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Factors affecting honey market outlet choices in Gera district, Jimma zone, Oromia region of Ethiopia

[1]Ayantu Arage, [2]Mengistu Ketema, [3]Adeba Gemechu
[1, 2, 3] Lecturer
[1, 2]School of agricultural Economics and agribusiness, Haramaya University, Haramaya Ethiopia
[3]Department of Agricultural Economics, Jimma University, Jimma Ethiopia
Email - [1]ayantu2arage@gmail.com [2]mengistuket@gmail.com [3]adebagemechu@yahoo.com

Abstract: *This study sought to analyze determinants of market outlet choices among smallholder producer in Gera district. Two stages random sampling procedure was used and data was collected from 139 producers. Multivariate probit model was used to analyze determinants of honey market outlets choice of small holder beekeepers. Processing and analysis of the survey data was carried out using SPSS and STATA. The multivariate probit model results indicated that education level of household head, beekeeping experience, distance to nearest market, access to credit, cash income other than beekeeping, volume supplied to market and frequency of extension contact significantly influenced producer's choice of market outlets for their produce. Policy makers should focus more on improving production and marketed surplus of honey through, expanding accessibility of market infrastructure, strengthening supportive institutions, improving input supply, support to improve the beekeepers bargaining power and beekeepers knowledge by establishment of beekeepers organizations and encourage adult education.*

Key Words: *Determinants; Gera; Honey; Market outlet; Multivariate probit*.

1. INTRODUCTION:

Honey production in Ethiopia is most often related with the availability of natural forest and in the country there is high possibility to produce good quality forest honey (Aravindakshan *et al.*, 2011). Beekeeping is a promising farm activity which directly and indirectly contributes to smallholder income and national economy (Belets and Berhanu, 2014). Beekeeping is also important for creating job to landless peoples (Melaku *et al.*, 2013). Honey production of the country is 47,706,101 kg with total number of beehives 5,902,624 traditional, 80,832 intermediate and 205, 873 modern beehives (CSA, 2017). These have enabled Ethiopia to take the total share of honey production around 23.58% and 2.13% of the African and world's respectively (Workneh and Puskur, 2011).The country is one of the top 10 producers of honey in the world, and it is the largest in Africa (USAID, 2012). According to MoA (2013), a significant number of people are engaged in production and trading of honey at different levels and selling of honey wines (local beverage *Tej*) which create job and self-employment opportunities for a large number of citizens. And the sector is contributing around USD 2.7 million to the national economy of the country. Beekeepers in the study area are producing honey both for home consumption as well as for market demand. To the best of my knowledge, even though honey is economically and socially crucial product, honey market outlets study have not yet been undertaken and assessed for the target study area. In order to maximize the benefits that they may earn, beekeepers have to make appropriate decisions as to where they should sell their product. However, there are various factors that affect beekeepers' decision to select appropriate outlet for delivering their products to the market. Identifying these factors is very important in terms of pinpointing possible areas of interventions that may help beekeepers to maximize benefits out of their crop production and marketing activities. The study attempts to analyze factors affecting honey market outlet choice decisions of beekeepers in Gera district of Jimma zone, Ethiopia.

2. MATERIALS AND METHODS:

2.1. Description of the study area

The study was conducted in Jimma Zone, specifically, in Gera District. Gera District, having an area of 144,340 ha, is located in Jimma Zone of Oromia Regional State, with the capital located at 440 km from Addis Ababa. The District has a total of 29 *kebeles* of which 27 are rural based *kebele* administration areas and 2 are town *kebele* (BFED, 2016). Total human population of the District is estimated at 147120 of whom 92% are males and 8% are female headed households. From the total population, 50.26% and 49.74% are males and females, respectively (BFED, 2016). Beekeeping and livestock production are the major sources of income and livelihood of people in the District. The altitude of the district varies from 1,500 meters to 3000 meters above sea level. It receives an annual rainfall of 1800-2080mm, and has an annual mean temperature ranges between 14-24 ^{O}C. The agro-ecological zones of the District are 3.7%, 50.19% and 46.11% lowland, mid highland and high land, respectively. The total area of the

District is about 144,340 ha, of which 3,288 ha are cultivable, 83,919 ha forest covered, 725.5 ha bush land, 900.97 ha grass land, 1,515 ha coffee land(covered by coffee), 7,000ha area covered by mountain and 9,991.11ha settlement area(DOoARD, 2016). The District is known by different agricultural activity like animal fattening, honey production, organic coffee, cereal crop and spice and Gera is endowed with livestock potential of the 252438 cattle, 72940 sheep, 20594 goat, 52584 equine, and 61174 poultry (DOLFRD, 2016).

2.2. Sampling procedure, type of data and method of data collection

The sample for this study was drawn from all actors involved along honey value chain such as producers, rural collectors, wholesalers, processors, retailers and consumers. Two stages random sampling procedure was used for the selection of sample household heads. In the first stage, out of 29 *kebeles* in Gera District, a total of four honey producer *kebeles* namely *Genji chela*, *Gera naso*, *Sadi loya* and *Kecho underacha* were randomly selected as a representative sample. In the second stage using probability proportional to size technique, from sample *kebeles* total beekeepers 139 samples producers of honey were selected. Both primary and secondary data were used for this study. Primary source were smallholder farmers randomly selected from rural *kebeles* and all most all traders and 29 consumers at different levels in the District. Primary data were collected using informal and formal surveys and key informant interview was used with questionnaire. The formal survey was undertaken through formal interviews with randomly selected beekeepers using a pre-tested structured questionnaire. Focus group discussions were held with four groups based on predetermined pre-tested structured questionnaire and a total of 7 key informants were interviewed from different organizations and institutions. Secondary data sources include Gera District livestock and fishery resource developments office, Gera District Bureaus of Agriculture, District Trade and Market Development Office and Central Statistical Authority (CSA), published and unpublished reports, bulletins, and websites. For informal survey Rapid Market Appraisal (RMA) technique like focus group discussion and key informant interview was used with checklists.

3 .METHODS OF DATA ANALYSIS:

Descriptive statistics and econometric models were used to analysis the data collected from the households. Multivariate probit model (mvprobit) was applied for household variation in the choice of a market outlet and to estimate several correlated binary outcomes jointly. Multivariate probit approach simultaneously models the influence of the set of explanatory variables on choice of markets outlets, while allowing for the potential correlations between unobserved disturbances, as well as the relationships between the choices of different market outlets (Belderbos *et al*., 2004, cited in Hailemariam *et al*., 2013). The observed outcome of market outlet choice can be modeled following random utility formulation. Consider the ith farm household (i=1, 2….. N), facing a decision problem on whether or not to choose available market outlets.

Let U_0 represent the benefits to the farmer who chooses wholesalers, and let U_k represent the benefit of farmer to choose the Kth market outlet: where K denotes choice of collector (Y_1), wholesaler (Y_2), consumer (Y_3), and retailer (Y_4). The farmer decides to choose the Kth market outlet if$Y_{ik}^* = U_k^* - U_0 > 0$. The net benefit Y_{ik}^* that the farmer derives from choosing a market outlet is a latent variable determined by observed explanatory variable (X_i) and the error term (ε_i):

$$Y_{IK}^* = Y_I\beta_K + \varepsilon_I \qquad (K = Y_1, Y_2, Y_3, Y_4) \qquad (1)$$

Using the indicator function, the unobserved preferences in equation (1) translates into the observed binary outcome equation for each choice as follows:

$$\begin{cases} 1 \; if \; Y_{ik}^* > 0 \\ 0 \; otherwise \end{cases} \qquad \left(K = (Y_{1,}Y_2, Y_3 \; and \; Y_4\right) \qquad (2)$$

In multivariate model, where the choice of several market outlets is possible, the error terms jointly follow a multivariate normal distribution (MVN) with zero conditional mean and variance normalized to unity (for identification of the parameters) where $(\mu_{y1}, \mu_{y2}, \mu_{y3}, and \; \mu_{y4})$ $MVN \sim (0, \Omega)$ and the symmetric covariance matrix Ω is given by:-

$$\Omega = \begin{bmatrix} 1 & \rho_{y12} & \rho_{y13} & \rho_{y14} \\ \rho_{y21} & 1 & \rho_{y23} & \rho_{y24} \\ \rho_{y31} & \rho_{y32} & 1 & \rho_{y34} \\ \rho_{y41} & \rho_{y42} & \rho_{y43} & 1 \end{bmatrix} \qquad (3)$$

Of particular interest are off-diagonal elements in the covariance matrix, which represent the unobserved correlation between the stochastic components of the different type of outlets. This assumption means that equation (1) generates a MVP model that jointly represents decision to choice particular market outlet. This specification with non-zero off-diagonal elements allows for correlation across error terms of several latent equations, which represents unobserved characteristics that affect the choice of alternative outlets. Following the form used by Cappellarri and Jenkins (2003), the log-likelihood function associated with a sample outcome is then given by;

$$lnL = \sum_{i=1}^{N} \omega_i ln\Phi(\mu_i, \Omega) \quad (4)$$

Where ω is an optional weight for observation i, and Φ is the multivariate standard normal distribution with arguments μ_i , Ω where μ_i can be denoted as;-

$$\mu_i = \left(k_{i1}\beta_1 x_{i1,} k_{i2}\beta_2\, x_{i2,} k_{i3}\beta_3 x_{i3,}\, k_{i4}\, \beta_4 x_{i4,}\right), while \Omega_{ik} = 1\, for\, j = k\, and \quad (5)$$

$$\Omega_{jk} = \Omega_{kj} = k_{ij} k_{ik} \rho_{jk}\, for\, j \neq k, k = 1,2,3 \ldots with\, k_{ik} = 2y_{ik} - 1 \quad (6)$$

3.1. DEPENDENT VARIABLE:

3.1.1. Market outlets choice: Binary dependent variable measured by the probability of producers sells honey to either of the alternatives market outlets. It was represented in the model as Y_1 for those households who choose to sell honey to collectors, Y_2 for producers who choose wholesalers, Y_3 for producers who choose consumers and Y_4 for producers who choose retailers to sell honey.

3.2. INDEPENDENT VARIABLES:

3.2.1. Sex of the household head: This is dummy variable (took value of 1 if the household head is male and 0 otherwise) and hypothesized that sex of households would have influence on market outlet choice decisions. Mamo and Deginet (2012) found that sex of the household head had statistically significant effect on whether or not a farmer participates in the livestock market and his/her choice of a market outlet. Thus, male head was expected to have relationship with better outlet choice decision of honey market. Addisu (2016) found that sex positively and significantly affected with use of collector outlet.

3.2.2. Family size: This variable is a continuous explanatory variable and refers to the total number of family in the household. It was hypothesized that family size of households to have influence on market outlet choice decisions. Addisu (2016) found family size positively and significantly influenced wholesale market outlet choice. Tewodros (2014) also reported that family size positively and significantly influenced wholesale market outlet.

3.2.3. Education level of the household head: This is a continuous variable which is measured in educational grade level of the household head. It was hypothesized that education to have influence on market outlet choice decisions. Addisu (2016) indicated that education level of households has negative and significant effect on choosing of consumer outlet. Abraham (2013) found that education of the household head is negatively and significantly related with retailer outlet choice.

3.2.4. Distance to nearest market: It is a continuous variable measured in kilometers from the household residence to the market center. Mekonin (2015) found that the choice of cooperative outlet is positively and significantly affected by distance to the market compared to private trader outlet. Hence, the variable was also hypothesized to influence outlet choice decision of the households.

3.2.5. Market information: It is a dummy variable with a value of 1 if a household head had accessed to the current and updated market information and 0 otherwise. Farmers marketing decisions are based on current information available on the market. Access to information, provided through mass media, from extension agents, or mobile phone reduces risk perceptions of farmers (Siziba *et al*., 2011). This variable was hypothesized to influence outlet choice decision of the households.

3.2.6. Credit access: This is a dummy variable with a value of 1 if a household head has access to credit for honey production and 0 otherwise. This indicates credit taken for honey production. Access to credit would enhance the financial capacity of the farmer to purchase the bee colony and the beehives. The variable was also hypothesized to influence outlet choice decision of the households. Urquieta (2009) found that access to loan was significant determinant of market outlet choice. Hence, it was also hypothesized that access to credit to have influence on household market outlet choice decisions.

3.2.7. Frequency of extension contact for honey production: This is discrete variable which is the number of days that farmer has contact with extension agent for honey production work supervision in a year. The variable was also hypothesized to influence outlet choice decision of the beekeepers. Abraham (2013) found that for the households having extension service, the likelihood of choosing collector outlet decreases.

3.2.8. Cash income other than beekeeping (log): It is a continuous variable measured in Ethiopian Birr (ETB) and transformed to natural logarithm. The variable represents income originating from different sources other than beekeeping obtained by household head and other household members in a year. The variable was also hypothesized to influence outlet choice decision of the beekeepers. Addisu (2016) revealed that availability of off/nonfarm income has negative and significant relation with the likelihood of choosing collector outlet.

3.2.9. Experience: It is a continuous variable, measured in the number of years that the household head spend in beekeeping business. According to Addisu (2016) the likelihood of choosing wholesaler outlet was also positively and significantly affected by farming experience. Hence, the variable was hypothesized to influence outlet choice decision of the households.

3.2.10. Lagged price (market price in 2016)(log): It is a continuous variable which measures annual lagged price per kilogram measured in ETB and transformed to natural logarithm. This variable was also hypothesized to influence outlet choice decision of the households. Addisu (2016) found price associated negatively and significantly with choosing retailer outlet.

3.2.11.Volume of honey supply to market: It is a continuous variable measured in kilogram. The more quantity of honey sold, the higher would be the chances of using different market alternatives. Addisu (2016) found that, honey quantity sold positively and negatively influenced the likelihood of choosing wholesaler and rural collector market outlet. Hence this variable was also hypothesized to influence outlet choice decision of the households.

4. RESULTS AND DISCUSSION:

4.1. DESCRIPTIVE ANALYSIS:

4.1.1. Socio-economic characteristics of the sampled households:

Concerning sex of the household head, out of the total sampled households in the study area, 88.5 percent were male while the remaining 11.5 percent were female headed households. As indicated in Table 1, educational level of the household head can influence how he or she views the new technologies and new ways of doing business. It can affect technology adoption decision. Educational level of the sample household heads in the study area ranges from illiteracy to secondary levels. The proportion of household heads that were illiterate was 33%, those who were at primary; junior and secondary educational levels were 4%, 60% and 3% respectively.

Table1: Demographic characteristics of sample household

Variable	Frequency	Percentage %
Sex		
Female	16	11.5
Male	123	88.5
Educational status		
Illiterate	46	33
Primary (1-4)	6	4
Junior (5-8)	83	60
Secondary(9-10)	4	3

The overall mean age of the respondents was 39.9 years with standard deviation of 11.3. As table 2 indicated that the average family size of the sampled respondents was 5.3 persons with standard deviation of 2.5. The average amount of honey marketed per sample household was 412kg and the standard deviation was 321kg. Distance from produce's house to nearest market was also the factor which was expected to determine produce's market outlet choice. As observed from Table 2, the average distance needed for producer's to travel to nearest market place was 6.4 kilometer with standard deviation of 4 kilometer.

Table 2: Demographic and socio-economic characteristics of sample household heads (continuous variable)

Variable	Mean	Standard deviation
Age of the household head	39.9	11.3
Year in beekeeping	9.6	7.9
Total number of family size	5.3	2.5
Distance to nearest market	6.4	4
Quantity supplied to market(kg)	412	321

4.1.2. Access to Services:

Out of the total respondents of honey producing sample households, about 81.3% have contacted extension services providers. Only 18.7% of the farmers reported that they had no access to extension service regarding honey

production. The extension services providers were office of livestock and fishery resource development experts, DAs, NGO and innovative farmers. The extension services provided were about honey production, input use, harvesting and post-harvest handling.

Table 3: Access to service of sampled household

Description	Frequency	Percent %
Frequency of extension contact		
No extension contact	26	18.7
Ones in month	19	13.7
Twice in month	35	25.2
Four times in month	59	42.4
Access to market information		
Yes	78	56.1
No	61	43.9
Access to credit		
Yes	102	73.4
No	37	26.6

From the survey result access to market information shows that there is no system in place for systematically collecting, analyzing and disseminating information relevant to the needs of different actors**.** However, about56.1% of sampled farmers had access to market information from different sources and 43.9% had no access to market information. Finance is the crucial element starting from purchase of input up to the marketing of the product. The survey result showed that 73.4% of the sample households reported as they have credit access for honey production in the study area. The main objectives of the credit were to purchase honey production input.

4.1.3. Household Cash Income and its Source :

Sample households depend on different means of livelihood earning strategies where honey production was the major sources of income for the majority of the producers in Gera District. The survey result indicated that following to honey production respondent support the livelihood by coffee production, crop production, fruit production, and eucalyptus tree plantation, animal fattening, off farm activities and trading.

Table 4: Sources of cash income by farmers (Birr/HH)

Income source	Mean	Standard deviation	Minimum	Maximum
Honey	22548.3	21819.8	1000	70000
Income other than beekeeping	16639.5	13515.5	650	59000
Total income	38828.6	26379.1	1850	129000

For the total sampled households, the average annual income generated from selling of honey and others including (salary, pension, and dividend) were Birr 22548.3 and Birr 16639.5 respectively.

4.1.4. Econometric result:

In the District, four market outlets are used by honey producing farmers. The model results (Table 5) reveals the choice set in the MVP model includes four outlet choices, which were collectors, wholesalers, retailers and consumers outlet. The model fits the data well the Wald test ($\chi 2(44)$ =137.95,$p = 0.000$) is statistically significant at 1% level, which indicates that the subset of coefficients of the model are jointly significant and that the explanatory power of the factors included in the model is satisfactory. Furthermore, results of likelihood ratio test in the model (LR $\chi 2(6)$ =18.0481, prov $>$ $\chi 2$=0.0061) is statistically significant at 1% level, indicating that the independence of the disturbance terms (independence of multiple market outlets) is rejected and there are significant joint correlations of the several estimated coefficients across the equations in the models. The likelihood ratio test of the null hypothesis of independency between the market outlet decisions (rho_{21} = rho_{31} = rho_{41} = rho_{32} = rho_{42} = rho_{43} = 0) is significant at 1%. Therefore, the null hypothesis that all the rho values are jointly equal to 0 is rejected, indicating the goodness of-fit of the model. Hence, there are differences in market outlet selection behavior among beekeepers, which are reflected in the likelihood ratio statistics. The rho_{21} (correlation between the choice of wholesaler and collector outlet), rho_{31} (correlation between the choice of consumer and collector outlet) and rho_{41} (correlation between the choice of retailer and collector outlet) are negatively at 5%, 1%, 10% statistically significant probability level which indicating a competitive relationship of collector outlet with consumer outlet, wholesaler outlet and retailer outlet. This shows that

in honey marketing producers use consumer, retailer and wholesaler as a substitute for collector outlets in Gera District. The simulation results indicate that the probability that honey producers choice collector, wholesaler, consumer, and retailer market outlet were 48.7%, 64.4%, 54.1%, and 56.7%, respectively. The joint probabilities of success and failure of the four variables also suggest that it would be unlikely for households to choice all the four market outlet simultaneously, for their likelihood to do so was only 5.1%. As depicted in Table 5 out of eleven explanatory variables included in multivariate probit model, three variables significantly affected collector market outlet; two variables significantly affected wholesaler outlet; two variables significantly affected consumer outlet; and two variables significantly affected retailer outlet choices at 1, 5 and 10 percent probability levels. Distance from the closest market place positively and significantly affected accessing collector's market outlet at 1% significance level. The positive sign for collector's outlet reveals beekeepers that are located far away from market face higher transaction costs and so may supply for collectors in their villages. This finding is in line with Kassa (2017) who found that distance from nearest market positively and significantly related with the use of collector's outlet choice. This confirms the findings of Berhanu *et al*. (2013) and Xaba and Masuku (2013).

Access to credit services influenced the choice of collector outlet negatively and significant at 10% level of significance. Access to credit services for honey producer farmers decreased the probability of choosing collectors outlet. This may be due to the fact that producer decide their outlet choice before harvest time to repay the credit to the provider (trader) in kind or by beekeepers produce. In other way, those farmers who have access to credit are able to pay their cost of production and marketing cost required to search for better outlet choice. Availability of cash income other than beekeeping has negative and significant relation with the likelihood of choosing collector outlet at 10% probability level. Beekeepers that have more income other than beekeeping have less possibility to choose rural collector outlet compared to those who have less income other than beekeeping. The result may imply that producers with availability of cash income other than beekeeping had capacity to transport their product to the nearest markets and sold to alternatives outlets. This confirms the findings of Atsbaha (2015) who found that income other than beekeeping negatively and significantly related with the use of collectors outlet choice. The likelihood of choosing wholesaler outlet positively and significantly affected by volume supply to market at 5% level of significance. This result implies households who supply large amount of honey accessed wholesaler market outlet compared to households who supply less because of wholesaler capacity to purchase large amount of product. The implication is that if the quantity of honey to be sold is large farmers search a market outlet which buys large volume with high price. But, if the quantity to be sold is low, farmers are not forced to search price and market information. This finding is in line with findings of Kassa (2017) and Muthini (2015). Similar findings explained the direct or positive relation between market outlet choice decisions of different products with quantity sold Chalwe (2011) and Bezabih *et al*. (2015). Distance from the closest market place negatively and significantly affected accessing consumer and wholesaler market outlet at 5% significance level. The negative sign beekeepers that are located far away from the nearest market face higher transaction costs and so may supply for other outlet in their villages. This confirms the findings of Addisu (2016) who found that distance from nearest market is negatively and significantly associated with likelihood of farmers selling to wholesaler's outlet choice. The likelihood of choosing consumer outlet was negatively and significantly affected by number of years that a beekeeper had been in beekeeping at 10% levels of significance**.** Farmers who had been producing honey more years were found to be less likely to selling honey to consumer outlet than those with less year of experience. The negative associations may imply that more experienced beekeepers had better knowledge of cost and benefits associated with various honey market outlets. This finding agrees with that of Riziki *et al*. (2015) who found that households with more experience in agro-pastoralism are assumed to be more exposed and venture into commercial activities like African indigenous vegetables marketing because they aware marketing and differences in profitability in the different marketing outlets. Education level of households has negative and significant effect at 5% probability level on choosing of retailer. Education is related with the best market outlet choice because as the education level increases farmer's ability to search better market from which they fetch better price for their product. The negative relationship between education level and selling to village retailer can be explained by the fact that being educated enhances the capability of farmers in making informed decisions with regard to the choice of marketing outlets to sell their beehive produce based on the marketing margin and marketing cost. This result is in line with Nasir (2017). Similar finding explained the negative relation between education level and retailer outlet Abraham (2013) found that education of the household head is negatively and significantly related with retailer outlet choice.

Frequency of extension contact has negative and significant influence with retailer outlet choice decision at 5% significance level. Households who were visited more by extension agent were less likely to deliver honey via retailer outlets than households less visited by extension agent. Extension contact enables the beekeepers to improve production through adoption improved beekeeping technology hence leading to more output and to search for best market outlet. This result is in line with the result obtained by Abraham (2013) who found that frequency of extension contact has negative relation with retailer outlet choice.

Table5: Multivariate Probit estimations for determinants of honey producer's outlets choice

Variable	Collector		Wholesaler		consumer		Retailer	
	Coef.	RSE	Coef.	RSE	Coef.	RSE	Coef.	RSE
Constant	1.042	2.189	-.534	2.918	1.428	2.112	-2.312	2.087
Volume of honey supplied	-0.001	0.001	0.003**	0.002	0.0002	0.0003	-0.0001	0.0003
Family size	0.039	0.044	-0.1	0.069	0.01	0.043	-0.043	0.043
Sex	-0.176	0.331	-0.984	0.61	-0.137	0.366	0.353	0.346
Education	-0.001	0.055	0.02	0.064	0.016	0.053	-0.117**	0.051
Cash income other than beekeeping(log)	-0.306*	0.160	-0.165	0.22	0.128	0.127	0.164	0.128
Experience	-0.026	0.038	-0.103	0.076	-0.045*	0.025	-0.02	0.025
Extension contact	-0.058	0.101	0.06	0.122	-0.066	0.098	-0.189*	0.1
Market information	0.048	0.260	-0.431	0.302	0.311	0.281	-0.266	0.269
Lagged Price(log)	0.309	1.153	2.258	1.442	-0.478	1.107	1.594	1.133
Distance to nearest market	0.083***	0.028	-0.099**	0.04	-0.056**	0.028	0.001	0.028
Credit access	-0.408*	0.232	0.227	0.29	-0.182	0.228	0.284	0.232
Predicted probability	0.487	0.643	0.541	0.567				
Joint probability(success)	0.051							
Joint probability(failure)	0.016							
Wald test ($\chi 2$ (44)	137.95							
Prov> $\chi 2$	0.000***							
Estimated correlation matrix								

	ρ_1	ρ_2	ρ_3	ρ_4
ρ_1	1			
ρ_2	-0.375**(0.177)	1		
ρ_3	-0.351***(0.127)	0.134 (0.178)	1	
ρ_4	-0.227*(0.13)	0.1610(0.173)	-0.212 (0.142)	1

N=139, Wald chi2 (44) = 137.95, Log likelihood= -299.047, number of draws= 5 rho21=rho31=rho41=rho32=rho42=rho43=0, where 1, 2, 3, 4, stands for collector, wholesaler, consumer and retailer, RSE is robust standard error.
chi2(6) = 18.048
Prob>chi2=0.006***
Note: *** ** and *statistically significant at less than 1%, 5% and 10% respectively.

4.2. RECOMMENDATIONS:

The findings suggest that an adjustment in each one of the significant variables can significantly influence the probability of choice market outlets. Policy makers should focus more on improving volume of sales of honey through, expanding accessibility of market infrastructure, increasing credit accessibility of beekeepers, strengthening supportive institutions, improving input supply system and frequency of extension contact, support to improve the beekeepers bargaining power and beekeepers knowledge by establishment of beekeepers 'organizations and encourage adult education. Distance from the nearest market significantly affect market outlets choice decision, government should ensure developing markets for honey within reach this will motivate a lot of beekeepers to participate in honey supply their by increase their income and choice of appropriate outlets.

5. CONCLUSION:

This paper examined the factors affecting honey market outlet choices, using the multivariate probit model and data collected from the smallholders' beekeepers in Gera district. Descriptive result showed that the mean distance to the nearest honey market was 6.4 km during survey years. The results also showed that a mean quantity of honey supplied to market was of 412 kg per households during survey year. Econometric result of the multivariate probit model indicated that education level of household head, beekeeping experience, distance to the nearest market, access to credit, cash income other than beekeeping, volume supplied to market and frequency of extension contact of honey production significantly influenced beekeepers choice of market outlets for their produce.

REFERENCES:

1. Aravindakshan, S., Worku Janka, Humayun, K. And Waliul, G. 2011. Exploring the Potential of Non-timber Forest Products: The case of Ethiopian honey export to Denmark, University of Copenhagen.
2. Belet Gebremichael and Berhanu Gebremedihin. 2014. Adoption of improved box hive technology: Analysis of smallholder farmers in Northern Ethiopia. *Journal of Agricultural Economics and Extension*, 2(2): 77-82.

3. Melaku Berhe, Girmay Mirutse and Bereket Gebremedihin. 2013. Identifying beekeepers adaptation strategies in response to climate change in Tigray, Ethiopia. *Journal of Agricultural Research*, 2(5): 155 – 159.
4. CSA (Central Statistical Agency), Agricultural Sample Survey 2016/17. Volume II. Report on livestock and livestock characteristics (private peasant holdings) CSA, Addis Ababa, Ethiopia.
5. Workneh Abebe and Puskur, R. 2011. Beekeeping sub sector challenges and constraints in Atsbi Wemberta district of Eastern Zone, Tigray Region, Ethiopia. *Journal of Agricultural Extension and Rural Development*, 3(1): 8-12.
6. USAID (United States Agency for International Development). 2012. Agricultural Growth Program Agribusiness and Market Development (AGP-AMDe) Project. Submitted by ACDI/VOCA to Contracting Officers Representative Tewodros Yeshiwork, USAID Ethiopia.
7. MoA (Ministry of Agriculture). 2013. The 6th national monitoring plan for residues in honey Addis Abeba.
8. BFED (Bureau of Finance and Economic Development). 2016. Gera district's Bureau of finance and economic development.
9. DOoARD (District Office of Agricultural and Rural Development). 2016. Gera district's Office of Agricultural and Rural Development.
10. Belderbos, R., Carree, M., Diederen, B., Lokshin, B. And Veugelers, R. 2004. Heterogeneity in R and D cooperation strategies. *International Journal of Industrial Organization*, 22: 1237-1263.
11. Hailemariam Teklewold, Menale Kassie and Bekele Shiferaw. 2013. Adoption of multiple sustainable agricultural practices in Rural Ethiopia. *Journal of agricultural economics 64*(3): 597-623.
12. Cappellarri, L. and Jenkins, S. 2003. Multivariate Probit Regression Using Simulated Maximum Likelihood *The Stata Journal*, 3(3): 278-297.
13. Mamo Girma and Degnet Abebaw. 2012. Patterns and determinants of livestock farmer's choice of marketing channels: Micro-level evidence. Ethiopian Economics Association, Addis Ababa, Ethiopia.
14. Addisu Hailu. 2016. *Value chain analysis of vegetables*: *In Ejere district, west shoa zone.* M.Sc thesis, Haramaya University, Haramaya, Ethiopia.
15. Tewodros Tefera. 2014. Analysis of Chickpea value chain and determinants of market options choice in selected districts of Southern Ethiopia. *Journal of Agricultural Science*, 6(10): 1916-9752.
16. Abraham Tegegn. 2013. *Value chain analysis of vegetables: In Habro and Kombolcha Districts.* M.Sc thesis, Haramaya University, Haramaya, Ethiopia
17. Mekonin Abera. 2015. *Determinants of market outlet choice and livelihood outcomes of coffee producing farmers: In Lalo Assabi District*, M.Sc thesis, Haramaya University, Haramaya, Ethiopia.
18. Siziba, S., Nyikahadzoi, K., Diagne, A., Fatunbi, A.O. And Adekunle, A.A. 2011. Determinants of cereal market participation by sub-Saharan Africa smallholder farmer. Learning Publics, *Journal of Agriculture and Environmental Studies*. 2 (1): 180-193.
19. Urquieta, A. 2009. *Effects of access to information on farmer's market channel choice: The case of potato in Tiraque Sub-Watershed (Cochabamba-Bolivia)*, M.Sc. Thesis, Virginia State University, Blacksburg, Virginia.
20. Kassa Tarekegn. 2017. *Determinants of honey producer market outlet choice in Chena District*, M.Sc thesis, Haramaya University, Haramaya, Ethiopia.
21. Berhanu Kuma, Derek Baker, Kindie Getnet and Belay Kassa. 2013. Factors affecting milk market outlet choices in Wolaita Zone, Ethiopia. *African Journal of Agricultural Research*, 8(21): 2493-2501.
22. Xaba, B. G. and Masuku, M. B. 2013. Factors affecting the choice of marketing channel by vegetable farmers in Swaziland. *Sustainable Agriculture Research*, 2(1)
23. Atsbaha Mehari. 2015. *Value Chain Analysis of Movable Frame Hive Honey: In Ahferom District*, Ethiopia. M.Sc thesis, Aksum University, Aksum, Ethiopia.
24. Muthini, N.D. 2015. *An assessment of mango farmers choice of marketing channels in Makueni*. M.Sc. Thesis, University of Nairobi, Nairobi, Kenya
25. Chalwe, S. 2011. *Factors influencing bean producer's choice of marketing channels in Zambia*. A research report B.Sc. Degree at University of Zambia.
26. Bezabih Emana, Mengistu Ketema, Jeffreyson K. Mutimba and Jemal Yousuf. 2015. Factors affecting market outlet choice of potato producers in eastern Hararghe zone, Ethiopia. *Journal of Economics and Sustainable Development*, 6(15): 2222-2855.
27. Riziki, J.M., Mlongo, P.M., Mwanarusi, S., Oradu, A.N. And Ipomai, S. 2015. *Determinants of choice of marketing outlets for African indigenous vegetables among the Agro Pastoral Maasai of Narok and Kajiado Counties.* M.Sc. Thesis, Egerton University.
28. Nasir Ababulgu. 2017. *Value chain analysis of coffee: In Seka Chekorsa district*, M.Sc thesis, Haramaya University, Haramaya, Ethiopia.