Journal of Marketing and Consumer Research
ISSN 2422-8451 An International Peer-reviewed Journal
Vol.21, 2016

Determinants of Market Participation among Kocho Producers in Hadiya Zone, Southern Region, Ethiopia

Nuri Lefebo[1*] Jema Haji[1] Endrias Getu[2] Lemma Zemmedu[1]
1. School of Agricultural Economics and Agribusiness, Haramaya University, Ethiopia
2. Agricultural Resource Economics and Management, Hawassa University, Ethiopia

Abstract
Hadiya zone in southern region of Ethiopia has been known for enset farming. kocho is the major product of enset. In the study area, kocho have been perceived to have high market value, resulting in tradeoffs with staple food. Despite kocho market value, its market participation has not been studied and quantified. Therefore, this paper aims to determine the factors influencing market participation and marketed surplus of kocho. Data was obtained from a sample of 398 households selected using multistage sampling techniques. The data was analyzed using the descriptive statistics and Heckman two-stage model. The results showed that age, sex, access to market information, availability of labour, non/off farm income, farming experience, perception of kocho price, quantity of kocho and livestock holding had significantly influenced market participation decision and extent of marketed surplus. Based on the findings, the study suggest that offering farmers a fair price, encouraging the use of labour saving technology, availing market information services, building farmers' experience, encouraging farmer's livestock holding besides farming, and paying attention to female households are needed to increase kocho marketed surplus.
Keywords: Heckman two-stage model, market participation, small-scale *kocho* farmers

1. Introduction

Agriculture has been the core driver of economic growth and long-term food security in Ethiopia. The Government committed 15 to 17 percent of expenditures to the sector; it covers 43 percent of gross domestic product (GDP), over 90 percent of export value and directly supports 80 percent of the population's livelihoods (MoFED, 2011). It is also the sector that is given an overriding focus in the government's plan for growth of the economy as a whole.

The main crops produced in Southern Ethiopia include *enset*, cereals, pulses, oilseeds, vegetables, root crops, fruit crops, chat, coffee, hops, and sugarcane. Of these crops, *enset* crop is used as a staple and co-staple food and represent a potential pathway out of poverty for many smallholders in Southern and South Western Ethiopia (Elias, 1998; George, 2004). A mixture of scraped leaf and pulverized corms, after fermentation in a pit, results in production of *kocho. Kocho* is the main product of *enset* crop consumed after making a pancake-like food. More than 20 million people concentrated in the highlands of southern Ethiopia depend upon *kocho* for human food and sell.

Among the rural areas of the country, Hadiya zone is one of the major areas for *kocho* production, processing, marketing and consumption. *kocho* in hadiya zone is a major food in most communities and increasingly play a major role in improving farmers livelihoods by providing a source of income and valuable source of employment especially for small holder farmers (Tsedale, 2009). Recognition of the potential of markets to unlock economic growth and agricultural development gave rise to market-led rural development paradigm during the 1991s (Readon and Timmer, 2007). In Sub-Saharan African countries like Ethiopia, the government previously used to play a role in assisting farmers with marketing of agricultural produce. However, Limited access to market facilities, less exposure for market information, infrastructural problem, inadequate support services and problem in transportation services are some the problems resulting in low participation of smallholder farmers in selling *kocho* products. More importantly marketed supply of *kocho* in the study areas is subjected to seasonal variation where surplus supply at the harvest time is the main feature. Therefore, understanding the behaviour of Market Participation of *kocho* and the variables affecting it can be of great importance in the development of sound policies with respect to agricultural marketing and prices, the chain coordination and overall rural and national development objectives of the country. Hence, it was important to analyse determinants of Market Participation of kocho producer and point out potential factors policy should focus in the area.

2. Methodology

Description of the study area: The study was conducted in Hadiya zone of the Southern Nations, Nationalities and Peoples Regional State (SNNPR). The administrative center of Hadiya zone is Hosanna town, which is located 232km Southwest of Addis Ababa following the asphalt road that passes through Alemgena, Butagera to Arbaminch. It is one of the 14 administrative zones of the SNNPR with the population of 1,231,196 of which 49.7% are male and 50.3% are female. Out of these, 10.89% live in towns and the rest 89.11% live in rural areas

(CSA, 2007). It has a total area of 3, 46958.5 hectares. It is approximately 2000 meters above sea level and its altitude ranges from 501-3000 meters.The area is divided into three ecological zones: Kola 12.9% (lowland <1500m), Woina Dega 68.1% (mid-altitude 1500-2300m) and Dega[4] 19% (highland > 2300m). Most of the area lies within the mid altitude zone. The report from zone administration indicated that Hadiya zone has 10 *woredas* and one administrative town with a total number of 329 administrative *kebeles* of which 303 rural, 8 are urban and 18 sub urban *kebeles.*

The major crops grown in the zone are *enset*, cereals such as wheat, sorghum barely, *teff,* maize, pulses such as beans and peas, and vegetable such as potatoes, onions and cabbage among others. Generally, the climatic condition is conducive for *enset* crop production which is the main source of *kocho* product.

Sampling Techniques: For this study, in order to select a representative sample a multi-stage sampling technique was implemented to select *kocho* producer *kebeles* and sample farm households. In the first stage, within Hadiya zone four major *kocho* producing and marketing *woredas* were selected in consultation with zonal agricultural office. In the second stage, from selected *woredas* 11 *kebeles* were selected randomly based on probability proportional to the population size of the selected *woredas*. In the third stage, using the household list of *enset* producing farmers, 398 sample *enset* farmers who produce *kocho* were selected randomly based on probability proportional to the population size of the selected *Kebele's.*

Sample Size Determination: It is important to have a representative data in order to be able to make proper inferences about the population of the study area. Accordingly, appropriate sample size is required to draw valid conclusion about the population. Thus, it is necessary to determine a representative sample size based on a scientific criterion. Consequently, the following formula was applied to calculate the total sample size (n) needed. Following Yemane (1967) the sample size is determined by the formula:

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Where, n = the minimum number of sample size, N =the total number of household heads in the study area, e = level of precision or the tolerable error in the sample. The level of precision is the range in which the true value of the population is estimated to be; it is expressed in percentage points (±5). Then, the minimum sample size (n) can be determined by choosing the value of e = 0.05 for the 95% level of significance. Thus, out of the 155, 200 total producing farmers in selected *kebeles*, 398 representative *enset* crop farmers was drawn using simple random sampling method and ultimately interviewed.

Data Types, Sources and Method of Collection: The data, both quantitative and qualitative type, of this study was collected from both primary and secondary sources through questionnaire, checklist, and group discussion. Structured questionnaire was used for the data collection from smallholder farmers through trained enumerators. Qualitative data about business practices and transactions and the patterns and socio-economic activities of the farmers in the study areas were gathered informally through direct observation of the study areas and informal discussions with key informants like DAs, agriculture sector offices, administrators, and ethnic leaders. On the other hand, secondary data of both qualitative and quantitative such as agricultural inputs supplied and consumed, physical characteristics, population size etc. were gathered through thorough reviewing and examination of reports as well as records of published and unpublished documents.

Method of Data Analysis: To analyze data, descriptive statistics were used together with the Heckman two-stage selection model. The main descriptive indicators that employed were means, frequencies, percentages, maximum, minimum, t-test and Chi square to investigate the relative difference between market participants and non-market participants. The Heckman two-stage selection model was used to determine the market participation and extent of participation. Heckman has developed a two-step estimation procedures model that corrects for sample selectivity bias. If two decisions are involved, such as participation and value of *enset* products sales, Heckman (1979) two-step estimation procedure is appropriate. The first stage of the Heckman model a 'participation equation', attempts to capture factors affecting market participation decision. This equation is used to construct a selectivity term known as the 'inverse Mills ratio' which is added to the second stage 'outcome' equation' that explains factors affecting Quantity marketed surplus. The inverse Mill's ratio is a variable for controlling bias due to sample selection (Heckman, 1979). The second stage involves including the Mills ratio to the Quantity marketed surplus equation and estimating the equation using Ordinary Least Square (OLS). If the coefficient of the 'selectivity' term is significant then the hypothesis that an unobserved selection process governs the participation equation is confirmed. Moreover, with the inclusion of extra term, the coefficient in the second stage 'selectivity corrected' equation is unbiased (Zaman, 2001).

Specification of the Heckman two-step procedure, which is written in terms of the probability of *kocho* Market Participation (EPMP), and Quantity Marketed Surplus (QMS) is:

The participation/the binary probit model is specified as:

$$Y_{1i} = X_{1i}\beta_{1i} + \varepsilon_i \qquad i = 1,2,\ldots, n \quad (2)$$

$$EPMP = 1 \text{ if } Y_{1i} > 0 \text{ and } EPMP = 0 \text{ if } Y_{1i} \leq 0$$

Where EPMP is *enset* products market participation; Y_{1i} is a dummy variable indicating the probability of sampled household *enset* products market participation; X_{1i} are the variables determining participation in the probit model; β_{1i} is unknown parameter to be estimated in the probit regression model; ε_i is random error term

Then the parameters can consistently be estimated by OLS over n observations reporting values for Y_{2i} by including an estimate of the inverse Mills ratios denoting λ_i as an additional regressor from the selection equation by ordinary least squares in equation (11). More precisely the observation equation is specified as:

$$Y_{2i}=X_i\beta_i+\mu_i\lambda_i+\eta_i \quad (3)$$

where Y_{2i} is the quantity of *enset* marketed surplus in the second step; X_i are the explanatory variables determining the quantity marketed surplus; β_i is unknown parameter that shows estimated in the quantity marketed surplus; μ_i is a parameter that shows the impact of participation on the quantity marketed surplus; η_i is the error term.

$$\lambda_i = \frac{f(X_1\beta_1)}{1-f(X_1\beta_1)} \quad (4)$$

$f(X\beta)$ is density function and 1-f ($X1$ $B1$) is distribution function

Before fitting important variables in the Heckman two-stage selection model it was necessary to test multicolinearity problem. As Gujarati (2003) indicates, multicollinearity refers to a situation where it becomes difficult to identify the separate effect of independent variables on the dependent variable because of the existing strong relationship among them. In other words, multicollinearity is a situation where explanatory variables are highly correlated. Multicollinearity was tested using variance inflation factor (VIF) of the variables.

Table 1: Description of Explanatory Variables and Working Hypothesis

Variables	Description	Measurment	Expected effect
Sex	Sex of the household head	1=male,0=female	+
Age	Age of the household head	Years	+
Educ	Educational status of the household head	Years	+
Hsize	Household size	Numbers	+
NonF income	Household income from non/off farm activities	Ethiopian birr	+
Sland	Size of enset landholding	Hectares	+
livestock	Total unit	Tropical Livestock unit	+
Koutp	Kocho output	Quintals	+
Kpp	Perception of kocho price	Ethiopian birr	+
DistMkt	Distance from farmer's residence to market center	Kilometers	–
DRS	Response to consumer demand	1=Yes,0=No	+
MktInfo	Access to market information	1=Yes,0=No	+
Credit	Access to credit services	1=Yes,0=No	+
Labor	Availability of labor	1=Yes,0=No	+
Extensio	Extension contacts	1=Yes,0=No	+
Transpo	Transport facilities ownership	Numbers	+

3. Results and Discussion

Kocho producers sell different amount of *kocho* in the market depending on different demographic and socioeconomic characteristics of the household. On average *kocho* producers were sold 2.18 quintals of *kocho* in 2013/14 production season.

The t-test revealed that quantity of *kocho* produced by the market participants and non-participants was found to be significantly different at less than 1% probability level. As expected, farm households with larger quantity of *kocho* produced had higher marketed surplus than with small quantity of *kocho* produced. This indicates that quantity of *kocho* produced can directly influence households' decision to participate in the *enset*

market (Table 2).

Table 2 shows that non-participant households had higher non/off-farm income level than market participating sample *enset* farm households. The t-test indicated that non/off-farm income have significant differences between *kocho* market participants and non participants at less than 1% probability level.

The t-test result indicated that, there is a significance difference between market participants and non participants in terms of the number of annual extension visits they had, distance to the nearest market center and labor availability at less than 1% probability level. *Kocho* market participants had more annual extension visits, attractive price, less distance, and are more experienced.

The Chi-square statistic is used to test the presence of a significant statistical difference between market participants and non participants in terms farmers' sex, perception of farmers towards current price of *kocho*, access to market information, availability of labor, response to market demand in *kocho* production. As indicated in Table 2, market participants had better access to market information, perceived that current price of *kocho* attractive, utilize transportation facilities and respond to market demand better than non market participants. It is important to keep in mind that female-headed households had a better market participation than male-headed households.

Perception of *kocho* price differs significantly between market participants and non market participants. Market participants experienced with attractive price than non participants. In accordance with the present results, previous studies by Sarkar and Roy (2013) and Adesiyan *et al.* (2012) found that an average price of paddy received by farmers affects marketed surplus of the crop positively. Therefore creating an environment where attractive price of *kocho* would be offered to farmers is an important policy issue for the concerned bodies so that farmers would be benefited from the sale of *kocho*.

Table 2: Socio-economic and demographic characteristics of *kocho* market participants and non participants in enset market

Characteristic (Variables)	Participants (n =252)	Non participants (n =129)	Overall (n =381)	t/ χ^2 -value
	Mean	Mean	Mean	
Farmer age (years)	46.53	47.81	46.96	1.19
Farmer's household size	6.43	6.09	6.24	-0.96
Number of annual extension visits	5.05	1.6	3.88	-14.37***
Enset landholding (ha)	0.19	0.17	0.18	-1.13
Farmer's education level (school years)	5.43	4.83	5.23	-1.56*
Kocho output(qts)	11.05	8.53	10.20	-16.79***
Price of *kocho* (attractive, %)	82	30	62	115.25***
Distance from home to nearst market (km)	3.12	6.64	4.31	13.48***
Farmer's non/off farm income (birr)	11419.70	4053.85	6547.80	18.25***
Livestock holding (TLU)	3.48	3.09	3.35	-1.98**
Sex (male,%)	85	92	87	4.16**
Availability of labor (yes, %)	94	16	67	239.76***
Ownership of transport facilities (yes, %)	84	28	65	116.61***
Access to market information (yes, %)	90	26	68	116.6***
Access to credit (yes, %)	27	20	25	-12.14
Response to demand	66	9	47	106.8***

***, ** and * represents significance at 1%, 5% and 10% probability levels, respectively.

Source: own computation of survey data, 2014

Econometric results

The heckchman sample selection model was employed to identify determinants of market participation and marketed surplus. Before running the econometric models (Heckman two-step procedure), the hypothesized predictor variables were checked for the existence of multicollinearity problem. The Breusch-Pagan / Cook-Weisberg test was also employed to detect heteroskedasticity. However, in the present study, the test result shows that heteroskedasticity was not a problem. Moreover, endogeniety test results showed that except quantity of *kocho* produced there was no endogeneity problem of all other explanatory variables. This problem can be overcome by using two stages least square (2SLS) method. The method involves two successive applications. The first stage is made by regressing the suspected endogenous variables over the pre-determined or pure exogenous variables to get their predicted values. Then the predicted values of the endogenous variables in the first stage are used to estimate the *kocho* surplus marketed equation. Farm experience variable used as instrumental variable.

Determinants of market participation (probit model result)

Results of first-stage probit model estimation of the determinants of probabilities of *kocho* market participation of the sampled households are given in Table 3. The model chi-square tests applying appropriate degrees of freedom indicate that the overall goodness of fit of the probit model is statistically significant at a probability of less than 1%. The McFadden's Pseudo R - square is calculated and the obtained values indicate that the

independent variables included in the regression explain significant proportion of the variations in the enset farmers' likelihood to participate in *kocho* market. The model has correctly predicted 90% of the observation, with significant chi-squared value of 394.92.

In the first stage, households decide whether they would be *kocho* sellers or not. The decision to participate in *kocho* market was estimated by probit maximum likelihood estimator.

Table 3. First-stage probit estimation results of the determinants of *kocho* market participation

Variables	Coefficient	Z	Marginal effect
Constant	-4.426**	-1.81	
Age	-0. 108***	-3.26	-0. 019
Sex	-0. 897**	-1.84	-0. 103
Education	-0. 002	-0.05	-0. 001
Family size	-0. 018	-0.23	0. 003
Livestock	0. 226**	2.23	0. 040
Output	0. 306***	2.99	0. 054
Perception of price	0. 811***	3.06	0. 143
Transport facilities	0. 375	0.96	0. 071
Labour	2.933***	6.76	0. 746
Market distance	-0. 040	-0.66	-0. 007
Land size	1.197	1.05	0. 212
Non/off-farm income	-0. 782***	-2.70	-0. 138
Market information	0. 765**	1.81	0. 161
Demand response	0. 088	0.23	0. 015
Credit	0. 051	0.13	0. 009
Extension	0. 068	1.01	0. 012

Number of observations= 398 Prob > chi2 = 0.0000, LR chi^2 (17) = 394.92, Pseudo R^2 = 0.81, Log likelihood = -46.41. The dependent variable *Kocho* market participation (Kmp) is a dummy variable that takes the value 1 if the farmer had participated in *kocho* market, 0 otherwise. Farm experience is an instrument for *kocho* quantity produced. ***, ** and * represents significance at 1%, 5% and 10% probability levels, respectively.

Source: Survey data (2014)

Amount of *kocho* produced: As was expected, this variable had positive relationship with household *kocho* market participation decision and it was found to be statistically significant at 1% probability level. The positive and significant relationship between the variables indicates that as the amount of *kocho* output produced increases, the probability of market participation and amount of *kocho* sold to the market also increases. The marginal effect of the variable also confirms that a one quintal increase in amount of *kocho* produced leads to the rise of the probability of *kocho* farm household kocho participation by 5.45%. This can be explained by the fact that the higher the produce the higher the farmers' motivation to sell more to generate more income. This finding tallies with that of Agete (2014) who found that in Ethiopia when farmers produce more red bean, it motivates them to sell more. The higher the output, the higher is the farmer willing to participate in the market. Moreover, the study by Chauhan and Singh (2002) also showed that, marketed surplus of paddy is positively related to the volume of production as well as with area under crop.

Livestock holding: Consistent with a *priori* expectation, livestock holding measured in tropical livestock unit (TLU) is found to be positively and significantly influence the probability of market participation decision. Livestock holding (TLU) is a proxy for wealth under Ethiopian farmers' condition and sometimes it is considered as an asset. The marginal effect shows that a unit increase in number of livestock (TLU) owned by the households will result to rise the probability of *kocho* farm household market participation by 4.00%. Livestock play a critical role in *enset* farming systems, as they provide manure for important plant crops, including *enset* crop that increase output of *kocho* products. Moreover, livestock serves as a means of transportation, renting back animals that support *kocho* market participation. However, this finding has contrasted the views held by Rehima(2006)farmers with more TLU tend to specialize in livestock production reducing the importance pepper production as means of cash generation.

Sex: Sex of the household head significantly and negatively influences *kocho* market participation. Being male-headed household decreases the probability of participating in the *kocho* market by 10.3%, all other factors held constant. This suggests that the female-headed households are more market oriented than male, hence they participate more in the market. The reason might be *kocho* production and business is gender specific in the study area. Gizachew (2005) found that in Ethiopia female-headed households had a higher tendency to participate in the dairy market than male-headed households. This is because in Ethiopia females are the ones who participate in the processing of dairy products. Onoja *et al*. (2012) reported that in Nigeria female-headed households had higher probability of fish market participation than male-headed households. The gendered nature of the fish business comes from the fact that skills and tasks training for the acquisition of knowledge is gender specific in the study area.

Perception of farmers towards current price of *kocho*: As was expected, this variable had a positive relationship with household *kocho* market participation decision and it was found to be statistically significant at 1% probability level. The positive and significant relationship between the variables indicates that as the perception of price *kocho* attractive, the probability of market participation also increases. The marginal effect of the variable also confirms that if farmer considers price of *kocho* as attractive, the probability of farm household participation would increase by 14.3%. This result in consistence with Boughton (2007) that local maize prices

had a strong positive and highly significant effect on the probability of market participation as a seller on his study on maize market participation in Mozambique.

Access to market information: Access to market information significantly and positively influences *kocho* market participation. The result shows that access to market information increases the probability of participating in the *kocho* market by 16.1%, all other factors held constant. Market information is vital instrument during marketing because it informs the farmers about marketing conditions. Farmers who have price information prior to marketing tend to sell more of their produce than those without. The finding is consistent with economic theory by Key *et al*. (2000) and Alene *et al*. (2008) who found the existence of positive relationship between the market information and the proportion of sale. Goetz (1992) also noted that better market information significantly raises the probability of market participation for potential selling households.

Availability of labor: Availability of labor affected *kocho* market participation decision positively and the effect is statistically significant at less than 1% probability level. The marginal effect also confirms that the availability of labor increases the probability of participating in the *kocho* market by 74.6%, all other factors held constant. *Kocho* production is labor intensive. A household with more number of labor produce more *kocho* and participate in market. Contarary to this study, a study by Singh and Rai (1998) revealed that marketed surplus of buffalo milk was negatively related with family size.

Non/off farm income: It influences *kocho* market participation decision significantly and negatively at less than 1% significance level. Contrary to the prior expectation, income form non/off-farm has negative relationship with the *kocho* market participation. The marginal effect of the variable also confirms that a one birr increase in non/off farm income of *kocho* producer household leads to a decrease in the probability of participation in *kocho* market by 13.8%. This may be explained by the fact that farmers who have better non/off farm income will not tend to generate cash from sell of agricultural commodities (*enset* products) rather from their non/off farm income. The finding concurs with that of Rehima (2006), who found non farm income was negative relationship with the quantity of pepper supply.

Factors influencing the extent of *kocho* marketed surplus

Heckman's second stage estimation identifies the significant factors that determine the extent of *kocho* marketed surplus by using the selection model which included the inverse Mill's ratio calculated from a maximum likelihood probit estimation of *kocho* market participation decision. The coefficient of Inverse Mills ratio (Lambda) in the Heckman two-stage estimation is significant at less than 1% probability level (Table 4). This indicates sample selection bias, existence of some unobservable farmer characteristics determining farmer's likelihood to participate in *kocho* market and thereby affecting the extent of marketed surplus. The overall goodness of fit of the model parameter estimates is assessed based on the log likelihood ratio test. The null hypothesis for the log likelihood ratio test is that all coefficients are jointly zero. The chi-square test result indicates the overall goodness of fit of the Heckman selection model as it is statistically significant at a probability of less than 1%. This shows that jointly the independent variables included in the selection model regression explain the level of participation.

Table 4. Results of the second-stage Heckman selection model

Variables	Coefficient	Standared error	Z
Constant	0. 388	0.493	0.79
Age	-0. 011**	0.006	-1.83
Sex	-0. 177***	0.079	-2.24
Education	0. 010	0.008	1.25
Family size	-0. 010	0.013	-0.76
Livestock	0. 038 **	0.017	2.26
Output produced	0. 184***	0.025	7.42
Perception of price	0.090**	0.045	2.02
Transport facilities	0. 047	0.083	0.57
Labour	0. 367***	0.145	2.54
Land size	0. 082	0.155	0.53
Non/off-farm income	0. 014	0. 033	0.45
Market information	0. 007	0.107	0.07
Demand response	0. 086	0.645	1.34
Credit	0. 024	0.066	0.36
Extension	0. 003	0.014	0.22
Mills lambda (λ)	0. 415***	0.147	2.82
Rho	0. 929		
Sigma	0. 446		
Lambda	0. 415		

Number of observation = 398, Censored observation = 129, Uncensored observation = 269 Wald chi2(16) = 90.33 (0.0000)***, R-squared = 0.78, Adj R-squared = 0.77

The dependent variable (KMS) is the amount of *kocho* marketed. Farm experience is an instrument for *kocho* quantity produced. *, ** and *** represents significance at 10%, 5% and 1% probability levels, respectively.

Source: Survey data (2014)

Age of the household head: Age was expected to affect the extent of marketed surplus positively. However, the opposite has been observed in the result. The model result depicts that age of the household head had a negative impact on *kocho* quantity sold and it was significant at 5% significance level. The negative and significant effect of age indicates that as the household head gets older may be the labour intensive nature of production and marketing of *kocho* becomes more difficult which in turn decreases marketed surplus of *kocho*. The model output predicts that increase in age in *kocho* production by one year causes the marketed surplus of *kocho* to decrease by 0.01 quintal per year.

Sex: Sex of the household head significantly and negatively affected marketed surplus of *kocho* at 1% significance level. Being male headed household has negative relationship with marketed surplus than female headed one. The result indicated that being male headed household decreases marketed surplus of *kocho* by 0.18 quintal per year. This suggests that the female-headed households are contribute more labor and time in harvesting, production, processing and sale of *kocho* than male, hence they participate more in the market. The reason might be *kocho* production and business is gender specific in the study area. Gizachew (2005) found that in Ethiopia female-headed households had a higher tendency to participate in the dairy market than male-headed households.

Livestock holding: This variable affected quantity of marketed surplus significantly and positively at 5% level. Livestock holding (TLU) is a proxy for wealth under Ethiopian farmers' condition and sometimes it is considered as an asset. The result indicated that a unit increase in number of livestock (TLU) owned by the households increases marketed surplus of kocho by 0.04 quintals per year. Livestock play a critical role in *enset* farming systems, as they provide manure for important plant crops, including *enset* crop that increase output of *kocho* products. Moreover, livestock serves as a means of transportation, renting back animals that support *kocho* market participation. Study by Makhura (2001) on maize market participation suggests that an increase in the value of livestock owned leads to an increase in maize sale.

Amount of *kocho* produced: As expected, amount of *kocho* produced has a positive effect on *kocho* quantity sold per household per year because it is statistically significant at 1% probability level. The model output predicts that the addition of one quintal produced causes the marketed surplus of *kocho* farmer household to rise by 0.18 quintal per year. This result suggests that marketed *kocho* surplus of the household in the study areas are more responsive to amount of *kocho* produced. Farmers with more *kocho* output are usually market oriented since the higher production levels enable them to sell the surplus produce. Furthermore, this result elaborates that marketed *kocho* surplus per year increases in response to the increase in amount of *kocho* produced. This result was in confirmation with the study by Abraham (2013) as production affected the amount of potato, avocado and tomato supplied to the market positively. A study by Wolday (1994) on output of food grains (wheat, teff and maize) and Rehima (2007) on pepper market also found that quantity produced has a positive effect on quantity supplied to the market.

Perception of farmers towards current price of *kocho*: Price of the *kocho* affected marketed surplus positively at less than 5% significance level. This reflects the law of supply, namely, *ceteris paribus* as the price of a good rises, the quantity supplied rises (Mas-Colell *et al*., 1995). The result indicated that if farmer considers price of *kocho* as attractive, quantity of marketed surplus in quintal would increase by 0.09 quintal per year. This result supports the study (2013) and Adesiyan *et al.* (2012) who found that average price of paddy received by farmers affected marketed surplus of the crop positively. This is related to farmers‟ decision to sell when there is high price because they need to increase their income to purchase other consumption items and production inputs. Price signals generated and transmitted to active actors along the value chain can influence production and consumption decision of the actors (Timmer, 1977). Onoja *et al*. (2012) found higher probability of fish market participation with an increase on price of fish in Nigeria. The author justified that households with higher expectation of making profits from price signals are more likely to participate in fish marketing in the study area.

Availability of labor: Availability of labor significantly and positively affected marketed surplus of *kocho* at 1% significance level. Thus, a shift from lack of labor to availability of labor for production of *kocho* would increase the extent of farmers participating in the *kocho* market by 0.37quintal, all other factors held constant. *Kocho* production is labor intensive. This indicates that a household with more number of labor produce more *kocho* and participate in market. Contarary to this study, a study by Singh and Rai (1998) revealed that marketed surplus of buffalo milk was negatively related with family size.

Lambda (λ): According to the model output, the Lambda (Inverse Mill's Ratio) or selectivity bias correction factor has a positive impact on farm household's *kocho* marketed surplus with 1% significance level. And this result suggests that there are unobserved factors that might affect both probability of *kocho* farm household market participation decision and marketed surplus. And, the positive sign of the inverse mill's ratio shows that there are unobserved factors that are positively affecting both participation decision and marketed surplus of *kocho*.

4. Conclusion and Recommendation

Different socio-demographic characteristics of both categories of farmers (market participants and non-market participants) were determined. Results of the Heckman's selection model pertaining to the determinants of probabilities of *kocho* market participation and extent of *kocho* market participation of the sampled households were influenced by different set and levels of determinant factors. To this effect, age of household head, sex of the household head, access to market information, availability of labour, non and off farm income, livestock holding, farming experience, price of *kocho* and quantity of *kocho* impacted the first binary decision of whether or not to participate in *kocho* market. On the other hand, age of household head, sex of the household head, availability of labour, livestock holding, price, quantity of *kocho* and inverse Mill's ratio (LAMBDA) impacted the second decision concerning farm households' extent of *kocho* market participation in large sales. All these factors except non/off farm income, age of household head and sex of the household head expectations of the farm.

Therefore, broad-based policies towards introducing improved enset variety, encouraging the use of labor saving technology, strengthening the existing extension package program, organizing farmer's cooperatives, promoting and empowering females, strengthening rural urban infrastructure. Farmers in the study area do not get timely market information up on which to base their marketing decision. They depend on traders and other farmer friends for price information. Therefore, there has to be an institution that can convey reliable and timely market information required by all stakeholders simultaneously. This would make the marketing system to operate efficiently and harmoniously. The availability of timely and precise market information increases producers' bargaining capacity to negotiate with buyers of their produce. In order to obtain this advantage there is a need to improve extension system which focused on market extension and linkage of farmers with markets is necessary to ensure a reliable market outlet for producers of the study area.

5. Acknowledgement

We would like to acknowledge the ministry of education for funding the study. Special thanks go to the enumerators for data collection and farmers who volunteered information. God bless them.

6. References

Abraham T. (2013). "Value chain analysis of vegetables: the case of Habro and Kombolcha Woredas in Oromia region, Ethiopia". An MSc Thesis presented to the School of Graduate Studies of Haramaya University.78p.

Abay A. (2007). "Vegetable market chain analysis: The case of Fogera Woreda in ANRS of Ethiopia". An MSc Thesis presented to the School of Graduate Studies of Haramaya University. 79p.

Agete J. (2014). An analysis of factors influencing participation of smallholder farmer in red bean marketing in Halaba Special District, Ethiopia. Msc thesis, university of Nairobi, p122.

Alene, A.D. Manyong, V.M., Omanya, G., Mignouna, H.D., Bokanga, M., and Odhiambo, G. (2008). Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya. *Food Policy,* 33:318–328.

Adesiyan, O. F. Adesiyan, A. T., and Oluitan, R. O. (2012). "Market Supply Response of Cassava Farmers in Ile-Ife, Osun State". Canadian Social Science. Vol. 8, No. 3, 2012, pp. 61-63.DOI:10.3968/j.css.1923669720120803.1125

Barrett, C. (2008). "Smallholder market participation: Concepts and evidence from eastern and southern Africa." *Food Policy,* 34, 299-317.

Boughton, D. (2007). Market participation by rural households in a low-income country: an asset-based approach applied to Mozambique. *Faith and Econonomics,* 50: 64-101.

Chauhan, V.K. and Singh, R. (2002). "Marketed surplus of paddy- A regression analysis. National level Quarterly." *Journal of Agricultural Marketing*. 45 (2).

CSA (Central Statistical Authority). (2007). Summary and statistical report of 2007 population and housing census. Federal Democratic Republic of Ethiopia population and census commission.

Elias E. (1998). Is soil fertility declining? Perspectives on environmental change in Southern Ethiopia: Managing Africa's soils. No.2, russel press, Nottingham.

Gregory J. Scott, Mark W. Rosegrant, Claudia R. (2003). Roots and Tubers for the 21st Century, Trends, Projections and Policy Options; Food, Agriculture, and the Environment discussion paper 31, p1-71; International Food and Policy Research Institute.

Gujarati, D. (2003). Basic Econometrics. 4th edition. Tata McGraw-Hill Publishing Company Limited, New Delhi, India. 614p.

Gizachew G. (2005). Dairy Marketing Patterns and Efficiency: The Case of Ada‟ Liben District, Eastern Oromia., Unpublished M.Sc. Thesis, Haramaya University, Ethiopia.

Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica*, 153-161p.