

Effect of transaction costs on choice of mango marketing channel: the case of small scale farmers in Makueni County, Kenya.

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Abstract: Makueni County in Kenya is one of the leading producers of mango fruits. The marketing of fruits is liberalized giving rise to multiple channels. Given the freedom to select a channel, it has not been evaluated what influenced the rural farmers to select a particular channel in the face of different sets of transaction costs. This study therefore, aimed at determining effect of transaction cost on choice of mango marketing channel. A simple random sampling was used to select 277 households where primary data was collected using semi-structured questionnaire. To analyze the data, descriptive statistic and multinomial Logit regression model were employed using STATA. The results indicated that age, education, experience, extension, gender, trust level, search in market price, information cost, transport cost, negotiation time, group membership and market distance significantly influenced the choice of marketing channel. Price information informs the farmer on prevailing pricing condition and lack of price knowledge is a major source of transaction cost. The study recommends that the stakeholders should re-evaluate the existing dissemination pathway and promote farmer awareness of the new and existing technologies. The government should invest in rural infrastructure in order to reduce high transport cost incurred by the farmer due to bad roads accessed when transporting mango to the market. Policy implementers should promote gender awareness by empowering more women to engage in mango marketing. In developing market linkages, policies in support of promoting formation of mango marketing group should be enhanced in order to promote knowledge dissemination, improve farmers bargaining power, reduce the transaction cost and increase the income of the farmers.

Keywords: Market choice, multinomial Logit, small scale farmers, transaction cost

I. Introduction

Access to new and better-paying markets for agricultural products is vital in enhancing and diversifying the livelihoods of poor subsistence or semi-subsistence farmers (Barrett, 2009). Assured markets have implication on producer decision with regards to choice of input as well as on the choice of marketing channel for the output. A market exchange involves transactions costs which can be fixed or variable. These transaction costs are related to limited market produce, difficulty in enforcing contracts, reliability on middlemen, location in remote areas and inability to meet stringent food safety norms (Nkhori, 2004).

Mango is a highly perishable commodity and due to its high frequency of exchange, transaction costs will always arise among the interaction of actors in the channels. Information costs, monitoring/enforcement cost and negotiation/contract costs are three categories of transaction costs (Hobbs, 1996; Stanford et al., 1999; Adhikari and Lovett, 2006). Transaction cost approach offers another perspective to help understand the forces shaping channel structure (Klein et al., 1990). In North (2000) institutions that evolve to reduce transaction costs are crucial to the performance of economies and the role of the government is crucial in specifying property rights and enforcing contracts both of which promote specialization and reduce the costs of market exchange. Salami et al. (2010) stipulates that the underdeveloped rural roads and other key physical infrastructure in Kenya, have contributed to high transport costs for agricultural products to the market as well as off farm inputs, reducing farmers' competitiveness.

Though there exist various market channels for mango in Makueni, each with different sets of transaction costs; such costs have not been evaluated. It is, therefore, not known what influences the farmers to select a particular channel. Consequently, the need to accelerate the transformation of sub-sector to market oriented agriculture, requires not only access to input and output markets but also understanding of transaction cost incurred by the small scale farmers when marketing the produce. This study attempted to fill this gap.

II. Methods

Makueni County is located in the southern end of Eastern region of Kenya and covers an area of 8,009 km², population of 884,527 and an annual growth rate of 2.4% (KNBS, 2009). It is comprised of nine sub-counties (Makueni, Kilungu Mukaa, Kibwezi, Kathonzweni, Makindu, Mbooni East, Mbooni West, Nzaui). Makueni lies between Latitude 1° 35' and Longitude 37°10' and 38° 30' East. Temperatures range between 12 °C to 28 °C while rainfall average is 150mm-650mm. There is bimodal rainfall pattern; the long rains (March/April) and short rains (November/ December). The major crop grown is maize, which is the staple food in the

County. Other crops grown in order of importance are cow peas, beans, pigeon peas and green grams. Fruits grown are mangoes, pawpaw and watermelons. A simple random sampling was used to select 277 households from a population of small scale mango farmers in Makueni County. Primary data was collected using a semi-structured questionnaire during the months between April to May 2011.

Model specification; The Multinomial Logit (MNL) model was used to analyse the factors influencing choice of marketing channel among small scale mango farmers in Makueni County. The model was preferred because it allows the analysis of decisions across more than two categories in the dependent variable; unlike the binary probit or logit models which are limited to a maximum of two choice categories (Maddala, 1983; Woodridge, 2002). Gujarati et al. (2007) advocates that Logistic regression does not assume linear relationship between the dependent variable and independent variables, but requires that the independent variables be linearly related to the logit of the dependent variable. The model allows for the interpretation of the logit weights for the variables in the same way as in linear regression (Pundo and Fraser, 2006). In this study small scale farmers are faced with four choices on the marketing channel to use, which are: selling direct to the market, local traders, brokers and producer marketing groups. The decision was based on the option, which maximized their utility, subject to transaction costs associated with each channel.

The MNL model was expressed as follows:

$$p(y = j/x) = \frac{\exp(x\beta_j)}{1 + \sum_{h=1}^J \exp(x\beta_h)}, j = 1, 2, \dots, J \tag{1}$$

Where, y denotes a random variable taking on the values $(1, 2, \dots, J)$ for a positive integer J and x denote a set of conditioning variables. X is a $1 \times K$ vector with first element unity and β_j is a $K \times 1$ vector with $j = 2, \dots, J$. In this study, y represents the mango marketing channels and x are transaction cost characteristics of small scale mango farmers. The response probabilities $P(y = j/x)$, $j = 1, 2, \dots, J$ is therefore determined by the change in smallholder and transaction cost characteristics. However, since the probabilities must sum to unity, $P(y = j/x)$ will be determined once the probabilities for $j = 1, 2, \dots, J$ are known.

In order for the parameter estimates of the MNL model in Equation 1 to be unbiased and consistent the Independence of Irrelevant Alternatives (IIA) was assumed to hold (Deressa et al., 2008). The IIA assumption requires that the probability of using one marketing channel by a given mango farmer must be independent of the probability of choosing another channel. The model parameters are estimated by the maximum likelihood estimation (MLE). The dependent variable need not be normally distributed under the maximum likelihood estimation since the estimates remain consistent. The model for the study can thus be summarized in Eq. (2):

$$Y_{i=1,2,\dots,j} = X_i \beta_k + Z_i \alpha_k + e_{ik} \tag{2}$$

Where Y_i is a vector of the marketing choices ($j = 1$ for direct sales to the market $2 =$ local trader channel, 3 for broker channel and 4 for producer marketing groups) of i th farmer, X_i is a vector of transaction cost characteristics, Z_i are socio-economic characteristics of farmers, β_k and α_k are parameters to be estimated, and e_{ik} is the error term assumed to have a distribution with mean 0 and variance 1. The estimated coefficients give the role of transaction costs characteristics and socio-economic factors in selecting a marketing outlet. However according to Greene (2002) the coefficients of multinomial regressions only provide the direction of the effect of the independent variables on the dependent variable; thus the estimates represent neither the actual magnitude of change nor the probabilities. Instead, the marginal effects are used to measure the expected change in probability of a particular technique being chosen with respect to a unit change in an independent variable from the mean. The marginal effect was computed by differentiating the coefficients at their mean Eq. (3):

$$\frac{\partial p_j}{\partial x_k} = p_j \left(\beta_{jk} - \sum_{j=1}^{J-1} p_j \beta_{jk} \right) \tag{3}$$

The empirical specification for examining the influence of explanatory variable as described in Table 1 on choice of marketing channel is given as follows:

$$Y_{i=1,2,\dots,j} = \beta_0 + \beta_1 Age + \beta_2 Gender + \beta_3 Educ + \beta_4 Mtree + \beta_5 Exper + \beta_6 Extv + \beta_7 Trainc + \beta_8 Mktserch + \beta_9 Infor cost + \beta_{10} negtim + \beta_{11} transctim + \beta_{12} trustlv + \beta_{13} Distmkt + \beta_{14} traspt cost + \beta_{15} grpm \tag{4}$$

Table 1: Description of variables used in the multinomial Logit model

Variable code	Variable description	Unit measurement	Expected sign
Dependent variable			
Choice of marketing channel: 1= Direct sale to market 2=Local trader 3= Broker 4= Mango marketing group			
Independent variables			
Gender	HH gender	Years	+/-
Age	HH age	Years	+/-

Educ	Education level	Years	+/-
Mtrees	Mango trees	Number	+/-
Exper	Experience	Years	-
Extv	Number of extension contact accessed	Continuous	+/-
Trainc	Number of training sessions attended	Continuous	+/-
Mktserch	Market search cost	Hours	+/-
Inforcost	Information cost	KES	+/-
Negotim	Negotiation time	Hours	+/-
Trustl	Trust level	1=high	+/-
Grpm	Group membership	1=yes 0=no	+/-
Distmkt	Market distance	Kilometer	+/-
Transptcost	Transport cost	Kenya shillings	+/-

III. Results and Discussion

Socioeconomic characteristics: A comparative analysis of the mean of socio-economic variables in the different mango marketing channels showed that there exist significant differences between three variables. They are: age of the household head at 1 percent, farming experience at 10 percent and the number of extension visits at 5 percent. The other variables training, land size and number of mango trees in the farm was insignificant (Table 2). The mean age across the channels was 40 years. Household head using broker channel were oldest at 43.4 years followed by farmers selling directly at the market, local traders and marketing group had a mean age of 39.4 years, 38.1 years and 37.8 years respectively. Barret et al. (2006) noted that younger farmers participated more in the market because they are receptive to new ideas and are less risk averse as compared to older farmers.

The mean marketing experience period of mango farmers was 12.6 years. Farmers who sold to brokers had mean experience of 15.9 years, followed by direct sale to market, marketing group and local traders with 13.6, 13 and 9.4 years respectively. It appears that the more experience a farmer the more likelihood to avoid groups and sells directly to individuals. It is likely that the older and more experienced farmers know the market price and therefore less likely to be cheated because they know the market dynamics. Marketing experience not only captures the aspects relating to social networks but also links the marketing players, which accrue over time. It is such links which helps reduce transaction cost related to searching for market information, negotiating and enforcing contracts with trading partners. The mean number of extension visits across the channels was low at 1.1 visits per year. Farmers in marketing group received highest number of extension visits of 3.9 followed by farmers who sold to brokers, local traders and directly at the market had 1.2, 0.8 and 0.3 numbers of visits respectively. This indicates that members in a marketing group had higher access to extension staff compared to households selling in the other three marketing channels. The importance of access to extension service is to empower farmers with skills of improved agricultural inputs, better methods of production and market information. These findings concur with those of Zuniga-Arias (2007) and Jagwe (2011) which showed that farmers in producer groups have better access to extension services (Table 3).

Table 2: Socio economic characteristics of mango fruit producers

Variable	Marketing channel used				Overall Mean	ANOVA by channel	
	Direct sale to market	Local trader	Broker	marketing group		F/Value	Sig
Age of head(years)	39.4	38.1	43.4	37.8	40	6.4	0.000***
Experience (years)	13.6	9.4	15.9	13	12.6	22.7	0.068*
Extension visit	0.3	0.8	1.2	3.9	1.1	55.9	0.052**
Training (contact)	0.3	0.9	1.3	4	1.2	39.7	0.427
Land size (Ha)	1.7	3	2.8	2.8	2.7	14.2	0.628
Mangtrees(number)	75.3	66	56.7	59.8	64.1	2.4	0.168

Notes: *, **, * = significant at 1%, 5% and 10% level respectively**

Gender and education level of farmers: The gender and education distribution of farmers across the channels was analyzed and presented (Table 3). Results showed that 64.6% were male while the rest (35.4%) were females. The plausible explanation is that women in SSA are disadvantaged in marketing due to unequal distribution of resources as well as cultural barriers (Chikuvire et al, 2006). The findings agree with those of Cunningham et al. (2008) where men are likely to participate and sell more due to their acumen in bargaining, negotiating and enforcing contracts. The choice of channel indicates that, direct sale to market was dominated by 60 percent of women while men were prominent in the other three channels. This result conforms to the findings of Sserunkuma et al. (2010), where women were observed to participate more in direct marketing as compared to their male counterparts because of ability of women to sell in small quantities.

In terms of educational status of the household heads, the result indicates that majority (45.1%) of the farmers had attained secondary education, primary education (37.2%), tertiary education (14.8%) and no education (2.9%). When farmers' education was analyzed based on choice of marketing channels, the results in

Table 3 shows that farmers who sold to local traders 53.2 percent had secondary education, primary education (37.8%), not obtained any education (7.2%) and a few (1.8%) had tertiary education. In the broker channel, 77.8 percent had tertiary education, primary education (52.8%) and secondary education (27%). With regards to marketing group, 77.8 percent had tertiary education, primary education (14.8%) and secondary education (7.4%). This reveals that the more educated farmers chose to market their produce through direct and marketing groups' channels with less educated (and most likely older farmers) using broker marketing channels. The result conform to Marenya and Barret, 2006; Jari, 2009 findings that higher level of education gives farmers ability to interpret and respond to new information much faster than their counterparts with lower or no education (Table 3).

Table 4: Distribution of categorical variables across different marketing channels

Variable	Category	Percentages					Chi- value	Sig
		Direct sale to market	Local trader	Broker	Produce marketing group	Overall		
Gender	Female	60.0	30.6	32.6	18.5	35.4	149.7	0.036
	Male	40.0	69.4	67.4	81.5	64.6		
	Total	100.0	100.0	100.0	100.0	100.0		
Education	Non	0.0	7.2	0.0	0.0	2.9	18.0	0.024
	Primary	20.0	37.8	52.8	14.8	37.2		
	Secondary	80.0	53.2	27.0	7.4	45.1		
	Tertiary	0.0	1.8	20.2	77.8	14.8		
	Total	100.0	100.0	100.0	100.0	100.0		

Fig.1 shows the different channels used by the farmers when marketing their mangoes. Majority (40.1%) sold their mangoes to local traders, 32.1% to brokers, 18.1% to the market and 9.7% to marketing groups.

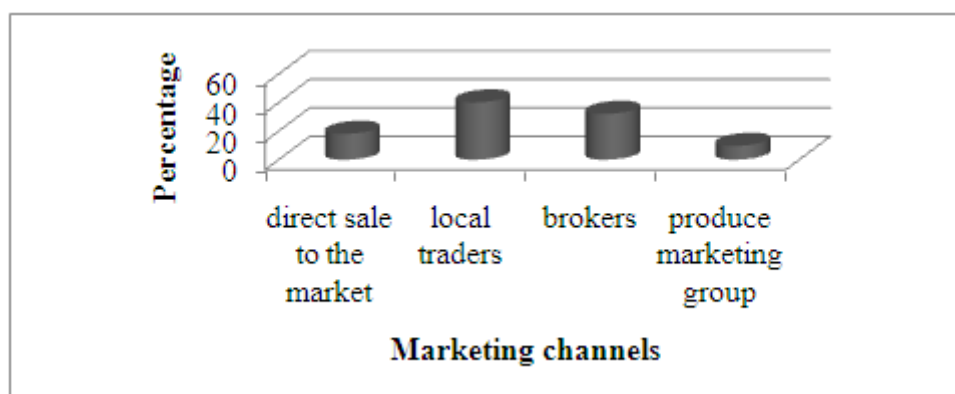


Figure 1: Marketing channels used by small scale mango farmer

Various reasons were cited for choosing a particular channel (Table 4). The reasons suggested by farmers making direct sales were that they received immediate payment (48 percent), higher prices (34 percent) and availability of buyers (18 percent). The preference of local traders by other farmers was due to different sets of reasons. About 69 percent preferred this channel because of cash payment while about 23 percent saw saving on transport cost, 4.5 percent and 4.5 percent selected because of proximity and availability of buyers respectively. Selling through brokers was selected by some farmers due to immediate payment expected (49.4 percent); saving transport cost (30.4 percent) and fetching higher prices (20.2 percent). It is evident that selling through a marketing group fetches higher prices as suggested by 70.4 percent and only 29.6 percent find the channel readily available to buy. The overall effect of these results is that mango producers would choose a channel which offers cash on delivery of produce. This is probably due to the immediate need for cash to use in other activities and lack of institutionalized mindset.

Table 4: Reasons for using a particular channel

Reasons of using a particular channel	Direct to the market	Local trader	Broker	Marketing group	Overall
Receive higher prices	34	0	20.2	70.4	19.5
Immediate payment	48	68.5	49.4	0	52
Availability of buyers	18	4.5	0	29.6	4.7
Proximity of buyers	0	4.5	0	0	5.1
No transport cost	0	22.5	30.3	0	18.8

Empirical results: Multinomial logit model results indicated that 12 out of 14 variables used were statistically significant at 1%, 5% 10% level (Table 5). The chi-square value of 121.46 showed that likelihood ratio statistic are highly significant ($p < 0.0000$) and that the model has a strong explanatory power. Pseudo-R square was 0.6038 an indication that explanatory variable explained about 60% variation in the choice of mango marketing channel.

Age of the household head significantly influenced the likelihood of choosing local traders and brokers at 1% and 10% significant level respectively. An increase in age by one year increased the probability of choosing broker by 5.71% but decreased the probability of choosing local trader by 5.71% (Table 5). An explanation behind this is that the older people prefer direct transaction like that offer by broker at farm gate; unlike, young people whose zeal to tap and venture new market make them more risk takers. The study result conforms to Zegeye et al. (2001) that young farmers might have a longer planning horizon and might be more willing to take risks. On the other hand, older farmers appear not to trust traders instead prefer brokers because they may have formed a long term relationship (Adegbola and Gardebroek, 2007; Sall, Norman, and Featherstone, 2000). Zaharieva (2001) indicated that older farmers do not trust traders on wholesale market and wholesaler and they preferred stable business relationships provided by marketing cooperatives and producer organization to riskier connections.

Education level of the household head significantly influenced the likelihood of choosing local traders and marketing group at 1% and 10% significant level respectively. One year increase in household head's education increased the probability of choosing marketing group by 48.6% but decreased the probability of choosing local trader by 22.34%. This can be explained by the fact that as an individual access more education he/she is empowered with the marketing skill and knowledge that will enable him/her to sell mangoes in lucrative market with high end returns such as marketing group that offer high prices for produced delivered and sold through the group.

Household marketing experience significantly influenced the likelihood of choosing direct marketing, local traders and brokers at 10%. An increase in farming experience by one year decreased the probability of choosing direct sale at the market and local trader by 1.09% and 3.35% respectively but increased the probability of using broker channel by 3.36%. The marketing experience has direct relationship with the farmer's level in bargaining prowess and marketing network. The long term relationship formed over the years between the farmer and the broker may have contributed to farmers preferring broker channel over selling directly at the market. This concurs with findings of Gong (2007) where market experience reduced the probability of selling cattle to spot market.

The number of extension contact had a negative influence on choice of local trader at 5% significance level. An increase in extension contact by one visit decreased the probability of choosing local trader by 25.22%. This might have been as a result of information obtained by the farmer may have suited the use of other channels and thus disadvantaged use of local trader channel. Agricultural extension agents provide different information and alternatives depending on prevailing activities which impacts farmers differently and they are expected to choose an option that suits them best (Baethgen et al., 2003). The study result is inconsistency with the findings of Makhura et al. (2001) where extension officers influenced positively participation of farmers in maize markets and Olwande et al. (2010) in vegetables, fruits and dairy markets.

Gender of the household head had a significant effect on the choice of local traders and brokers at 1% level. Male headed household had a higher probability of selling to a broker by 95.15% but had a lower probability of selling to a local trader by 96.05%. This implies that male headed households possess more marketing network due to interaction capabilities with more buyers unlike women who are in most cases restricted to household chores. This contradicts the result of Jagwe (2011) that male household had high probability of selling its produce at the market and not at the farm gate. This can be attributed to their ability to engage in negotiations and their experience in trade which is positively linked to gender.

Trust level significantly influenced the likelihood of choosing local traders and brokers at 1% and marketing group at 5% level. An increase in trust level by one increased the probability of choosing local trader and marketing group by 89.99% and 55.19% respectively. However, it decreased probability of choosing local trader by 59.39%. Farmers consider contracts made under marketing group reliable since whatever has been signed on the contract has to be enforced unlike case of local traders were mostly the contract is informal through verbal and one party can easily forfeit the terms of contract. Farmers who have high trust in buyers are likely to spend less time screening their transacting partners or following up on payments and these factors are prominent especially for marketing group where contracts are formal.

The search for market price information had significant influence on the channel choice of direct sell at the market, local trader and broker channel. An increase in search for market price information by one hour decreased the probability of using the channel of direct sell at market and broker by 11.09% and 15.70% respectively; but increased the probability of using the local traders channel by 57.12%. This implies that a farmer who sells through the local market channel had to spent a lot of hours searching for the buyers because

they are uncertain about ready market whereas selling directly at the market doesn't consume a lot of hours searching for the buyer because they are readily available in the market. On the other hand, farmers selling through brokers spent less time since the brokers are entirely in charge of responsibility of searching for the end buyer.

The cost of information significantly influenced direct sale at the market and brokers at 5% and 1% respectively. An increase in information cost by one Ksh increased the probability of selling to brokers by 78.83% but decreased the probability of selling direct to market by 76.27%. The justification behind this is that using broker channel is prohibitive in terms of information search cost because farmers use a lot of airtime while negotiating for a premium price with the broker. Whereas direct sale at the market doesn't cost the farmer much because it is the market point and the buyers and sellers converge there. However, the implication is that their bargaining powers is reduced and are prone to sell at the price offered to them at the farm gate.

The cost of a single trip to the market had a positive and significant influence on choice of local traders and brokers at 1% and marketing group at 5%. An increase in transport cost by one shilling increased the probability of choosing local traders, brokers and marketing group by 88.87%, 88.76% and 10.56% respectively. The reason for this outcome is that with increased transport cost, farmers opted to sell at the farm gate where they will not incur any transport cost and also for farmers who did not have transport equipments to facilitate easier and cheaper cost of transporting their produce to the market. Farmers who sold through the marketing group incurred lower transport cost because of economies of scale where members hired means of transport as a group, and the cost incurred in transporting the produce was spread among the members. The findings is in line with Mzyece (2010) results in that farmers who owned transportation implements were able to travel further distances in order to sell cowpeas to markets that offered higher prices than the homestead markets even if they incurred some transportation cost. Key et al. (2000); Makhura et al. (2001) and Olwande et al. (2010) also indicated that ownership of transport equipment is significantly associated with the decision to participate in the market due the reduced transaction cost associated with cost of transport. However, this is not always the case, in situation where transaction costs are extremely high, ownership of means of transport may not influence the decision to participate in banana markets (Jagwe, 2010). Increase in probability of selling to group marketing by 10.56% could be attributed to collective action in transport cost.

Table 5: Marginal effects from the multinomial logit on the choice of marketing channel

Explanatory Variables	Direct sell		Local traders		Brokers		Produce marketing group	
	dy/dx	P-value	dy/dx	P-value	dy/dx	P-value	dy/dx	P-value
Age	0.0294	0.827	-0.0571***	0.002	0.0571*	0.062	0.2212	0.742
Education (Years)	0.0766	0.750	-0.2234***	0.000	0.2227	0.103	0.4860*	0.081
Experience (Years)	-0.0109*	0.072	-0.0335*	0.073	0.0336*	0.073	0.1824	0.606
Extension (Visits)	-0.0235	0.819	-0.2522**	0.019	0.2524	0.319	0.9988	0.833
Training (Contacts)	-0.0106	0.836	-0.0676	0.345	0.0677	0.344	0.5049	0.690
Gender (1=male)	0.0904	0.689	-0.9605***	0.000	0.9515***	0.000	-0.3368	0.783
Mango Trees (Number)	0.0455	0.743	-0.0028	0.373	0.0028	0.377	-0.0465	0.446
Trust Level (1=High)	-0.0600	0.733	0.8999***	0.001	-0.5939***	0.001	0.5519**	0.018
Market Price Search (Hours)	-0.1109**	0.046	0.5712***	0.000	-0.1570***	0.000	0.7022	0.703
Information Cost (KES)	-0.7627**	0.020	-0.0255	0.918	0.7883***	0.009	0.2484	0.775
Transport cost (KES)	-0.0122	0.765	0.8888***	0.000	0.8876***	0.000	0.1056**	0.009
Negotiation time (Hours)	-0.0228*	0.078	0.4307**	0.017	0.4405**	0.017	-0.4136	0.680
Group Membership (1=Member)	-0.0803	0.778	0.3013	0.545	-0.9742***	0.000	0.1051**	0.047
Market distance (KM)	-0.0967**	0.044	-0.4058	0.374	0.4048	0.376	0.4655***	0.002

Notes: ***, **, * = significant at 1%, 5% and 10% level respectively
 Number of observations =277; Wald chi2 (72) = 357.41; Prob > Chi² = 0.0000; Pseudo R² = 0.6038; Log pseudo likelihood = -121.46.

Negotiation time significantly influenced the likelihood of choosing direct sale to market at 10%, local trader and brokers at 5% level. An increase in a negotiation time by one hour increased the probability of using the local traders and brokers channel by 43.07% and 44.05% respectively; while decreases the probability of selling directly at the market by 2.28%. This means that selling directly at the market doesn't involve bargaining

process because prices are control by market forces whereas those who operate under broker and local trader channel are force to negotiate to arrive at agreed price. The result concurs with the findings of Gong (2007) who found the bargaining power to negatively influence the probability of selling cattle's through spot markets. Group membership had a positive influence on choice of marketing group at 5% and negative influence on selling to brokers at 1% significance level. Belonging to group memberships had a higher chance of using marketing group by 10.51%; but had a lower chance of using broker channel 97.42%. In essence group membership provide platform of collective marketing and a ready market which reduces the farmers' costs associated with searching for potential buyers. For this reason, the farmers opt to sell to marketing group in order to incur zero or minimal transaction cost as a result of economies of scale. The findings is line with Njuki et al. (2009) who stated that besides reducing transaction costs; collective marketing empowers farmers to negotiate for better trade terms and prices. Jagwe (2011) stated that the membership in groups exposes farmers to a wide range of ideas and thus gives farmers the opportunity to have better access to information through training and extension services.

Market distance from the farmer's homestead influenced negatively the choice of direct sale at the market at 5% significance level and positively choice of produce market group at 1%. An increase in market distance by one kilometre increased the probability of using marketing group by 46.55% and decreased the probability of using direct sale at market by 9.67%. This implies that as the distance to market increases the farmers opt to choose the channel that minimise transport costs for this reason the farmers select a channel that has economies of scale such as group marketing. On other hand, farmers disregard the channel that leads to high transport cost like such as direct sale at market. The finding is in line with argument by Jari and Fraser (2009), who stated that the farmers who participate in group have ability to reach a distance market because they are able to share information and broaden social capital within their groups. The reason could be as distance increases, the cost of transporting mango to the market increased and therefore with increased marketing cost it hindered farmers from selling to the market which conforms to the findings of Nkhori, (2004); Ogunleye et al. (2007) and Chalwe, (2011). The study results concurs also with observation made by Fafchamps et al. (2005) and Andersen et al. (2002) that the shorter distances imply more knowledge about markets and guarantees easier access to information with low travelling and transportation costs involved in enforcing and monitoring the purchase and sales contracts. However, Jagwe (2011) contradicts this results as he observed that the more remotely located a household was, the greater the probability that the household would travel to the market to sell their commodities. The plausible explanation was that the urgent need for cash revenue outweighed the opportunity cost of time especially for the remotely placed households such that to gain the revenue meant they were willing to travel long distances. An increase in farm distance by one kilometre increased the probability of selling to marketing group by 46.55% and the reason would be farmers opt to sell to other market alternatives such as group marketing where there is a minimal transport cost because the cost is spread across the members.

IV. Conclusion

The use of local trader marketing channel emerged as the predominant choice among the small scale mango farmers. The results from the model indicate that most of the variables used in the model had significant effects on the marketing channel used by small scale mango farmers. This include; age, education, experience, extension, gender, trust level, search in market price, information cost, transport cost, negotiation time, group membership and market distance significantly influenced the choice of marketing channel. However the most outstanding significant variables were education, gender, search in market price and transport cost.

V. Policy recommendations

Farmer transaction cost has been identified as very critical in shaping farmer decision to use a particular channel in marketing their mangoes. Price information informs the farmer on prevailing pricing condition and lack of price knowledge is a major source of transaction cost. The stakeholders therefore, need to re-evaluate the existing dissemination pathway, and promote farmer awareness of the existing technologies such as SMS services, radio, television and internet where they can access price information and formal markets for mangoes. This will help reduce cost incurred in searching for market prices. Moreover, exploitation due to information asymmetry between the farmers and buyers will be minimized during the transaction. In promoting farmer extension service delivery, awareness should be made on the readily accessible practical extension services aired in various television programmes while others are broadcasted on the radio with advantage of listening to local vernacular station. The government should invest in rural infrastructure to ease conveyance of mango produces from area of production to marketing point. This will help reduce the high transport cost incurred by the farmer due to bad roads accessed when transporting mango to the market. Affirmative action should also be considered for gender awareness by empowering more women to engage in mango marketing. Policy implementers should thus focus on women involvement in the mango farming enterprise. Furthermore, in developing market linkages, the stakeholders should promote formation of mango marketing group in order to

reduce the transaction cost, increase income and improve bargaining position of mango farmers as well as promote knowledge dissemination among the farmers.

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