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Factors Affecting Coffee Market Supply of Smallholder Farm Household: The Case of Gewata District Kaffa Zone, Southwest Ethiopia

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Abstract

Ethiopia has a broad genetic diversity among its coffee varieties. Despite high coffee production potential of the district, 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 that do not provide premium price for their coffee produce and results low market margins. Both primary and secondary data were used for this study. Descriptive statistics like: percentage, frequency, mean and standard deviation and econometric model which is stages least square (2SLS) were used to analyze the data. The result of econometric analysis of 2SLS regression shows that four variables (which are education level of household head, membership to coffee cooperative, transport ownership and quantity of coffee produced) positively and significantly affected market supply of coffee. However, distance to the nearest market affected it market supply of coffee negatively and significantly. Therefore, policy implication drawn from the findings aimed at strengthening farmers coffee cooperative and enhancing the financial capacity of cooperative with functional collection center, improving accessibility of transport services and developing infrastructure,improving farmers'knowledge through adult education as well as their experience sharing with other coffee producing farmers, improving productivity through strengthening supportive institutions(extension service provider).

Keywords: Two stage least square; Gewata; Quantity supply.

1. Introduction

Ethiopia has a broad genetic diversity among its coffee varieties. The country has also become particular interest to the world for its inherent quality and coffee production potential due to its Arabica coffee, an indigenous variety (ECX Ethiopian Commodity Exchange, 2009). Coffee export sales are generally done through three consecutive channels: local, ECX, and the international market. At the local level, coffee farmers sell their coffee to traders or cooperatives whereupon most of it ends up going to ECX for eventual export. In addition, a small percentage of exportable coffee bypasses the ECX and is sold directly to foreign buyers. However, this direct sales option is only available to cooperative unions and large commercial operations (Abu Tefera and Michael, 2015). Coffee producers in Gewata district are widely characterized by limited marketing linkage which emanates from limited infrastructure. This results them inability to force local collectors and traders' price setting and exploitation at farm get level. Despite high coffee production potential of the district, the market supply of coffee is low as compared to its potentiality. 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 produce and results low market margins. Therefore, there is a need to employ a market chain approach to fully understand and make an intervention to resolve the problem of coffee marketing at all stages by identifying major coffee market chain actors and marketing channels; analyzing structure, conduct and performance of coffee market and by identifying determinants of coffee market supply and producers' market outlets choice in Gewata district.

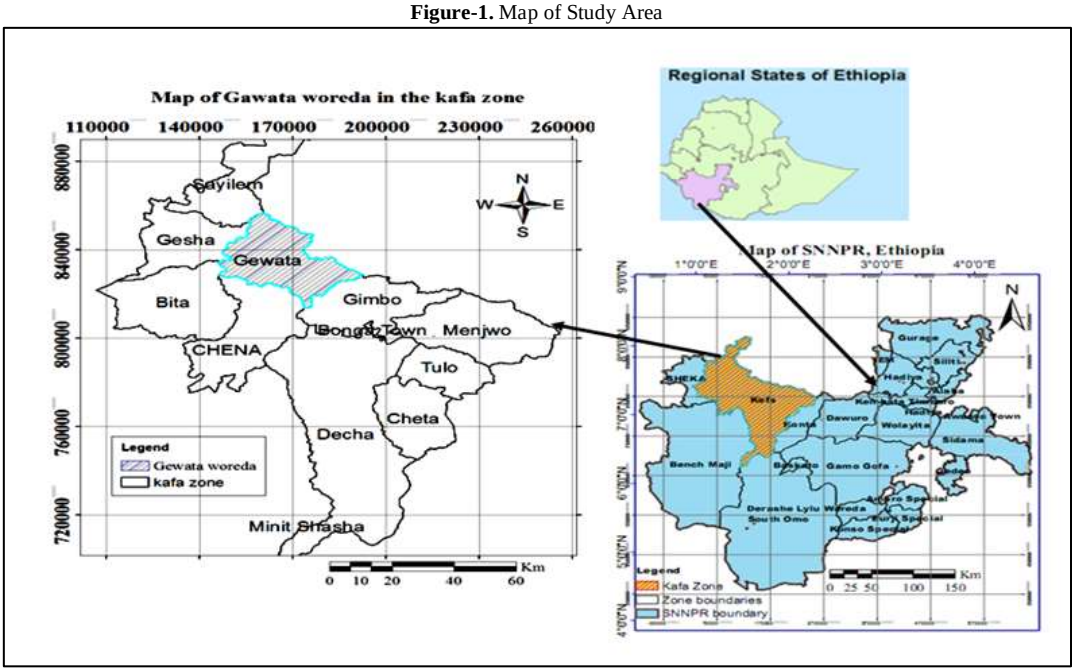
2. Methodology

2.1. Description of the Study Area

Gewata district is located in Southwest of Ethiopia, Kaffa zone. It is located 86km away from Bonga town, 813km from Hawasa and 546km from Addis Ababa. The area lies within 07°25′- 7°50′N Latitude and 35°56′-35°89′E Longitude. It is bordered in the South by Gimbo and Chena district, in the West by Bitta and Gesha district, in the North by sayilem and Oromia region and in the East bordered by Oromia region (GDAO, 2016). The district has a total of 30 kebeles of which 27 are rural based kebele administration areas and 3 are urban kebeles.

According to GDHO Gewata District Health Office (2016), the total population of the district was 91,645 of which male accounts for 44906 (49%) and female accounts 46739 (51%) of the total. Of the total households 97.32% are rural agricultural households. The estimated total area coverage of the district is 91,500 hectares. Gewata district is well known by high vegetation cover and most of the surrounding area is covered by tropical rain forest comprising a rich mixture of woody species arranged in many stories. The area is characterized by a long rainy season that extends from March /April to October. The mean annual rainfall ranges from 1800 mm to 2200mm. Over 85% of the total annual rainfall occurs in 8 months rain season**,** with mean monthly values in the range of 125-250mm occurs in 8 months long rain season. The mean temperature of the district ranges from 16°c (lowest) and 22°c highest. The district is dominated by midland agro ecology which is favorable for coffee production. The dominant soil type of the district is loamy soil. The district was characterized by subsistence mixed farming system in which production of both crops and livestock is common economic activity (GDAO Gewata District Agriculture Office, 2016). The district is known for its highest production of coffee and other cereal crops. However, coffee production takes the lion share and main source of income generation of the household in the district. Major cereal crops grown in the district are maize, barley, faba bean, chickpea, *teff.* Moreover, root crop are produced in the district include sweet potato, potato and *taro (godere)* and fruit product like banana and avocado are produced in the district.

Figure-1. Map of Study Area



2.2. Data Types, Sources and Methods of Data Collection

Both primary and secondary data were used for this study. Primary data were collected from smallholder coffee producers randomly selected from four rural *kebeles.* The primary data were collected from farmers by focusing on factors affecting coffee market supply, size of output, distance from nearest market, cooperative membership, credit access, access to transport, size of land allocated for coffee, extension service, and demographic characteristics of the household. Before the data collection, the questionnaire was pre-tested on five farmers to evaluate the appropriateness of the design, clarity and interpretation of the questions, relevance of the questions and to estimate time required for an interview. Subsequently, appropriate modifications and corrections were made on the questionnaire. The questionnaire covered different topics in order to capture relevant information related to the study objectives. Secondary data were collected by reviewing documents of secondary sources namely: Gewata district office of agriculture, office of trade and industry, district cooperative and marketing office, office of district environmental protection, Ethiopian Commodity Exchange (ECX) and Kaffa Zone of agriculture. Beside to district offices information, websites were visited to generate relevant secondary information focusing on coffee marketing. Furthermore, from these secondary sources data on prices, output, number of licensed coffee traders and data on other socioeconomic variables were taken.

2.3. Sampling Procedure and Sample Size Determination

The sample for this study was drawn from coffee producing households coffee traders and consumers. Multi stage random sampling procedures was used for the selection of sample household heads. Gewata district was selected purposively as it was one of the highest coffee producing district in Kaffa zone. In the first stage from a total of 30 kebeles of the district, 4 coffee producing kebeles namely Senteria, Mashamalo, Emich and Wodiyo were selected randomly. In the second stage, from 8269 coffee producers in Gewata district, 121 samples of household heads were selected randomly, using probability proportionate to size. Sample size was determined following a simplified formula provided by Yamane (1967). Accordingly, the required sample size at 95% confidence level with

degree of variability of 5% and level of precision equal to 9% were used to determine a sample size required to represent the population.

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

Where, n = sample size, N= population size (sampling frame) and e = level of precision considered 9%.

Table-1. Sample distribution of coffee producers in selected kebeles

Kebeles	Total number of coffee producers	Number sample household selected
Senteria	234	22
Mashamalo	341	32
Emicho	262	24
Wodiyo	463	43
Total	1300	121

Source: Gewata District Agriculture Office (2017)

2.4. Methods of Data Analysis

Both descriptive statistics and econometric analysis were used for analyzing the data.

Descriptive statistics like: ratios, percentages, means and standard deviations in the process of examining and describing farm household characteristics, The econometric methods of data analysis refers to the use of different economic and statistical tools or models for testing hypothesis related to the objective of the study. For this study multiple linear regression was used to analyze the determining factors that affect market supply of coffee. Since, coffee is a cash crop that all farmers decided to produce for selling purpose in order to earn cash. Therefore, all the sampled coffee farmers of the study area supply coffee to the market and the dependent variable which is amount of coffee supplied to the market is a continuous variable. Hence, multiple linear regression model (was fitted to survey data to identify the determinants of coffee supply to the market. Even if the multiple linear regression model was the fitted model for the data, it doesn't address the endogeneity problem of the data. Therefore, the two stage least square (2SLS) was applied to full fill the exogeinty assumption of Classical Linear Model (CLRM) since quantity produced was taken as an explanatory variable. Following (Greene, 2000), econometric model specification of the multiple linear regression models in matrix notation is:

$$Y_i = \beta X_i + \varepsilon_i \quad (2)$$

Where: Yi = coffee supplied to the market

β = a vector of estimated coefficient of the explanatory variables

X_i = a vector of explanatory variables

ε_i = is disturbance (error) term

2.5. Independent Variables Which Affect Quantity of Coffee Supply

The independent variables hypothesized to affect quantity of coffee supply are the following:

Sex of the household head: This is a dummy variable that takes a value of 1 if the household head is male and zero otherwise. In mixed farming system, both men and women take part in crop production and management. Bizualem *et al.* (2015), found that marketing infrastructures are less accessed by female headed than male headed coffee producing household. Therefore, this variable is expected to affect market supply of coffee positively.

Household size: It is a continuous variable measured in terms of number of family members in the household. Family is an important source of labor supply in rural areas. It is expected that households with large family members have better advantage of being able to use labor resources at the right time, particularly during peak harvesting period. Accordingly, families with more household members tend to have more labor which in turn increase coffee production and then increase coffee market supply. On the other hand, family size also decreases market supply because high proportion of the product would be used for consumption. But for this study family size was expected to influence positively the volume of coffee supply to the market. Gezahagn (2010), who found that family size have positive effect on the households' gross income from groundnut production.

Education level of household head: It is continues variable measured in terms of years of schooling that the household head was attended and hypothesized to affect market supply positively. This is due to the fact that a farmer with good knowledge can adopt better practices and would increases marketable supply. A study conducted by Zekarias *et al.* (2012) indicated that, education positively and significantly affected the market supply of coffee. Therefore, this variable was expected to affect market supply of coffee positively.

Amount of credit received: This is a continuous variable which represent the amount of credit taken by an individual household for coffee production purposes. Credit is a key financial instrument to break low level of production and then marketing problem. Debashis and Debajit (2013), found that access to credit affected marketed surplus of paddy positively. Hence, it was hypothesized that farmers 'who receive credit would influences market supply positively.

Quantity of coffee produced: It is a continuous variable that can affect the household level volume sales and measured in quintals per hectare during survey year. Quantity produced is assumed to affect the volume market supply positively, because a farmer that obtains high yield can supply more to the market than a producer who had fewer yields. Bosena (2008), found that productivity of cotton influenced marketable supply of cotton positively and significantly.

Distance to nearest local market: It is a continuous variable and is measured in kilometers which farmers spend time to sale their product to the market. If the farmer is located in a village or distant from the market, he/she is weakly accessible to the market. The closer to the market the lesser would be the transportation cost and time spent. A study conducted by Mohammed (2013) identified that distance from the nearest market affected quantity of coffee marketed significantly and negatively. Therefore, this variable was expected to affect market supply of coffee negatively.

Non/off-farming income: It is continues variable measured in amount of birr that income in thousand obtained from non-farming activities or income out of own farm by the household head. This income may strength farming activity or reluctant to produce coffee to generate money from coffee rather than getting income from other activities. However, getting income from non-farming activity is assumed to have direct or inverse relation with marketable surplus. Bizualem *et al.* (2015), found an increase in the non/off-farm income, increase coffee marketed surplus and income obtained from businesses other than farm activities would finance the production and enhanced marketed surplus. Hence, off/non-farm incomes was expected to influence market supply of coffee either negatively or positively.

Membership to coffee cooperative: It is a dummy variable and takes the value of 1 if the household is member of coffee cooperatives, and 0 otherwise. Thus, cooperatives improve understanding of members about market and strengthen the relationship among the members. Bizualem *et al.* (2015), found that those who are a members of cooperatives might be motivated with double payment (dividend payment besides actual price of commodity) than non-members and motivated to increase the quantity of coffee marketed. Therefore, this variable was expected to be associated to marketed surplus positively.

Frequency of extension contact: It is a continuous variable measured in number of days visited by Development Agent (DA). A study conducted by Wondmagegn (2014), indicated that extension service positively and significantly related to the volume of coffee product supplied to the market. This suggests that extension service avails information regarding technologies which improves production of coffee that affects the volume coffee supplied by the household to the market positively.

Ownership of means of transportation: It is a dummy variable which takes a value of 1 if the household owned transportation facility and 0 otherwise. The availability of transportation facilities helps farmers to supply their product from long distance and remote area to the available market easily. Agete (2014), found that ownership of transportation means significantly enhance market supply of households in red bean market. This variable is expected to have positive effect on market supply of coffee.

3. Result and Discussion

3.1. Socio-Demographic Characteristics of Coffee Producers

This section begins by discussing demographic characteristics sample respondents with regard to sex of the household head, years of farming experience, household size, and education level of coffee producing households. It further discuses findings of coffee production status and access to service.

As shown in Table 2, out of the total sample respondents, 99(81.82%) were male-headed households and 22(18.18%) were female-headed. Regarding cooperative membership, 67(55.37%) of the sampled households were members of coffee cooperatives and 54(44.63%) were not organized under coffee cooperatives.

Table-2. General Characteristics of sampled households (dummy and categorical variables)

Variables	Frequency	Percent
Sex		
Female	22	18.18
Male	99	81.82
Cooperative membership		
No	54	44.63
Yes	67	55.37
O/ship of means of transport		
No	37	30.58
Yes	84	69.42

Source: survey result, 2017

With respect to educational level of the sample households the average number of years of schooling completed was 4.25 years with a standard deviation of 3.03. The average household size of respondents was 5.87 with standard deviation of 2.21. The level of coffee farming experience is taken to be the number of years that an individual was continuously engaged in coffee production activity. The average years of farm experience for sample respondents was found to be 12.041 years with standard deviation of 4.90. Regarding the distance from home to the nearest coffee market place where they sold their product (coffee), sampled coffee producing farmers reported that they have

to travel an average of 3.58km (approximately) with corresponding standard deviations of 1.72. The minimum and the maximum distance that sampled coffee producing respondents have to travel to nearest market centers were 0.5 km and 7 km, respectively (Table 3).

3.2. Land size and Ownership

The average area of land allotted to coffee production per household was 1.27 hectares with standard deviation of 0.77. The minimum and maximum land allocated for coffee production was 0.25 and 3 hectare respectively.

Extension contact: Extension service provision was expected to have direct influence on the production and marketing behavior of the farmers. The mean extension contact frequency provided for coffee producing farmers was found to be 1.82 day/month with standard deviation of 0.84 as mentioned in Table 3.

Table-3. General Characteristics of sampled coffee farm households (Continuous variables)

Variables	Observation	Mean	Std. dev
Household size(number)	121	5.87	2.21
Education(years of schooling)	121	4.25	3.03
Farming experience(years)	121	12.04	4.90
Distance to market(km)	121	3.58	1.72
Land under coffee(hectare)	121	1.27	0.77
Extension contact frequency	121	1.82	0.84
Amount of credit received	121	812.19	2597.58

Source: survey result, 2017

Access to credit service: Farmers access to credit may reduce the effect of financial constraints and able to buy the necessary inputs which improves their coffee productivity more readily than those with no access to credit. Therefore, it is expected that access to credit can increases the production of agricultural crops in general and coffee in particular. Even if credit services enhance the productivity level of farmers, there is lack of attention to access and availability of credit from formal institution rather than borrowing from informal sources (friends, relatives or village money lenders). Those households who have access to credit receive from their relative and friends in the form of cash or in kind. The mean credit received was found to be 812.19 birr with standard deviation of 2597.85. The amount of credit received ranges from 0 to 14600 birr minimum and maximum respectively.

3.3. Determinants of Quantity of Coffee Supplied to Market

Since, coffee is a perennial and cash crop, coffee farmers' primary decision to produce it for sales purpose in order to earn cash as well as for household consumption purposes. According to the result of this study, all sample households are suppliers of the coffee to the market. Therefore, multiple linear regression model was employed to identify the factors affecting market supply of coffee. For the parameter estimates to be efficient, unbiased and consistent assumptions of Classical Linear Regression (CLR) model should holds true? Hence, multicollinearity, endogeneity and heteroscedasticity detection test were performed using appropriate test statistics.

Test of multicollinearity: All VIF values are less than 10. This indicates absence of serious multicollinearity problem among independent variables (Appendix Table 1). If there is presence of multicollinearity between independent variables, it is impossible to separate the effect of each parameter estimate in the dependent variables. It is thus, important to test multicollinearity between explanatory variables.

Test of heteroscedasticity: Since there is heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. Therefore, to overcome the problem, Robust OLS analysis with heteroscedasticity consistent covariance matrix was estimated.

Test of endogeneity: Testing for endogeneity of quantity of coffee produced was carried out in the model using both Hausman test and Durbin-Wu-Hausman (DWH) test and endogeneity problem was found in quantity produced variable. Hausman test result indicated that, the predicted productivity was statistically significant with (p= 0.000) when included as additional explanatory variable in structural model which implies hypothesized quantity produced variables endogenous due to its correlation with error term. Durbin Wu-Hausman test results also shows that the null hypothesis of exogeneity of the quantity produced was rejected at 1% probability level (χ^2=17.76 and P-value = 0.000) using estat endogenous STATA command after ivregress. Therefore, two stages least square (2SLS) method was used to address the endogeneity problem.

The F test result for for quantity of coffee produced was"137.006" (a general rule of thumb is that if F test is less than 10 there is cause for concern). So we should reject the null hypothesis presence of weak instruments hence our statistics greatly exceeded the critical values (Appendix Tables 6). Overidentifying restrictions test was also tested using Hansen-Sargan test and Basmann test using estat overid command. The results of Basmann test show a P-value of 0.448, and which indicated the model is correctly specified and the instruments are valid (Appendix Tables 3).

Therefore, 2SLS methods was applied to overcome the endogeneity problems. In the first stage of 2SLS method, regressions was run and analyzed using eleven explanatory variables including instrumental variables and the result showed that, education level of household head cooperative membership, distance to nearest market, land under coffee and years of farming experiences affects significantly quantity produced of coffee (Appendix Table 2). Land under coffee and years of farming experiences are used as instruments for quantity produced variables.

As shown in Table 2, in second stage of 2SLS ten explanatory variables was used to influence the volume sales of coffee; from those five variables quantity of coffee produced, education level of household, cooperative membership, distance to nearest market and ownership of means of transport were significantly affects the amount of quantity of coffee supplied to market. The result shows that the model was statistically significant at 1% level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations (R^2) was used to check goodness of fit for the regression model. Hence, R^2 indicates that 94.27 % of the variation in the farm level market supply of coffee was explained by the explanatory variables included in the model.

Table-4. Determinants of farm level volume sales of coffee (2SLS estimates)

Variables	Coef.	Std. Err.	z
Constant	(-.963)*	.418	-2.30
Quantity produced	(.668)***	.052	12.84
Sex of household head	.002	.008	0.33
Household head size	.004	.005	0.89
Education level of household head	(.080)**	.030	2.67
Cooperative membership	(.038)**	.013	2.92
Off/nonfarm income	.004	.031	0.129
Extension contact frequency	.032	.022	1.45
Distance to nearest local market	(-.130)**	.060	-2.167
Ownership of transport	(.027)***	.004	6.75
Amount of credit received	.001	.002	0.5

Number of observation = 121, R-squared=94.27, Prob>F=0.0000***
Note: Dependent variable is quantity of coffee supplied in kg (transformed in ln)
***, ** and * significant at 1, 5, and 10 probability levels respectively
Source: survey result, 2017

Quantity produced: As it was hypothesized that quantity of coffee produced is positively and significantly related with market supply of coffee at 1% significance level. The positive and significant relationships between the two variables indicate that coffee produced is very important variable affecting household head volume of coffee supply. The coefficient for quantity of coffee produced implies that an increase in productivity of coffee by one quintal per hectare resulted in an increase in farm level market supply of coffee by 66.8%, keeping other factors constant. This is in line with Bosena (2008) Bosena and Addisu (2016) showed that cotton and potato productivity significantly and positively affected the market supply of each of the commodities, respectively.

Educational level of the household head: Educational level of the household head was found to have positive and significant relation with the quantity of coffee supplied to the market. It influence household market supply of coffee at 5% significance level. The model output shows that a one year increase in formal education level leading to an increase in market supply of coffee by 8%. The positive and significant relationship indicated that education determines the willingness to accept new ideas and innovations, and easy to get supply, demand and price information which enhances farmers' willingness to produce more and increase volume of sales. Zekarias *et al.* (2012), studied market chain analysis of forest coffee in south western Ethiopia and found that education level has significant and positive effect on market supply. Cooperatives membership: Membership in coffee cooperative affect volume of coffee supplied positively at 5% significance level. As compared to those household who are not a member of coffee cooperatives, those household who are a member of coffee cooperative market supply increase by 3.8%. They were motivated to supply more quantity of coffee with the expectation future benefit from profit dividend than non-members. Farmers in groups have a strong bargaining power when marketing their products and in turn receive better returns for their produce. The result is in line with Bizualem *et al.* (2015) who indicated that being a member in coffee cooperative increase marketed surplus positively and significantly. Distance to the nearest local market: The result obtained from the model output indicates that distance from the nearest market was found to be negative and significant influence on the market supply of coffee at 5% significant level. An increase in distance from nearest coffee market by a unit kilometer decreases quantity of coffee supplied to the market by 13% keeping other factors constant. This implies that an increase in market distance increase producers marketing cost and this in turn reduces market supply of coffee. It is in line with Wondmagegn (2014) reported that market distance affecting volume of coffee market supply negatively. Ownership of means of transportation: Transportation was also another factor, which was hypothesized to affect the volume of coffee supplied positively. The variable's coefficient is positive and statistically significant at 1% significance level. The positive and significant relationship between variables indicate that, as farmers have their own means of transportation, the quantity of coffee supplied to the market increase by 2.7% keeping other factors constant. This is concurrence with the study of Agete (2014) who found that ownership of transportation means significantly enhanced market supply households in red bean market.

4. Conclusion and Recommendations

Econometric result of 2SLS model indicated that education level households heads, cooperative membership, distance to nearest market, quantity of coffee produced and ownership of transportation access to transport significantly determined the quantity of coffee supplied to market. However, from those mentioned significant variables, distance to nearest market was significantly and negatively affected market supply of coffee. Therefore, government and other concerning bodies should give emphasis on encouraging farmers to learn adult education and

providing short and intermediate practical based training. Building farmers' exposure through trainings and creating a conducive environment to share their experience with other farmers found in the zone and other regions. Encouraging the existing cooperatives members and announcing non-members about the additional cost that they would incurred from not being a member of cooperatives and persuading them to become member of cooperatives and benefiting them from profit dividend. Strengthening the existing means of transport and creating conducive environment for transport that enhance production capacity of producers and market supply. Therefore, strengthening and expanding the existing rural roads that connect different rural kebeles with market through encouraging rural road construction worker.

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Appendices

Appendix Table-1. Test for multicollinearity of explanatory variables

Variable	VIF	1/VIF
Quantity produced(ln)	3.54	0.282847
Distance to nearest market	2.01	0.498127
Education level of household head	2.00	0.500464
Amount of credit received	1.38	0.724631
Extension contact frequency	1.33	0.751019
Off/non-farm income	1.27	0.786186
Household size	1.25	0.801744
Transport ownership	1.17	0.856192
Cooperative membership	1.15	0.866054
Sex of household head	1.08	0.924532
Mean VIF	1.62	

Source: Own computation from survey result, 2017

Appendix Table-2. Factors affecting quantity produced of coffee

Variables	Coef.	Robust Std. Err.	t
Sex of household head	.003	.309	0.01
Household head size	.189	.133	1.42
Education level of household head	(.325)***	.123	2.65
Cooperative membership	(2.55)***	.955	2.67
Off/non-farm income	.025	.045	0.57
Extension contact frequency	-.016	.215	-0.08
Distance to nearest market	(-.161)*	.074	-2.17
Ownership of means of transport	.153	.640	0.24
Amount of credit received	.487	.121	4.00
Land under coffee	(8.263)***	.615	13.42
Years farming experience	(3.242)***	1.081	2.99
Constant	-2.190	1.39	-1.58

Note: quantity of coffee produced is dependent variable.
Land under coffee and years of farming experience are instruments for quantity of coffee produced.
Source: Own computation from survey result (2017).

Appendix Table-3. First-stage regression summary, endogeneity and over identification test

Test of endogeneity for quantity produced					
Ho: variables are exogenous					
Durbin (score)chi2(1)			17.76 (p = 0.000)		
Wu-Hausman F(1,109)			18.75 (p = 0.000)		
First regression summery statistics					
Variables	R-sqr	Adj-sqr	Partial R-sq.	F(2,109)	Prob > F
Quantity produced(log)	0.914	0.905	0.714	137.006	0.000

Minimum eigenvalue statistic	= 137.006	
Critical Values		# of endogenous repressors:1
Ho: Instruments are weak		of excluded instruments: 2

	10%	15%	20%	25%
2SLS size of nominal 5 % wald test	19.93	11.59	8.75	7.25
LIML size of nominal 5 % wald test	8.68	5.33	4.42	3.92

Over identifying restriction test	
Sargan chi2(1)	= .634(p=0.425)
Basmann chi2(1)	= .574(p=0.448)
Score chi2(1)	= .700 (p =0.402)

Source: Own computation from survey result (2017).