

Effect of Cooperative Membership on Market Outlet Choice in Case of Anfilo District, Western Ethiopia

Wakjira Kitessa^{1*}, Shemshedin Mohamed², Adane Edao³, Eshetu Beyene⁴, Aboma Benti⁵, Namo Gabisa⁶

^{1*}Lecturer, Department of Agribusiness and Value Chain Management, College of Agriculture and Natural Resource, Dambi Dollo University, Ethiopia

^{2,3}Lecturers, Department of Agricultural Economics, College of Agriculture and Natural Resource, Dambi Dollo University, Ethiopia

^{4,5}Lecturers, Department of Business Management and Entrepreneurship, College of Business and Economics, Dambi Dollo University, Ethiopia

⁶Lecturer, Department of Economics, College of Business and Economics, Dambi Dollo University, Ethiopia

Corresponding Author's E-mail: wakjirakit@gmail.com

Abstract

This study was conducted to analyze the effect of cooperative membership on market outlet choice the case of Anfillo district, western Ethiopia. The data were collected from both primary and secondary sources. Three stage sampling technique was employed to select coffee producer households for the study. The primary data were collected from 183 (86 members and 97 nonmembers of cooperatives) coffee farmers. Descriptive statistics and econometric methods were employed to analyze the data. Accordingly, from the total members of cooperatives (86), only 10(11.6%) were female headed; this indicates that female household's heads could not actively participate in institutional and organizational activities and majority of the social work has been dominated by male. Based on the result of multivariate probit model, the probability of choosing cooperative market outlet is influenced by membership into coffee cooperative, marketing service provided from cooperative and availability of equine owned. While probability of choosing collector market outlet is negatively influenced by membership in to coffee cooperative, marketing service provided from cooperative and time of coffee sale; probability of choosing retailers outlet is negatively influenced by membership into coffee cooperative and frequency of extension contacts.

Keywords: Coffee Cooperative, Multivariate probit, Ethiopia

1. Introduction

Coffee is one of the most important traded commodities in the world and dominates the agricultural sector in its contribution in general and the export sector in particular (Birhe, 2010). Although, it has been contributing a substantial value to the livelihood of the rural people; smallholder farmers in the coffee sector often find barriers and challenges to elevate their situation in the worldwide market place.

Therefore, became the driving force on the involvement of farmer cooperatives in the coffee value chain (Pratiwi and Ita,2015).

According to Bijman and Iliopoulos (2014), cooperatives have been important institutions for strengthening the economic position of farmers throughout the world. Cooperatives take part in the market, it can help to add some values to the farmers' output and create effective and efficient agricultural marketing system. It engaged in

collective bargaining with sellers of farm inputs or buyers of farm outputs and also helps the farmers in terms of sales of agricultural products, provide market information, and offer technical services during production, financial assistance, government subsidies and provision of affordable production material (Eleni *et al.*, 2002).

Access to market in the form of different market outlet for coffee farmers is crucial to exploiting the potential of coffee production to contribute to increased cash income of rural households. Identifying factors affecting market outlet choice is therefore important. People form cooperatives to do something better than they could do individually or through a non-cooperative form of business. Forming a cooperative will not automatically solve business problems faced by individual households. This is because of cooperatives are subject to the same economic forces, legal restrictions and international relations that other business face (Medeksa, 2014).

Jari and Fraser (2009) provided an insight into the institutional and technical factors that influence agricultural marketing channel choices among smallholder and emerging farmers in Kat River Valley. The institutional factors that influence agricultural marketing channel choices include transaction costs, market information flow and the institutional environment which encompasses formal and/or informal rules, the use of grades and standards, organization in the markets and the legal environment. An appropriate institutional environment reduces transaction costs for traders. According to

Abera (2015), educational level of the operator, off- farm employment, access to transportation facility and age of operator had positive effect whereas the household size was negatively associated with supper marketing channel choices.

Geoffrey (2015) identified factors affecting the choice of marketing outlets among small-scale pineapple farmers in Kericho country. The result of multinomial logistic regression revealed that gender, group marketing, pineapple produce, price information and vehicle ownership significantly influenced the choice of pineapple marketing outlets. The result confirmed that price information had a positive influence on the choice of local market outlet while vehicle ownership positively and significantly influenced the choice of both local and urban market outlets.

Riziki *et al.*, (2015), employed multinomial logistic regression to identify determinants of market outlet choice of African Indigenous Vegetables (AIV) in Kenya and Tanzania; and revealed that quantity of AIVs sold, distance to the agricultural market, sex of the household head, education level, family size, levels of value addition, farming experience in agro-pastoralist, off-farm income and marketing costs influenced the choice of marketing outlet of the sampled agro-pastoral Maasai.

Agarwal and Ramaswami (1992), identified factors related to price, production scale and size, farm household characteristic, behavioral aspects such as trust, risk, and experience, and market context (distance and purchase condition) affect producer

market outlet choice. Furthermore, Zuniga-Arias (2007) as cited in Anteneh, 2011), found out that factors such as price attributes, production system, farm household characteristic, and market context could affect market outlet decision of farmers in mango supply chain in Costa Rica. According to Mujawamariya *et al.*, (2013), apart from the difficulty to attract new members, leakage of sales outside the cooperative is a major challenge for the coffee cooperatives in Rwanda. Local (independent) traders still constitute a major market for coffee producers. Yet, cooperatives also accept the produce from non-members and pay them the same price.

Although, cooperatives have been playing significant socioeconomic roles by reducing transaction costs and improving the bargaining power of individuals in all sectors including agriculture (Staatz, 1986; Bonin *et al.*, 1993; Francesconi and Ruben, 2012) and agricultural cooperatives in particular are recognized as major tools to fight poverty especially in rural areas (Deriada, 2005; FAO, 2012). However, some studies showed poor performance of agricultural cooperatives in developing countries (Chibanda *et al.*, 2009; Nkhoma and Conforte, 2011). Accordingly, the majority of members have sold their coffee to private traders, which may affect the economic impact of cooperatives on their members. Moreover, Anteneh *et al.*, (2011) reported that only 42% of members sell their coffee to their respective cooperatives due to no unique economic benefits of cooperatives to their members. However, as long as Ethiopian cooperatives are guided by (ICA, 1995) principles, they should be

economically viable and profitable, socially equitable and environmentally sustainable, while benefiting members who own and control them (Mojo, 2003).

Out of Kellem Wollega Zone, Anfillo district has high level of coffee production and supply highest coffee output in the Zone. Cooperative Union (Torban Anfillo) that found in this district has good potential to market the members output and provides different service to their members and non-members (KWZOoCPD, 2015). Even though coffee is economically and socially crucial cash crop of this district and more than 34% of the total land was planted with coffee, coffee marketing outlets have not yet been undertaken and assessed for the target study area. Cognizant of these facts, this study was conducted to answer the effect of cooperative membership on market outlet choice in the selected study area.

2. Methodology of the Study

2.1. Sample size determination and sampling techniques

Anfillo district was purposively selected based on actual coffee production potential and supplying highest coffee in the zone. Since all of 23 rural *Kebeles* in the district produce coffee and cooperative members were evenly distributed in all *kebeles*, 3 *kebeles* were randomly selected. Then, households that are either members of cooperative or non-members were identified and selected randomly by using Yamane formula at 93% confidence level, 7% level of precision, then probability proportional to size (PPS) was used at 95% confidence interval of the total numbers of coffee producers (Yamane, 1967). Accordingly, by using probability proportional to size (PPS),

86 members and 97 nonmembers were sampled. There are about 257 and 138, 224 and 248, and 379 and 580 members and nonmembers of coffee cooperative were produce coffee in Ashi, Dolla and Shebel kebele respectively (Appendix Table 1).

2.2. Types, sources and methods of data collection

To achieve the intended objectives of the research both primary and secondary sources of data were collected. Moreover, in this study both qualitative and quantitative data were used to describe the role of cooperative in the study area. Primary information was collected from randomly selected cooperatives members and non-members and traders using questionnaires, focus group discussion and key informant interviews.

Furthermore, secondary information were collected from different offices such as zonal cooperative promotion office, cooperative union, and district office (Agricultural and Natural Resource, Cooperative promotion, Trade and Market Development, Coffee and Tea Authority office), journals, research papers, internet, CSA and other relevant publications and documents were used to supplement the primary data. Different tools of primary data collection methods were used to collect the raw data from primary sources. Structured questionnaire was used for sampled farmers and traders', semi structured interview for key informants and focus group discussion participants. Focus group discussion were held with farmers those who have experience of coffee production and

marketing, experiences and practices in meeting, have ability to discuss and express their opinion, in the selected *kebeles* (8 people from each ($8 \times 3 = 24$)). These were 12 from members and 12 from nonmembers for the purpose of triangulation. Key informant interviews were conducted with DA's, committee members of selected from cooperative and union, district and zone cooperative promotion office workers as they had more exposure with the issue of the study; so as to attain dual objective that is, minimizing the limitations of questionnaire methods and to obtain supplementary information through cleared stated check list.

2.3. Method of data analysis

To change the raw data of the study into fact, both descriptive and inferential statistics were used. Descriptive statistics such as frequency, mean and percentage were used in the process of comparing socio-economic, demographic and institutional characteristics of households across market outlets choices. In addition to this, descriptive tools such as tables were used to present the results. Inferential statistics such as F-test (log-likelihood ratio test), Wald test, and pseudo R^2 were used to test adequacy of the model and hypothesis for the statistical significance of parameters.

2.4. Econometric approach

Determinants of the market outlet choices were identified by using multivariate probit model. Some recent empirical studies of market outlet choices assume that farmers consider a set (or bundle) of possible outlets and choose the particular marketing outlet that maximizes expected utility. They also

assume that the addition or deletion of alternative outcome categories does not affect the odds among the remaining outcomes and the odds of choosing a particular market outlet over the other do not depend on which other outcomes are possibly chosen. However, in the present study more than one marketing outlet is available in the study area and farmers are more likely to simultaneously choose more than one market outlet in order to address their multiple needs. In this case, the dependent variables are the dichotomous variables indicating whether sales are made through the relevant marketing chain.

The market outlets have been categorized into three groups: cooperative, collector and retailer market outlets. Each farmer can use one or more marketing outlets or several combinations of different outlets which maximize the expected utility and due to this there is some overlapping and many farmers sell on more than one market outlet. This is to mean that farmers do not sell coffee permanently to the particular market outlet and use the available market outlets alternatively in the absence or presence of the possible choices. Since farmers may market their coffee via multiple outlets, the multinomial logit model would be infeasible due to the resultant very large number of possible choices. The relative risk of selecting one outlet can be affected by the relative risk of the selecting the other and violate the Hausman assumption of Independence of Irrelevant Alternatives (IIA) in multinomial logit model. If simultaneity in decision-making exists, this approach yields biased, inefficient and inconsistent estimates (Maddala, 1983;

Greene, 2003). Thus, the decision of choosing market outlets is inherently multivariate and attempting univariate modeling excludes useful economic information contained in interdependent and simultaneous choice decisions. Failure to capture unobserved factors and interrelationships among choice decisions regarding different market outlets will lead to bias and inefficient estimates (Menale *et al.*, 2012).

The multivariate probit model takes into account the potential interdependence in market outlet choices and the possible correlation in the choice of alternative outlets. The probability of preferring of any particular market outlet is estimated conditional on the choice of any other related outlet. The multivariate probit model assumes that each subject has distinct binary responses, and a matrix of covariates that can be any mixture of discrete and continuous variables. Generally speaking, the multivariate probit model assumes that given a set of explanatory variables the multivariate response is an indicator of the event that some unobserved latent variable falls within a certain interval. The multivariate probit is an extension of the probit model (Greene, 2003) and is used to estimate several correlated binary dependent variables jointly.

For this study, the multivariate probit model was employed to determine the market outlet choice of coffee producers to the market and it can be specified as follows:

$$y_{im}^* = \beta_m X_m + \varepsilon_{im}$$

.....
1

Where y_{im} ($m = 1 \dots k$) represent the dependent variable of coffee market outlet selected by the i^{th} farmer ($i = 1 \dots n$). The dependent variables are the polychotomous variable indicating whether sales are made through the relevant marketing outlet. The outlet has been aggregated into many groups: collectors, cooperatives and retailers. Each farmer was using one or more marketing outlet. X_{im} is a $1 \times k$ independent variables that affect the choice of marketing outlet decisions and β_m is a $k \times 1$ vector of unknown parameters to be estimated ε_{im} , $m = 1, \dots, m$ are the error terms distributed as multivariate normal, each with a mean of zero, and variance-covariance matrix V , where V has values of 1 on the leading diagonal and correlations.

Above equation is a system of m equations that has been shown in the following equations;

$$y_{1i}^* = \beta_1' X_{1i} + \varepsilon_{1i} \dots\dots\dots 2$$

$$y_{2i}^* = \beta_2' X_{2i} + \varepsilon_{2i} \dots\dots\dots 3$$

$$y_{3i}^* = \beta_3' X_{3i} + \varepsilon_{3i} \dots\dots\dots 4$$

The equation continues like this based on the choice of household and availability of choice to the farmers and other.

3. Results and Discussion

3.1. Household market outlets choice

The major coffee market outlets used in the study area were cooperatives and private traders such as collectors and retailers. Majority of the respondents (72.7%)

reported that they mainly choose cooperatives because they can sell their coffee at high price, cooperatives provide them different marketing services (provision of input, sugar, oil and different coffee materials) and marketing of their output at any time they need. On the other hand, collectors and retailer's outlets were selected by 43.2% and 60% respectively (Appendix Table 2).

3.2. Household characteristics on coffee market outlet choice

The effect of continuous variables over market outlet choice is examined by using mean comparison as Berhanu *et al.* (2013) and Geoffrey *et al.* (2014) have used. As shown in Appendix Table 2, the mean age of household that choose cooperatives, collectors and retailers outlet were 42.5, 45.9 and 42.5 in years respectively. Regarding educational status, the mean of household head those choose cooperatives, collectors and retailers outlet were 7, 4 and 7 grades respectively. The nearest distance to reach cooperative, collector and retailing centers is found 0.23, 0.25, and 0.55 km respectively.

3.3. Socio-economic characteristics of households by market outlet

Frequency of dummy variables those included in multivariate probit model can be concluded and interpreted as; 92 % of cooperative members sell through cooperatives, while 31.4% and 9.3% directly to collectors and retailers respectively, whereas, 55.7% of non-cooperative members select cooperatives, 53.6% select collectors and 46.4% retailers respectively. Majority of male (63.5%) and female (62.5%)

respondents prefer cooperative outlet than other channel. Depending on the time of sale of coffee, among coffee producers those sold their coffee immediately after harvest; 79.6%, 38.8%, and 45.9% prefer cooperatives, collectors and retailer's outlet respectively; while among those store their coffee 64.7%, 48.2% and 32.9% would select cooperative, collectors and retailer's outlet respectively. In both cases, majority of coffee farmers prefer to supply to cooperatives as cooperatives provided financial services (credit) before harvesting time, provide different storage, and information services about coffee production and marketing (i.e. cooperatives do for its members) and purchase their product, whereas, coffee collectors purchase coffee from producers immediately after harvest to generate profit and take advantage out of it.

On the other hand, farmers that got different marketing services from cooperatives; prefer cooperative, collectors and retailers outlet by 86.2%, 35.8% and 40.7% respectively; while household those do not get any services prefer cooperative, collectors and retailers outlets by 45%, 58.3% and 38.3% respectively. This result indicated that, if cooperative provide any marketing services for producers (members and nonmembers) such as provision of input, marketing output, consumption good (sugar, oil etc.), they prefer to supply their coffee to cooperatives than other outlets.

In addition, coffee producers those own their own transport animal, choice cooperative, collectors and retailers with 78.6%, 36.8% and 29% respectively, but those do not own select cooperative, collectors and retailers

channel by 28.8%, 54.6% and 62.1% respectively. The reason behind is that, if coffee producers own their own transport animal, they transport their coffee to cooperative centers rather than supply to local traders (collectors and retailers) in their farm gate, but if they have not, they supplied their coffee to collector at farm gate rather than carrying on their back to the cooperatives. In the same manner, coffee producers that got different marketing information from different body choose cooperative, collectors and retailers outlet by 86.25%, 43.75 and 33.75 respectively. Based on frequency of extension contacts, hence, producers those have higher frequency got information about price of coffee, coffee quality standards, buyers' information; they prefer cooperative outlet and supplied their product according to predetermined quality standards and cooperative purchase from them, while collectors and retailer's outlet were preferred by households those extension contact was minimum (Appendix Table 3).

3.5. Factors affecting market outlet choice of the coffee producers

Three classes of dependent variables were identified in market outlets: whether the farmer chooses to sell coffee to cooperatives, collectors and retailers. Each farmer can use one or more marketing outlet. In the analysis, it is measured by the probability of selling coffee to either of the markets.

The multivariate probit model was estimated jointly for three binary dependent variables. The P-value of the Wald test statistics for the overall significance of the regression is ($p = 0.000$) indicating that the multivariate

regression is highly significant. Further, the likelihood ratio test of rho is significant (P-value = 0.0009) indicating that a multivariate probit specification fits the data. The significance of the off-diagonal elements of the covariance matrix shows that there are unobserved heterogeneities that influence the choice decisions on the different market outlets. The correlation coefficients among the error terms are significant indicating that the decision to choose one market outlet affects the decision of choosing the other. The correlation coefficients between the cooperative, collector and retailer market outlets is negative and significant at the 1% level, indicating that farmers who choose one market outlet are less likely to choose another (Table 4 in the Appendix 1).

According to the result obtained from the multivariate probit model indicated in Appendix Table 5, the probability of choosing cooperative market outlet was influenced positively by membership in to coffee cooperative, marketing service provided from cooperative and availability of equine owning at 5% significance level. The result shows that, being membership affects cooperative outlet positively at 5% significance level. Accordingly, as coffee producers are members in to coffee cooperative the probability of choosing cooperative outlet would increase by 64.3%, while the probability of choosing collectors and retailers outlet would decrease by 100% and 36% respectively. This result in line with Anteneh (2011), if coffee cooperatives are supported and well managed, still smallholder member coffee farmers continue to prefer them as their main outlet choices.

And according to Berhanu *et al.*, (2013), membership to cooperative positively and significantly affected accessing cooperative milk market outlet as compared with accessing individual consumer milk market outlet.

Marketing service provided from cooperatives and availability of equine owning also influences coffee market outlet choice. If the cooperative provide regularly marketing services to members and non-members; they use cooperative as their best coffee market outlet choice. As the result of analysis indicated, as services provided from cooperative increase, the probability of choosing cooperative as their market outlet would increase by 100% at 5% significant level. This output is in line with Anteneh *et al.*, (2011), index of cooperative performance, member satisfaction about cooperative performance and the dividends paid to members have a positive relationship with the proportion of coffee sold to cooperative by members; and also if coffee cooperatives are supported and well managed still smallholder member coffee farmers continue to prefer them as their main outlet choices. And also if household have their own equine animals, hence, availability of equine animals helps to reduce long market distance constraint, offering greater depth in marketing choices and search different market to sell their coffee rather than sell to farm gate market. Accordingly, if coffee producers own equine animals, the probability of choosing retailers' outlet would decrease by 12.8% at 5% significance level.

While probability of choosing collector market outlet was affected negatively by

membership in to coffee cooperatives, services provided from cooperative, and by time of coffee sale. Accordingly, as coffee producers are members in to coffee cooperative the probability of choosing collectors outlet would decrease by 100%. This in line with Anteneh *et al.*, (2011), index of cooperative performance, member satisfaction about cooperative performance and the dividends paid to members have a positive relationship with the proportion of coffee sold to cooperative by members; and also if coffee cooperatives are supported and well managed still smallholder member coffee farmers continue to prefer them as their main outlet choices. In addition as services provided from cooperative increase, the probability of choosing collectors outlet would decrease by 135 at 1% significant level. Time of coffee sale also influence coffee market outlet choice. Accordingly, if coffee producers store their coffee than selling it immediately after harvest, hence cooperative give higher price for quality coffee, they sell their coffee to cooperative outlet than other outlet. So, as the time of storing coffee increased the probability of choosing collectors' outlet would decreased by 39% at 10% significance level.

The probability of choosing retailers outlet was affected negatively by membership in to coffee cooperative and by frequency of extension contacts. Being membership affects retailers' outlet negatively at 10% significant level. Accordingly, as coffee producers are members in to coffee cooperative the probability of choosing retailers outlet would decrease 36%.

Frequency of extension contacts also significantly associated with retailers' outlet

negatively at 5%. This is due to the fact that, if coffee producers access to extension contact is increased, the ability of them to acquire important market information which in turn their ability to choice appropriate market outlet for their product would increase. Based on this, as frequency of extension contact increased by one per month the probability of choosing retailers outlet would decrease by 12.8%. This result is in line with Assefa *et al.*, (2016), number of visit by extension has negative and significant effect on formal markets and brokers and positive and significant effect on cooperatives. This is due to fact that, the extension advice farmers to sell their coffee to cooperatives rather than local traders. Charity *et al.*, (2015), hence, 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; so, number of extension contact had a negative influence and disadvantaged on choice of local trader channel.

4. Conclusion and Recommendation

The result obtained from the MVP model revealed that about ten explanatory variables were found to be statistically significant at different significance level by determining the choice of cooperative, collector and retailer market outlets. Accordingly, the probability of choosing cooperative market outlet was influenced positively by membership in to coffee cooperative, marketing service provided from cooperative and availability of equine owning at 5% significance level. While probability of choosing collector market

outlet was affected negatively by membership in to coffee cooperative and services provided from cooperative at 1% significance level, and also by time of coffee sale at 10% significance level. Similarly, probability of choosing retailers outlet was affected negatively by membership in to coffee cooperative and by frequency of extension contacts at 10% and 5% significance level. Therefore, these variables should be promoted and get special attention. Side-selling may undermine the legitimacy of the cooperative as a member-owned/managed organization and in the long run supply of coffee to the cooperative will reduced. Therefore, further research is needed to analyze the governance inside the cooperatives and how to reduce side-selling in the study area.

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5. APPENDICES

Table 1: Sample distributions of cooperative members and non-members coffee producers in selected kebeles

Name of selected kebeles	Total households	cooperative Members		Non- Members		Total Household sampled		
		Total	Proportion	Total	proportion	Member	Non-members	Total
Ashi	395	257	0.3	138	0.1	26	10	36
Dolla	472	224	0.3	248	0.3	26	29	55
Shebel	959	379	0.4	580	0.6	34	58	92
Total	1826	860	1	966	1	86	97	183

Source: Own computation from data from Anfillo district cooperative and the selected kebeles, 2016

Table 2: Household characteristics on coffee market outlet choice

Major market outlets	Category	N	%
Cooperatives	Yes	133	72.7
	No	50	27.3

Collectors	Yes	79	43.2
	No	104	56.8
Retailers	Yes	110	60
	No		

Market outlet choices

Continuous variables	Category	Cooperatives	Collectors	Retailers
Age of HH in year	Yes	42.5	45.9	42.5
Educational level of HH	Yes	6.9	3.9	6.9
Distance from homestead	Yes	0.23	0.25	0.55

N= frequency, %= percentage, Source: Authors survey result 2016

Table 3: Frequency of household characteristics by market outlet choice

			Outlet choice					
			Cooperatives		Collectors		Retailers	
Variables	Category		N	%	N	%	N	%
Membership in to coffee cooperatives	Members	Yes	79	91.86	27	31.4	8	9.30
		No	7	8.14	59	68.6	78	90.69
	Non members immediately after harvest	Yes	54	55.67	52	53.61	45	46.39
		No	43	44.33	45	46.39	52	53.61
		Yes	78	79.59	38	38.78	45	45.92
		No	20	20.41	60	61.22	53	54.08
Time of sale of coffee	after storing	Yes	55	64.71	41	48.24	28	32.94
		No	30	35.29	44	51.76	57	67.06
Sex of HH	Male	Yes	101	63.5	56	35.3	43	27
		No	58	36.5	103	64.7	116	73
	Female	Yes	15	62.5	7	29	10	41.7
		No	9	37.5	17	71	14	58.3
		Yes	106	86.18	44	35.77	50	40.65
		No	17	13.82	79	64.23	73	59.35
Service provided from cooperatives	Got services	Yes	27	45	35	58.33	23	38.33
		No	33	55	25	41.67	37	61.67
	Do not got services	Yes	69	86.25	35	43.75	27	33.75
		No	11	13.75	45	56.25	53	66.25
Access to marketing information	Access	Yes	42	59.15	54	76.1	44	62
		No	29	40.85	17	23.9	27	38
	Non access	Yes	92	78.63	43	36.75	34	29.06
Access to transport services(animal)	Access	No	25	21.37	74	63.25	83	70.94
		Yes	19	28.8	36	54.55	41	62.1
	Non access	No	47	71.2	30	45.45	25	37.9
		Yes	6	35.29	14	82.35	7	41.18
Frequency of extension	0	Yes	6	35.29	14	82.35	7	41.18

contacts in months		No	11	64.71	3	17.65	10	58.82
		Yes	27	35.48	8	25.81	12	38.71
1		No	4	12.9	23	74.19	19	61.29
		Yes	47	78.33	19	31.67	13	21.67
2		No	13	21.67	41	68.33	47	78.33
		Yes	29	70.73	19	46.34	12	29.27
3		No	12	29.27	22	53.66	29	70.73
		Yes	24	70.59	19	61.29	9	26.47
4		No	10	29.41	15	48.39	25	73.53

N= frequency, %= percentage, Source: Authors survey result 2016

Table 4: Correlation coefficient among outlet choice

	Coef.	Std. Err.	Z	P> z
atrho21	-0.425	0.182	-2.33	0.02
atrho31	0.055	0.152	0.36	0.717
atrho32	-0.498	0.237	-2.11	0.035
rho21	-0.401	0.153	-2.62	0.009
rho31	0.055	0.152	0.36	0.717
rho32	-0.461	0.186	-2.47	0.013

Likelihood ratio test of $\rho_{21} = \rho_{31} = \rho_{32} = 0$, Wald $\chi^2(30) = 84.697$ Prob> $\chi^2 = 0.0009$

Table 5: Results of multivariate probit model on the effects of cooperative membership on coffee producer's market outlet choice

Variables	Market outlet choices											
	Cooperative				Collectors				Retailers			
	Coef.	SE	Z	P> z	Coef.	SE	Z	P> z	Coef.	SE	Z	P> z
AGHH	0.002	0.013	0.14	0.887	0.005	0.013	0.38	0.702	0.013	0.013	1.01	0.314
SEHH	-	-	-	-	-	-	-	-	-	-	-	-
EDHH	0.181	0.322	0.56	0.574	0.068	0.337	0.2	0.84	0.330	0.297	1.11	0.266
MACOOP	-	-	-	-	-	-	-	-	-	-	-	-
TIMESL	0.014	0.035	0.41	0.682	0.056	0.035	1.63	0.104	0.049	0.034	1.43	0.153
MKTSVS	0.643	0.231	2.79	0.005	1.003	0.232	4.32	0.000	0.361	0.215	1.68	0.092
TRANSP	-	-	-	-	-	-	-	-	-	-	-	-
	0.140	0.228	0.61	0.54	0.390	0.235	1.66	0.097	0.084	0.217	0.39	0.699
	-	-	-	-	-	-	-	-	-	-	-	-
	1.021	0.347	2.94	0.003	1.359	0.377	-3.6	0.000	0.241	0.353	0.68	0.494
	-	-	-	-	-	-	-	-	-	-	-	-
	0.484	0.229	2.11	0.035	0.009	0.235	0.04	0.971	0.063	0.224	0.28	0.778

									-	-		
ACMINF	0.347	0.341	1.02	0.308	0.205	0.372	0.55	0.581	0.308	0.340	0.91	0.364
									-	-		
DFNMKT	0.149	0.142	1.05	0.292	0.063	0.149	0.42	0.673	0.086	0.136	0.63	0.529
					-		-		-	-		
FEXTCONT	0.080	0.058	1.39	0.164	0.004	0.056	0.07	0.94	0.128	0.056	2.28	0.023
	-		-						-			
Cons	1.258	0.799	1.57	0.115	0.226	0.769	0.29	0.769	0.227	0.758	-0.3	0.764

N= 183, Wald χ^2 (30) = 84.69, Prob> χ^2 = 0.0009, Log likelihood = -282.11, $\rho_{21} = \rho_{31} = \rho_{32} = 0$, where 1, 2 and 3 stands for cooperatives, collectors and retailers respectively; ***, **, * are statistically significant at 1%, 5% and 10% respectively; source model output.