

Determinants of Coffee Marketing: The Case of Coffee Growers and Suppliers in Kafa Zone, Ethiopia

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Abstract:

Coffee is the most important cash crop commodity to the Ethiopian economy. About 15 million peoples have been directly or indirectly deriving their livelihoods from coffee product. The coffee marketing chain in Ethiopia is weak in terms of linkages with industry, agro processing and value-addition downstream of farms, provision of farm inputs upstream, and poor post-harvest operations, storage, distribution and logistics. This has resulted in poor performance of the sector mainly on the targets of export earnings that the government has planned to attain. This study aims at examining the basic factors that determine coffee marketing on growers and suppliers in Keffa Zone Gimbo woreda. Purposive and two stage random sampling technique were used and the data was collected from 78 coffee producers and supplier. The data collection tools used for the study were interview and observation on the determinants of coffee marketing in the coffee producers as well as coffee suppliers in the study area. Tobit regression was used to identify the main determinants of coffee marketing and to identify the extent of each factor on coffee producer and supplier. The result indicates expansion of illegal trade was significantly hinder the coffee market participation and reduce the amount of coffee supplied to the market. On the other hand access to market, training access, transportation access, farming experience and land size allotted to coffee production was found positive and significant. In addition restricted time schedule to buy and sell coffee product was also discourage the coffee marketing. Restricted time schedule sometimes resulted in oversupply of coffee product and low market price. Therefore, all responsible bodies like federal and regional government, kaffa zone, traders, investors, ECX, NGOs etc. should work together in order to make the society beneficiary from marketing of coffee.

Keywords:

Coffee growers and suppliers; coffee marketing; Tobit regression; gimbo; Ethiopia

I. Introduction

Ethiopia is the birth place and largest producer of Arabica coffee in Sub-Saharan African countries and it is ranked the fifth largest coffee producer in the world next to Brazil, Vietnam, Colombia, and Indonesia by contributing about 7 to 10% of total world coffee production. Coffee is the most important cash crop; more than 15 million people directly or indirectly depend on it for their livelihoods (EIAR, 2017). It is grown widely in two regions of the country namely Oromia region and Southern Nations, Nationalities and People's Regions (SNNPRS). 95% of Ethiopia's coffee is produced by small holder farmers on less than two hectares of land while the remaining five percent is grown on modern commercial farms.

Agricultural markets in Ethiopia before 2008 had been characterized by high costs and risks of transacting and little access to market information due to a long-chain supply of coffee with several market intermediaries (ECX, 2011). It was fragmented and not well integrated into a wider market system, which increases transaction costs and reduces farmers' incentives

to produce for the market. Linking small producers to markets are widely recognized as a valuable development route (Alemu & Meijernik, 2010). The government and other stakeholders have focused efforts at linking smallholder farmers with these channels by assisting farmers form groups and organizing forums where farmers and the buyers can link. The Ethiopian commodity exchange (ECX) was established in 2008 to transfer the economy through dynamic and efficient marketing system (ECX, 2011). Yet Inefficient and underdeveloped markets, results in low and variable prices thereby reducing the profitability of new technologies for farmers, discouraging business people from investing in processing activities, retailers and transporters from investing in improved market and transport services (Mulat & Tadele, 2001). Thus, identifying the determinants of coffee marketing is very important in terms of investigating possible areas of interventions that may help farmers to maximize benefits out of their coffee production and marketing activities.

The Arabica coffee originated in keffa zone Mankira area. Keffa zone located in southwestern Ethiopia and the major coffee producer in Ethiopia. Despite there is a potential existence for coffee production, major constraint related with marketing, infrastructure, information cause lower level of coffee production (Engida et al., 2020). Previous study indicate marketing challenge take the lion share as constraint of coffee production. For instance, (Tadese, 2015) indicate the coffee market have been discouraged due to polices regulating the market, and the low base of market infrastructure, lack of adequate marketing information system, high seasonal price variability, and the unorganized sector, high transaction cost, and mainly the longer marketing channel.

(Minten, et al., 2015), a number of problems might have emerged in some areas because of this new policy. Furthermore, the time of procurement and processing has become too long, and that because of the increased competition, processors had to buy lower quality coffee. Mulie (2014) also finds that many coffee farmers are performing badly because of poor access to extension service, weak financial institutions and low educational level among the farmers. Andrew and Philip (2014) also point out that high cost of coffee production, shortage of extension service and high interest rates for new investments negatively affect the profitability of coffee farmers. Tolera and Gebermedin (2015) identify that lack of physical infrastructure and poor market information has a negative impact on coffee production in SSA. These findings are partly in line with Baffles (2003).

Coffee producers in Gimbo Woreda are widely characterized by limited marketing linkage which starts from limited infrastructure. This is due to some socioeconomic, production, market and institution related factors. The market and marketing system of the area is generally dominated by conventional system of marketing and producers are forced to sale directly for conventional transaction root which they do not get premium price for their coffee product and results low market margins. In fact, the performance of coffee marketing is affected by numerous pertinent issues downstream from supply utilization of inputs, the agricultural practices, trust between value chain actors, for example the governance, marketing and their interdependency, regional rules (Gimbo Woreda office of Trade and Industry, 2019 unpublished). Therefore, the main objective of the study was to examine the determinants of Coffee Marketing in Kaffa Zone, Gimbo Woreda.

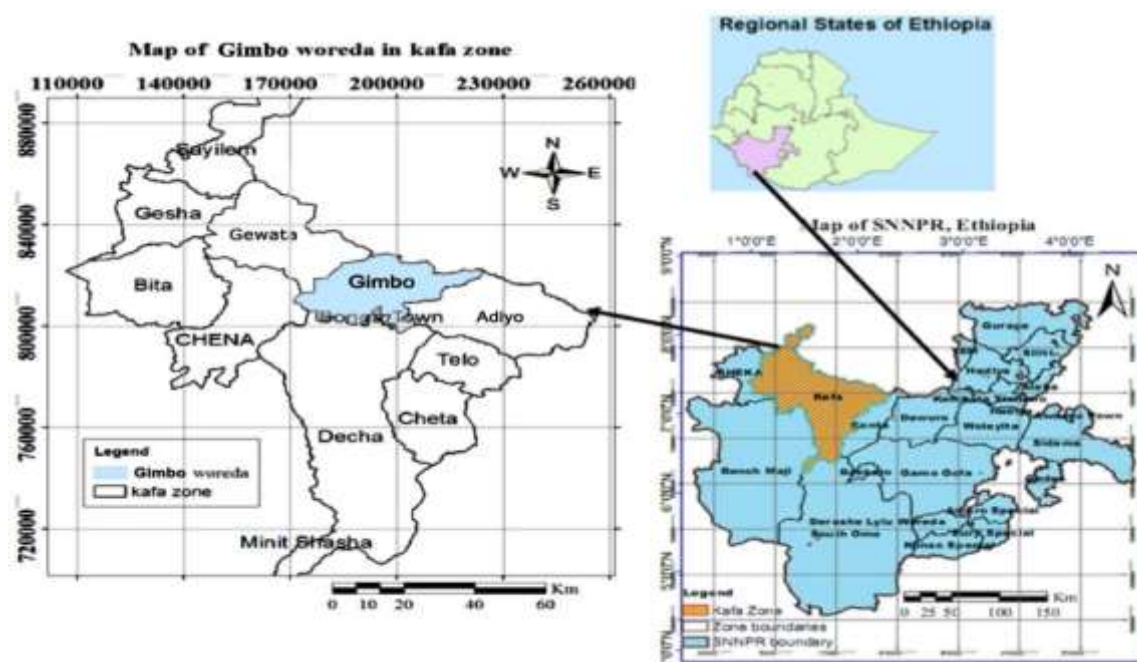
II. Research Method

2.1 Research Approach

Quantitative research approach was used in this study. Quantitative methods involve the process of collecting, analyzing, interpreting, and writing the results of a study (Kothari, 2004). It employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data. A survey design and questionnaire method was used to analyze the role and challenge of ECX on coffee supply and marketing. Survey research provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population (Fetene, 2019).

2.2 Description of the study area

The study is carried out in Gimbo Woreda Kaffa Zone, Southwestern Ethiopia). The study area is located at altitudes between 1000 and 3500 m above sea level and situated at 432km away from Addis Ababa. It is also 705 km from Hawassa town on the road to Bonga. It is found within the geographical location 07°4'00"- 7°35'00"N latitude and 36°1'30"- 36°31'00"E longitude. The soils of the area are deep, clay red soils with an agric B-horizon distric-nitosols. The soils have good agricultural potential, good physical properties and uniform profile. They are porous, clay-to-clay loam texture, and have low base saturation with less than 5.5 pH values and well drained (CBFED, 2004). The mean annual temperature ranges between 15.1°C and 22.5°C with warmest month January, February and March. The study area receives the highest amount of rainfall in Ethiopia with annual rainfall between 1401-2000 mm. The largest amount of rain occurs between May and September (Ayele, 2011).
Figure 1: Map of Gimbo woreda in Kafa Zone



Source: Kaffa zone Agriculture Department

2.3 Target Population

The target population of the study was Gimbo woreda coffee grower and supplier as well as trader. The target population comprise from land holding households who cover their maximum land with coffee was selected from each Kebeles as indicated by CSA, (2007). Based on purposive sample selection sex Kebele were selected for this study. Equal number of

samples, were selected from each kebele was taken in to consideration. Therefore, the total number of sampled coffee producer was 60. With the same approach three most experienced suppliers are selected from each Kebele. Therefore a total of 78 respondent were selected and data were collected. The sample for this study was drawn from coffee producing households and coffee traders. Two-stage non-random sampling procedure was used for the selection of sample household heads. In the first stage from a total of 31 kebeles from Gimbo Woreda 6 most potential coffee producing kebeles are selected purposively. In the second stage, 10 coffee producing household heads and 3 coffee suppliers are selected purposively from each kebeles.

2.4 Methods and Procedures of Data Analysis

The descriptive and econometric analysis was used for the analysis. The data collected from the respondent was coded and entered into Statistical Package for Social Science (SPSS-20) software version. Descriptive statistics such as, mean, frequency, and graphs was used to present the outputs of the analysis. Thus, the completed data is presented by using tables; excel charts, pie-charts, and bar graphs. As noted by Creswell and Plano Clark (2007) data analysis in mixed methods research consists of analyzing the quantitative data using quantitative methods and the qualitative data using qualitative methods. In addition, tobit regression analysis were conducted to identify the main determinant in coffee marketing activities and the model is specified as follow:

2.5 Econometric Analysis: Tobit Model specification

Most of the population in study area are practice coffee production both for consumption and for source of income. To determine the farmer's actual sales will be variable such that the probability of selling will have increase the total amount of output to be sold. Tobit model was used to interpret the stand point of the study to look factors that affect farmer's participation in coffee supply to market.

The objective of the study was to identify the main determinates of coffee marketing in case of coffee grower and supplier. The amount of coffee produced and supplied in the market was used as a measure of coffee marketing and as a dependent variable. The value usually censored/clustered at limiting value. An econometric model with censored/truncated error term come into increasingly used (MacDonald and Moffitt, 1980). One model is seeing as increasingly applied for censored/truncated is tobit analysis.

Tobit assumed that the dependent variable has a number of its value clustered at a limiting value usually zero (MacDonald and Moffitt, 1980). In any analysis it is important that every information provided used fully and correctly. The model also provide consistent estimator with a Non-zero threshold (Carson and Sun, 2007). In case of non-zero (Carson and Sun, 2007) indicate estimating the unknown censoring threshold by the minimum of the uncensored y_i 's. The tobit technique use all observation, both at the limit and those above it, to estimate the regression line, it is to be preferred over the alternative Technique that estimate a line only with the observation above the limit(Gujarati, 2004). For instance OLS with censored information result biased and inconsistent estimator (MacDonald and Moffitt, 1980).

The Tobit regression model was employed to quantify the magnitude and direction of the effects of the factors influencing coffee marketing. Previous studies have been employed tobit regression model in agricultural commodities marketing analysis. For instance, Study by Martey *et al* (2012) Employed tobit regression for smallholder agricultural commercialization.

Tobit can be used to determine both the change in probability of being above the limit and change in the value of dependent variable if it is already above the limit (Gujarati, 2004).

In the current study, the model used to show how the reduction in income induced by low coffee supply be spread between decrease coffee production and decrease in the probability coffee market participation. Following Gujarati, (2004) and MacDonald and Moffitt, (1980) tobit model specified as follow:

The Tobit or censored normal regression model assumes that the observed dependent variables Y_j for observations $j = 1, \dots, n$ satisfy:

$$Y_j = (Y_j^*, 0) \quad (1)$$

Where the Y_j^* are latent variables generated by the classical linear regression model:

$$Y_i^* = \begin{cases} X_i\beta + \mu_i & \text{if } X_i\beta + \mu_i > 0 \\ = 0 & \text{if } X_i\beta + \mu_i \leq 0 \end{cases} \quad i = 1, 2, \dots, N \quad (2)$$

Where N is the number of observation, Y_i is the dependent variable, X_i is the vector of independent variable, β is the vector of unknown coefficient and μ_i an independently distributed error term assumed to be zero with zero mean and constant variance δ^2 . Thus the model assume that there is an underlying, stochastic index equal to $(X_i\beta + \mu_i)$ which is observed only when it is positive and hence qualifies as an observed latent variable.

The current study considered the amount of coffee produced and supplied, which used as proxy for coffee marketing as dependent variable. And based on literature the study identify market access, Access to extension service, expansion of illegal trade and other socio economic factor considered as independent and critical determinates of coffee marketing.

Following from the aforementioned discussion, the empirical model for quantifying the factors which influence the coffee marketing is specified as follows:

$$Y_i^* = \beta_0 + \beta_1 \text{Illegal} + \beta_2 \text{MA} + \beta_3 \text{ES} + \beta_4 \text{Training} + \beta_5 \text{Experience} + \beta_6 \text{Edu} + \beta_7 \text{landsize} + \epsilon_i$$

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Where, Y_i^* the amount of output supplied in the market by coffee grower and supplier $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 are parameters to be estimated. While Illegal, MA, ES, Training, Experience, Edu, and land size are the independent variable indicate, illegal market expansion, Market Access, Access to training, Experience in coffee Marketing, level of education, and amount of land size allotted to coffee production respectively.

Table 1. Description of the explanatory variables used in the regression models

Variable	Description	Unit measurement	Expected sign
Illegal,	Illegal trade expansion,	Nominal (1= yes, 0= no)	-ve
MA	Market Access	Nominal (1= yes, 0= no)	+ve
ES	Access to extension service	Nominal (1= yes, 0= no)	+ve
Training	Access to training	Nominal (1= yes, 0= no)	+ve
Experience	Experience in coffee Marketing	In years	+ve

Edu	level of education	In years	+ve
Landsize	and amount of land size allotted to coffee production	In hectare	+ve

Source: own construction

III. Results and Discussion

3.1 Descriptive statistics

This section describe the sample demographic, socio-economic and market related factor

Table 2. Average age of the respondent by Gender

Variable	Gender	Mean	Std. Dev.	Minimum	Maximum	F-statistics
Age (n=60)	Male(53)	47.4	9.19	28	73	0.058
	Female (7)	46.5	5.65	40	52	
	Total (N=60)	47.3	8.8	28	73	

Note: number in parenthesis indicate the number of observation

Source: own Survey, 2021

Table 3. Descriptive Statistics of coffee producer asset

Variable (N=60)	Mean	Std. dev.	Min	Max
Total Land size in hectare	3.8	2.02	.75	11
Area of land allotted to coffee in hectare	2.5	1.9	.25	7
How long have you practiced production of coffee in years	12.1	5.3	2	25.
what is the estimated quantity of coffee you obtain in the given coffee years in Quintals	29.6	25.0	3.	92
How much Quintals did you sale in a given year	27.9	24.2	3	90
What is the estimated amount of income you obtain from coffee production and sale in a given year in birr	1437.1	60101.6	\$127.5	\$5357.1

Note: 1 USD was equivalent with 42 Ethiopian birr based on September exchange rate

Source: own Survey, 2021

Table 4. Factors Affecting Coffee Market

	Frequency	Percent
Do you have access to transportation?(n=60)		
Yes	36	60
No	24	40
Types of Transportation (n=60)		
Vehicle	10	16.7
Animal Transport	27	45
Cart	8	13.3
Carrying by human being	15	25
Access to Market Information (n=60)		
Yes	38	63.3
No	22	36.7
Access to extension service(n=60)		
Yes	29	49

No	31	51
Access to training (n=60)		
Yes	26	43.3
No	34	56.7
Illegal Market expansion (n=60)		
Yes	54	90
No	6	10

Source: own Survey, 2021

3.2 Determinants of coffee marketing

a. Tobit model regression analysis

Tobit model was used to analyze the factor affecting the extent of coffee marketing participation by coffee growers and suppliers. Tobit's the maximum likelihood estimates presented in table 5. Prior to tobit regression estimate, diagnostic test was conducted to make sure the appropriates of the model. Presence of heteroscedasticity was tested using Brush pagan test and the result indicated that there was heteroscedasticity problem. The study conducted test for existence of hetroscedasticity for the error term and found that there was no problem of hetroscedasticity ($F(3, 47) = 0.24$, $\text{Prob} > F = 0.87$). The problem of multi-collinearity also checked and the result indicate no problem of multi-collinearity (Mean VIF=1.66). According to Gujarati (2004), for the mean VIF below 10 indicate no problem of multi-collinearity among explanatory variable

The tobit regression likelihood function of the model was found significant at 1 percent ($\text{LR chi}^2(9) = 93.96$, $\text{Prob} > \text{chi}^2 = 0.0000$) indicating the model is adequate because coefficients are jointly significant. Moreover, the overall model significant was also measured with the coefficient of determination. In tobit model Pseudo R^2 was considered as a measure of coefficient of determination. The value Pseudo R^2 (=0.176), indicate 17.6 percent of the variation in the dependent variable explained by the variation in the independent variable (table 6).

In tobit regression the amount of coffee product produced and supplied in to the market by the coffee grower and supplier was used as a dependent variable. The results of tobit model showed that most of the variables tested for influencing the degree of market participation had the expected signs except education. As displayed in table 6, however, information access, extension service and level of education was found insignificant. On the other hand, Illegal market expansion was found negative and significant at 10% level. The market access, transportation access and training access also significantly and positively affect coffee marketing participation at 5 percent. Moreover, the coffee farming and marketing experience and the land size allotted to coffee farming was found positive and significant at 1 percent level of significance (table 6).

Table 2. Tobit Model Results for Factors Influencing the Level of Coffee Marketing

Variable	Coefficient	Std. error	t	P> t
Illegal market (1= yes)	-2.02*	1.59	-1.27	0.072
Market Access (1= yes)	14.26**	5.64	2.53	0.015
Transportation access (1=yes)	8.24**	3.78	2.18	0.034
Information Access (1= yes)	1.49	3.85	0.39	0.70
Extension service (1= yes)	-1.43	3.93	-0.36	0.72
Training access (1= yes)	8.38**	3.22	2.60	0.012
Experience	1.33***	.39	3.37	0.001
Level of education	-1.22	1.19	-1.02	0.31

land size	6.03***	1.28	4.68	0.000
Constant	-7.91	7.61	-1.04	0.30
Sigma	11.20***	1.05		

Note: Dependent variable was quantity of coffee produced and supplied to the market

***, **, * indicate significance at 1 percent, 5 percent and 10 percent respectively.

Source: Own survey, 2021

Expansion of illegal trade (illegal): Tobit estimation results in Table 6 indicated that expansion of illegal trade has negative and significant impact on the amount of coffee supplied to the market. Existence of illegal trade discourages the coffee supplier and grower to supply their product to the market. The coefficient of illegal market was found -2.02, which indicate other things remaining constant existence of illegal market, reduce the coffee supply to the market by 2.02 Quintal as compared with absence of illegal trade. The finding was consistent with Jima et al (2020) and Tekleab (2020) finding, indicating presence of illegal trade discourage coffee supplier to deliver their product to the formal market. The possible reason might be the price of coffee in formal market would be expensive than the price delivered by illegal trader. Illegal trader has the advantage to buy coffee at lower price and earn more profit by selling with low price. Not only the coffee producer, but also the coffee supplier also indicate expansion of illegal trader has become the main treat in coffee marketing. The observation and interview with the coffee supplier revealed that illegal coffee trader become the main challenge to stay in coffee market. Coffee supplier claim that illegal trader provide coffee product with cheaper price than the market price and the consumer prefer to buy with lower price.

Market access (Market A): it was hypothesized that good market access in terms of distance, market information and buyer existence have positive and significant contribution in coffee marketing. In line with the expectation, the result from the model indicated the market with good access increase the amount of coffee supplied to the market and the result was significant at 5 percent. The coefficient of market access was found 14.26, which indicate other things remaining constant, on average with good market access coffee producer provide 14.3 Quintal more of coffee product than the coffee producer with low market access. The rationale behind this could be access to market information might enable farmers to receive accurate price level and encourage selling more. The finding was consistent with Jima et al, (2020) finding and they indicate market access is not only the main determinant of coffee market participation, but also market access determines the degree of market participation.

Transportation access (Transport): Access to transport was also found significant and positive in affecting coffee supply and marketing. In line with the expectation transportation access encourage the coffee producer to provide more coffee to the market. The coefficient of transportation access was found 8.24, which indicate other things remaining constant, coffee producer with existence of transportation access, on average deliver 8.24 Quintal of coffee to the market than coffee producer without transportation access. The rationale behind this coffee by its nature is difficult to take into market place by human being and without transport access coffee producer unable to deliver the product to the market. The result was consistent with Tekleab (2020) and (Engida et al, 2020) finding who indicate improving transport sector create favorable environment in coffee marketing and encourage coffee producer to invest more on coffee production. Linking small producers to markets are widely recognized as a valuable development route and transportation access has been the most important factor to link producer with the market (Engida *et al*, 2020).

Training access: access to training has been recognized as cost effective strategy to create knowledge with short period of time. The study hypothesized that training access has significant and positive effect on coffee supply and marketing by coffee producer. In line with the expectation the tobit regression revealed that the coefficient was found positive and significant at 5 percent level of significance. The coefficient (8.38) indicate keeping other factor constant, coffee producer with training access, on average provide 8.38 Quintal of coffee more than producer without training access. The possible reason could be provision of training for the coffee producer would create better production strategy by using the existing resource efficiently. Moreover, training delivery provides way of financial management and coffee producer able to manage their income obtain from coffee market. The result regarding the training access effect on coffee supply and marketing was consistent with Anteneh *et al*, (2011) finding.

Experience: tobit regression displayed in table 6 revealed that coffee farming was found significant and positive effect on coffee supply and marketing. the coefficient was 1.33, indicating keeping other things remaining constant, additional years of experience increase the amount of coffee supplied by the coffee producer, on average increase by 1.33 Quintal. The result was consistent with the expectation and it confirmed the finding of Pierre *et al* (2017), Bizualem et al (2018) and Tizazu (2019). The rationale could be farmers get more and more experience in their work; production per unit area (productivity) increases and this will have a probability of increasing market supply. More over more experienced farm household tends to have more contact, social networking, permitting further discovery of trading opportunities ant lower cost.

Land size allotted to coffee production: land size is the most and probably the first factor of coffee production. It was hypothesized that land size allotted to coffee production have significant and positive influence on amount of coffee supply to the market. Land covered by coffee affected market supply of coffee positively and significantly as expected. It affects the volume of coffee supplied to the market at 1% significance level as discussed in table 6 above. The coefficient (6.03) indicate, while keeping other factor constant, additional hectare land allotted to coffee product, on average increase coffee production and supply to the market 6.03 Quintal. It is a known fact that as land size increases the total amount of production increases and then market supply increases. The result was consistent with the finding of Angula (2010) and Jima *et al* (2020).

IV. Conclusion

The general objective of the study was to examine the determinants of Coffee Marketing in Kaffa Zone, Gimbo Woreda. In order to meet the general objective, survey was made. The study results indicate expansion of illegal trade significantly and negatively affect the coffee producer and supplier in coffee marketing. Existence of illegal trade discourages the coffee producer and supplier from coffee marketing participation. Illegal trade also prevents the coffee producer to utilize their maximum production and supply capacity. Illegal trader take the advantage of price and has the advantage of buying coffee at lower price and earn more profit by selling with low price. Illegal trade expansion not only discourages the coffee producer and supplier, but also the coffee dealer illegal trader has become the main treat in coffee marketing.

Access to market in terms of market distance, market price information and buyer information were found significant factor in coffee marketing. The coffee producer and supplier with good market access encourage them to produce and supply more coffee and the

result was significant at 5 percent. Market access not only affects the participation in coffee marketing but also affect the degree of coffee production and supply. Therefore, improving the market access through information dissemination would improve the coffee marketing. The sample respondent indicates the main source of information about price and buyer existence from local ECX agent and radio.

The coffee producer and supplier amount of coffee production and supply also depend on Transportation access and extension service. The problem related with transportation holds the great share or transportation is the dominant factor contributing for the low marketability of kaffa coffee. Because lack of road access in remotest coffee producing areas of kaffa, lack of modern transportation system and lack of trusted transporters in the area. Therefore, the study concludes that improving transportation means improving coffee production and supply. In addition, training access also another significant factor that determine the coffee grower and supplier in coffee marketing. Existence of training access not only encourage coffee producer to participate in coffee but also increase the volume coffee supplied to the market. Training improves the coffee production through knowledge transfer. Therefore provision of training to the coffee producer improves coffee marketing.

Coffee farming experience was found another significant factor determine the coffee marketing. Experience has been considered as means of self-teaching through work experience. Experience increase the productivity of coffee and more experienced farm household tends to have more contact, social networking, permitting further discovery of trading opportunities and lower cost.

Finally the size of land allotted to coffee production was another significant factor that affects the coffee marketing. Land is the most important input in coffee production and higher land size allotted to coffee production resulted in higher amount of coffee grow and supplied to the market.

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