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Gezahagn Kudama (✉ gkudhama@gmail.com)

Research

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Determinants of Fairtrade Channel Choice and its Effect on Income of Coffee Farm Households

Gezahagn Kudama (MSc in Agricultural Economics), Wollega University, Shambu Campus

Department of Agricultural Economics, Ethiopia. Email: gkudhama@gmail.com

Abstract

This article attempts to identify factors determining Fairtrade coffee marketing channel choice and its effect on income of coffee farmers in Jimma zone, based on primary data generated from 153 randomly sampled respondents. The Probit model result ascertain that membership of cooperatives, literacy, access to market information and small-scale coffee farm enhances but remoteness from cooperatives reduces the probability of farmer's participation in Fairtrade coffee market. Furthermore, OLS model result confirms that coffee farming experience, larger coffee farm, and participation in training lead to increase but access to credit lead to decrease income earning of farmers from coffee. The finding also designates that Fairtrade marketing participation yields considerable income over traditional markets. Based on these, policy measures that advance farmers' capacity via training, physical access to market places, market information services, participation cooperatives and expansion of Fairtrade markets will lead to increase earning of farmers' from coffee sector.

Keywords: Channel Choice, Coffee, Fairtrade, Farmers, Income, Selection Model

1 Introduction

The global coffee production and business offer economic benefits for both exporting and importing countries. Coffee production delivers employment opportunities and generates income for about 25 million households. With a total export worth of US\$19 billion in 2016, coffee is one of the most traded agricultural product in the world. Furthermore, coffee is an essential source of foreign exchange earnings and represents a high share of their total exports for several coffee growing countries especially for lower income level nations like Burundi, Uganda and Ethiopia. Coffee export earning represents 10% to 40% of their export earnings. However, reliance on coffee might be a great concern in these countries since coffee is exposed to price fluctuations and market risks (ICC 2018).

As coffee exporting countries are price taker they are disposed to external shocks in coffee prices crisis. As a result of this smallholder coffee farmers will continue to be highly vulnerable to the risk of coffee price volatility (CIDIN 2014). Although coffee obviously renders profit for food companies, it is a different case for coffee farmers. The share of the retail value of coffee taken by farmers has dropped over the years. In 1970s coffee producers retained 20% of the retail prices of coffee sold in a shop on average. Moreover, coffee producers received 1-3% and 2-6% of the price of a cup of coffee sold (in a café in Europe or America) and the price of coffee sold in a supermarket respectively. Farmers are also seriously influenced by dishonorable instability of world coffee prices and growing complicated risk of climate change. However, Fairtrade can create confidence and stability for producers as it guarantees a fair and stable price for their coffee that covers average costs of sustainable production (Fairtrade Foundation 2019).

Based on GAIN (2018) report Ethiopia is the leading Arabica coffee producer in Africa with 40% of regional production, sixth largest coffee producer in the world, representing 4% of world

coffee production and placed to tenth position in coffee exports worldwide. Coffee farming generates living revenue for estimated 15 million Ethiopians (15% of the population), from four million smallholder coffee farms (Abu 2015).

Even though coffee production doubled over past two decades in Ethiopia, coffee productivity is stagnant and lower as compared to other coffee producer countries like Vietnam and Brazil (Kikkawa 2018). Furthermore, Ethiopian smallholder coffee farmers take only a small fraction of the retail price and continue to engage in subsistence farming (CIDIN 2014). Therefore, Ethiopia must improve coffee productivity and create advanced value added products to keep its competitiveness in global coffee market. Despite the fact that contradictory components exist between productivity improvement and value addition advancement, given the situation of coffee production in Ethiopia there exists an opportunity for both productivity and value addition improvement simultaneously (Kikkawa 2018).

On the other hand, Fairtrade is superior prices, pleasant working situations, locals' sustainability and fair relations of trade for farmers and workers in developing countries and discourses the unfairness of traditional trade against weakest producers through necessitating companies to pay sustainable prices (that never fall below market prices). Furthermore, the Fairtrade movement is an endeavor to connect producers involved in socially progressive and environmentally sound farming in the south (developing countries) with socially and environmentally conscious consumers in the North (developed counties), so that consumers and producers get linked directly and producers will be more benefited from the marketing of their products than conventional production and trade have allowed (Negash 2016). Particularly, Fairtrade certified cooperatives can get at least the Fairtrade minimum Price of \$1.40 per pound for Arabica coffee sold on Fairtrade terms (30 cents more if organic), plus an extra 20 cents per

pound Fairtrade premium to invest as they realize appropriate – 5 cents of which is dedicated to improving productivity and quality (Fairtrade Foundation 2019).

Currently, Fairtrade system encompasses more than 1.66 million farmers and workers in 1,411 producer organizations from corner to corner. It works to empower small scale farmers who are disadvantaged by conventional trade via setting and ensuring social, economic and environmental standards for both companies and farmers and workers of the products, promoting and licensing the Fairtrade mark, a guarantee that products have been produced in accordance with internationally agreed Fairtrade standards. The standards for farmers and workers involve: safeguarding workers' rights and environment and that of companies include Fairtrade minimum price and Fairtrade premium to invest in business or projects of the community's interest (Fairtrade Foundation 2019).

In recent years Fairtrade coffee become the fastest growing markets. According to FLO (2018) for the years 2016 to 2017, the volume of Fairtrade coffee sold increased by 15 percent, reaching 214,106 metric tons. The overall quality improvement of Fairtrade coffee and its visibility increment among buyers have helped producers gain access to the specialty coffee market and brought successful results in acquiring higher recognition both from brands and consumers sides (FLO 2018).

The outcomes of the empirical studies conducted on impact Fairtrade coffee vary widely. Some studies reveal that Fairtrade coffee marketing channel user farmers receive three times as much for their coffee as conventional coffee marketing user farmers. Other studies observe insignificant effects or find it difficult to measure the impacts of Fairtrade coffee totally (CIDIN 2014).

Ethiopian coffee marketing chain follows mainly two marketing channels, though ECX and the coffee cooperative unions. Fairtrade certified coffee is only traded directly through coffee

cooperative unions to different countries in the world (Dahlberg 2011). The unions have been legally allowed to bypass the national coffee auction system and the ECX starting from 2001 and 2009 respectively. Currently, coffee cooperatives which are certified for Fairtrade purchase coffee not only from their members but also from nonmembers directly or indirectly as long as the coffee supplied by farmers meet the standard qualities requirement in Jimma zone. Accordingly, coffee farmers in this area supply their coffee to Fairtrade coffee marketing channel or traditional coffee marketing channel.

OCFCU, the largest Fairtrade coffee producer in Ethiopia, was established in 1999 and certified in 2002. As a result, Fairtrade price and additional premium have enabled Oromia regional state to establish various social and productive programs, as well as increased sales and revenue year after year (Fairtrade Foundation 2019). On the other hand, whether such revenue increments yield considerable earning for coffee farmers supplying their coffee to Fairtrade marketing is not yet clear in Jimma zone. In addition to this, Jimma Zone is the birth place for coffee Arabica (OCTB 2014) and eminent potential for coffee production, but the income derived by coffee farmers from the sector stacked back and low. Furthermore, factors influencing Fairtrade coffee marketing channel choice and its effect on income of coffee farmers are not clear yet in the study area. Thus, this study is designed to identify factors determining Fairtrade coffee marketing channel choice its effect on income of farmers in Jimma Zone

2 Materials and methods

2.1 Description of the study area

The study was conducted in Jimma zone of Oromia National Regional State in Ethiopia. The Jimma zone capital, Jimma town is located 335 km to the South west of Addis Ababa in the

Ethiopia. The zone is situated between $7^{\circ} 13' - 8^{\circ} 56'$ latitudes and $35^{\circ} 49' - 38^{\circ} 38'$ longitudes. It shares borders with East Wollega zone in the North, East Shoa zone and Southwest Shoa zone in North East, with south nation, nationalities and people's regional state in the South East and South, and with Ilu-Ababora zone in the West.

The zone is characterized by a tropical highland climate with heavy rainfall, warm temperatures and a long wet period. Its annual rainfall ranges from 1,200 mm and 2,500 mm (Diro et al., 2016). From a total of 1.1 million hectares of land the zone possesses, the area covered by coffee is estimated 0.1 million hectares in the zone. Even if coffee is produced by state and private investors in the zone, the coffee farms are largely owned by smallholder farmers (JZARDO 2008). Similarly, coffee is the mainstay for the large mass of the communities in the zone (Diro et al. 2016). Among eight potential districts (Gomma, Manna, Gera, Limmu Kossa, Limmu-Seka, Seka-Chokorsa, Kersa and Dedo) for coffee production in Jimma zone, Gomma and Manna districts were randomly selected for this study.

Agaro, the capital town of Gomma district is located 397 km away from Addis Ababa (the capital city of Ethiopia) in Southwest direction and 50 km far away from Jimma town (the capital town of Jimma zone). The annual rainfall of the district varies from 800-2000 mm. The agro climate of the district involves: highland (8%), intermediate high land (88%) and low land 4% (Diro et al., 2016). Based CSA (2008) population census extension Gomma district had an estimated total population of 300200 of whom 153095 were males and 147105 were females in 2019.

The capital town of Manna district, Yebu is located at 368 km southwest of Addis Ababa and 20 km west of Jimma town. The district constitutes 12% highland, 65% intermediate highland and 23% lowland with altitude ranges between 1470 – 2610 meter above sea level (Diro et al. 2016).

Based on CSA (2008) census extension the district has an estimated total population of 206700 of whom 105267 were males and 101433 were females.

2.2 Data sources, collection method and sampling procedures

The data for this study was collected both from primary and secondary sources. The secondary data source includes different reports, census data and journal documents, whereas the primary source of data was entirely from sampled respondents of coffee farmers. The data was obtained through structured questionnaire developed for this study by researcher. So as improve the contents of the questionnaire and increase precision of the research the questionnaire was pretested.

This study was followed multiple stage sampling procedures. The first stage comprised random selection of two districts (Manna and Gomma) among eight potential districts in coffee production from Jimma Zone. The second stage was followed by random selection of three rural *kebele* administrations (the lowest administration organ) from each district. Finally, based on the estimated proportion of coffee farmers of the two districts, a total sample of 153 respondents (farmers who produced coffee and sold) were selected and data on inputs, output, yield, income, farm practices, socioeconomic characters, and prices of 2017/ 2018 cropping season were collected.

2.3 Data analysis

Descriptive and inferential statistics as well as econometric models results were analyzed with aid of STATA version 14. Descriptive statistics like mean and standard deviation were used in computing different farmers' characters. As well as t-test was used as inferential statistics.

Econometric model analysis: In estimating dependent variable, marketing channel selection had dichotomous nature as the choice was either Fairtrade or traditional coffee marketing channel.

Estimation of this type of relationship requires probit or logit models as a function of the explanatory variables (Gujarati 2003).

In estimating the effect of Fairtrade coffee channel choice on income of farmers, we may use a regression of income as a function of the various farmer characteristics and a dummy variable, Fairtrade channel choice. However, the difference in income among Fairtrade and traditional coffee marketing user farmers need not necessarily be due to their marketing arrangement. There could be a number of unobservable factors (like management skills, entrepreneurial skills, and risk attitude) that might cause a difference; thus, a comparison of average income of the two groups of farmers could be biased.

In order to correct for the effects of selection bias another variant of econometric analysis is applied. Thus, instead of estimating the income using OLS model, the Heckman selection correction model also known as treatment effects model is used. To check and correct for sample selection bias, the Heckman selection correction model uses the probit model to calculate the inverse Mills ratio in selection model and includes this ratio as a regressor in the outcome model or income model as it applied in this case (Greene 2002). If we observe sample selection bias, we can use the two-step estimate for the regression and selection equations; if there is no evidence of sample selection bias, OLS analysis is consistent and unbiased to be applied (Wooldridge 2012). In the analysis, the maximum likelihood estimation technique is implemented; in which case all parameters are estimated instantaneously rather than the conventional Heckman two-step procedure. The technique employed in this study is presented as follows:

$$P_i^* = \gamma\omega_i + \varepsilon_i^* \quad (1)$$

$$Y_i = \beta X_i + \delta P_i + \varepsilon_{2i} \quad (2)$$

Where

P_i^* is a latent (unobservable) variable representing households' discrete decision of farmers whether to select Fairtrade or traditional marketing channel in the first-step which has a dichotomous P_i realization that is related to it as $P_i = 1$ if $P_i^* > 0$ otherwise $P_i = 0$)

$P_i = 1$ (Fairtrade marketing channel choice)

$P_i = 0$ (Traditional marketing channel choice)

ω_i are the variables determining marketing channel choice in the probit model

X_i are the explanatory variables determining the income from coffee,

γ is unknown parameter to be estimated in the probit regression model

β is unknown parameter to be estimated in the income regression model,

Y_i is gross income from coffee supply in the second-step

δ is a parameter that shows the effect of channel choice on the income

ε_i^* and ε_{2i} are random error terms for the first and the second stage respectively.

The net impact of marketing channel choice, δ is defined as the difference in the expected income earning of farmers in Fairtrade marketing and traditional marketing channel for coffee supply. More formally, this is:

$$E[Y_i / X_i, P_i = 1] - E[Y_i / X_i, P_i = 0] \quad (3)$$

Based on the recent findings related studies, the independent variables assumed to affect dependent variables are described and given along with hypothesized sign in Table 1.

Table 1. Description of variables

		Expected sign on:	
Variable	Definition	Fairtrade	Income
	Fairtrade channel choice decision (dummy):		
Fairtrade	yes = 1 and no = 0		Positive
Income	Income from coffee in Ethiopian Birr (ETB)		
Exper	Coffee farming experience of farmer (years)	Positive	Positive
	Whether or not membership of cooperatives (dummy):		
Mcoop	membership = 1 and non-membership = 0	Positive	
Famsize	Family size (number)	Positive	Negative
Literacy	Literacy status: literate = 1 and illiterate = 0	Positive	Positive
Farsize	Coffee farm size(hectare)	Negative	Positive
Minfo	Accessed to marketing information: yes = 1 and no= 0	Positive	
	Remoteness of cooperatives engaged in Fairtrade		
Remoco	coffee business on foot walk time (minutes)	Negative	Negative
Tpart	Training participation on coffee: yes = 1 and no = 0	Positive	Positive
Accredit	Accessed to credit (dummy): yes = 1 and no = 0	Positive	Positive

3 Results and discussion

3.1 Descriptive results

Table 2 presents the descriptive statistics results of the independent variables (farm households and farm characteristics) involved in treatment effect model.

Coffee farming experience represents cumulative duration of time the household head practice in coffee farm management. The result shows that average coffee farming experience of sample household heads was about 12 years with standard deviation of 5.11. Likewise, the average family size of the sample farm household was 6.43 with standard deviation of 2.85. Similarly, the mean coffee farm size possessed by sample household heads was 0.57 hectare with a standard deviation of 0.5. This implies that there is high gap between coffee farm households in terms of coffee farm size they owning. Remoteness of coffee cooperative stands for the time it takes the farmer from his/her home residence to arrive Fairtrade coffee cooperative center on foot walking time measured in minutes. Accordingly, the result shows the average remoteness of cooperative was 73.09 minutes with standard deviation of 14.69. Income from coffee represents the total income that the farm household derives from coffee production measured in Ethiopian Birr (ETB = 0.03506 US\$). The average coffee income of the farm household was 14250.65 ETB with standard deviation of 20324.04. This implies that there is big difference among coffee farm households in terms of income gained from coffee production (Table 2).

Furthermore, the study result shows that 29.41% of the households were the member cooperative. This implies that the large share of the coffee farm households is not the members of cooperatives in the study area. Similarly, the result shows that 58.82% of the household heads were literate (at least read and write) whilst the rest was illiterate (can't read and write). Likewise, the share of the sample coffee farm household who accessed to market information and credit were

50.33 and 41.18% respectively (Table 2). Finally, the study result shows that the proportion of the sample coffee farm household head who took part on coffee farm management and marketing is 11.11%, which implies the large proportion of the sample households was not participated in the training.

Table 2 Farm households and farm characteristics. Source: Survey Data, 2018

Continuous variables	Mean	Std. deviation
Coffee farming experience (years)	11.88	5.11
Family size (number)	6.43	2.85
Coffee farm size(hectare)	0.57	0.50
Remoteness of cooperative walking time (minutes)	73.06	14.69
Income from coffee (Ethiopian Birr)	14250.65	20324.04
Dummy variables	Frequency	Percentage
Membership of cooperatives (membership)	45	29.41
Literacy status (read and write)	90	58.82
Market information (accessed)	77	50.33
Training participation of farmer on coffee (participated)	17	11.11
Credit (accessed)	63	41.18

3.2 Mean comparisons

The t-test assesses whether the means of two groups, are statistically different from one other. In this case the t-test is employed to compare the mean difference of Fairtrade and traditional coffee marketing channel supplying farmers in terms of different continuous variables. Table 3 presents

the mean comparison results of the two groups. The total the sampled farm households used in this study are 153 (41 Fairtrade and 112 traditional marketing channel users).

Table 3 Mean comparison of different characters. Source: survey data computation, 2018

Characters	Faittrade (N = 41)	Traditional (N = 112)	T value	MD
	Mean	Mean		
Coffee farming experience (years)	13.90	11.14	2.70***	2.76
Family size (number)	6.85	6.28	1.17	0.58
Coffee farm size(hectare)	0.75	0.50	2.74***	0.25
Remoteness of cooperative (minutes)	61.98	77.12	-8.22***	-15.14
Income from coffee (Birr)	27951.69	9235.08	3.53***	18716.60

*** is statistically significant at 1% significance level

The result shows that the continuous independent variables: coffee farming experience, coffee farm size and remoteness of cooperatives purchasing Fairtrade coffee are found to be statistically significant as their p values are $< 1\%$. Together this suggests that farming experience, farm size, remoteness affect coffee farmers' marketing channel choices. Furthermore, the result shows the mean difference of income from coffee selling is statistically significant at 1% level of significance. This implies there exists considerable income difference obtained from coffee selling among Fairtrade and conventional market outlets supplying coffee farm households. On the other hand, the t-test of family size was insignificant, implying that coffee farmers' who supplied their

coffee either to Fairtrade or conventional marketing channel are indifferent in terms of their family size.

3.3 Econometrics model results

The econometric analysis seeks to examine the determinants of Fairtrade coffee marketing channel choice and its effect on income of coffee farmers following a three-step analytical procedures. Results of the probit, Heckman selection and OLS regression models are presented in Tables 4, 5 and 6 respectively.

Table 4 shows the results of the probit model on participation in Fairtrade coffee marketing channels. The log-likelihood ratio (LR) chi-square test is found to be significant at a probability of less than 1%, implying that the overall joint significance of the independent variables included in a probit model in explaining the probability of coffee producing farmers' choice of Fairtrade coffee supply chain. Among the explanatory variables: membership of cooperatives, literacy status, coffee farm size, access to market information and remoteness of cooperatives are statistically significant with expected sign.

The estimated coefficient for membership of cooperatives was positive and significantly determines coffee farmers' marketing channel choice decision in favor of Fairtrade coffee marketing channel at 5% level of significance (Table 4). The marginal effect of the variable, 0.2450 confirms that all other factors held constant, membership in cooperatives increases the probability that a farmer participates in Fairtrade markets by 24.5%. This is mostly related to the reality that farmers who are the members cooperatives involved in Fairtrade coffee business have better understanding about the benefits associated to Fairtrade coffee marketing. Thus, membership of cooperatives enhances the probability of coffee farmers in favor of Fairtrade coffee channel choice. The current result is consistent with the findings of Wollni and Zeller (2006) in Costa Rica which

showed that membership in cooperatives increases farmer's probability to participate in specialty and cooperatives markets.

The estimated coefficient for literacy status was positive and significantly determines farmers' marketing channel choice decision towards Fairtrade coffee marketing channel at 1% level of significance (Table 4). The marginal effect of literacy status, 0.1692 signifies that all other factors held constant, literacy increases the probability that a farmer participates in Fairtrade markets by 16.92%. This is plausible, because literacy improves farmers' information processing and business dealings ability such as supply arrangements, contracts and price negotiations. Thus, it increases farmers' likelihood to participation in Fairtrade markets. The finding is in agreement with (Wollni and Zeller 2006).

The estimated coefficient for farm size was negative and significantly determines farmers' marketing channel choice decision against Fairtrade coffee marketing channel at 1% level of significance (Table 4). The marginal effect of this variable, -0.2675 denotes that, a hectare increase in farm size lead 26.75% decrease in the possibility of the coffee farmers to sell their coffee to Fairtrade coffee marketing channel holding other factors constant. This is due to the fact that farmers with large coffee farm size and farmers who produced high quality coffee may have a better bargaining position when dealing with private buyers. In other words, small scale farmers are more probable to market their coffee through cooperative channels (Fairtrade channels). The finding is concurrent with (Mosheim, 2002; Wollni and Zeller, 2006).

The estimated coefficient for access to marketing information was positive and significantly determines farmers' marketing channel choice decision towards Fairtrade coffee marketing channel at 1% level of significance (Table 4).

Table 4 Probit model estimations for determinants of marketing channel choice. Source: survey data computation, 2018

Variables	Coefficient	z	P>z	Marginal Effect
Coffee farming experience	-0.0063	-0.19	0.847	0.0014
Membership of cooperatives	1.05111**	2.51	0.012	0.2450
Family size	-0.0487	-0.84	0.401	-0.0088
Literacy status	1.01506***	2.93	0.003	0.1692
Coffee farm size	-1.4744***	-3.02	0.003	-0.2675
Marketing information	1.07175***	2.78	0.005	0.1985
Remoteness of cooperatives	-0.0791***	-3.92	0.000	-0.0144
Training participation	0.82108	1.51	0.132	0.2106
Access to credit	-0.2077	-0.64	0.522	-0.0369
Constant	4.3018	2.46	0.014	
<hr/>				
Number of observation	=	153		
Prob> chi2 =		0000		
LR chi2 (9) =		88.62		
Log likelihood =		-44.61789		
Pseudo R ² =		0.4983		

*** and** indicate statistically significant at 1% and 5% probability levels, respectively.

The marginal effect of access to marketing information, 0.1985 signifies that access to marketing information increases the likelihood that a farmer participates in Fairtrade markets by 19.85% keeping other factors constant. This is genuine, because having marketing information prior to selling their coffee helps the farmers to be aware about Fairtrade coffee buyers' preferences and

demand information along with the advantage of Fairtrade marketing participation like premium price payment and other related benefits over traditional marketing counterpart, that those farmers who have accessed to marketing information prior to sell their coffee have better chances to meet requirements and sell their coffee to Fairtrade coffee marketing category.

The coefficient of remoteness of cooperatives purchasing Fairtrade coffee was negative and significant at 1% level (Table 4). The marginal effect of the variable, -0.0144 imply that if the time it takes the producers to arrive cooperative's purchasing center increases by 1 minute, the probability of farmers selling to Fairtrade marketing category (cooperatives) decreases by 1.44%, keeping other variables constant. In other words, it increases the propensity of producer selling to traditional marketing category (like local collectors). This is plausible, because producers want to reduce transportation cost and save time. The finding is in agreement with Tru (2009) who conducted research on factor affecting choices of fresh lychee marketing channels in Vietnam.

Table 5 presents Heckman selection model analysis (the effects of market channel choices on coffee farmers' income). The Wald test is highly significant, indicating that a good model fit. On the other hand, the likelihood-ratio test is insignificant, designating that there is no selection bias in the previous specification of the model, eliminating the need to estimate income using the two-step Heckman procedure. Hence, ordinary least squares (OLS) model is preferred in estimating farmers' income as a function of farm and farmers' characteristics and a dummy variable Fairtrade coffee channel choice.

Table 6 presents OLS analysis (the effects of market channel choices on coffee farmers' income). The F ratio was significant at 1% probability level indicating that there is a significant linear relationship between the independent variables taken together and coffee income.

**Table 5 Effects of market channel choices on coffee farmers' income (selection model).
Source: Survey data computation, 2018**

Dependent variable: income	Coefficient	S.E.	Z	P>Z
Coffee farming experience	515.187**	210.790	2.44	0.02
Family size	565.667	378.859	1.49	0.14
Literacy status	479.013	2304.658	0.21	0.84
Coffee farm size	16620.900***	2745.834	6.05	0.00
Remoteness of cooperatives	-18.264	105.670	-0.17	0.86
Training participation	22677.240***	3991.046	5.68	0.00
Access to credit	-8078.462***	2082.282	-3.88	0.00
Fairtrade	8407.940**	4159.526	2.02	0.04
Constant	-5389.966	10353.33	-0.52	0.60
Dependent Variable: Fairtrade				
Coffee farming experience	0.002	0.035	0.07	0.94
Membership of cooperatives	0.996**	0.424	2.35	0.02
Family size	-0.058	0.062	-0.94	0.35
Literacy status	1.137***	0.388	2.94	0.00
Coffee farm size	-1.364***	0.491	-2.78	0.01
Marketing information	1.064***	0.392	2.72	0.01
Remoteness of cooperatives	-0.083***	0.021	-3.9	0.00
Training participation	0.734	0.543	1.35	0.18
Access to credit	-0.291	0.348	-0.84	0.40
Constant	4.408	1.788	2.46	0.01
/athrho	-0.188087	0.20216	-0.93	0.352
/lnsigma	9.40951	0.05808	162	0.000
rho	-0.1859	0.19518		
sigma	12203.89	708.826		
lambda	-2268.706	2409.68		

*, ** and *** for 10%, 5% and 1% Significance level respectively.

LR test of independent equations (rho = 0): chi2(1) = 0.80, Prob> chi2 = 0.3706

Number of observation = 153 Wald chi2(8) = 269.85

Log likelihood = -1700.4167 Prob> chi2 = 0.000

The R-squared of 0.6397 shows that 63.97% changes of coffee income are explained by the various independent variables used in the model and the rest 36.03% changes is due to other determinants not included in the model. Among independent variables estimated to affect the income of coffee farmers derived from coffee, all except family size are statistically significant with expected sign. On the other all except, access to credit are consistent with prior expectation.

The coefficient of coffee farming experience, 533.89 implies that 1 year increase in coffee farming experience leads to increase coffee income by 533.89 Ethiopian Birr *ceteris paribus*. This is may be justified as, having farming experiences for long duration of time helps the farmers to develop practical skill of coffee farm management and coffee business dealings along with appropriate coffee markets channel choices. Subsequently, farmers who have accumulated coffee farm experiences over long period of time may intensify their coffee yield and income.

The coefficient of coffee farm size, 16051.30 implies that as land size allocated for coffee increases by one hectare, the income the household gain from coffee increases by Birr 16051.30, keeping other factors constant (Table 6). This is plausible, since large farm size often leads to larger quantity of produce, which in turns lead to higher income. In addition to this, farmers with larger coffee plots achieve economies of scale in coffee production, which allows them to minimize costs and maximize profits. The finding of this study is in consensus with scholar findings of Zhang, et al. (2014) in China which showed that large farm size leads to higher income derived from apple.

The coefficient of training participation, 23807.52 indicates that training participation during the last three years on coffee production and quality improvement practices lead to increase income earned from coffee by Birr 23807.52 than non-participating, other variables being constant (Table 6). This is reasonable, because trainings given to farmers by different development programs

enhance farmers' coffee farm management and postharvest handling skill that in turns increase their income derived from coffee sales.

Table 6 The effects of market channel choices on coffee farmers' income (OLS). Source: Own computation, 2018

Variables	Coefficient	S.E.	t	P>t
Coffee farming experience	533.89***	215.53	2.48	0.01
Family size	523.41	386.37	1.35	0.18
Literacy status	1154.56	2249.51	0.51	0.61
Coffee farm size	16051.30***	2750.90	5.83	0.00
Remoteness of cooperatives	-61.49	97.76	-0.63	0.53
Training participation	23807.52***	3909.40	6.09	0.00
Access to credit	-8024.39***	2137.81	-3.75	0.00
Fairtrade	5491.65*	2853.19	1.92	0.06
Constant	-1620.88	9807.32	-0.17	0.869
Number of observation =	153			
F(8, 144) =	31.96			
Prob> F =	0.000			
R-squared =	0.6397			
Adj R-squared =	0.6197			

*, ** and *** for 10%, 5% and 1%Significance level respectively

The coefficient of access to credit, -8024.39 imply that access to credit reduces amount of income earned from coffee by Birr 8024.39 than those farmers who are not accessed to credit,

keeping other variables constant (Table 6). The sign of the coefficient seems inconsistent with theoretical considerations, but could be justified as credit received by farmers supports highly other activities (like fattening, small business) which competes coffee production rather than enhancing specialization of the farmers in coffee as it was observed during survey time.

The coefficient of Fairtrade coffee channel choice, 5491.65 confirm that coffee marketing through cooperatives (Fairtrade) increases the average income obtained by 5491.65 Birr (Table, 6) over traditional market. The result is in agreement with findings of (Arnould et al., 2009; Yuka, 2009).

4 Conclusion and Policy Implication

The findings of this study ascertain that membership of cooperatives, literacy, access to market information and small scale coffee farm size enhances the probability of farmer's participation in Fairtrade coffee market. On the other hand, remoteness of cooperatives engaged in Fairtrade business reduces the likelihood of farmer's participation in Fairtrade coffee market.

Similarly, the study confirms that income earning increment from coffee sector seeks for long period accumulated coffee farming experience, larger coffee farm, participation in training and Fairtrade coffee marketing. Furthermore, the finding designates that participating in Fairtrade coffee marketing category yields average income earning of Birr 5491.65 over traditional counterparts. On the other hand, access to credit tends to reduce income derived from coffee.

Based on finding of the study, the following policy implications may be stressed. Coffee farmers' Fairtrade marketing channel choice and income enhancement linked to capacity building, institutional services, and physical access to market places in Jimma zone. Hence, policy measures that advance the capacity of farmers' via training (on coffee farm management and quality control),

physical access to market places, market information services, participation cooperatives and expansion of Fairtrade markets will lead to increase earning of farmers' from coffee sector.

Abbreviations

CIDIN: Centre for International Development Issues Nijmegen; CSA: Central Statistics Agency; ECX: Ethiopia Commodity Exchange; ETB: Ethiopian Birr; FLO: Fairtrade Labeling Organizations International; GAIN: Global Agricultural Information Network; ICC: International Coffee Council; JZARDO: Jimma Zone Agricultural and Rural Development Office; MD: Mean Difference; OCFCU: Oromia Coffee Farmers' Cooperative Union; OCTB: Oromia Culture and Tourism Bureau; US\$: United states dollar.

Declarations

Availability of data

The author would like to declare that he can submit the data and datasets used for this study upon publisher's request.

Competing interests

The author declare that nobody has competing interests.

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Ethical approval and consent to participate

Ethical clearance letters were collected from Wollega University research and community service directorate and Jimma zone administrative office to care for both the data collectors and the researcher. Study participants were informed that clients have full rights to discontinue the study if they lose interest. Hence, the overall processes of survey were completed without any obstacle.

Author's contributions

GK (the author analyzed, interpreted the whole survey data and wrote up the manuscript. The author read and approved the final manuscript.

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