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# Coffee Value Chain in Ethiopia: A Case Study

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**Abstract.** *Coffee is a bulging commercial crop ever growing up in Ethiopia to export for gaining comparative advantageous of price and income. It also plays a pivotal role to supporting livelihoods of most of the people particularly poor within the territory of the country. It is obvious that the farmers are facing numerous problems encountered with coffee value chain for marketing of their products in marketing channel. The main objective of this research is to analyzing the factors influencing coffee cooperatives effectiveness in coffee value chain of Ilubabor Zone in Oromia Region of Ethiopia. Research is carried out with methodology of data analysis based on descriptive statistics and econometrics model. A logistic regression method is used to analysis the effectiveness of coffee cooperatives in coffee value chain and multi -collinearity regression analysis is employed to determine the correlation between explanatory variables. It is found that despite of inactiveness of cooperatives the coffee value chain is playing an important role to facilitating marketing of coffee in Ethiopia. The research is an important perspective to measuring emerging problems associated with value chain and its solutions with valuable recommendations.*

## Introduction

### 1. Background of the study

Ethiopia is the center of origin for highland coffee (Coffee Arabica L), which is one of the most valuable cash crops in the country. It is one of the agricultural products and considered as "the top cash crop in the export economy of the country", providing 25 -35% of the foreign exchange earnings. The coffee sector contributes about 5% to the country's Gross Domestic Product (GDP) and creates hundreds of thousands of local job opportunities (Tesfaye Tadesse, 2020). In Ethiopia, currently there are about 2.52 million hectares of f land were covered by coffee plantation of which 1.129 hectares are being used for harvesting coffee (Yewondwossen, 2019) and annual production of 500,000-700,000 tones were obtained with average productivity of 7quintals per hectares in 2018/19 Meher Season and registered a record almost 917 million US dollars from coffee exports (United States Department of Agriculture [USDA], 2019). As the regional Government's official report records,the Oromia Regional state possesses the largest part of coffee plantation of the country, amounting to about 1.8 million hectares and around 320,000- 448,000 tons of annual average production (Bashargo, 2018). This report revealed that among total coffee production of the country, 64% of the total production belongs to Oromia regional State (Central Statistical Agency (CSA), 2019). From top 25 coffee producing districts in Ethiopia, Oromia dominates with 18 coffee producing districts (James et al., 2015). As the data reported by Ilubabor Zone Agricultural and Natural Resource office (2019) stated, in Ilubabor Zone land covered by Coffee plantation was 229,609.3 hectares (23% of total land coverage 999,625.30 of the Zone). In the Zone, 88,853.9-ton coffee was produced, but only 26,740.04 ton (30.09 %) was exported to central market (IANRO, 2019).

Primarily due to the unreliable supply and unaffordable prices of farm inputs, and poor rural marketing infrastructure, productivity of smallholder agriculture lingers at subsistence level. Consequently, rural income remains low, and poverty looms large. Cooperatives are indispensable institutions for addressing such a structural problem. In this regard, only a few farmers understand the necessity of producing to meet the market and of finding a market for their produce. His solution to this dilemma is to encourage the growth of cooperatives to undertake the marketing responsibilities. So, intervention to reduce uncertainty and other marketing problems and to bring the peasant households into profit maximizing category realized through establishment of rural institutions, such as cooperatives (Omer, 2016). Their production reaches to consumers in different countries through value chains which add value to the final product. The concept of the value chain describes input and output relationships and identifies key actors who play a critical role in coordinating production in the chain. Value chain actors are those involved in supplying inputs, producing, processing, marketing, and consuming agricultural products (National Conference on Cooperative Development in Ethiopia, 2015).

**Statement of the problem**

Cooperative activities could play an effective role in supporting coffee farmers by supplying the price information, capital, and transportation that small-scale farmers often lack. In addition, a cooperative as a representative of coffee farmers can be a stronger negotiator than an individual farmer in the international market (KODAMA, 2007). Due to cooperatives, many coffee growers have changed their life. In the area where this study will be conducted coffee is marketed by both under individual traders and coffee cooperatives. However, the issue of value addition was forgotten by almost all actors in the coffee chain. Actors are those individuals and organizations who participate in the transfer of coffee directly or indirectly from one to another until the product reaches final consumers. To compete in the stiff competition of the world coffee market and protect the market position they already have and fetch their members with good return on their product value addition became choice less activity for coffee cooperatives. This can be achieved by building effective chain approach in which every actor benefit according to their participation in the chain. A review of literatures on the Ethiopian coffee value chain indicate that the sector has an enormous potential and opportunities for growth and rooms for significant improvements in its number of areas (International Coffee Council, 2015). Despite the progress made in the last two decades, the Ethiopian coffee value chain faces many challenges due to limited market outlets, limited efforts in market linkage activities and insufficient market information among actors (Girma, 2017). Similarly, (Dendena, et al., 2009) argued that small scale, dispersed and unorganized producers are unlikely to exploit market opportunities as they cannot attain the necessary economies of scale and lack bargaining power in negotiating prices. However the study was not addressed determinants of effectiveness of coffee cooperatives. The study by (Fethi Omer, 2016) was initiated with assess the major constrains that exist in the channel members and to recommend the better placement of coffee product as well as the positioning of Kurtu Cooperative Society in Melka BaloWoreda. Nevertheless, the effectiveness of coffee cooperatives in coffee value chain was not addressed. Besides, as identified by various literatures and surveys, for example (Tilahun, 2007) , (Birhanu, et al., 2013) and (Yilma, 2017) participants in the Ethiopian coffee value chain are numerous which include smallholder coffee farmers, primary collectors, suppliers, processors, service cooperatives, unions, exporters and various governmental institutions. In addition, the study conducted by (Balgah1, 2019) identify key factors driving coffee farmers' decisions to join or not to join a cooperative. But they not analysis the effectiveness of coffee cooperatives in value chain.

Although coffee is an economically important commodity for country and individuals. However, studies conducted on the effectiveness of coffee cooperatives in coffee value chain are scanty. For instance, the study of Dr.M.KARTHIKEYAN, 2015 focuses on effectiveness of Cooperatives in Coffee Value Chain. But the study doesn't address the impact of storage facility, transport facility, and training to determine whether the coffee cooperative effective or not. The study also not included the main actors and their role in coffee value chain in its objective. In addition, Mujawamariya in 2013 stated that free riding, noncompliance, underinvestment, poor management, membership desertion and heterogeneity among members will affect cooperatives' efficiency and effectiveness. However, it not addressed the effect of market information, access to credit, storage facility, technology and etc. on coffee cooperative members. In light of this, the study will tried to analyze factor affecting Coffee Cooperatives effectiveness in coffee Value Chain in Ilubabor Zone, Oromia region in general and attempts to identify actors and their roles in CVC activities, investigate the degree of linkage between cooperatives and other actors in coffee value chain; and analyses factors affecting the coffee value chain in particular.

**Objectives of the study**

**General objective of the study**

The general objective of this study is to investigate the factor influencing effectiveness of coffee cooperatives in coffee value chain in Ilu Ababor Zone, Oromia Region.

**Specific objectives**

Other specific objectives are as follows:

1)      To identify actors and their roles in Coffee value chain activities.

2)      To investigate the linkages between cooperatives and other actors in the coffee value chain.

3)      To examine the degree of strength of the linkages between actors existing in the chain.

4)      To analyze the different factors influencing the effectiveness of coffee value chain in the study area.

## 2. Coffee Value Chain in Ethiopia

A value chain is a supply chain consisting of the input suppliers, producers, processors and buyers that bring a product from its conception to its end use. In Ethiopia, coffee value chain approach to development seeks to address the major constraints at each level of the supply chain, rather than concentrating on just one group (e.g., producers) or on one geographical location. Constraints often include a lack of technical, business or financial support services, a difficult regulatory framework, poor public infrastructure (roads, telecommunications, electricity, etc.), a lack of information about or weak connections to end markets, and/or inadequate coordination between firms. Taking a value-chain approach is often essential to successful economic development since micro and small enterprises and smallholder farmers will only benefit over the long term if the industry as a whole is competitive ((Jim, D., & Ruth C., 2006, P5-7)).



**Figure 1. Ethiopian coffee value chain**

Source: (UNIQUE forestry and land use, 09th December 9, 2019)

Smallholder farmers sell coffee to cooperatives and traders. The cooperatives can export coffee directly or through the ECX, but usually trade coffee with the help of their cooperative union. Larger smallholders (at least 2ha coffee farm) can export coffee directly, but rarely do so. Direct interaction between producers and international buyers is most likely within the cooperative value chain.

**Cooperatives in Ethiopia**

Cooperatives, as economic enterprises and self-help organizations, play a meaningful role in uplifting the socio-economic conditions of their members and their local communities. The people of Ethiopia have a very long social history of working together to fulfill their socioeconomic needs. Many social events are still taking place in rural Ethiopia through collective effort. The Government of Ethiopia has identified the cooperatives form of business organizations as instrumental to socio-economic development and has paved the way for better cooperatives development in the country by creating the legal basis and expansion of human resource development at higher institutions. In countries where a cooperatives activity is developing strong cooperatives are backbone for the economy of the country. In our country the establishment of modern cooperatives took more than fife decade. According to Federal Cooperative Agency complied report up to December 30/2009 E.C totally there are 15,482,168 (Male 11,041,619 and Female 4,440,549) members and 79,038 primary cooperatives within capital of 13,874,369,638.00. In addition, currently 370 cooperatives union are performing their activities and earns 3,808,433,565.00 capital. In general, the cooperatives sector earns 17.68 billion capitals. Furthermore, the saving culture of the cooperatives is growing from time to time and it become 7.9 billion birr and credit distribution riches 6 billion birr. Cooperatives have played a considerable role in improving smallholders" access to inputs; services, information and markets, yet the cooperative movement in Ethiopia faced a number of problems in the past. The current free market economy of the country is conductive to cooperatives development, but their limited capacity has inhibited them from making full use of the existing opportunities. (YILMA, June, 2017)**.**

## 3. Description of study area

The study was conducted in the Ilubabor Zone, Oromia Region, Ethiopia. Ilu Ababor Zone is a province in the south western part of Ethiopia. The name Ilu ababor was come from two Oromo words "Ilu" and "Ababora". Ilu is a name of a clan and ababora was horse name of Chali Shone, the one who founded the ruling family of the area when it conquered by Shewa, hence Ilu ababora means the Ilu belonging to Ababora. Ilu Ababora was an independent Oromo state that was conquered and occupied by the forces of emperor Minilik II in 1881. The last king of Ilu Aba Bor was Fatansa Ilu. The Shewan forces led by Tessema Nadew broke Fatansa's main force and camped at a place called Karsa Gogila near modern day Mettu. However, Fatansa had surrounded the camp to make a bloody battle Fatansa's forces were overwhelmed by the firepower of Ras Tessema. Fatansa was captured and imprisoned at Barroi, about five kilometers from Mettu. Ras Tesema made Gore the seat of his administration. With the adoption of the constitution in 1995, the territory of Ilu Ababor divided between the Gambela, and southern Nation's Nationalities and Peoples of Ethiopia. The Zone has 13 woredas and 1 urban area. Those woredas: Alge sachi Ale, Bure, Halu, Nono sale, Diduu, Becho, Mettu, Hurumu, Yayu, Doreni, Bilo Nopha, Darimu & Mettu Town. Total population of the zone is 934,783 (Male: 467,490 and Female: 467,293).

It is located in the Southwestern part of the regional state of Oromia. It cover the western part of the region and lies between 34º52'30"E - 36º5'30"E longitudes and 7º27'30"N - 8º49'30"N latitudes. The zone surrounded by Gambela Region in the west, in East and Southeast by SNNPS, in the north and West Wollaga, north-east by east Buno Bedele. IIlubabor zone comprises mostly gently undulating terrain with elevations between 1,500m to 2,000m. The average temperature ranges between 16°C and 24°C (20°C in Metu), and the average rainfall between 1,500 to 2100mm (1,700mm in Metu). Rainall is unimodal, with most rainfall occurring from May to September. Arabica coffee is native to the region, occurring naturally in the remnant moist afromontane forests. With climate change, coffee production in the lower areas of Illubabor (around 1,500m) may become less viable over the coming decades (UNIQUE forestry and land use, 2019).Illubabor zone retains much of its original vegetation, with 65% of the zone covered by forests and woodlands (Table 1). The largest forest areas are found in the southern and western woredas. Only 100,000ha (10%) of the region's forests are included in the Yayu BR, located in the center of the zone. The reserve also covers 54,000ha cropland, the majority of it in the transition zone. Across Ilubabor about 470,000ha (28%) are classified as cropland.

### 3.1.   Research design

In data collection, the research design will be cross-sectional design. Cross-sectional survey constitutes a collection of data from sample members of coffee cooperatives in the study area at a single point in time to describe actors in the coffee value chain and their roles and to describe the linkages between cooperatives and other actors in the coffee value chain. Moreover, in this study both quantitative and qualitative research approaches will be employed to achieve the objectives of the study.

**Target Population**

In this study the target population is coffee producers who are members of coffee cooperative societies in Ilu Aba Bor Zone. In the study area, there are about 605 primary cooperative societies. Among six hundred and five cooperative societies, forty one (41) of them are coffee producers' cooperatives and 13 of them are selected for the study purpose.

**Data type, source and data collection techniques**

**Data types and sources.** The data for this study will be based on both primary and secondary data. Primary data will be collected from members of the sampled coffee cooperative through questionnaire-administered survey as well as participatory rural appraisal (PRA) data collection tools like, group discussions and key informant interview. And Secondary data were collected from Ethiopian Commodity Exchange Authority, Cooperative union, Ilu Aba Bor Zone Agriculture and Rural Development Office, Cooperative and promotion Authority, Ilu Aba Bor Economic and Finance Offices, and different and relevant published and unpublished reports, bulletins and websites will be used.

**Data collection techniques.** A mixed method of diverse data collection and analysis tools will be used. Specifically, structured questionnaire will be employed as instrument to gather primary data from the respondents which first prepared in English and then translated into Oromiffa to make the communication easier. The open-end and closed - end questionnaire will be pretested to identify and avoid vague and sensitive questions. Further Focus Group Discussion (FGD) and Key informants interview will be also utilized for data collection process. Enumerators, who have acquaintance with the local language and the culture of the local people were selected, trained and employed for data collection. Besides, under the close follow up of the researcher, data collection process from traders, Promoters, Local consumers, and Private traders from the district were undertaken by using trained enumerators. The remaining primary data like private exporters' data, Cooperative Union staffs and secondary data were collected by the researcher.

**Primary Data Collection**

The primary data sources will be generated by the researcher in order to measure the independent variables. Data will be collected through questionnaire, key informant interview, and focus group discussion.

**(i) Questionnaire**

A survey questionnaire will be administered for sample members of coffee cooperatives by the researcher directly during a field survey conducted in August, 2020. The questionnaire will be designed mainly to generate data on socioeconomic characteristics, perception of the farmers engaged in cooperatives towards the effectiveness of coffee cooperatives and about the benefits that they get from them. For the process of data collection, a survey questionnaire, which consists both open ended and close ended questions, will be used as main tool to gather information from sample farmer's members of coffee cooperatives. The questionnaire will be first prepared in English and then translated in to local language (Afaan Oromoo). Finally, questions will be administered face to face with the members of the sample coffee cooperatives. All the selected sample respondents (n= 344) participated in the administered survey questionnaires.

**(ii) Interviews**

In order to accomplish the mixed research approach of this study, face to face in-depth interviews will be also conducted with key informants. The semi-structured interview questions will be administered with selected key informants, who are representatives of the Stakeholders involved in the effectiveness of coffee cooperatives activities, market value chain, and related. The choice of these key informants will be based on knowledge, expertise, experience, responsibility and involvement with the coffee, cooperatives and agriculture related activities sector in the study area.

Accordingly, the key informants will be drawn from different governmental and nongovernmental (NGO's) offices working as head of cooperative and promotion agency at zonal and Districts level, FARM AFRICA and NEUMAN FOUNDATION project coordinator, two representatives from Ethiopian Commodities Exchange (ECEX), 15 management committee of the coffee cooperatives in the five selected districts (Yayo, Hurumu, Bilo Nopha, Bacho and Ale districts), two from Sor Gaba union staff members. In total, 23 in-depth interviews were conducted with key informants. A key informant interview is particularly important in getting information about types of Linkages between PCCs and other actors in the CVC, continues improvements in coffee quality and quantity systems and like.

**(iii)     Focus Group Discussion (FGD)**

The Focus group discussion creates the opportunity to participants to feel at home and express their behaviors, attitudes and opinions freely.  The focus group discussion will be organized by the researcher with 7 individuals from the office of each sampled districts. Three management committee of coffee cooperatives, three members of the cooperatives and one expert related to coffee/cooperatives will be participated. Open ended questions were used during the FGD session. The FGD session will be chaired and guided by the researcher and the participants will be encouraged to forward their ideas, opinions, feelings and knowledge regarding the challenges and possibilities for the effectiveness of their coffee cooperatives. Data collected through focus group discussions include about how manage coffee quality, how they sell their coffee product, main challenge and opportunities in coffee cooperative.

**Secondary Data Collection**

Tools of data collection for qualitative and quantitative research design (secondary data source) will be obtained from the office of the Zonal Agricultural and Natural resource office, cooperative and promotion agency, plan and Economic development office, and NGO's. The data will be collected from them were about coffee production and contribution for economic development, coffee cooperatives activities in the study areas, major opportunities and challenges of the coffee cooperatives in value chain, and like.

**Sampling technique and sample size determination**

**Sampling techniques**

The Sampling technique for this study will be applied multi-stage sampling techniques to select PCC's and individual's respondents. The reason the researcher will be selected multi sampling techniques were (Fethi Omer, Volume I, Issue II, May 2016), (Ahmed Aliyi, 2019), (Roland Azibo Balgah1, 2019), (Zekarias Shumeta, PhD1 and Marijke D'Haese, PhD2, 2018), and other researchers were applied. In the first stage Ilu Ababor Zone is selected purposively because the area is representative of high potential coffee production. Secondly, 5 districts which was 35.7% of the total districts of the Zone were  selected by stratified sampling techniques out of  13 districts and one town in the Zone that are listed in the table 3 below based on similarity of their weather conditions and soil types. The five districts were namely: Yayo, Hurumu, Bilo Nopha, Bacho and Ale districts. For the purpose of analysis the factor influencing effectiveness of coffee cooperatives in the coffee value chain, randomly 13 primary coffee cooperatives were selected out of the 24 primary coffee cooperatives found in the selected five districts. Finally, 344 individual members were selected using simple random sampling technique on the basis of proportionate to size according to Yemane (1967) formula as shown in the next equation 1.

**Sample size determination**

The sample size in this study will be determined by using simple random sampling technique according to Yemane (1967) formula, as shown below

$$n = \frac{N}{1+N(e^2)} = \frac{2481}{1+2481(0.05^2)} = \frac{2481}{7.2025} = 344 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where; n is the sample size from the population of the selected districts; N is total members of coffee cooperatives in study area; e is degree of precision at 95% confidence interval (Yemane, 1967). In this study i.e. e= 5%. The distributions of the total sample in sample districts were based on the probability of proportional to the number of population of Coffee producers in each selected primary coffee cooperatives of the selected districts.

**Methods of data analysis**

Before analyzing the collected data, checking its completeness, editing, organizing and coding activities will be carried out to attain the stated objectives of the study. This study was basically used three broad categories of data analysis, namely financial ratios (profitability, shareholder and liquidity ratios), descriptive statistics (Percentages, and Frequency) and econometric model analysis using the logistic regression model.

**Effectiveness measures via performance Criteria**

Measurement of performance involves knowing how far actual performance is consistent with planned performance or with standard already established. Markets todays are showing a growing interest in

developing better marketing control needed by companies including cooperatives: annual-plan control, profitability control, efficiency control, and strategic control (SHEREFA, 2008).

**Financial Ratios analysis of the effectiveness of coffee cooperatives**

Ratios can be used as a one tool in identifying effectiveness of the coffee cooperatives. Financial ratios enable to make comparison of cooperative's financial conditions over time or in relation to other cooperatives. Ratios were calculated from the audit reports of coffee cooperatives. From the audit reports of cooperatives, balance sheets and income statements were used to analyze financial ratios. The most well-known financial statement is the balance sheet. It gives a view of the assets and liabilities of the cooperative at the end of each accounting period.

**Profitability ratios**

They are profit margin ratios which compare components of income with sales. They give an idea of what makes up a coffee marketing cooperatives income and are usually expressed as apportion of each birr of sales. Among the profitability ratios we use gross profit margin ratio, net profit Margin ratio and return on capital employed ratio.

**Shareholder ratios**

**Dividend per share Capital**

Deal with the effectiveness and financial condition of the coffee marketing cooperatives. This ratio provides information focus on the interest of the owners, shareholders ratio. The ratio translates the overall result of operation so that they can be computed in terms of a share of stock (share capital). Dividend per share (DPS) is the birr amount of cash dividend paid during a period, per share of common stock (share capital).

Dividend per share = Dividend paid to shareholders/Number of share outstanding

**Liquidity Ratios**

Liquidity ratios attempt to measure a cooperative's ability to pay off its short-term debt obligations. This is done by comparing a cooperative's most liquid assets (or, those that can be easily converted to cash), its short-term liabilities. In general, the greater the coverage of liquid assets to short-term liabilities the better as it is a clear signal that a cooperative can pay its debts that are coming due in the near future and still fund its ongoing operations. On the other hand, a cooperative with a low coverage rate should raise a red flag for the them as it may be a sign that the cooperative will have difficulty meeting running its operations, as well as meeting its obligations. Among the liquidity ratios, the ratios that look at in these studies are the current Ratio.

**Current Ratio**

The current ratio is a popular financial ratio used to test a cooperative's liquidity (also referred to as its current or working capital position) by deriving the proportion of current assets available to cover current liabilities. The concept behind this ratio is to ascertain whether a cooperative's short-term assets (cash, cash equivalents, marketable securities, receivables and inventory) are readily available to pay off its short-term liabilities (notes payable, current portion of term debt, payables, accrued expenses and taxes). In theory, the higher the current ratio, the better.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{current liabilities}}$$

**Model specification**

To achieve the objectives of this study, econometric analysis with the help of the Statistical software called IBM SPSS Statistics 22 with 95% confidence level were employed.

**Econometrics Analysis**

A variety of statistical models can be used to establish the relationship between the regressed and explanatory variables and determine their significance. Conventionally, linear regression analysis is widely used in most economic and social investigation because of availability of simple computer packages, as well as ease of interpreting the results. However, results derived from linear regression analysis may lead to fairly unreasonable estimates when the dependent variable is dichotomous. Therefore, the use of the logit or probit

models is recommended as a panacea of the drawback of the linear regression model (Gujarati, 2003).Which model to choose between logit and probit is, however, difficult for they are similar in most applications, the main difference being the logistic function has slight flatter tails that is, the normal curve under logit function approaches the axes more quickly than in the case of probit function. Ignoring minor differences (Gujarati D. N., 1988)**,** pointed out the probit and logistic model are quite similar. They usually generate predicted probabilities that are almost identical, but for its comparative mathematical and interpretational simplicity in estimation many researchers like (Ahmed Aliyi, 2019), (Balgah1, 2019), (Karthikeyan Muthumariappan , 2015), (Mersha, 2017)and etc tend to choose the logit model. Therefore, this study will be employed the logit model following the footstep of these researchers.

$$P = (Y = \frac{1}{xi}) = \frac{1}{1+e^{-zi}} = \frac{e^{zi}}{1+e^{zi}} \qquad (1)$$

Where e is an exponential term, Pi is the probability of coffee cooperatives effectiveness in coffee value chain. It is Pi= 1, if cooperatives are effective in coffee value chain and Pi= 0, if otherwise. Y is the observed coffee cooperatives effective in coffee value chain.

Xi is explanatory variables effect on coffee cooperatives effectiveness in coffee value chain.

$Z_i$. i= 1, 2….m are observation on variables for coffee cooperatives in coffee value chain, n being the sample size 344.

$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n$

From Equation 1, the probability of coffee cooperatives being not effective is given by (1-Pi) which can be written as Equation 2:

$$1 - \frac{1}{1+e^{-zi}} = \frac{1+e^{-zi}-1}{1+e^{-zi}} = \frac{e^{-zi}}{1+e^{-zi}} \qquad (2)$$

Therefore,the odds ratio $\frac{Pi}{1-Pi}$ is given by equation 3:

$$\frac{Pi}{1-Pi} = \frac{1+e^{zi}}{1-e^{zi}} \qquad (3)$$

Now $\frac{Pi}{1-Pi}$ is the odds ratio in favor of effectiveness of coffee value chain. It is the ratio of the probability that the coffee cooperatives would be effective (Pi) to the probability that a coffee cooperatives would be not effective (1-Pi).

Finally, taking the natural logarithm of Equation 3 and assuming linearity produces Equation 4:

$$L_i = \ln\left[\frac{Pi}{1-Pi}\right] = Z_i \qquad (4)$$

Where Li is the logarithm of the odd ratio which is assumed linear for both variables and Parameters.

If the disturbance term, $e_i$ is introduced, the logit model in Equation 4 is represented by Equation 5: $Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + e_i$ (5)

Where, the terms $\beta_i$ are parameters to be estimated, and $X_1$ to $X_n$ are explanatory variables such as: X1 is Age of the members, X2 is Educational level, X3 is Family Size , X4 is Farming experience , X5 is Coffee farm size, $X_6$ is Access to Credit, $X_7$ is Proximity to cooperative society, $X_8$ is Storage facility, $X_9$ is Adopt new technologies, $X_{10}$ is Transport facility, $X_{11}$ is Training, $X_{12}$ is Extension contact, $X_{13}$ is Input Supply, $X_{14}$ is Market Information, $X_{15}$ is coffee Processing, $X_{16}$ is Terms of payment for red cherry, $X_{17}$ is Terms of payment for dried cherry and $X_{18}$ is Dividend received respectively.

Table 1. Independent Variables used in the logistic Model and their expected sign

| No | Variables | Definition | Measurement types | Expected sign | Empirical studies |
|---|---|---|---|---|---|
| 1 | AGE | Age of the members in years | Continuous | + | (Muthyalu,2013) |
| 2 | EDU | Educational level of cooperative members | Continuous | + | (Tilahun,2007), Adinya et al.(2010) |
| 3 | FAMSIZ | Family Size in households | Continuous | + | (Temesgen,2019) (Tilahun,2007) |
| 4 | FARMEXP | Farming experience in coffee production in years | Continuous | + | (Wana,2019), Tru(2009) |

Table 1 (cont.). Independent Variables used in the logistic Model and their expected sign

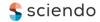| No | Variables | Definition | Measurement types | Expected sign | Empirical studies |
|----|-----------|------------|-------------------|---------------|-------------------|
| 5 | COFARMSIZ | Coffee farm size in hectare | Continuous | + | (Machuka, 2016) Mahamud, 2016 |
| 6 | CREDIT | Access to Credit | Dummy | + | Boekalmann,2010-2011 (Hailu, 2016), (Sherefa, 2008) |
| 7 | PROXIMITY | Distance of cooperative center from individual in kilometer | Continuous | + | (Lencho, 2019), (Lemecha, 2018), (Shumeta, 2018) |
| 8 | STORFAC | Storage facility | Dummy | + | (Sherefa, 2008), (Aliyi, 2019) |
| 9 | TECHNO | Technology | Dummy | + | (Bart Minten, 2015), Abebaw &Haile (2013) |
| 10 | TRANSFAC | Transport facility | Dummy | + | (Legese,2013), (Hailu, 2016), (Adjimoti, 2013) |
| 11 | TRAININ | Training | Dummy | + | (Ahmed Aliyi, 2019), (Muthumariappan, 2015), (Sherefa, 2008) |
| 12 | EXTENS | Farm contact of DA's per week | Continuous | + | (lemecha, 2018) |
| 13 | MARKINFO | Market Information | Dummy | + | (Muthumariappan, 2015), (Sherefa, 2008), (Haile, 2009), (Adjimoti, 2013) |
| 14 | INPUSUPP | Input Supply | Dummy | + | (Delelegne A.,2016), (Schipmann,2006) |
| 15 | PROCES | Processing | Dummy | + | (CRF,2010), (Muturi,2014) |
| 16 | PAYRED | Terms of payment for red cherry in cash | Dummy | - | (Gashaw, 2018). |
| 17 | PAYDRI | Terms of payment for dried cherry | Dummy | - | (Gashaw, 2018). (Tilahun, 2007). |
| 18 | DIVREC | Dividend received | Dummy | + | (Tilahun,2007) |

## 4. Descriptive Analysis

Descriptive analysis is used to elaborate and helps to understand the socio-economic and institutional characteristics of the sampled households and /or members and officials of the coffee cooperatives organized in the area.

**Socio- Demographic characteristics of a member**

It begins by discussing findings on demographic characteristics such as Age, gender, education status, family size, marital status, and coffee farming experiences, coffee farm land size, and years of members in cooperatives of coffee producer households. It further discusses findings of land holding, coffee farming experiences and membership status. To get information on these issues the respondents were asked structured question and their responses are presented and analyzed as follows. The results of this survey processed using the IBM SPSS Version 22 software. The results presented in Table 5 depict the respondents answer. As indicated in table 5 below, the analysis on these demographic characteristics highlighted that, about 8.1% of respondents are youngster between of 14-30 years of age. About 42.2% are adults with age group of 31- 45 years old and 49.7% is reported as age of 46-60 years. Gender was analyzed by checking the number of male and female of cooperatives members. The sample population of farmer respondents considered during the survey was 344. As shown in table 5 below, the gender characteristics of sampled members opined as, 94.2% of the sampled members were male and 5.8% of them were female. This indicates that the majority of cooperative member households were male headed. However, one of the current and critical issues related to cooperatives movement in the country is enhancing female's participation in the cooperative to minimize gender inequality in terms of socio-economic participation. Findings of this study based on educational status revealed that about 17.4% and 34.3% of the sample members were illiterate and can read and write, respectively. However, 22.4% and 9.3% had joined primary and secondary school respectively, whereas 16.6% are higher secondary (9-12). A similar finding was also reported by (Omondi, 2017). This indicated that increased educational entitlement has helps a member to understand much about the importance of collective action through co-operatives, due to that the educational background of the sample members is believed to be an important feature that determines the readiness of household to accept new ideas and innovations which create effective coffee value chain. Findings of the

study revealed that majority of the coffee members 305(88.7%) were with small (1-4) family size followed by 39(11.3%). Bigger family size has supported to boost volume of supply in the study areas to impact for better participation in markets. Thus, existence of larger family size has positively affected the supply of marketable surplus mainly due to lower dependency ratio and reduced cost of input especially for labor. But from the data only 11.3% of cooperative members have medium family (5-8). On marital status, the findings show that majority of respondents (81.4percents) were married. While the rest of 18.6% respondents were single. Similar findings were obtained by Aksoy et al., (2011) and Lwelamila et al., (2011). One of the most important factors that influence crop production is availability of land for coffee production. As revealed in (Table 5), in the study area, the average land holding was 1.11 (ha.) per Household. Based on sampled farm households, the proportion of farmers of land holding, less than 0.5(ha.), between 0.6 (ha) and 2.0(ha) and greater than 2.1(ha) were 78.20%, 12.5% and 9.3% respectively. This shows that many members are own less than 0.5 hectares of farmland. Similar results were obtained by (MREMA, 2017). Out of sampled households, all were practicing farming activities, especially forest coffee farming system. Regarding to experience in farming activities, Years of coffee farming experience was then grouped into five groups (0-10, 11-20, 21-30, 31-40, 41 and above). The highest percentage was found from members who have 31-40 years of experience, 198(57.6%). The remains 9%, 20.6%, 3.5% were coffee members who had years of experience in coffee production in between 0-10, 11-20, 21-30, 41 and above respectively. About 315(91.8 %) of the coffee cooperatives members respond that their membership duration were above three years. The rest 29(8.4%) were join the cooperatives in between 1-2 years.

Table 2. Demographic and socio economic characteristics of respondents

| Variables | | Frequency | Percent |
|---|---|---|---|
| | | n=344 | n=344 |
| Age | 14-30 | 28 | 8.1 |
| | 31-45 | 145 | 42.2 |
| | 46-60 | 171 | 49.7 |
| | | | |
| Gender | Male | 324 | 94.2 |
| | Female | 20 | 5.8 |
| | | | |
| Educational status | Illiterate | 60 | 17.4 |
| | Read and write | 118 | 34.3 |
| | 1-6 | 77 | 22.4 |
| | 7-8 | 32 | 9.3 |
| | 9-12 | 57 | 16.6 |
| | | | |
| Marital status | Single | 64 | 18.6 |
| | Married | 280 | 81.4 |
| Family size | Small(1-4) | 305 | 88.7 |
| | Medium(5-8) | 39 | 11.3 |
| Coffee Farming experience | 0-10 | 32 | 9.3 |
| | 11-20 | 31 | 9 |
| | 21-30 | 71 | 20.6 |
| | 31-40 | 198 | 57.6 |
| | 41 and above | 12 | 3.5 |
| | | | |
| Coffee Farm land size | 0.1-0.5 | 269 | 78.2 |
| | 0.6-2.0 | 43 | 12.5 |
| | 2.1 and above | 32 | 9.3 |
| Years of membership duration in cooperatives | <1year | 0 | 0 |
| | 1-2 | 29 | 8.4 |
| | >3years | 315 | 91.6 |

Source: Computed from own field survey data.

## 5. Economic Activities

### Credit services

The availability of financial sources for credit is crucial for farmers. Some farmers are using as an important input for agricultural activities. As depicted in table 3, out of the total 29.7% sample households who had credit services, 18.6% of them get from individual coffee traders, 7.3% of them get their credit from Micro finance institution (Oromia credit and saving) while 3.8% of respondents get it from relatives/friends. The

households use the credit to purchase inputs, to pay debt, social purpose and expanding and improve coffee production. Although credit was accessible and available for poor farmers to build asset and food secured by purchasing the different packages designed by the regional government, there is lack of attention to access and avail credit for coffee producers.

Table 3. Respondents related to Credit services

| Variables | | Frequency | % |
|---|---|---|---|
| | | n=344 | n=344 |
| Are you get a credit services | Yes | 102 | 29.7 |
| | No | 242 | 70.3 |
| From where you get a credit | Micro finance institution | 25 | 4.3 |
| | friends/relatives | 13 | 3.8 |
| | individual coffee traders | 64 | 18.6 |

Source: Computed from own field survey data.

## 6. Infrastructural Facilities

Proximity to different cooperatives centers has an economic advantage especially in saving time and reducing labor cost that may use for important producing and marketing activities. In the study areas, about 73.8% of respondents distance from cooperative centers less than 1kilometers which implies the cooperatives have an opportunity to improve the participation rate of members in creating effective coffee value chain as a market channel and can saves time and decreases marketing costs. With regard to storing material, cooperative use jute sack (50.3%), poly sack (37.2%), traditional material made from earth (9.3 and made from wood (3.2). similar results were revealed by (SHEREFA, 2008). Storage bag should be made up of natural jute or sisal and it should be clean of foreign odor (FARM AFRICA, 2018). The major problem related to storing materials as reported by FGD were availability and quality followed by its price. As shown in table 7, the proportion of the farmers who dry their coffee on raised bed was 48.3%. The rest were practiced on mat placed on the ground (25%), on cleaned bare earth (14.5%) and on cemented floor (12.2%). The availability of well-functioning transport network is very important because it creates place utilities of the product. According to the survey result, for 48.8% of households means of transportation were Pack Animals. Also main means of transport were Head/pack loading and cart for 43.3% and 7.8 respondents respectively (Table 7). Infrastructural deficiencies in sampled cooperatives are huge: the road network needs to be improved in order to connect the coffee producing villages with the market outlets; village markets completely lack adequate buildings, storage facilities, lack of pulping and hulling machine and transportation hubs. Together with poor transportation services, inadequate infrastructure is largely responsible for the delay in coffee delivery from the warehouses to the markets.

Table 4. Infrastructural facilities

| Variables | | Frequency | % |
|---|---|---|---|
| | | n=344 | n=344 |
| Proximity to cooperative | <1km | 254 | 73.8 |
| | 1-2km | 42 | 12.2 |
| | >2km | 48 | 14 |
| | | | |
| What material do you used to storing your coffee | Jute sack | 173 | 50.3 |
| | Poly sack | 128 | 37.2 |
| | Traditional storage material made from earth | 32 | 9.3 |
| | Traditional store made from wood | 11 | 3.2 |
| | | | |
| After collecting your coffee how did you dry your coffee? | On raised bed | 166 | 48.3 |
| | on mat placed on the ground | 86 | 25 |
| | on cleaned bare earth | 50 | 14.5 |
| | on cemented floor | 42 | 12.2 |
| Means of transportation | Head/pack loading | 149 | 43.3 |
| | Cart | 27 | 7.8 |
| | Pack Animals | 168 | 48.8 |

Source: Own computation from survey result

## 7. Institutional Activities

### Training

Woreda cooperative promotion office, cooperative unions, Ethiopian commodity exchange and NGOs are the main actors providing training to farmers. The survey result revealed that 151(43.9%), of member producers were participated in training (table 8).

### Access to Extension Service

Extension service in agriculture is indispensable and it provides assistance for farmers in improvement of production and productivity, it also enables flow of information and transfer of knowledge and scientific findings to practice. Access to agricultural information services makes farmers to be aware of and get better understanding and ultimately leads to decision to take risk for improved agricultural practices. The result highlighted that, learning and knowledge imparting has failed to support households to participate in the value chain. Table 5 depicts that out of the total respondents of coffee cooperative members sample households, about 64% of the farmers reported that they had access to extension service and 124 (36%) of the members reported that they had no access to extension service in 2019. Accordingly, from 220(64%) of respondents get extension services, about 44 (12.8%) of them are visited monthly, while 102 (29.7%) and 74 (21.5%) of the respondents are entitled to get extension access only once a year and twice in a year, respectively.

Table 5. Training and Access to Extension Service

| Variables | | Frequency | % |
|---|---|---|---|
| | | n=344 | n=344 |
| **Does the cooperative provide you training?** | Yes | 151 | 43.9 |
| | No | 193 | 56.1 |
| | | | |
| **Extensions services** | Yes | 220 | 64 |
| | No | 124 | 36 |
| | | | |
| **Farmers extension agent contact frequency** | Monthly | 44 | 12.8 |
| | Once a year | 102 | 29.7 |
| | Twice a year | 74 | 21.5 |
| | | | |

Source: Own computation from survey.

## 8. Market Activities

### Input supply

Lack of adequate access to basic inputs influenced the productivity and quality of the product in the study area. As shown on the result revealed in table 9, 82% of the respondents was not received any materials used for the production of coffee. The remaining of 18%, received jute sacks (11.3%) and stumping tools (6.7%) of input materials. As from focus group discussions with officials, high prices, availability, and financing for inputs are major barriers to their use; this shows that directly affects the effectiveness of cooperatives.

### Market Information

220(64%) of sampled farmers had access to market information from different sources and only 124(36%) had no access to market information (Table 9). The type of information provided were (100%) about price information. The table showed that the major source of information was radios, which is 25.9%. About 14.5%, 6.4%, 6.7%.7.3% and 3.2% of the respondents can get market information from cooperatives, TV, Traders, Extension agents, and surrounding farmers respectively.

### Coffee Processing /Cleansing

In dry processing, after harvesting, coffee cherries are processed by either dry or wet processing. For unwashed Arabica (or sun-dried coffee), the cherries are dried on mats, concrete, or cement floors immediately after they have been picked. After drying to a moisture content of about 11.5%, the outer layer of the cherries is removed by hulling and the green bean obtained is ready for marketing. Smallholder producers mainly use sun drying methods for coffee processing. The primary processing practices which the coffee cooperative societies had adopted were established in the study. According to Table 9, the results

revealed that majority of the coffee cooperative societies had adopted the dry processing 257(74.7%) while only 87(25.3%) had adopted the wet processing method.

In order to address their financial needs, a farmer tends to sell major proportion of their coffee to collectors, who pay cash immediately. About 36.9% of members reported that they sold coffee to their cooperatives while the proportion of farmers who sold their coffee to traders was 23.3%. Majority of respondents sold their coffee both to cooperatives and traders (39.8%). As results from Focus Group Discussion the majority of farmers choose private traders were to get immediate cash for their needs.

Table 6. Marketing Activities for respondents

| Variables | | Frequency | Percent |
|---|---|---|---|
| | | n=344 | n=344 |
| Have you received any materials | Yes | 62 | 18 |
| | No | 282 | 82 |
| | | | |
| Which materials did you receive | Jute sacks | 39 | 11.3 |
| | Stumping tools | 23 | 6.7 |
| Market information services | Yes | 220 | 64 |
| | No | 124 | 36 |
| From where you get information? | From cooperative | 50 | 14.5 |
| | Radio | 89 | 25.9 |
| | TV | 22 | 6.4 |
| | Traders | 23 | 6.7 |
| | extensions agents | 25 | 7.3 |
| | Surrounding farmers | 11 | 3.2 |
| What type of coffee did you process? (types of processing) | dry processing | 257 | 74.7 |
| | Wet processing | 87 | 25.3 |
| To whom did you sell your coffee? | Cooperatives | 127 | 36.9 |
| | Traders | 80 | 23.3 |
| | Both | 137 | 39.8 |

Source: Own computation from survey result.

## 9. Actors and their roles in Coffee Value Chain of the study area

Analyzing the value chain actors and their interaction between them is also becoming more focused on understanding small coffee farmer's current position and relationships within markets and pinpointing why particular market systems are not including and benefiting poor people. The main actors involved in the coffee value chain in the study area were both direct and indirect actors. According to KIT et al. (2006), cited in Abraham 2013, direct chain actors are actors which directly participate in the chain for commercial purpose and indirect actors are actors which indirectly contribute for the chain through providing financial and non-financial support. The survey results indicated that the coffee value chain actors in the study areas are input suppliers, Smallholder Farmers/producers, Primary cooperatives, Sor Geba cooperative Union, Suppliers (Akrabies), Domestic consumers, Processors/milling house, Extension service providers, NGO's, Ethiopian Commodity Exchange (ECX), Ethiopian Institute of Agricultural Research (EIAR) and Oromia Cooperative Bank. Actors and their roles are described as follows.

**Direct Chain Actors**

**1. Input suppliers**

There are many actors whose role is to supply farm inputs to coffee producers in the study area. Cooperatives union, Agriculture office, Ethiopian Agricultural research institute Mettu Branch and bilateral and non-government organization (FARM AFRICA, GIZ, NEUMANN) were Suppliers of inputs for the coffee production. The farm tools (pruning scissors, cutting saw), improved coffee seedlings, and coffee drying beds were the major agricultural inputs delivered by input suppliers. Regarding fertilizers, all farmers used only organic fertilizer (manure and compost) because of organic coffee production. In the study year, a total of 3,764kg improved coffee seedlings were distributed from Zone agriculture office to the farmers in the study areas. In the study area, on average one sampled farmer used 7,000-8,000 coffee seedling (2kg of improved coffee seed).

## 2. Smallholder Farmers/producers

Farmers are the second link along the coffee value chain actors, who decides on how to produce and for whom to sell their produced coffee products. They are main actors in the value chain who carry out most of the value chain activities right from farm input preparation to producing the final output of coffee. The major value chain functions that coffee producers perform include:

1. **Primary cooperatives:** Primary cooperatives are the other important actors in the coffee value chain purchasing coffee directly from farmers and sell to importers via unions and ECEX. They are located in different Kebeles of the district.

2. **Private Suppliers (Akrabies):** Coffee suppliers are to mean persons who, upon getting the required licenses/meeting criteria, buy coffee from farmers, collectors or take from own farm for delivery to ECX. Like coop/unions, private suppliers were also engaged in both wet and dry processing and then finally selling to exporters in an open ECX auction market. In the study areas there are 441 private suppliers involve in coffee market.

3. **Domestic consumers:** These are the ultimate actors participated in coffee value chain. (MOT, 2012). Ethiopia enjoys, not only a strong export demand, but also has a healthy domestic market which helps the country sustain the industry when demand abroad falters. In the growing urban centres, consumers are increasingly turning to commercially roasted coffee and baristas rather than preparing coffee at home in traditional way.

### Indirect chain actors

There were actors who provided supportive services as training and advisory services, extension services, information, financial services, research and technology transfer services; and influencers, those who affect the value chain by binding the law and regulations of the business through giving trade licenses, controlling quality, protecting environment and other issues. Cooperatives/unions, processors/milling house owners, NGOS (FARM AFRICA,NEUMAN foundation, GZ), Cooperative banks, Oromia credit an saving institutions, ECX were those supporting and influencing enablers having a crucial role in provision of the aforementioned services.

1. **Coffee Processors/milling house:** Miller house owners are those who have their own huller and pulpier machine and involved in providing processing services for farmers and for some suppliers. These are critical component in coffee value chain and mainly consist of Sor Geba farmers Union participated in processing wet and dry cherry. Consequently, coffee washing stations in the study areas were 108. The ownership were; unions owner 2(1pulpier and 1 huller), there is 32 hullers owned by primary cooperatives (19 installed by union, 12 installed by TECHNO SERVE, and 1 by cooperatives itself), the remaining 74 are private owners.

2. **Extension service providers:** Agriculture office, cooperative and promotion office Cooperatives union, non-governmental organizations were the main sources for farmers to get extension services in studies area. The major extension services given to the smallholder farmers were training, loan services, technical advisory services, and experience sharing visit to model farmers' site. It implied that majority of farmers in the study areas did not get the important extension services.

3. **International /Bilateral Donors and NGOs:** Various international and bilateral donors as well as non-governmental organizations (mostly international NGOs) are active in the coffee sector in studies area. Their interests range from overall economic wellbeing, to social welfare of the growers, to environmental protection and conservation. Among these are: FARM AFRICA, GIZ, CARITAS Switzerland, and NEUMANN Foundation, the activities of these organizations are in the coffee sector.

4. **Ethiopian Institute of Agricultural Research (EIAR)**: The Ethiopian Institute of Agricultural Research (EIAR) Metu branch was established in 1967 in Jima, and it is totally devoted to coffee research. This establishment focuses on improving the quality of coffee, disease resistance, nutrition improvement and the general improvement of the coffee industry. Accordingly, For the Illubabor coffee growing zone 14 specific varieties along an altitudinal range are available. As interview branch Manager, in the study areas 45 quintal (45,000kg) improved seed were distributed to coffee farmers by the institution.

5. **Oromia cooperative Bank (OCB):** Services the bank provided to cooperative and union were loan services, saving, deposit, and withdrawal services. Among 556 cooperative including Sor Geba union clients under the bank, 35 cooperatives were received loan. So far around 80 million loans were dispersed to cooperatives.as compared to retailers (16.25%, the interest rates of the cooperative to get loan (12.5%) were

less. But still the cooperative do not like to take loan from formal bank like cooperative Bank of Oromia due to fear of high interest rate and fluctuations of coffee price in the international market.

## 6. Sor Geba farmer's cooperative Union

SGFCU is one of the coffees marketing cooperatives established in 2005 G.C (1997E.C) and currently organized with170 primary cooperatives. It located in Mettu town and played different roles such as providing a warehouse service, support coffee processing, make certain supply of organic coffee directly from its origin, providing modern farm inputs, offer saving and credit facilities and representing its members.

**Ethiopian Commodity Exchange (ECX):** established in 2008, and its representative offices in the coffee growing regions (Alternative Transaction Centers, liquoring and inspection units) label coffee based on geographical origin, control the quality of and grade coffee, and provide a trade platform for bulk and micro-lots from a specific source.The basic function of ECX is to provide a centralized and standardizing service where agricultural goods and futures can be traded. Grading, warehousing, and trading services are the major ones.

### Vertical and horizontal linkage

Vertical linkage shows the formation of the primary cooperatives and the cooperative unions by their members - farmers/producers and primary coops respectively. This shows two tier of cooperative formation. Since the primary cooperatives and unions are owned by farmers and primary cooperatives respectively, these two sets of institutions form an efficient, vertically integrated operation.

Table 7 shows that 230(66.9%) reported that there is Medium Vertical Linkage between PCCs and Coffee Producers. weak and strong vertical linkage was reported by 99 (28.8% and 15 (4.4%) of the respondents. The Vertical Linkage between PCCs and Cooperative Unions also found weak as reported by majority of the respondents 169 (49.1%). The rest of the respondents, 160 (46.5%) and 15 (4.4%) confirmed medium and strong vertical linkages.

Table 7. Opinion of Respondents on the Vertical Linkage between Different Actors

| Variables | | Frequency | % |
|---|---|---|---|
| | | n=344 | n=344 |
| Vertical Linkage between PCC and Producers | Strong | 15 | 4.4 |
| | Medium | 230 | 66.9 |
| | Weak | 99 | 28.8 |
| | | | |
| Vertical Linkage between PCC Union | Strong | 15 | 4.4 |
| | Medium | 160 | 46.5 |
| | Weak | 169 | 49.1 |

Source: Own computation from survey result.

### Technical Support Linkage

Technical linkage is mostly relationship establishment between cooperative unions and its members. A good example is a relationship which found between Sor Gaba union and its members. Through this linkage the union represents its members and facilitates loan services from Oromia cooperative banks. This means the bank is given loan guarantee through the union. In the last year the union loan guarantee for 74 cooperatives. The result of the KII and FGD also indicated that the union undertakes some activities on behalf of its members, like assisting the coffee cooperatives in organic certifications continues improvements in coffee quality and quantity systems and performance needed to maintain certifications. The other technical linkage is that found between cooperative promotion office and PCCs, and between Agriculture office and member producers (coffee producers). Technical linkage is mostly related to vertical linkage. They are the two faces of a coin. Technical supports like training, inviting members on experience sharing on coffee quality, auditing service, supervision, and others are also achieved through vertical linkage.

Table 8. Opinion of Respondents on the Technical Linkage between Different Actors

| Variables | | Frequency | Percent |
|---|---|---|---|
| | | n=344 | n=344 |
| Technical linkage between coffee producers and Agriculture office | medium | 242 | 70.3 |
| | Weak | 102 | 29.7 |
| | | | |
| Technical linkage between cooperative promotion Office and PCC | Strong | 15 | 4.4 |
| | medium | 245 | 71.2 |
| | Weak | 84 | 24.4 |
| | | | |
| Technical linkage between cooperative union and PCCs. | medium | 115 | 33.4 |
| | Weak | 229 | 66.6 |
| | | | |
| Technical linkage between ECX and PCC's | medium | 81 | 23.5 |
| | Weak | 263 | 76.5 |

Source: Own computation from survey result.

As indicated in table 11 above, majority of the respondents, 242(70.3%) opined that there is medium technical linkage between Coffee Producers and Agriculture Office followed by 102(29.7%) of respondents who reflected the linkage is weak. The survey result also indicated that there is medium technical linkage between cooperative promotion Office and PCCs as witnessed by 245(71.2%) of the respondents. Others 84(24.4%) and 15(4.4%) indicated weak and strong technical relationship between actors. With regard to Technical linkage between cooperative union and PCCs, weak technical support linkage was recorded as 229(66.6%) of the respondents reported and 115(33.4%) of the respondents opined medium relationship. On the other hand, weak Technical Linkage was found Between ECEX and PCCs followed by medium linkage as opined by 263(76.5%) and 81(23.5%) of the respondents respectively.

## Business linkage

From the discussion with FGD and KII, it was clear that business linkage is the widest linkage found between almost all coffee value chain actors. As cooperative organizations are business entities, they have business relationship almost with all actors in the chain. The most existing business linkage is the one which found between PCCs and its members. This relationship is bilateral, means the members trade their coffee to the respective primary coffee cooperatives to which they are members. As shown in Table 12 below, weak business Linkage was reported between PCCS and coffee producers as opined by 224(65.1%) of the respondents followed by medium relationship 120(34.9%). The same business Linkage was reported between cooperative unions and coffee producers. Out of the total respondents 212(61.6%) of them opined there is weak business linkage between cooperative unions and coffee producers whereas 132(38.4%) of the respondents opined the linkage is medium. With regard to business Linkage between cooperative unions and PCCs, weak linkage was reported by 218(63.4%) respondents while the remaining respondents 126(36.6%) confirm medium linkage. With regard to Business Linkage between Coffee Producers and Retailers strong linkage was recorded by majority of the respondents187(54.4%) while weak and medium linkage was reported by 92(26.7%) and 65(18.9%) of the respondents respectively.

Table 9. Opinion of Respondents on the Business Linkage between Different Actors

| Variables | | Frequency | % |
|---|---|---|---|
| Business Linkage between PCCS and producers | Medium | 120 | 34.9 |
| | Weak | 224 | 65.1 |
| Business Linkage between cooperative unions and producers | Medium | 132 | 38.4 |
| | Weak | 212 | 61.6 |
| Business Linkage between cooperative unions and PCCs | Medium | 126 | 36.6 |
| | Weak | 218 | 63.4 |

Table 9 (cont.). Opinion of Respondents on the Business Linkage between Different Actors

| Business Linkage between Producers and Retailers | **Strong** | **187** | **54.4** |
|---|---|---|---|
| | Medium | 65 | 18.9 |
| | Weak | 92 | 26.7 |
| Business Linkage between Producers and Wholesalers | Strong | 173 | 50.3 |
| | Medium | 67 | 19.5 |
| | Weak | 104 | 30.2 |

Source: Own computation from survey result.

## Marketing Linkage

In marketing linkage, cooperative unions play great role. Searching and creating the best market opportunity for members (PCCs) is the primary objective of the cooperative unions for which they were established. Among such cooperative unions Sor Gaba coffee farmers' union is the outshining one. The union collects and processes members' produces and searches for best market, especially international markets and fetches them with best return that they never had before its establishment. Other marketing linkage also exists between cooperative unions and coffee producers, between PCCs and coffee producers and between cooperative unions and ECEX.

Table 10. Opinion of Respondents on the Marketing Linkage between Different Actors

| Variables | | Frequency | Percent |
|---|---|---|---|
| | | n=344 | n=344 |
| Market Linkage between cooperative unions and PCCs | Medium | 162 | 47.1 |
| | Weak | 182 | 52.9 |
| | | | |
| Market Linkage between cooperative unions and coffee producers | Medium | 146 | 42.4 |
| | Weak | 198 | 57.6 |
| Market Linkage between PCCs and coffee producers | Medium | 171 | 49.7 |
| | Weak | 173 | 50.3 |
| | | | |
| Market Linkage between union and ECEX | Strong | 132 | 38.4 |
| | Medium | 75 | 21.8 |
| | Weak | 137 | 39.8 |

Source: Own computation from survey result.

In the table 13 above, the marketing linkage between cooperative unions and PCCs, between cooperative unions and coffee producers, between PCCs and coffee producers and between cooperative unions and ECEX was found weak as reported by 182 (52.9) , 198(57.6%), 173(50.3%) and 137(39.8%) of the respondents respectively. Medium marketing linkage was recorded between cooperative unions and PCCs, between cooperative unions and coffee producers, between PCCs and coffee producers and between cooperative unions and ECEX as witnessed by 162(47.1%),146(42.4%),171(49.7%) respondents respectively.

## Econometric Model Analysis Result

In this section, the logistic regression model is specified using SPSS Version 22. The model is focusing on effectiveness of coffee cooperatives in creating coffee value chain. The main purpose of this section is to specify a logistic regression model fitted to identify the potential variables affecting coffee cooperatives in creating effective coffee value chain in the study area. The variables described are used to estimate the logistic regression model.  Using coffee cooperatives in creating effective value chain as dependent variable where by a value of 1 is given to cooperatives effectiveness in coffee value chain and 0 for cooperatives ineffective in creating coffee value chain. Accordingly, the model uses 18 explanatory variables.

The results of the logistic regression model estimates indicates that out of the 18 factors included, 9 variables were found to have a significant influence on the probability of being effective in creating coffee value chain at less than 5% probability level. The variables considered were Age of the members, Farming experience in coffee

development, Coffee farm size, Access to credit, Proximity to cooperative society, Storage facility, Coffee Processing, Terms of payment for dried cherry, and Dividend received. Except terms of payment for dried cherry, the remaining seven independent variables/factors were statistically significant and affecting the coffee cooperatives in creating effective coffee value chain positively (Table 14). The remaining 9 of the 18 explanatory variables were found to have no significant influence on the probability of being effective. The significant explanatory variables which have effect on coffee cooperatives in creating effective coffee value chain are discussed below.

1.    **Age of household head (AGE):** This variable affects effectiveness of the cooperatives members positively and statistically significant at 5 % probability level in the study area. The positive relationship implies that when household heads get older, they are expected to have stable economy in farming. Moreover, older household heads are expected to have more experience in agricultural activities and marketing through co-operatives, because younger men either have to wait for land redistribution, or have to share land with their families. If all other things are held constant, the odds ratio of 70.31 for household age size implies that, the odds ratio in favor of being effective increases by a factor of 70.31 as household age increase by one year. This means that an increase in the age of a member increases the likelihood to effectiveness of the coffee co-operatives and result confirms with (Frehiwot, 2007) and (Ojogho, 2010) findings.

2.    **Farming Experience in coffee production (FARMEXP):**   The likelihood of coffee cooperatives in creating effective coffee value chain was also positively and statistically significantly affected by farming experience at 5% levels of significance. Since p-value = 0.001<0.05, this result indicated that as the farmers experiences in coffee production increased by one year, the more likely to be effective in coffee value chain by 8.13 than those with less experienced farmers, keeping others variables constant. This means that the many years engaged in coffee production gives the farmers desire to adjust their market links; trying alternative marketing outlets to increase sales volume or better prices all this to maximize profits. This is in line with finding of (Ayelech, 2011), and (El et al., 2013) who illustrated as farmer's experience increased the volume of tomato, avocado and crops supplied to the market has increased, respectively.

3.    **Farm land size (COFARMSIZ):** This variable refers to the portion total farm land area owned by household heads allocated to coffee production in hectare. Farm land size, which is significant at 5% probability level, has positive influence on the probability of effectiveness of coffee cooperatives in the study area. It implies that the probability of effectiveness increases with coffee farm size. The interpretation of the result indicates that, if all other things are held constant, the odds ratio of 56.47 for the farm land holding coffee size implies that, the odds ratio in favor of being effective increases by a factor of 56.47 as the coffee farm land holding size increases by one hectare. The result is in line with the study of (Fayera Bakala, 2019)  which studied on Market chain analysis for potato in Masha District, Southwestern Ethiopia.

4.    **Access to Credit facility (CREDIT):** credit is important source of investment on activities that generate income for farm households. The households can purchase agricultural inputs like improved seeds, expanding /improve coffee production, and other. Farm households who have access to credit could increase their effectiveness in creating coffee value chain. The logistics model analysis revealed that this variable is statistically significant at p-value equal to 0.047. This indicated that credit is statistically significant positive effects on effectiveness of coffee cooperatives in creating value chain at a probability level of 5%. This in agreement with the prior expectation about the impact of the differential access to credit service. This is because farm households who have the opportunity of accessing farm credit would build their capacity to produce more through purchasing of agricultural inputs. The households with more access to farm credits have the possibility of being effective in coffee value chain. The odds ratio in favor of effectiveness increases, other things remain constant, by a factor of 23.33 as far households get access to farm credit. These econometric results were similar to the results revealed by (Ethiopia, 2015).

5.    **Proximity to Cooperative society (PROXIMITY)**: it refers to the distance nearer to cooperative and measured in terms of kilometers. It is expected that households nearer to cooperative will incur lower transaction cost and can easily participate, easy to input access, market information which benefit the members and then create effective coffee value chain This variables result the same to the hypothesis, showed distance nearer to the cooperative centers was found to be positive and statistically significant influence on the effectiveness of coffee cooperatives at 5% probability level. Since p=0 <0.05 as the farmers nearer to cooperatives centers by one kilometers, it resulted in increased the likelihood of effectiveness of cooperatives in coffee value chain by a factor of 124.24, keeping other factors constant. Similar to this, the results by (Aliyi, 2019) found that distance nearer the cooperatives had a positive and significant effect on effectiveness of coffee cooperatives.

6.	**Access to Storage facility (STORFAC):** The logit model analysis revealed that this variable is statistically significant at p-value equal to 12.63. This indicated that storage facility is statistically significant positive effects on effectiveness of coffee cooperatives in creating value chain at a probability level of 5%. This in agreement with the prior expectation about the impact of access to storage/warehouse services. The odds ratio in favor of effectiveness increases, other things remain constant, by a factor of 12.63 as far households get access to storage facilities .

7.	**Coffee Processing (PROCES):** It is one of the statistically significant predictor variable influencing effectiveness of cooperatives in coffee value chain at p-value 0.007. Its Exp (B) value which is 13.35 indicates that it is a useful strong predictor of the effectiveness of cooperatives in coffee value chain. The odd ratio indicates that there is positive relationship between predictor variable (coffee processing) and dependent variable (effectiveness of cooperatives in coffee value chain). Therefore, the hypothesized statement which states that the more the cooperatives members use wet mills coffee processing , the more will be the effectiveness of cooperatives in coffee value chain is not rejected since a unit increase in use of wet mills processing has increased the likelihood effectiveness of cooperatives in coffee value chain by a factor of 13.35.

**8.**	**Terms of payment for dried cherry (PATDRI):** Terms of payment for dried cherry by the cooperatives influenced negatively the effectiveness of coffee value chain at significance level of 5%.  Since p=0.001<0.05, the result tells us that, the cooperative members were purchasing dried chary for immediate demand that proved the decreased the likely probability of effectiveness of cooperative by 7.7% as the members decides to purchase one unit additional dried cherry, citrus paribus. The findings were similar to (Gashaw, 2018) who analysis Value Chain of Coffee in Jimma Zone of Oromia Regional State, Ethiopia

**9.**	**Dividend received (DIVREC):** This variable was hypothesized to influence the effectiveness of cooperatives in coffee value chain positively. As dividend received increase effectiveness of cooperatives in coffee value chain increase. The p-value (Sig.) for dividend received is 0.001(less than 0.05) indicates that it is statistically significant predictor variable which has positive effect on effectiveness of cooperatives in coffee value chain. This indicates that the increase of dividend received will result in the increase of effectiveness of cooperatives in coffee value chain. Its Exp (B) value 65.92 signifies that there is relationship between the predictor variable dividend received and effectiveness of cooperatives in coffee value chain. Therefore the hypothesized statement which states that the increase in dividend received will be the increase in effectiveness of cooperatives in coffee value chain is accepted since an increase in dividend by birr one increases the probability (the likelihood that effectiveness of cooperatives ) of demand for additional share by birr  65.92,  Citrus paribus.

Table 11. Summary of results for the logistics model in the study area

| No | Independent Variables | ß | S.E | Wald | Df | Sig | Exp(ß) | 95% C.I for EXP(ß) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower | Upper |
| 1 | **Age of the members** | **4.25** | **.93** | **20.63** | **1** | **.000***  | **70.31** | **11.22** | **440.55** |
| 2 | Educational level | .72 | .42 | 2.85 | 1 | .091 | 2.05 | .89 | 4.75 |
| 3 | Coffee Family Size | -.73 | 1.17 | .39 | 1 | .532 | .48 | .04 | 4.77 |
| 4 | **Farming experience in coffee production** | 2.09 | .63 | 10.99 | 1 | .001* | 8.13 | 2.35 | 28.05 |
| 5 | **Coffee farm size** | **4.03** | **1.07** | **14.05** | **1** | **.000*** | **56.47** | **6.85** | **465.1** |
| 6 | **Access to credit** | **3.15** | **1.58** | **3.95** | **1** | **.047*** | **23.33** | **1.04** | **520.38** |
| 7 | **Proximity to cooperative society** | **4.82** | **.70** | **47.18** | **1** | **.000*** | **124.24** | **31.38** | **491.85** |
| 8 | **Storage facility** | **2.53** | **.88** | **8.13** | **1** | **.004*** | **12.63** | **2.21** | **72.13** |
| 9 | Adopt new technologies | -.69 | .80 | .74 | 1 | .389 | .50 | .10 | 2.42 |
| 10 | Transport facility | 1.09 | .73 | 2.24 | 1 | .134 | 2.98 | .71 | 12.51 |
| 11 | Training | .92 | 1.00 | .85 | 1 | .356 | 2.51 | .35 | 17.83 |
| 12 | Extension contact | -.10 | .14 | .54 | 1 | .459 | .90 | .68 | 1.190 |
| 13 | Input supply | .60 | 2.20 | .07 | 1 | .783 | 1.83 | .02 | 137.41 |
| 14 | Market information | -.63 | 1.99 | .10 | 1 | .752 | .53 | .01 | 26.69 |
| 15 | **Coffee Processing** | **2.59** | **.96** | **7.19** | **1** | **.007*** | **13.35** | **2.00** | **88.71** |
| 16 | Terms of payment for red cherry | -1.66 | 1.00 | 2.73 | 1 | .098 | .19 | .02 | 1.35 |
| 17 | **Terms of payment for dried cherry** | **-2.56** | **1.01** | **6.46** | **1** | **.011*** | **.077** | **.01** | **.55** |
| 18 | **Dividend received** | **4.18** | **1.24** | **11.39** | **1** | **.001*** | **65.92** | **5.79** | **750.32** |
| | Constant | -38.90 | 5.85 | 44.14 | 1 | .000 | .000 | | |

 Number of observations =344, Nagelkerke $R^2$ = 0.807, * is statistically significant at

Source: own computation from survey result.

## Summary of Findings

The study was conducted in Ilubabor Zone of Oromia Regional State, Ethiopia. The main objective of this study has been to identify factors that affecting the effectiveness of coffee cooperative in coffee value chain in terms of profitability, dividend per share capital and liquidity. The specific objectives of the study include identify actors and their roles/value additions in Coffee value chain activities, examine the degree of strength of the linkages between actors existing in the coffee value chain and analyze the different factors influencing coffee cooperatives in creating effective of coffee value chain in the study area.

In the study areas, 344 cooperative members are selected by applied Multi stage stratified sampling technique and data was collected from coffee cooperative members residing in Ilubabor Zone using a structured questionnaire. Focus group discussion (35 members) and key informant interview (23 members) was also conducted. Secondary data which assisted this study were collected from agriculture office, Market Development office, cooperative and promotion office, ECEX, and from published and unpublished materials. Audit reports of thirteen sampled primary coffee cooperatives were also used as sources of information to examine effectiveness of the coffee cooperatives in terms of profitability, dividend per share capital, and liquidity. The data were analyzed using econometrics and descriptive statistics tools by employing IBM SPSS version 22 software packages. Data collected regarding actors and their roles in the CVC, and the linkages between cooperatives and other actors in the CVC were analyzed by using descriptive statistics. Data collected regarding determining factors affecting the effectiveness of cooperatives in CVC was analyzed using binary logistic regression.

## Finding of Financial analysis

Ratio analysis was used as methods of calculating and interpreting financial ratios to analysis the effectiveness of coffee cooperatives in Ilubabor zone hence, profitability ratio (Gross profit margin and net profit margin), shareholder ratio analysis (Dividend per share capital) and liquidity ratio (Current ratio could be used in this study.

The Audit report of the sampled primary coffee cooperative resulted that, on the average, the gross margin of the coffee cooperatives under the investigation was 24% of the average total sales of the years. Averagely the net profit margin ratio of the cooperatives in the study area was 0.695. This means in the last year the cooperative could earn 6.95% of the total sales as a net profit. Separately, but, Goji Hoyi was not profitable (loss), which leads to shut down. Regarding to Shareholders Ratio Analysis, Dividend per share Capital of the cooperatives in the last year was 0.23 similarly, this ratio indicates that 1 birr of members share investment enabled them to earn on average 23 cents as a dividend. It also implies, the coffee cooperatives had accomplished low profitable activities. This discourages the coffee cooperatives members in participation in members and brought its coffee to its cooperatives which leads to their cooperatives become ineffective.

The cooperatives were also analysis with respect to their ability and readiness in settling their debt over years. On average, liquidity (Current ratio) of the coffee cooperatives was 5.91. However the benchmark ratio is 2:1 (TILAHUN, 2007). The small ratio below the rule indicates that the coffee cooperatives were faced short come in paying the current obligation of creditors'. So based on the bench mark, three cooperatives (Biftu Gudina, Aggatta, and Goji Hoyi) exhibited lower performance. This implies their ability to satisfy their members with respect to provision of credit and settlement of current debt of the cooperatives was low.

## Findings of Demographic Characteristics of the Respondents

To describe respondents by their socio- demographic characteristics, the survey result shows that majority of respondents 171(49.7%) were aged between 46-60 and 324(94.2%) were male. As to the educational level of member respondents majority of the respondents 284 (82.6%) were literate, or minimum they can read and write. From the total respondents 280(81.4%) were married and also 305(88.7%) respondents were with small (1-4) family size. Majority of the coffee producers 198(57.6%) experienced between 31-40 and about 269(78.2%) respondents coffee farm size were between 0.1-0.5 hectares. When we see membership duration 315(91.6%) of coffee cooperatives members were more than three years.

## Findings of Actors and Their Roles in the coffee Value chain

In the study area, there are primary and supportive actors currently involving in CVC. The primary actors are those involved in commercial activities and include input supplier, coffee producers, primary coffee

cooperatives, Sor Geba Farmers' cooperative unions, private intermediaries (retailers and wholesalers), and local users. The supportive actors are those who provide supportive services and include coffee processors, Extensions services providers, Oromia Cooperative Bank (OCB), Ethiopian Institute of Agricultural Research (EIAR), Ethiopian commodity exchange (ECEX) and bilateral & international NGOs in Ilubabor zone. Supplying farm inputs such as coffee drying bed, agricultural tools, providing services like training and extension, market information and loan were indicated as major roles which these actors contribute in the CVC in study area.

The survey result indicated that the role of actors on supplying farm inputs such as coffee drying bed at required amount is not as required. The roles of actor in providing training were found out ineffective as opined by 56.1% of the respondents. Even if majority of respondents get extension service (64%), the frequency of extension contact were not as required. The market information was provided to members as it was opined by 64% of the respondents. However, it was found ineffective due to lack of timeliness of the information. Credit service also found out ineffective due to absence of interest free credit service as respond by 70.3%.

With regard to respondents' overall opinion on the roles of actors, majority of the respondents as collected through interviews argued that the roles of actors in CVC were not effective. It is evident from previous analysis that farm inputs supply such as coffee drying bed is not available at required quantity, the market information provided to members was not up-to-date and not distributed at the right time. The credit service also was not interest free. All these factors led members express their opinion on the roles of actor in CVC as not effective.

### Findings of Linkages between Cooperatives and Other Actors in the CVC

There are five main linkages between actors in CVC namely; Horizontal linkage, Vertical linkage, Technical Support Linkage, Business linkage and Marketing Linkage. No Horizontal linkage was found between cooperative societies at the same level as supported by the respondents. From the total respondents, 230(66.9%) reported that there is medium Vertical Linkage between PCCs and Coffee Producers. Weak Vertical Linkage was recorded between PCCs and union as opined 169(49.1%) of the respondents. Regarding to technical linkage, there is medium Technical support linkage between Coffee Producers and Agriculture Office,& between PCC and Cooperatives promotion office as recorded by 242(70.3%) and 245(71.2%) respondents respectively. As the survey indicated there is weak Technical support linkage between PCC and union and between PCCs and ECEX as witnessed by 229(66.6%) and 263(76.5) of the respondents. On the other hand, Business Linkage between PCCS and producers , between cooperative unions and producers , and between cooperative unions and PCCs  weak relationship was recorded by 224(65.1%) , 212(61.6%)  and 218(63.4%) of the majority of the respondents respectively. Out of total respondents, 187(54.4%), and 173(50.3%) of them opined strong business linkage between Coffee Producers and Wholesalers, between Coffee Producers and Retailers respectively. Regarding to Market linkage, there is weak marketing linkage was recorded in all stated actors.

### Findings of determining factors affecting the Effectiveness of Cooperatives in CVC

The interpretation from the result of binary logistic regression gives a good understanding of the effect of variables affecting the effectiveness of cooperatives in coffee value chain. The Nagelkerke R Square were used to measure the proportion of the total variation of the dependent variable explained by the predictor variables. Accordingly, in this study 80.7percent of the variation in the dependent variable "effectiveness of coffee cooperatives in coffee value chain" was explained by the variance in the predictor variables. Out of thirteen predictor variables included in the model it was found out that only nine of them have statistically significant effect on the dependent variable "effectiveness of coffee cooperatives in coffee value chain". Accordingly, Age, farming experience in coffee production, coffee farm size, access to credit, proximity to cooperatives society, storage facility, coffee processing, terms of payment for dried cherry and dividend received  were found that they have statistically significant effect on dependent variable "effectiveness of coffee cooperatives in coffee value chain at 0.05(5%)  significant level.  Out of these statistically significant variables except payment terms for dried cherry which negatively effect on the dependent variable, the remaining eight variables were positively effect on the dependent variable "effectiveness of coffee cooperatives in coffee value chain". Accordingly, Age, farming experience in coffee production, coffee farm size, access to credit, proximity to cooperatives society, storage facility, coffee processing, and dividend received  have positive effect on dependent variable "effectiveness of cooperatives in coffee value chain"

whereas, terms of payment for dried cherry has negative effect on dependent variable "effectiveness of cooperatives in coffee value chain".

## Conclusion

The study was conducted in Ilubabor Zone of Oromia Regional State, Ethiopia. The main objective of this study was to identify factors that affecting the effectiveness of coffee cooperative in coffee value chain in terms of profitability, dividend per share capital and liquidity. The specific objectives of the study include identify actors and their roles/value additions in Coffee value chain activities, examine the degree of strength of the linkages between actors existing in the coffee value chain and analyze the different factors influencing coffee cooperatives in creating effective of coffee value chain in the study area.

It is obviously found that all other things are held constant, the odds ratio of 70.31 for household age size implies that, the odds ratio in favor of being effective increases by a factor of 70.31 as household age increase by one year. In other words, the growing age of the households increase the effectiveness of the coffee processing. However, the coffee value chain actors in the study areas are input suppliers, Smallholder Farmers/producers, Primary cooperatives, Sor Geba cooperative Union, Suppliers (Akrabies), Domestic consumers, Processors/milling house, Extension service providers, NGO's, Ethiopian Commodity Exchange (ECX), Ethiopian Institute of Agricultural Research (EIAR) and Oromia Cooperative Bank are playing an important role for effectiveness of the coffee production. However, the Ethiopian commodity exchange and EIAR contributions are more significant as compared to other actors. Effectiveness of coffee cooperatives in coffee value chain was explained by the variance in the predictor variables. Out of thirteen predictor variables included in the model it was found out that only nine of them have statistically significant effect on the dependent variable "effectiveness of coffee cooperatives in coffee value chain". Accordingly, Age, farming experience in coffee production, coffee farm size, access to credit, proximity to cooperatives society, storage facility, coffee processing, terms of payment for dried cherry and dividend received were found that they have statistically significant effect on dependent variable "effectiveness of coffee cooperatives in coffee value chain at 0.05(5%) significant level. Out of these statistically significant variables except payment terms for dried cherry which negatively effect on the dependent variable, the remaining eight variables were positively effect on the dependent variable "effectiveness of coffee cooperatives in coffee value chain". Accordingly, Age, farming experience in coffee production, coffee farm size, access to credit, proximity to cooperatives society, storage facility, coffee processing, and dividend received have positive effect on dependent variable "effectiveness of cooperatives in coffee value chain" whereas, terms of payment for dried cherry has negative effect on dependent variable "effectiveness of cooperatives in coffee value chain".

## References

1. Simeon C. Onya1, Samuel E. Oriala1, Ikenna V. Ejiba and Okoronkwo1, F. C. (2016). Market Participation and Value Chain of Cassava Farmers in Abia State. *Journal of Scientific Research & Reports*, *12*(1), 1-11. [Link]

2. Ahmed, A. (2019). Analysis of the Effectiveness of Coffee Cooperatives in Coffee Value Chain in Melka-ballo Woreda, East Hararghe Zone, Oromia Regional State. *Ethiopia. European Journal of Business and Management*, 11, 7. [Link]

3. Alemayehu, A. (2014). Coffee Production and Marketing in Ethiopia; European Journal of Business and Management, 6, 37. [Link]

4. Anandajayasekeram, P., Gebremedhin, B. (2009). Integrating innovation systems perspective and value chain analysis in agricultural research for development: Implications and challenges. Improving productivity and market success (IPMS) of Ethiopian Farmers Project Working paper 16. ILRI (International Livestock Research Institute), Nairobi, Kenya, 67 p.[Link]

5. David AlanAschauer (1989). Is public expenditure productive? *Journal of Monetary Economics*, *23*(2), 177-200. [CrossRef]

6. Balgah, R. A. (2019). Factors Influencing Coffee Farmers' Decisions to Join Cooperatives Sustainable Agriculture Research, *8*(1). ISSN 1927-050X E-ISSN 1927-0518. [Link]

7. Heiko, B. (2007). Participatory value chain analysis for improved farmer incomes, employment opportunities and food securit. *Pacific Economic Bulletin*, *22*(3). Asia Pacific Press. [Link]

8.  Miguel Hernández-Espallardo, Narciso Arcas-Lario, Gustavo Marcos-Matás (2012). Farmers' satisfaction and intention to continue membership in agricultural marketing co-operatives: neoclassical versus transaction cost considerations. *European Review of Agricultural Economics, 40*(2), 239–260. [CrossRef]

9.  Bart Minten1, Mekdim Dereje1, Ermias Engeda1, Tadesse Kuma ( 2019 ) Coffee value chains on the move: Evidence from smallholder coffee farmers in Ethiopia. IFPRI, Addis Ababa, Ethiopia. [Link] [CrossRef]

10. Temesgen, F. (2016). Analysis of Technical Efficiency of Coffee Production on Small Holder Farmers in Case of Sasiga & Limu Districts of East Wollega Zone. Journal of Economics and Sustainable Development. 7(15). [Link]

11. Beshah, B. D. Kitaw and Dejene, T. (2013). Quality and value chain analyses of Ethiopian coffee. Journal of Agriculture and Social Research (JASR). Quality and value chain analyses of Ethiopian coffee, *Journal of Agriculture and Social Research (JASR).* [Link]

12. Aliyi, A., Ibrahim; Haji, Jema; Aman, Mr. M. (2021). Coffee value chain analysis in kombolcha district, east hararghe zone, oromia national regional state, Ethiopia. Harmaya University.

13. Kodigehalli, B. V. (2011). Value Chain Analysis for Coffee in Karnataka, India. Research Thesis for the joint academic degree of International Master of Science in Rural Development from Ghent University (Belgium), Agrocampus Ouest (France), Humboldt University of Berlin (Germany), Slovak University of Agriculture in Nitra (Slovakia) and University of Pisa (Italy) in collaboration with Wageningen University (The Netherlands). [Link]

14. Bogale, A. (2004). Land degradation, impoverishment and livelihood strategies of rural households in Ethiopia: farmers' perceptions and policy implication. 227 p. [Link]

15. Bogale, A. & Shimelis, A. (2009). Household level determinants of food insecurity in rural areas of dire dawa, eastern ethiopia. African journal of food agriculture nutrition and development, 9, 1914 1926. [Link]

16. Tilahun, D. (2007). Performance of coffee marketing co-operatives and members' satisfaction in Dale District: SNNPRS-Southern Ethiopia. MSc thesis (Agricultural Marketing). Haramaya (Ethiopia): Haramaya University. 120p. [Link]

17. Bacsi, Z.; Fekete-Farkas, M.; Ma'ruf, M.I. Coffee Yield Stability as a Factor of Food Security. *Foods* 2022, *11*, 3036. [CrossRef]

18. Carlos A. da Silva, Hildo M. de Souza Filho (2007). Guidelines for rapid appraisals of agrifood chain performance in developing countries. Agriculture management Marketing and Finance Occasional Paper. Food and agriculture organization of the United Nations Rome. [Link]

19. Paul A. David (2000). Knowledge, Capabilities and Human Capital Formation in Economic Growth. A Research Report to for the New Zealand Treasury. All Souls College, Oxford & Stanford University. [Link]

20. Delelegne A. Tefera,Jos Bijman, Maja A. Slingerland (2016). Agricultural Co-Operatives in Ethiopia: Evolution, Functions and Impact. Journal of International Development, *29*(4), 431-453. [CrossRef]

21. Fintrac Inc (2015). Fresh mango value chain analysis in arbaminch area organization of value chain competency. Addis Ababa, Ethiopia. USAID-KAVES Mango Value Chain Analysis. USAID. Link Microsoft Word - USAID-KAVES Mango value chain study. [Link]

22. Muthumariappan, K. (2018). Effectiveness of Cooperatives in Coffee Value Chain: An Analysis in Sasiga District of Oromia Region, Ethiopia. Afribary. [Link]

23. Seyfe Fikre Hailu (2020). The Role and Challenge of Ethiopian Commodity Exchange (ECX) on Coffee Supplies and Marketing in Ethiopia. *Business and Management Studies*, *6*(3), 1. [Link]

24. Rikitu, A. (2013). Analysis of Tomato Value Chain: The Case of Toke Kutaye District, West Shawa Zone, Oromia National, Regional Stat. *American Research Journal of Agriculture*, 4, 1-15. [Link]

25. Abebaw Yenesew Dejen Debeb (2019). Challenges and Prospects of Cooperatives in Ethiopia with Reference Sough Gondar Zone- Ethiopia. *European Journal of Business and Management*, *11*(34). [Link]

26. Fethi Omer (2016). An Assessment of Factors Influencing the Market Performance of Coffee Farmers' Cooperatives in Melka Balo Woreda: The Case of Kurtu Cooperatives Society, Ethiopia. [Link]

27. Bizualem, A., and Habteyesus, D. G. and Nedjo, Z. S. (2018). Value Chain Analysis of Coffee in Jimma Zone of Oromia Regional State, Ethiopia. *American Based Research Journal*, *7*(11). [Link]

28. Hellin, Jon and Madelon, M. (2006). Guidelines for value chain analysis. Food and Agriculture Organization (FAO). [Link]

29. Raphael Kaplinsky (2004). Spreading the Gains from Globalization: What Can Be Learned from Value-Chain Analysis? *Problems of Economic Transition*, *47*(2), 74-115.

30. Kaplinsky, R. and Morris, M. (2001). A Handbook for Value Chain Research. [Link]

31. Kodama, Yuk (2007). New role of cooperatives in Ethiopia: the case of ethiopian coffee farmers cooperatives. African study monographs. Supplementary issue. [Link]

32. Nigusie Legese (2013) Performance Evaluation of Coffee Marketing Cooperatives Union: The case of Chercher Oda Blttom Farmers Cooperatives Union in West Harerghe Zone Oromia Region, Ethiopia, Thesis. Mekelle:MU. [Link]

33. Lemecha, Z. (2018). Value chain analysis of coffee: the case of amaro woreda in southern ethiopia. Developing Country Studies, *9*(11). [Link]

34. Keane, J. (2014). The Governance of Global Value Chains, Upgrading Processes and Agricultural Producers in Sub-Saharan Africa. In: Fukunishi, T. (eds) Delivering Sustainable Growth in Africa. IDE-JETRO Series. Palgrave Macmillan, London. [CrossRef]

35. Leopold P (2008).Coffee in Kenya: Some challenges for decent work /. Mureithi; International Labour Office, Sectoral Activities Programme. – Geneva: ILO, 2008 1 v. (Working Paper, No. 260)

36. Tilahun, D. (2007). Performance of coffee marketing co-operatives and members' satisfaction in Dale District: SNNPRS-Southern Ethiopia. MSc thesis (Agricultural Marketing). Haramaya (Ethiopia): Haramaya University. 120p. [Link]

37. Addisu, A., Barassa, B., Demeke, D., Kanbiro, O. (2022). Determinants the Value Chain of Coffee Product in Primary Coffee Producing Cooperatives in Dale Woreda of Sidama Regional State, Ethiopia. *Journal of Purchasing, Logistics and Supply Chain*, *3*(1). [Link]

38. Sovit, P., Thapa, B., Kusum, A., Bishal, M., Srijan, B. (2021). Value-chain analysis of ginger sub-sector in Solukhumbu district, Nepal. *Food and Agriculture Economics Review, (FAER), 1*(2) 127-133. [CrossRef]

39. Negasa, E., Mitiku, A., and Mitiku, F. (2019). Analysis Of Coffee Value Chain Finance In Bodji Dirmeji District Of West Wollega, Ethiopia. *Ethiopian Journal of Environmental Studies & Management*, *12*(1), 32-42. [Link]

40. Beyenech, Y., Matiwos, E. (2020). Value Chain Analysis of Coffee in Gedeo Zone, Ethiopia, with Focus on Farmers' Cooperatives. *Journal of Supply Chain Management Systems, 9*(4), 1-9. [Link]

41. Lemecha, Z. (2018). Value Chain Analysis of Coffee: The Case of Amaro Woreda in Southern Ethiopia. Developing Country Studies, *9*(11). [Link]

**Appendix 1.**

Table 1. Cooperative societies operating in Ilu ababor Zone by their types

| No | Type of Cooperative Societies | Amount in number | Beginning Membership | | | Current Membership | | | Beginning Capital | Current capital |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | M | F | T | M | F | T | | |
| 1 | Multipurpose Cooperatives | 234 | 12,706 | 970 | 13,676 | 48,649 | 8,775 | 57,424 | 2,697,956 | 32,317,140 |
| **2** | **Agricultural development cooperatives** | **54** | **2,924** | **519** | **3,443** | **6,224** | **1,518** | **7,262** | **395,450.1** | **14,398,181** |
| 2.1 | Coffee Cooperatives | 41 | 2,321 | 395 | 2,716 | 5,215 | 1317 | 6,052 | 372,870.1 | 13,641,876 |
| 2.2 | Honey producers Cooperatives | 6 | 190 | 25 | 215 | 199 | 22 | 221 | 7,750 | 238,976 |
| 2.3 | Fattening Cooperatives | 1 | 24 | 4 | 28 | 24 | 4 | 28 | - | 7,300 |
| 2.4 | Milk cooperatives | 1 | - | 10 | 10 | - | 10 | 10 | 50 | 10,000 |
| 2.5 | Forest Cooperative | 5 | 389 | 85 | 474 | 786 | 165 | 951 | 14,780 | 500,028.9 |
| 3 | Consumer Cooperatives | 51 | 3,564 | 2,012 | 5,576 | 6,279 | 3755 | 10,034 | 2,586,400 | 10,653,236.4 |
| 4 | Saving and credit Cooperatives | 266 | 2,915 | 11,497 | 14,599 | 4,954 | 19,705 | 24,623 | 3,424,662 | 25,416,994 |
| | **Total** | **605** | **19,185** | **14,479** | **33,851** | **59,882** | **32,235** | **92,081** | **8,709,018** | **68,387,370.4** |

Source: Ilu ababor Zone Cooperative and Promotion Office, 2019.

Table 2. Independent Variables used in the logit model and their priori expectations

| No | Label | Variables | Measurement types | Expected sign | Source |
|---|---|---|---|---|---|
| | **Dependent variable** | | | | |
| | ECCVC | The effectiveness of coffee cooperatives in coffee value chain | Dummy (1 cooperatives that engaged in value addition, o otherwise) | | |
| | **Independent variables** | | | | |
| 1 | **ACCES** | **Access to Credit** | 1 if members and cooperatives have got access to credit, and 0 if otherwise) | + | (Hailu, 2016), (Ahmed Aliyi, 2019),  (Sherefa, 2008), (Haile, 2009) |
| 2 | PRICING | Pricing | Dummy (1 if cooperatives offer better prices than other actors, and 0 if otherwise) | + | (Lemecha, 2018), (Haile, 2009) |
| 3 | PROXIMITY | **Proximity to cooperative** | Dummy (1 if the distance is short as much as possible and 0 otherwise) | - | (Hailu, 2016), (Ahmed Aliyi, 2019) |
| 4 | STORAFAC | **Storage facility** | Dummy (1 if cooperatives have standard storage facility, and 0 if otherwise) | + | (Sherefa, 2008), (Aliyi, 2019) |
| 5 | TECHNO | **Technology** | Technology (1 if members use up-to-date technology and 0 if otherwise) | + | (Aliyi, 2019), (Muthumariappan, 2015) |
| 6 | TRANSFAC | **Transport facility** | Dummy (1 if there is sufficient transport facility and 0 if otherwise) | + | (Hailu, 2016), (Sherefa, 2008), (Adjimoti, 2013) |
| 7 | CORRUP | **Corruption** | Dummy (1 if there is no corruption, and 0 if otherwise) | - | (Aliyi, 2019) |
| 8 | MNGTCAPP | **Management Capacity** | Dummy (1 if management is qualified, and 0 otherwise) | + | (Aliyi, 2019) |
| 9 | TRAININ | **Training** | Dummy (1 if cooperative members, employees and boards have got sufficient training,0 otherwise) | + | (Ahmed Aliyi, 2019), (Muthumariappan, 2015),  (Sherefa, 2008 |
| 10 | INPUSUPP | **Input Supply** | Dummy (1 if there is sufficient input supply and 0 otherwise) | + | (Aliyi, 2019), (Muthumariappan, 2015) |
| 11 | MARKINFO | **Market Information** | Dummy (1 if cooperatives have access to timely market information, and 0 if otherwise) | + | (Hailu, 2016), (Muthumariappan, 2015),  (Sherefa, 2008), (Temesgen2, 2019), (Haile, 2009), (Adjimoti, 2013) |
| 12 | TIMELYDEL | **Timeliness in delivery** | Dummy (1 if the required product/service is delivered on time and 0 otherwise) | + | (Aliyi, 2019), (Muthumariappan, 2015) |

Source: Ilu ababor Zone Cooperative and Promotion Office, 2019.

## Appendix 2. Proportional sample size formula

Stratified sample size formula ($n_i$) =  n * ($\frac{Ni}{N}$);  where, n is the total sample size of the members of the cooperatives that is already determined using the formula: n = $\frac{N}{1+N(e^2)}$

N is the total members of cooperatives

$N_i$ is the total members of each cooperatives

$n_i$ is the sample size of each cooperative member.