explanatory variable and the ε_i is the error term. Several factors were hypothesized to influence the farmers' choice of financial provision mode. The description of these factors is presented in Table 1.

Table 1: Variables used for quantitative analysis of determinants of choice of a financial services provision option by the farmer

Variable	Description	Expected sign
Dependent variable		
FSPO Choice	Financial service provision option (j=1, 2, 3)	
Explanatory variables		
Gender	Sex of the household head (1= male, 0 = female)	+
Age	Age of the household head (continuous)	±
Education	Household head years of formal education (continuous)	+
HhSize	Size of the household (continuous)	±
GroupYrs	Years in a group (continuous)	±
NoneMember	1 = none group member, 0 otherwise	±
GroupOfficial	1 = official in the group, 0 otherwise	±
ExtensionContact	No. of extension contacts access by the farmer, (continuous)	+
Land	Size of the cultivated farm in the 2013 cropping Year in acres	+
LnIncome	Natural log of the household income	-
Lnwealth	Natural log of the household wealth	-
AgentDistance	Distance in km to the nearest bank agent outlet	-
BankTransport	Money spent as fare to access bank branch in Kshs	+

Results and discussion

Use of different financial services provision modes: Results in table 2 reveals that overall, 40 percent of the respondents preferred agent banking, 41 percent preferred mobile phone-based money transfer services (MMT services) while 14 percent preferred visiting banking halls while some few farmers preferred microfinance, ROSCAs and others managed their finances without using any financial service provision option. Similar results were observed in a study on rural financial services in Kenya where it was found out that MFIs mostly concentrate on non-agricultural ventures in the rural areas only loaning a mere 0.6 percent of rural agricultural households (Kibaara, 2005). Previous studies have argued that financial services from microfinance seems to be inadequate for agricultural entrepreneurs with seasonal production types (Llanto, 2007; Pellegrina, 2011) and this might be the reason why the outreach of most MFIs to rural areas, where the concentration of agricultural entrepreneurs is the highest, is still limited (Reyes and Lensink, 2011).

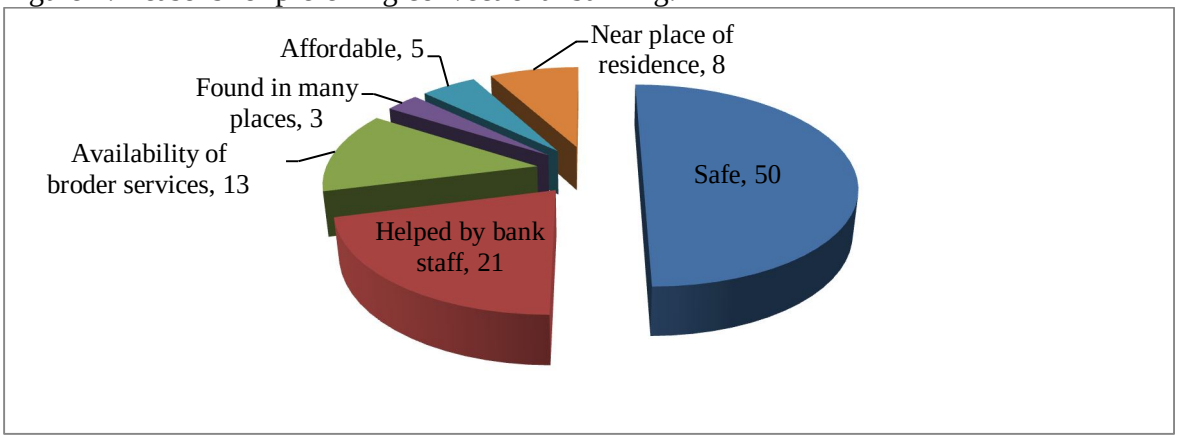
Table 2: Preferred financial service provision mode (FSPO)

Financial provision mode	No.of respondents	% response
Agent Banking	69	40
Convectional Banking	25	14
Mobile-Phone Money Transfer Services (MMT services)	70	41
Microfinance	2	1
ROSCAS	5	3
Keep money at home	2	1

Source: Authors' analysis, 2014[1]

As shown in Figure 1, security and confidentiality of the account details accounted for 49 percent of the reasons why households preferred convectional banking. Assistance from bank officers while transacting accounted for 21 percent of the reasons why households preferred convectional banking. Other reasons for preferring convectional banking included access to broader financial services, proximity, affordability and availability of a big network of physical banks in other regions of the country . According to Mpuga, (2004), informal financial institutions offer a narrow range of financial services and operate over small geographical areas and therefore to fill up the gap of absence of formal financial institutions in the rural areas.

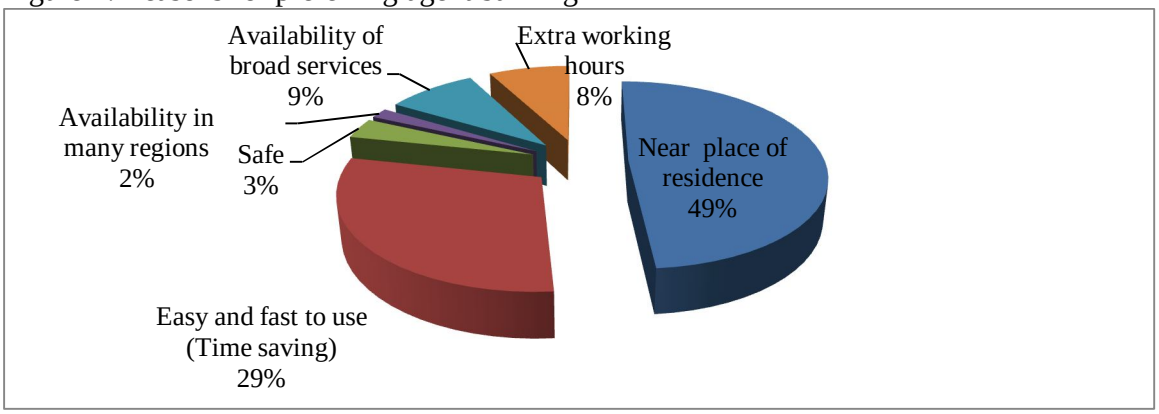
Figure 1: Reasons for preferring convectional banking.



The preference for agent banking was found to be influenced by proximity, ease of use, availability of broader services, safety, extended operating hours of agent outlets and a well spread out bank agent outlets in many regions (figure 2). As shown, proximity to the bank agent outlets constituted 49 percent of the reasons for preference; making it the most important factor. Proximity to a service reduces on transport cost and minimizes opportunity cost for time that could have been spent accessing that service elsewhere. Another 29 percent of famers preferred agent banking because it is easy and fast to use while another 9 percent said they can access broader financial services at a bank agent outlet. Extended working hours was another key reason cited by about 8 percent of households which preferred agent banking.

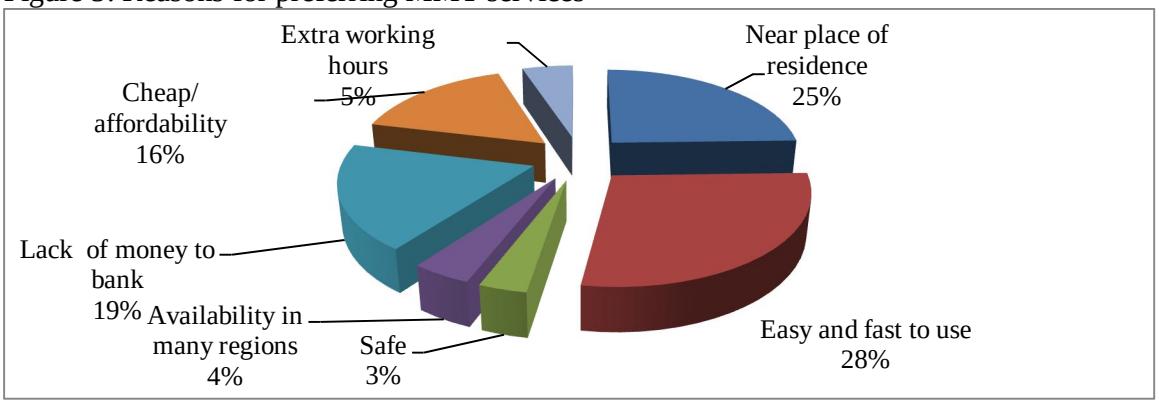
[1] For all the tables and figures, the source is the authors' analysis unless stated otherwise.

Figure 2: Reasons for preferring agent banking



The above observations are in line with other studies which found out that low transaction cost, services closer to the residence and longer opening hours are the main reasons why entreprenuers in Kisii Township preferred agent banking services to other forms of financial provison modes (Nyabogo et al., 2012). According to Kibaara (2005), proximity to formal financial services saves local communities money they could have used for transport, travelling time in addition to offering convenience. As shown in figure 3, ease of use accounted for 28 percent of the reasons why farmers prefered MMT services. Proximity accounted for 25 percent of the reasons while low economic status accounted for 19 percent of the reasons for preferring MMT services. Cost of using MMT services accounted for 16 percent of the reasons of preferring MMT services. Additional working hours, availability in many regions and safety of transactions were other reasons behind household preferrence for MMT services. According to Ayuma (2013), low transaction cost, proximity of financial services, longevity of agent outlet operating hours and brevity of time when transacting influences adoption of a specific financial services provision mode.

Figure 5: Reasons for preferring MMT services



An analysis of the effect of choice of financial services provision option of farm profitability To estimate total revenues, a summation of all crops harvested were valued at the market prices that prevailled. Total cost included the cost of seeds, fertilizer, herbicides, pesticides, irrigation, machine hire and labour. As shown in table 3, agent bank users earned the highest crop enterprise gross margin per acre, Kshs 19,126, while convectional bank and MMT services users had Kshs 10,495 and Kshs 9,538 respectively. Total capital included the cost of purchased seeds, fertilizer, herbicides, pesticides, irrigation and machinery hire.

Table 3: Crop enterprise gross margin for households using different financial services provision options

Variable	Agent banking		Convectional banking;		MMT services	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Total cultivated land	3.51	3.44	4.01	2.86	2.71	13.54
Total annual crop earnings (kshs)	99,199	95,419	88,168	51,507	56,438	36,136
Total Capital(kshs)	25,660	31,983	29,733	23,014	20,142	20,668
Total cost of labour(kshs)	20,591	18,086	20,846	11,601	19,438	13,339
Gross margin(kshs)	52,947	65,584	37,588	43,252	16,858	38,759
Gross margin per acre(kshs)	16,191	27,245	8,802	14,370	6,221	17,480
Gross margin per unit labor(kshs)	514	890	361	583	173	269

An analysis of variance (ANOVA) was carried out to test whether there was any significant difference in the gross margins per acre for the three groups of households and the critical value of F was 3.06 while F calculated was 6.95. The null hypothesis that crop enterprise gross profits are equal for all the three groups of households was rejected. This implies that a household choice of a financial services provision option has an effect on the farm profitability. Availability of appropriately-designed financial services is therefore an essential component in creation of an enabling environment for rural economic growth and poverty reduction. Access to working capital or investment credit offered by rural finance institutions can substantially accelerate the adoption of modern agricultural technologies and production patterns which will improve the ability of the rural households in providing for their both subsistence needs and market participation if they produce in surplus.

The results show that households using agent banking recorded higher gross margin in crops enterprise compared to those using convectional banking or MMT services. In comparing per acre annual expenditure on yield enhancing inputs including cost of seeds, fertilizer, pesticides and insecticide, it was highest among agent bank users amounting to Kshs 5,585 while for conventional and MMT users was Kshs 4,508 and Kshs 3,390 respectively. It is likely that agent bank model of financial services provision offers well-designed platform that link rural households with formal financial services. Through savings hence capital accumulation households overcome liquidity constraints and their investment in yield enhancing inputs is likely to be higher. It can be argued that expansion of formal financial services to the rural areas has a potential to enhance household profitability.

An analysis of determinants of choice of a financial services provision option: Table 5 presents a summary of the marginal effects from the multinomial logit model where seven variables were found to be significant. These included sex and age of the household head, number of years in a group, number of contact with extension services, natural log of household income, distance to the nearest bank agent outlet in kilometers, and transport cost incurred in accessing the nearest convectional bank.

Table 4: Multinomial logit regression results for factors influencing a households' choice of financial service provision option

	Agent banking			**MMT**		
Variables	Coefficient	Std error	P>z	Coefficient	Std error	P>z
Gender	1.071	0.834	0.199	-0.028	0.793	0.972
Age	-0.196	0.154	0.202	-0.242	0.141	0.086*
Age^2	0.001	0.001	0.584	0.002	0.001	0.158
Education	0.028	0.089	0.757	-0.044	0.083	0.601
HHSize	0.152	0.157	0.330	-0.022	0.150	0.885
GroupYrs	0.083	0.032	0.009***	0.021	0.031	0.490
NoneMember	0.974	0.966	0.313	0.471	0.907	0.604
OfficialMember	-0.219	0.883	0.804	0.593	0.867	0.494
ExtensionContontact	-0.076	0.046	0.100	-0.132	0.050	0.008***
Land	0.459	0.289	0.113	0.349	0.293	0.234
LnIncome	-1.479	0.367	0.000***	-1.559	0.361	0.000
Lnwealth	0.014	0.055	0.799	0.028	0.039	0.479
Distance	0.244	0.173	0.158	0.406	0.168	0.016**
Transport	0.021	0.006	0.000***	0.005	0.005	0.333
Constant	18.52	7.113	0.009***	23.68	7.023	0.001***

R^2 = 0.30, Log likelihood = -119.76, Prob > χ^2 = 0. Conventional banking was the base case outcome

The observed positive relationship between gender of the household head and choice of agent banking implies that male headed households were more likely to prefer agent banking to convectional banking than female headed households. Male headed households had a 22.6 percent probability of preferring agent banking to convectional banking. According to Fletschner, Anderson and Cullen, (2010), women tend to be more risk averse as compared to men. Producers who are risk averse are less likely to adopt new technologies and they tend to opt for informal financial services since they shun risky new projects that expose them to high risk (Fletschner, et al., 2009; Boucher, et al., 2008; Liu, 2008). Female headed households in Indonesia exhibited low financial literacy level and consequently a lesser propensity to use a new formal financial service compared to male headed households (Shawn et al., 2010). In addition, male headed households have a higher access to resources and information making them more likely to adopt new technologies (Odendo et al., 2009).

The effect of household head age was significant for the preference of agent banking and MMT services at 5 and 1 percent respectively. An increase in the age of the household head by one year reduced the probability of preferring agent banking over convectional banking by 1.4 percent while it increased the probability of preferring MMT services by 0.8 percent. This is probably because younger farmers are more risk lovers as compared to old farmers who are risk averse and therefore young farmers have a higher likelihood of adopting a new technology faster as compared to older farmers. Whereas another argument could be that older farmer have a higher likelihood of adopting a new technology than young farmers due to their experience while other studies have suggested that direction of effect on age is location and technology specific (Kebede et al., 1990; Polson and Spencer, 1991).

The number of years of active involvement in groups positively influenced preference for agent banking but negatively influenced preference for MMT services relative to conventional banking. A unit increase in involvement in group activities increased the probability of preferring agent banking by 1.4 percent but reduced probability of preferring MMT services by 1 percent. Involvement in group activities exposes farmers to a wide range of ideas helping them to access information that may positively change their attitude towards a certain innovation (Nkamleu, 2007).

An inverse relationship was also observed between the number of times the farmer have accessed extension services and the preference of MMT services. An extra contact with extension services reduced the probability of preferring MMT services by 1.7 percent. It is argued that information access positively contributes to awareness and subsequent adoption of new technologies (Adesina et al., 2000; Abdulai and Huffman, 2005; Menale et al., 2009). Though we could argue that MMT services is a new technology in financial provision as compared to conventional banking, there are underlying technology specific factors that could lead to the inverse relationship. It is likely that information from extension officers did not add any value to the choice of financial provision option by farmers. It is argued that farmers' assessment on the relevance of information from extension officers matters most than physical contact with extension (Zinnah et al., 1993).

Households with higher income levels are more likely to prefer using convectional banking services as opposed to adopting new MMT services. An increase in household income by 10 percent reduced the probability of preferring MMT services to convectional banking by 8.3 percent. This was unexpected and contrary to other studies who found that household income positively influences adoption of ICT in agriculture (Okello et al., 2012). A possible explanation is that individuals with higher levels of income are more selective and demand more personalised attention which are more likely to be provided in a convectional bank outlets than in MMT agent outlets. It could also be due to the fact that farmers with higher income levels participate more in the market while wealthier households have a tendency to travel to distant markets to seek for market information (Okello et al., 2012). Maybe, such households are likely to opt for convectional bank even as they seek market information since convectional banks are mainly found in larger market centres.

Farmers who are far from a bank agent outlet were more likely to prefer using MMT services as compared to convectional bank. This is implied by the positive relationship between distance to the nearest bank agent outlet and the preference for MMT services. A one kilometre increase in distance to the nearest bank agent outlet increases the probability of preferring MMT services by 2.5 percent. Proximity and convenience are key determinants of choice of formal financial services (Frimpong, 1999; Kennington et al., 1996; Seshaiah and Narender 2007; Dabone et al., 2013). These findings suggest that lack of access to formal financial services resulting from distance to the nearest bank agent outlet is a key factor in explaining exclusion of farmers in rural areas from formal financial services.

A significant positive relationship was found between the cost of accessing the nearest convectional bank and the choice of agent banking. This implies that the more the money a farmer expends to access a banking hall, the higher the probability of choosing agent banking over convectional banking. An increase in transport cost by Kshs 10 increased the probability of preferring agent banking to convectional banking by 4 percent. This is in agreement with Okello, Kirui, Njiraini and Gitonga (2012) where they found out that a unit increase in transport cost to the market increased the likelihood of using modern ICT tools by 0.2 percent. On the other hand, the relationship was inverse and significant for farmers preferring MMT services. An increase in transport cost to the nearest convectional bank by Kshs 10, reduces the probability of preferring MMT services by 0.2 percent. It is argued that there are some technology specific factors that influence adoption of a particular technology (Kebede et al., 1990; Polson and Spencer, 1991). This could include farmer's attitude towards a certain technology, transaction cost involved in accessing a technology, ease of using a technology and perceived relevance. Alternatively, there could be a high linkage between MMT services and convectional banking making the movement of effect the same. There are some cases where bank loan repayment can be made through MMT services, convectional banks act like MMT agent outlets, and situations where cash can be transferred from bank account to an MMT account and vice versa. If this is the situation, movement of the effect on one will result to a similar effect on the other.

Summary and conclusion

Kenyan agriculture has undergone some fundamental changes which have profoundly affected agricultural financial services. Initially, most financiers used to shy away from serving the agricultural sector because of the covariant risks related to rain-fed agriculture. Innovations in financial services provision alternatives have a significant potential to improve rural household access and use of financial services. Given this background, we undertake a comparative analysis on financial provision models of agricultural finance that have expanded the agricultural finance frontier to the smallholder farmers. With growth in ICT, formal banks have increased their outreach through agent banking. Despite this innovation in provision of formal financial services, it not understood who the users of these services are, whether rural agricultural households are using this service, and the impact it has on their agricultural productivity.

Households that preferred using agent banking reported the highest crops enterprise annual gross margin per acre of Kshs 15, 769 as compared to conventional bank users and MMT services users with annual per acre gross margins of Kshs 9,274 and Kshs 6,771 respectively. Per acre annual farm inputs expenditure including expenditure on seeds, fertilizer, pesticides and insecticide, was highest among agent bank users which amounted to Kshs 5,585 while for conventional and MMT users was Kshs 4,508 and Kshs 3,390 respectively. These results suggest that agent bank model has the potential to link rural households with formal financial services may be through savings hence capital accumulation therefore enabling such households overcome liquidity constraints. Consequently, such households have a higher likelihood to invest in yield enhancing inputs. In order to achieve higher agricultural profits, rural agricultural households therefore need more than money transfer services. Policy should therefore encourage financial institutions to innovate and devise delivery models that reduce transaction costs in order to meet the demand for financial services in the rural and remote areas. Policy should also enable other financial services providers like MFIs, SACCOs and cooperatives adopt agency delivery model to improve their outreach and lower transaction cost.

Based on the multinomial logit model results; household head gender was significant and positively related to choice of agent banking. Male headed households had a 24% likelihood of using agent banking over conventional banking as compared to female headed households. This affirms the notion that women are more risk averse hence more unlikely to adopt a new technology like agent banking. There is need to foster policy that enhances rural financial literacy biased towards women. Gender, participation in group activities and cost of accessing financial services were all positively related to choice of agent banking over other financial services provision options. However, income was positively related to use of conventional banking as opposed to MMT and agent banking. These results confirms the notion that high income earners and more wealthy individuals demand more specialized and personalized financial services that are mostly offered at conventional banks. The negative relationship between choice of MMT and cost of accessing financial services appears to support the claim that money transfer services are complements to banking services rather than substitutes.

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