Analysis of marketed surplus of coffee by smallholder farmers in Jimma zone, Ethiopia

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Abstract

The generation of marketed surplus and its transfer from agricultural sector to non-agricultural sector is crucial for achievement of self-sustaining economic growth. In order to expand the leading role agriculture plays in economic growth and poverty reduction, smallholder farmers need to improve their marketed surplus. A higher marketed surplus would help farmers to participate in a high value markets by increasing their level of income. The objective of this paper is to estimate the marketed surplus of coffee by smallholders and to identify its underlying determinants. A stratified multi-stage random sampling procedure was hired and a total of 152 smallholder farmers from six kebeles were randomly and proportionately sampled to collect both secondary and primary sources. The result of econometric analysis from OLS marketed surplus model revealed that sex, coffee farming experience, access to credit, perception of farmers towards the adequacy of extension service on marketing, perception of farmers towards current price of coffee, membership to coffee cooperative, and non-and/or off-farm income significantly affected marketed surplus of coffee. The findings imply that offering farmers a fair price, providing adequate credit and extension services, improving marketing infrastructures, building farmers' experience, encouraging farmer's business diversification besides farming, improving farmer's linkage with cooperatives, and paying attention to female households are needed to increase coffee marketed surplus.

Key words: - Marketed surplus, Coffee, Multiple linear regression

INTRODUCTION

Background and justification: Agriculture remains to be the main stay of Ethiopian economy contributing about 47% of GDP and providing employment to more than 80% of the rural population (World Bank 2010). Commercializing smallholder agriculture is an indispensable pathway towards economic growth and development for most developing countries relying on the agricultural sector (Timmer 1997). Marketed surplus as generally been defined as the portion of production which actually enters the market irrespective of farmer's requirements for family consumption, farm requirements, social and religious payments. Coffee, Ethiopia's largest export crop is the backbone of the economy (Nicolas 2007). It is estimated that between 7.5 and 8 million households depend on coffee for a considerable share of their income, and provides jobs for many more people in coffee-related activities of processing, transporting or marketing along activities (Samuel & Eva 2008). Although coffee is produced in many parts of Ethiopia most of the marketed coffee comes from the regions of Oromia and Southern Regional State. The two regions contribute for about 99 % of the total coffee production (64% from Oromia, 35% from SNNP) and the remaining 1% comes from Gambela regional states (FDRE-MOT 2012). Jimma zone is one of the coffee growing zones in Oromia Regional State covering a considerable export share of the country (JZARDO 2008).

To meet ever increasing demand of coffee, the country is heavily dependent on the availability of adequate local supplies particularly from Jimma zone. In order to expand the leading role agriculture plays in economic growth and poverty reduction, smallholder farmers need to improve their marketed surplus. A higher marketed surplus would help farmers to participate in a high value markets by increasing their level of income. Despite the importance of coffee for better income generation, smallholder farmers in the area continue to face numbers of challenges related with marketing. Though coffee is one of the world's most traded goods, as the commodity price has plunged in recent years it is increasingly hard for coffee farmers to survive on their crops (Tora Bäckman 2009). Even if some farmers are continuously encouraged to increase supply of coffee into the market, the low price offer forced farmers to hoard their products waiting for better price. The nature of the commodity

on the one hand and lack of properly functioning marketing system on the other often resulted in lower producers' price. Limited access to market facilities, less exposure for market information, infrastructural problem, inadequate support services and problem in transportation services are some the problems resulting in low participation of smallholder farmers in selling their products. More importantly marketed supply of coffee in the study areas is subjected to seasonal variation where surplus supply at the harvest time is the main feature (preliminary information). Therefore, understanding the behaviour of marketed surplus of coffee and the variables affecting it can be of great importance in the development of sound policies with respect to agricultural marketing and prices, imports and exports, and overall rural and national development objectives of the country. Hence, it was important to analyse determinants of marketed surplus of coffee and point out potential factors policy should focus in the area.

METHODOLOGY

Description of the study area: Jimma zone is located in the South-Western part of Ethiopia between Latitude 6° and 9° North and Longitude 34° and 38° East, and between altitude ranges of 880 to 3340 meters above sea level (ORG 2003). The Zone is one of the coffee growing zones in the Oromia Regional State, Ethiopia which has a total area of 1.1 million hectares of land. Currently, the total area of land covered by coffee in the zone is about 0.1 million hectares, which includes small-scale farmers' holdings as well as state and private owned plantations. Jimma zone covers a total of 21% of the export share of the country and 43% of the export share of the Oromia Region (JZARDO 2008). There are favourable climatic conditions, variety of local coffee types for quality improvement and long history of its production in the Zone. In Jimma zone, coffee is produced in the eight districts, amongst and Limmu-Kossa Gomma serves as a major means of cash income for the livelihood of coffee farming families (JZARDO 2008).

Limmu-Kossa district is geographically located between 70 50' to 80 36' North and 360 44' to 370 29' East (ORG 2003). The total surface area of the district is 1355 km^2. Agro-climatic condition of the district comprises of highland (25%), midland (65%) and lowland (10%) with annual rain fall varying between 1200 to 2000 mm and altitude ranging between 1450 to 1950 masl while annual temperature is 10^oC to 25^oc. The total population of the district is 187,815 out of which 50.5% are male. The average land holding size per household is 2.39 hectare out of which 24.6% is covered with annual crops.

Gomma is also one of the known coffee growing districts of Jimma Zone. It is located 397 km Southwest of Addis Ababa and about 50 km west of Jimma town (ORG 2003). Its area is 1,230.2 km^2. The annual rainfall varies between 800-2000 mm, while the mean minimum and maximum annual temperatures of the district vary between 7^oC-12^oC and 25^oC-30^oC, respectively (ARDO 2008). Altitudinal range of the district is between 1387-2870 masl. Agro-ecologically, this district is divided into highland (8%), midland (88 %), and lowland (4%).
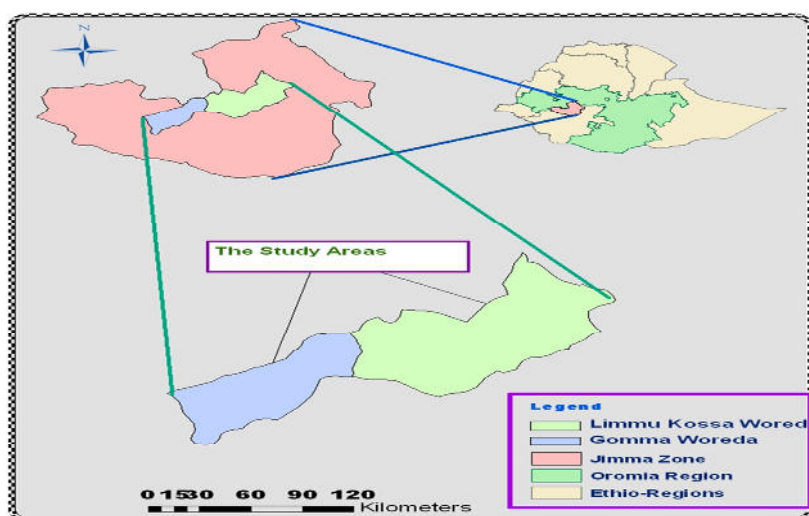

Figure 1: Map of the study area
Source: Adopted and manipulated from Ethiopian map

Sampling Techniques: A stratified multi-stage random sampling procedure was employed. In the first stage districts were stratified in two as potential and non-potential areas for coffee production. From among the eight potential districts, two districts namely Gomma and Limmu-Kossa were sampled randomly. Production potential of kebeles was again assumed to be important criteria to stratify kebeles for deriving representative sample kebeles. However, since it was difficult to get the actual volume of coffee production in each kebeles, agro-ecology was an alternative best proxy for production potential in the study area. Thus, in the second stage, kebeles in the two districts were stratified into three by their agro-ecology as lowland, midland and highland. The lowland agro-ecology covers less than 10% in both districts while the highland agro-ecology covers only 8% in Gomma district. Accordingly, kebeles were sampled randomly and proportionately from midland and highland category in Limmu-Kossa district and from midland category in Gomma district. After screening out non- producing kebeles, proportionately four kebeles from Limmu-Kossa district (three from midland and one from highland) and two midland kebeles from Gomma district were randomly selected to obtain a total of six sample kebeles. In the third stage, based on the number of coffee farmers available, proportional size of sample coffee farmers were selected from each sample kebeles using simple random sampling technique.

Sample Size Determination: Since adequate size of sample is needed for the purpose of econometric analysis (Israel 1992), sample size is determined using Cochran (1963) formula. For populations that are large, Cochran (1963) developed the following Equation to yield a representative sample for proportions: $n_0 = \dfrac{z^2 pq}{e^2}$ ……….……….. (1)

Where, n_o is the sample size, Z is the standard normal distribution (1.96) at $\alpha= 0.05$, p is the estimated proportion of an attribute that is present in the coffee growing population from the districts (in this case 10% of population is considered) and q is 1-p, e is the is the desired level of precision, (in this case 0.05). Therefore,

$$n_0 = \frac{(1.96)^2 (0.1)(0.9)}{(0.05)^2} = 138$$

But for the finite number of population known (in this case 54,893 coffee growing farmers, (30,000 from Gomma and 24,893 from Limmu-Kossa district) finite population correction for proportions was needed. If the population is small then the sample size can be reduced slightly. This is because a given sample size provides proportionately more information for a small population than for a large population. Hence, the sample size (n_o) in equation 1 can be adjusted using the following Equation 2 (Cochran, 1963).

$$n = \frac{n_0}{1 + \dfrac{(n_0 - 1)}{N}} \quad ....(2)$$

Where n_o is sample size calculated in equation (1) assuming infinite number of population, n is the adjusted sample size for population known, and N is the population size. Therefore, out of 54,983 total smallholder coffee producing farmers, 138 sample coffee farmers were selected. Besides, many researchers commonly add 10% to the sample size to compensate for persons that the researcher is unable to contact (Israel 1992). In this way the sample size was subject to some modification to account conditions in the survey period and increased to 152 by adding the 14 (10%) on the 138 samples.

Data Types, Sources and Method of Collection: The data, both quantitative and qualitative type, of this study was collected from both primary and secondary sources through questionnaire, checklist, and group discussion. Structured questionnaire was used for the data collection from smallholder farmers through trained enumerators. Qualitative data about business practices and transactions and the patterns and socio-economic activities of the farmers in the study areas were gathered informally through direct observation of the study areas and informal discussions with key informants like DAs, agriculture sector offices, administrators, and ethnic leaders. On the other hand, secondary data of both qualitative and quantitative such as agricultural inputs supplied and consumed, physical characteristics, population size etc. were gathered through thorough reviewing and examination of reports as well as records of published and unpublished documents.

Method of Data Analysis: Descriptive statistics like means, frequencies, percentages, maximum, minimum, and range were used to describe the descriptive result while t test and chi-square test were used to test it; and multiple linear regression model was employed to analyse factors affecting marketed surplus.

Specification of the regression model for marketed surplus: Market participation studies based up on dichotomous regression models have attempted to explain only the probability of participation versus non-

participation rather than the extent and intensity of participation. A strictly dichotomous variable often is not sufficient for examining the extent and intensity of some problem such as market participation (Feder *et al.* 1985). Thus, multiple linear regression model was applicable for marketed surplus analysis since all household farmers in this study sold coffee. The Econometric model specification of marketed surplus function in matrix notation is $y_i = X'\beta + \varepsilon_i$, where; y_i is quantity of coffee in kg marketed, X' is vector of explanatory variables, β is a vector of parameters to be estimated, and ε_i is disturbance (error) term.

Definitions and Hypothesis of Variables

Dependent variable
Log of marketed surplus (marketed_log): It is a continuous variable measured by the total quantity of coffee (in dry cherry unit) in kg marketed by individual smallholder farmer in 2013/2014 fiscal year.

Independent variables: Marketed surplus were hypothesised to be influenced by various factors such as institutional, infrastructural, socioeconomic, etc. Based on the preliminary information and literature reviews, the following variables were defined and hypothesised accordingly.

Sex of the household head (sex): It is a dummy variable taking 1 for male and 0 for female coffee farmers. Male headed farmers are expected to have positive relation with marketed surplus than female headed one. Mamo and Deginet (2012) found that sex of the household head has statistically significant effect on whether or not a farmer participates in the livestock market. Thus, being male headed household was hypothesised to affect marketed surplus positively.

Literacy status of the household (literacy): It is a dummy variable considering farmers' education from illiterate up to the higher level of education. It takes 0 for illiterate and 1 for literate household. Households who have better knowledge are assumed to adopt better production and marketing practices which in turn increase the supply of produce to the market. Grover *et al.* (2012) found that level of education was found to affect marketed surplus of wheat and rice positively and significantly. Holloway *et al.* (1999) revealed that education had significant and positive effect on quantity of milk marketed in Ethiopian highlands. Therefore, literacy status was hypothesised to influence marketed surplus positively.

Coffee farming experience (exp): This is a continuous variable referring to the number of years since the start of coffee production and assumed to affect quantity of coffee to be sold positively. Farmers with longer production experience are expected to be more knowledgeable and skilful and then would most probably increase the amount of coffee supplied to the market. The result from Abraham (2013) implied that as farmers have high potato production experience the amount of potato supplied to the market increased through its effect on potato production. Ayelech (2011) and Abay (2007) have also found that their respective commodity farming experience has affected quantity of avocado and tomato supplied positively. Hence, it was hypothesised to affect coffee marketed surplus positively.

Active family labour force (labour): It is a continuous variable considered as the number of active labour force available in the household, which affects farmer's marketed surplus. Since production, processing and other marketing activities are the function of labour, availability of labour was assumed to have positive relation with marketed surplus. A study by Singh and Rai (1998) revealed that marketed surplus of buffalo milk was negatively related with family size. However since coffee is a commercial commodity, it is assumed that the positive effect of active family labour force weighs up that of the negative impact on marketed surplus there by hypothesised to have positive impact on quantity of coffee marketed.

Distance to the nearest red cherry market (disred): It is a continuous variable defined as the distance for coffee producer households from the nearest red cherry market and measured in kilometres of single trip. This variable is proxy to transportation cost, loss cost, and marketing cost. Being far from home to the nearest market is another indicator of market isolation. Those households who are close to red cherry market are encouraged to have better probability of supplying their red cherry coffee to the market there by increasing volume of coffee marketed. It is expected that longer distances increase travel time and travel costs, which affect the marketed surplus negatively due to adverse impact on market participation. Abraham (2013) indicated that distance to market caused market surplus of cabbage to decline. Therefore, distance to the nearest red cherry market center was hypothesised to negatively associated with coffee marketed surplus.

Distance to urban centre (disurban): It is a continuous variable measured in kilometres of distance from the farmers' residence to the nearest urban center. Accordingly, distance from household's home to the district towns was considered. In this study, the variable is assumed as a proxy for access to information assuming that urban centres are sources of market and other information. The advantage is that as farmers are close (near) to urban centers, they would have more interaction with informative peoples and get awareness about price information, its costs and benefits and overall market condition. Hence, it was expected to influence volume of coffee marketed negatively.

Access to credit (credit): This is a dummy variable taking the value 1 if farmer takes loan for production and/or marketing activities related to coffee and 0 if otherwise. Credit is a key financial instrument to break low level production and then marketing problem. It is critical in financing investment and purchase of new inputs (Ellis 1992 as cited in Shimelis 2004). Sarkar and Roy (2013) found that access to credit affected marketed surplus of paddy positively. Hence, it was hypothesised that farmers' access to credit would influences marketed surplus positively.

Perception of farmers towards extension service on marketing (extm): It is defined as whether farmers have got an extension services related to marketing promotion. The aim of the extension service here is promoting farmers with providing marketing extension services to increase their involvement in market participation. The variable was considered as dummy taking 1 if farmers perceived that they got adequate extension service and 0 if otherwise. According to Ayelech (2011), extension contact affected quantity of mango supplied to the market significantly and positively. Therefore, marketing extension service given to farmers was hypothesised to affect marketed surplus of coffee positively. Therefore, the more certainly important the extension service, the more would be the quantity of coffee sold to the market.

Perception of farmers towards current price of coffee in general (price): If the farmer considers that the price of coffee is attractive, there would be an increase in quantity of marketed surplus; and if farmers had a view that the price was not attractive, he/she would be forced to decreases or even stops to supply coffee to the market and might choose alternative options like hording/storing. Sarkar and Roy (2013) and Adesiyan *et al.* (2012) found that an average price of paddy received by farmers affects marketed surplus of the crop positively.

Perception of farmers towards relative price of other crops (priceo): It is a dummy variable that can affect marketed supply of that given crop and in turn that of coffee. It takes a value of 1 if relatively attractive and 0 if otherwise. Here it is defined as a relative attractiveness of the price of other crops over that of coffee. An increase in price of other crops produced in the farm was expected to have negative effect on marketed supply of coffee. It is because farmers by that time might prefer to sell other crops they produce for their immediate expenditure that they think relatively attractive in price and prefer to dry and hoard coffee for waiting higher price in the future. In this case, price of maize and/or chat were taken as variable since these are important potential crops grown in the study areas. Here the two crops are not necessarily to mean substitute in consumption but are alternative crops to possibly be marketed. Therefore, relative price of other crops expected to have negative influence on the marketed surplus of coffee.

Membership to coffee cooperative (coop): It is a dummy variable taking the value of 1 if the household was tied up in coffee cooperatives and 0 if otherwise. Cooperatives can develop members' understanding about market and strengthen the relationship among the members which in turn determine participation in marketing. Those who are members of cooperatives might be inspired by additional dividend payment besides on actual commodity price than their counterparts and motivated to increase the quantity of coffee marketed. Some researchers argue that farmers in groups have an easy access to skills and information which in turn enable them to diversify their income sources and marketing. This happens because the government and donors target not individual farmers but farmer groups and cooperatives. These farmers are given grants and loans which enable them to expand the scale of marketing activities unlike non-members. Therefore, this variable was expected to be associated to marketed surplus positively.

Log of non- and/ or off-farm income (offarm_log): It is a continuous variable which refers to part of the total amount of income measured in birr that is received from business activities other than farm activities by the household. If earning from non/off-farm income is higher than income from coffee, farmers would shift towards the non/off-farm income activities due to the fact that farmers with better non/off-farm income would not tend to generate cash from sell of agricultural commodities rather is from their non/off-farm activity. Likewise, if households earn more non/off-farm income, they could wait for higher price of coffee in the future than selling currently. In these ways, it has negative effect on marketed surplus. According to (Komarek 2010; Omiti, *et al.*

2009; Alene *et al.* 2008; Rehima 2006), non/off-farm income contributes to low marketed surplus. On the contrary, another study revealed that off-farm income was positively related to the level of cereal sale in sub-Saharan Africa, which financed the production and enhanced the marketable surplus (Siziba *et al.* 2011). Therefore, non/off-farm income hypothesised to affect marketed surplus of coffee either positively or negatively.

RESULT AND DISCUSSION

Farmers' characteristics by marketed surplus: The average amount of coffee marketed in Limmu-Kossa district was 15.5 quintal and in Gomma it was 7.2 quintal. This implies on average smallholder farmer in Limmu-Kossa supply more quantity coffee than in Gomma district. Categorising farmers on their marketed supply (using the average marketed supply as reference); the majority of the farmers (64.5% of the total sample farmers) supplied an amount below the average quantity of marketed surplus. It is indicated that 61.2% of farmers who supplied below the mean quantity of marketed surplus are from Gomma district. Farmers in Limmu-Kossa supplied to the market more than those in Gomma. The Chi-square test result showed that there was significant difference in districts between marketed surpluses at 1% significant level. This difference might be due to the difference in different demographic, socio-economic and market environments of the districts.

Table 1 below depicts demographic and socio-economic characteristics of sample farmers across the volume of marketed surplus. Volume of coffee harvested, distance to urban center (proxy to access to market information), access to credit and adequacy of extension service have significance difference among those coffee marketers below the average and above the average at 1% significant level. These implied that farmers who harvested large quantity of coffee and those who have extension, information and credit access would sell relatively larger quantity than those households who harvest lesser quantity, and haven't extension, information and credit access. Thus, encouraging farmers to produce more and enabling them to access market information, extension and credit services is vital to achieve the objective of increasing marketed surplus.

Table 2: Mean/proportion comparison of variables by volume of marketed surplus

Variables	Marketed surplus			Pearson χ^2/ t
	Below mean (N=98)	Above mean (N=54)	Total (N= 152)	
District (Gomma, %)	61.2	27.8	49.3	15.58***
Agro-ecology (Lowland, %)	98	70.4	88.2	25.38***
Volume of coffee harvested (qtl)	21.31	81.86	42.82	-11.72***
Sex (male, %)	79.6	98.1	86.2	10.07***
Literacy status (literate)	76.5	92.6	82.2	6.15**
Cooperative (yes, %)	56.1	68.5	60.5	2.24
Distance to urban center (km)	2.89	5.32	3.75	-3.75***
Credit (yes, %)	50	87	63.2	20.52***
Adequacy of extension on marketing (yes, %)	15.3	51.85	28.29	22.92***
Price of red cherry coffee (attractive, %)	23.5	59.3	36.2	19.31***
Price of dry cherry coffee (attractive, %)	71.4	92.6	79	9.38***
Price of coffee in general (attractive, %)	11.2	92.6	40.1	95.94***
Relative price of other crops (attractive, %)	27.6	27.8	27.6	0.0009
Age (year)	43.6	43.76	43.66	-0.09
Farming experience (year)	16.46	16.91	16.62	-0.29
Active family labour (Number)	2.27	4.46	3.05	-9.16***
Non/off-farm income (birr)	1417.4	13592.2	5742.6	-6.79***

***, **, and * Significant at 1%, 5% and 10% significance level, respectively, N=sample size
Source: Authors computation from survey, 2014

59.3%, 92.6% and 92.6% of those farmers who sold above the average amount were those who perceived that the price of red cherry, price dry cherry and price of coffee in general attractive respectively. The corresponding chi-square values for these variables revealed that they have significance difference between those who marketed below and above the average level of marketed surplus at 1% significance level. Therefore creating an environment where higher price of coffee would be offered to farmers is an important policy issue for the concerned bodies so that farmers would be benefited from the sale of coffee. Ownership of modern transport

vehicles and availability of active family labour force depicted significance differences among those who marketed below and above the mean quantity of marketed surplus at 1% significance level. Thus encouraging farmers to have their own modern vehicles and to involve their family members on their coffee business would increase the amount of coffee marketed surplus (Table 1).

Econometric results

Determinants of marketed surplus: 12 explanatory variables (five continuous and seven dummy) were hypothesized to be determinant factors to affect marketed surplus of coffee. A VIF for continuous variables and contingency coefficient values for discrete variables were computed to check the existence of multicollinearity problem. The results revealed that no significant problems of multicollinearity and high degree of association among discrete variables were detected; then all the variables were included in the model. Besides, the white's test for checking the existence of heteroscedasticity problem was carried out; and the result (Prob > chi2 = 0.2) revealed that the problem of heteroscedasticity was not significant. The regression model was also checked whether properly specified or not. The result of 'ovtest' (Prob>F = 0.33) showed that the model has no omitted variables. Then, all the aforementioned explanatory variables were regressed with multiple linear regression (MLR) model and the result revealed that seven explanatory variables were found to statistically and significantly affect the quantity of marketed surplus of coffee. The F-test calculated value F (12, 139) = 40.94 was highly significant; and the adjusted R^2 was computed to be 76% implying that 76% of the variation in the dependent variable was explained by the explanatory variables under consideration (Table 2).

Table 3: OLS estimates of multiple linear regression model of marketed surplus

Variables	Coefficient	Standard Error.
Sex	0.61***	0.16
Literacy status	-0.08	0.12
Coffee farming experience	0.01**	0.00
Family labour force	0.06	0.04
Distance to red cherry	0.01	0.03
Distance to urban center	0.01	0.01
Credit access	0.23**	0.10
Adequacy of extension service	0.37***	0.13
Attractiveness of price of coffee	0.46***	0.10
Relative price of other crops	0.07	0.11
Cooperative membership	0.25***	0.09
Non and/or off-farm income (log)	0.35***	0.04
_cons	2.44	0.26
Number of observations = 152	Root MSE = 0. 51483	
F(12, 139) = 40.94	Multicollinearity (Mean VIF = 1.5)	
Prob > F = 0.0000	Heteroscedasticity (Prob > chi2 = 0.2)	
Adjusted R^2 = 76%	Model specification (ovtest: Prob>F = 0.33)	

Note: - Dependent variable is total quantity of coffee marketed in kg (transformed in logarithm)
***significance at 1% level and ** refers significance at 5% level
Source: Authors computation from survey, 2014

Sex of the household head (sex): As expected sex of the household affects marketed surplus of coffee at less than 1% significance level. Being male headed household has positive relationship with marketed surplus than female headed one. The result indicated that being male headed household increases marketed surplus of coffee in kg by 61%. This might be due to the case that in the study area marketing infrastructures are less accessed by female headed than male headed households. This result was in line with the study of Mamo and Deginet (2012) who found that sex of the household head has statistically significant effect on whether or not a farmer participates in the livestock market.
Coffee farming experience (exp): This variable affected quantity of marketed surplus significantly and positively at 5% level. The coefficient for this variable implied that, a one year increase in farming experience leads to a 1% increase in marketed surplus of coffee. This is probably due to the reason that as farmers are experienced with coffee farming, they would be aware of the benefits of selling coffee than those famers with low farming experience. This result was in confirmation with the studies by Abraham (2013), Abay (2007), and

Ayelech (2011) as production experience affected the amount of potato, avocado and tomato supplied to the market positively.

Credit access (credit): This variable affected marketed surplus positively at 5% significance level. The result showed that those farmers who have got credit access would increase marketed surplus in kg by 23%. This result implied that credit is a key financial instrument to break the marketing problem.

Perception of farmers towards adequacy of extension service (extm): Access to extension service also influenced amount of coffee marketed surplus positively at less than 1 % significance level. Having access to extension services increase the intensity of marketed surplus in kg by 37%. This is probably due to the reason that extension service is source of information regarding the benefit of marketing and has a strong influence on the farmer's intensity of marketed surplus. A study by Gebremedhin *et al.* (2009) showed that expansion of agricultural extension services had significant impact on the intensity of input use, agricultural productivity and market participation of Ethiopian smallholders. Thus, promoting farmers with providing marketing extension services would increase their involvement in marketing of coffee. The result coincides with the studies of Rehima (2006) and Ayelech (2011) that pepper supplied to the market and quantity of mango supplied to the market respectively were positively affected by extension contact.

Perception of farmers towards current price of coffee (price): Price of the commodity coffee affected marketed surplus positively at less than 1% significance level. The result indicated that if farmer considers price of coffee as attractive, quantity of marketed surplus in kg would increase by 46%. If farmers had a view that the price was not attractive, he/she would be forced to decreases or even stops to supply coffee to the market and might choose alternative options like hording/storing and waiting attractive prices. This result supports the studies of Sarkar and Roy (2013) and Adesiyan *et al.* (2012) who found that average price of paddy received by farmers affected marketed surplus of the crop positively.

Membership to coffee cooperative (coop): As hypothesised, membership in cooperative affected marketed surplus of coffee positively at less than 1% significance level. Those who are 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. The result showed that, other factors held constant, being a member of coffee cooperative would probably increase the level of marketed surplus of coffee in kg by 25%. It is due the fact that farmers in cooperative have an easy access to skills and information cooperatives leading to improve their understanding about market opportunities and strengthen the relationship among other members. Social capital (in this case cooperative membership) is a key instrument for exchange of ideas and in essence farmers would benefit both economically and socially if they belong to groups. This happens because the government and donors target not individual farmers but farmer groups and cooperatives. These farmers are given grants and loans which enable them to engage in more off farm activities unlike their counterparts. Moreover, farmers in groups have a strong bargaining power when marketing their products and in turn receive better returns for their produce. This is in addition helps them penetrating wider markets and being offered contracts by major buyers which in turn increases marketed surplus.

Non- and/or off-farm income (offarm_log): In line with the expectation, it affected marketed surplus of coffee positively at 1% significance level. The result indicated that a unit additional percent increase in the non- and/or off-farm income (birr) would increase coffee marketed surplus (kg) by 35%. The result suggested that income obtained from businesses other than farm activities would finance the production and enhanced marketed surplus. It agrees with the results of Siziba *et al.* (2011) and Abraham (2013) who revealed that off-farm income was positively related to the level of cereal sale and cabbage supply respectively.

CONCLUSION AND RECOMMENDATION

The result concluded that male headed households are in a better situation in marketing of coffee compared to female headed implying that giving due attention for female headed households is required. Governmental and non-governmental organizations should target women while providing training and other extension service for farmers. Farming experience is also significant variable that affect quantity of marketed surplus positively. Therefore building farmers' exposure through trainings and experience sharing sessions among smallholder farmers better be designed to increase marketed surplus. The study finds that access to credit increases coffee marketed surplus. Hence, strengthen the financial capability of farmers by providing adequate size of credit is a strategy to increase farmers' participation in and intensity of marketing. Government must finance coop/unions sufficiently to solve severe financial problems of farmers. Other modern financial products (more importantly warehouse receipt finance) as an alternative for credit provision should be established in the zone. The adequacy of extension service provided to farmers has also something to do with enhancing marketed surplus. Therefore, appropriate extension service provisions by assigning professional and appropriate DAs helping farmers adequately.

Furthermore, price of coffee found to be positively related to marketed surplus. There should be a system for which suppliers couldn't fix price below some threshold limit. As farmers are the pro-poor groups who need to

be prioritized in any intervention, legal tactics and conditions (for instance prevailing price ceiling and price floor) under which such practices of offering unfair price would not likely to prevail should be implemented. Government and other NGOs must stand besides farmers to safeguard them by offering fair price. Membership in primary cooperatives affected farmers by increasing marketed surplus. Farmers should be encouraged to be members of cooperatives so that they can benefit from the support given by government via cooperatives and unions. Income obtained from non-and/ off-farm activities is another important factor affected marketed surplus positively. Encouraging farmers to diversify their business besides coffee is another way to boost coffee marketed surplus at farmer level. In general strategies points toward at providing farmers with adequate credit and other extension services, improving marketing infrastructures, offering farmers a fair price, building experience of farmers, encouraging farmer's business diversification besides coffee farming, improving farmer's linkage with cooperatives, and bearing in mind female headed households when any marketing program is designed, are recommended to increase coffee marketed surplus in the study area.

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