

Determinants of Members' Participation in Maize Marketing through Cooperative: The Case of Boreda District of Gamo Zone, Ethiopia

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Abstract- Cooperative, as economic enterprises, play a meaningful role in uplifting the socio-economic conditions of their members and their local communities. Reducing the challenges the agricultural cooperatives are facing, and using their potentials can support to have tenth agricultural sector and economic growth of the country. The objective of this study is therefore to identify determinants of members' participation in maize marketing through cooperatives at Boreda District of Gamo Zone, Ethiopia. Primary and secondary data were collected for this study. Multi-stage sampling procedure was employed to select three Multi-Purpose Primary cooperatives and out of 733 cooperative members, 129 sample respondents were selected. Primary data to the year 2019 was collected from selected respondents through the interview Schedule. Out of the total sampled households, 73.64%, and 26.36% participants and non- participants were selected through maize marketing cooperative respectively. Descriptive statistics were used to compare the socio-economic and institutional characteristics of the participants and non-participants households of maize marketing through cooperative. The T-test was used to determine whether there is a significant difference between the means of two groups and Chi-square test was used to see the relationship between the two groups. Heckman two-stage selection models were employed to identify the participation decision and level of participation of cooperative members in the maize market. A total of fifteen explanatory variables were included in the descriptive analysis, off which eight variables influenced the members' participation in maize marketing through cooperative. Whereas thirteen explanatory variables were incorporated in the Heckman two stage model and eight variables such sex, education status, farm size, farm experience, non-farm income, market distance, cooperative members satisfaction and maize production significantly affects the participation decision in maize market through cooperative. And four variables such as, farm size, training, market distance and members' satisfaction significantly influence the level of participation in maize marketing through cooperative. The policy implication of this study is that continuous training, and education, improved maize production with diversification of income sources has to be maintained.

Keywords- Cooperative Members' Participation, Maize marketing, Household decision, Extent of participation, Heckman two stage model, significant variables

I. INTRODUCTION

In Sub-Saharan countries, like Ethiopia, where the small-scale farming dominates the overall national economy, agricultural production and productivity is very poor. It is characterized by limited use of improved agricultural input and backward cultural practices and entirely depends on rain. Poor agricultural productivity is not addressed the demand of ever-growing population. The factors contributed to poor productivity are recurrent droughts, environmental degradation, and poor infrastructure both in quality and quantity, and backward cultural practices (Davis, 2016). Besides, Substantial loss also occurs with the products due to poor postharvest management practices and inadequate usage of suitable

post-harvest technologies (MOFED, 2005). Moreover, due to the weakness of markets, characterized by high transaction costs, high risk, and inadequate communications and transport infrastructure, people living in food shortage areas exposed to starvation and food insecurity while producers in excess areas suffer unattractively low producer prices (Eleni, 2004).

Matsumoto and Yamano (2010) explained that Agricultural marketing is the methods of the sale of extra agricultural harvest at reasonable prices in structured and regulated markets orient is the performance of all business activities involved in the flow of food products and services from the point of initial agricultural production until it reaches in the hands of the end consumers. Agricultural marketing provides an incentive for farmers

to grow produce. In this way, it gives farmers more income. The diverse nature of the products to be managed and their perish-ability characteristics leads the agricultural marketing to be complicated and difficult. In addition to this the scattered nature of agricultural production and the very large number of separate production units in most tropical countries like Ethiopia results for further complication. Agricultural marketing requests for substantial initiative, decision making, and skill for the aforementioned reasons.

The Ethiopian government has emphasized the establishment and promotion of cooperatives to facilitate agricultural marketing activities. The development and promotion of cooperatives has a significant contribution to enhancing rural development by providing different agricultural inputs and outputs marketing. In the country's economic development, cooperation was accorded a place of prominence in the Five-Year Plan Documents until the 8th Plan. In accordance with the policies laid down and the budget allocations provided, the Cooperative Movement has made tremendous achievements e.g., Dairy Cooperatives, Fertilizer Cooperatives, Rural Credit sector, Environment up-gradation, and livelihood improvement, etc (Efa et al., 2016) and (Tekle and Berhanu, 2016).

A cooperative is an autonomous association of women and men, who unite voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. It is a business enterprise that aims to maintain the balance between making profit and addressing the needs and interests of members and their communities. Cooperatives can provide and offer economic and wide range of services opportunities to its members and the cooperative enterprise model can be found in many forms and sectors which including agriculture, consumer issues, marketing, and financial services, and housing (ICA, 1995). . Cooperative inhabits a main position in agricultural development through support in resource and input use, water resource harvesting, marketing channels, storage facilities, distribution channels, value addition, market information, and a regular monitoring network system. It is also engaged in different economic activities like credit disbursement, agricultural inputs (seeds, fertilizers, and agrochemicals) distribution, etc. Cooperatives have innate advantages in attacking the problems of poverty mitigation, food security, and employment generation. To deliver goods and services in the areas where the public and private sectors have failed, cooperatives are considered to have huge potential to fill the existing gaps. (ICA, 1995).

However, with the tremendous growth in size and operations and complexity of agricultural marketing, cooperatives are facing a big challenge from both their members and management and the competitors. The

cooperative members are expected to be loyal to cooperatives and vice versa. Absence of transparency and other trusts related issues regarding financial management aspects are also hindering the involvement of members in their cooperative. Cooperatives failed to meet their members' need and members' ceased participating in different economic activities like buying and selling of input and output marketing, utilizing available loan, and making democratic decisions in their cooperatives for instance attending the meeting, approving by-law and audit report etc. Therefore, there must be a clear understanding of the bottlenecks in executing agricultural marketing by cooperatives (Dawit, 2005).

Hence, based on the cooperative extension agents' complain and the researcher's observation and experience, farmers in Boreda District were mostly price takers due to the fact that they have poor marketing skills and limited negotiating power. Still now, no studies have been made on the identifying of determinants of members' participation in maize marketing through cooperative in the study area. But it is known that if cooperatives fail to meet members' demand or members do not get any feasible benefits from the existing cooperatives, they do not keep their membership or cease to participate in the cooperatives' activities. This is because the members' participation can only be enhanced and maintained based on concrete or tangible benefits. So, it is very often complained that the participation of members in the cooperatives is very poor.

Maize is a very potent and widely produced crop in the study area by all of the farmers but farmers are not getting the reasonable market price to compensate their production cost, to feed their family and to earn income from it. There are different alternative markets in the local context and they mislead farmers not to market their maize through the cooperative by telling them as they have provided better prices than cooperatives. So farmers are being abused by the private merchants and traders by selling their maize to them with improper scale and they are losing the sense of ownership to their respective cooperatives. The other problem which initiated the researcher to conduct this study is that the seasonality of the maize marketing by the cooperative in the area means that the cooperatives are active in maize marketing during the harvesting season and stopped it after certain months after the harvesting time. So, still farmers who have surplus maize may not access to market their maize through cooperative and they are enforced to sell it to the private merchants in a low price. So, evaluating the performance of Cooperative Societies and the participation level of members, identifying the major problems which are facing cooperative members are critical areas, which have to be studied to see whether agricultural marketing cooperatives are playing their role in the study area. So this study was tried to attempt to

identify determinants of members' participation in maize marketing through cooperative.

II. METHODOLOGY

1. Description of the study area

Boreda District is found in Gamo Zone, Ethiopia. The name of the town of the District is called zefine and it is located at 96 km from Arbaminch zonal town. There is a rough road that connects the District with zonal towns and the neighboring District. The population of the District reaches about 95,662 of which 48,526 are Male and 47,136 are Females with its population growth rate of 2.9 as that of the national population growth rate. The District is made of 29 local administrations, of which 28 are found in the rural areas of the District (BWOFFED, 2019).

Topographically, Boreda District is situated in plain areas. Besides the agro ecology of the District is characterized by 'Woina-dega', which covers 52% of the total areas followed by "Kola" 34% and the remaining 14% is covered by 'Dega' areas. As a result, the lives of farmer households depend on agricultural products. Most of the farmers generate income from on-farm and off-farm activities (BWOANRM Office, 2019).

Moreover, smallholders of the high land communities in the District are suffering from shortage and erratic rainfall, low grazing land, and lack of skills and technologies. Finally, there is only one banking institution in the District. Thus farmers are challenged to come to the town to get a service from this single bank institute.

2. Research Design

The study follows the mixed research approach with explanatory research design qualitative methods to collect relevant data. It is believed that using both qualitative and quantitative methods in integration would provide a better understanding of the research problem than using a single method alone.

III. SAMPLE AND SAMPLING TECHNIQUES

In the study area, farming households are responsible for making day to day decisions on-farm activities. Thus, households are the basic sampling unit. To generate the essential primary data, a multi-stage sampling technique was used. Firstly, Boreda District has been selected as a study area purposively because it is the most potential maize producing areas in the Gamo Zone and particularly the Villages of the study area are also the known maize producer in the District. Besides on the maize production, these Villages have Multi-Purpose Primary Cooperative (MPPC) which have been established for different agricultural crop marketing, to provide agricultural input

for better production and productivity. In addition to that, the study area is accessible and well known by the researcher because the researcher has worked there and established a grain marketing cooperative there. So that first, out of 15 Multi-Purpose Primary Cooperatives, 3 were selected using a purposive sampling method because of the largest numbers of members, and the accessibility of the researcher and the rich practice of Agricultural marketing and the potential and experience of maize production and marketing. The MPPCs -are, (Zefine-Menuka, Mesa Buntaza, and Meteka Mele). Thirdly, Sample farm households/ cooperative members have been listed as participants and non-participants of maize marketing through cooperatives by using Stratified sampling technique. Following that sample households have been selected. Here again, the proportional probability sampling technique was employed to select the required number of farm households from each MPPCs. The recent lists of the MPPCs and their members were obtained from Boreda District Cooperative Office. Cooperative extension workers and MPPCs Committee members were consulted to include all members if some individuals are not in the list and exclude those whose names are on the list but not living in the area. Finally, simple random sampling technique was applied to get the target respondent households from the list.

1. Sample Size Determination

The sampling frame of all households of the selected three MPPCOs has been prepared from the Boreda District Cooperative office. The sample size was determined based on Yamane (1967) Formula described below.

$$n = N / (1 + N(e)^2) = 129 \text{ ----- (1)}$$

Where n = sample size, N = population size, e = Error margin (8%)

Table 1 Distribution of Sampled Households involved in the Survey by MPPCOs.

District	MPPCOs	Total	Sample Size households		
			Participant	Non-participant	Total
Boreda	Zefine Menuka	264	38	9	47
	Mesa Buntaza	239	31	11	42
	Meteka Mele	230	26	14	40
Total		733	95	34	129

Source: Boreda Woreda Agriculture and Natural Resource Management Office (2019)

2. Sampling Procedure for Qualitative Data

2.1. Selection of Key Informants Interview

Key informants were chosen based on their experience and knowledge on the area. Government officers in the charge of cooperative development were identified based

on their responsibilities in implementing and supporting the District cooperative extension services they are working with. In this procedure, a total of 7 interviewees: Cooperative agents (3*1), one from District cooperative office head and 1 village /cooperative leader from each village (1*3) were conducted. KII were done to generate supplementary information on more technical areas of the study.

2.2. Selection of Focus Group Discussion (FGD)

Focus group discussions were involved village council members, village elders, religious leaders, to gather qualitative data. 3 FGD were held on specific topics with small groups of people that consist of 8 from each village who have intimate knowledge about the topics under consideration. Often the researcher chose to confirm that the discussion does not diverge too far from the original topic and that not Participant dominates the discussion. FGD is helped to triangulate the collected information and data from the respondent farmers individually. So that it was important to gather more reliable data from all sides of the expected variables that have supposed to be affecting the member's participation in maize marketing cooperative.

3. Types of Data

Data for this research were gathered from primary and secondary sources. Primary data was collected by employing a household interview schedule surveys, focus group discussion, field observation, and key informant interviews to bring the study to realization. All information about maize marketing, socio-economic and institutional factors and other relevant to the study has been gathered from primary and secondary sources such as documents, study reports, District cooperative office and resource centers.

The survey was focused on economic, demographic, institutional and psychological factors of cooperative members. Secondary data was collected from different sources such as the Boreda District cooperative office, Journals, and Central Statistical Authority (CSA) publications published and unpublished documents, etc.

Method of Data Analysis

Both descriptive and econometric analysis method was employed. The descriptive method of data analysis refers to the use of percentages, means and standard deviations. Chi-square was used to test the relationship of the dummy variables between the two groups and t-test was used to see whether there is significant mean difference between the two groups in the method of comparing socio-economic, demographic and institutional characteristics of households of the study area. The econometric analysis was used Heckman two-stage selection models.

4. Two-Stage Heckman Selection models and hypothesized variables

To analyze determinants of members' participation decision and the level of participation in the maize market, Heckman's two-stage selection models were used. Specifications of the models used to identify determinants follow the selectivity models widely discussed in the participation decision and level of participation literature by Gotez (1992), and Heltberg and Trap (2002), Holloway et al., (2004) and Barrett (2006).

In selectivity models, the decision to participate can be seen as a sequential two-stage decision-making process. In the first stage, households make a discrete choice whether or not to participate decision in maize markets. In the second-stage, conditional on their level of participation in the maize market, households make the continuous decision on the quantity of supply. In the first-stage, standard probit model, which follows the random utility model was used:

$$\begin{aligned}
 Y^* &= Z' \alpha + \mathcal{E}_1 \\
 Y &= 1 \text{ if } Y^* > 0 \\
 Y &= 0 \text{ if } Y^* \leq 0
 \end{aligned}
 \text{-----eq(2)}$$

Where,

Y^* = is a latent (unobservable) variable representing household discrete decision whether to participate in maize market or not

Z' = is a vector of independent variables hypothesized to affect household decision to participate (members' decision in agricultural cooperatives in maize market)

α = is a vector of parameters to be estimated

\mathcal{E}_1 = is normally distributed disturbance with mean (0) and standard deviation of (1), and captures all unmeasured variables

Y = is a dependent variable which takes on the value 1 if a household participate in maize markets and 0 otherwise.

Conditional on participation, variables determining on members' participation decision and the level of participation in maize market through cooperatives was modeled using second-stage Heckman selection model Heckman, (1979). The Heckman selection equation is specified as

$$\begin{aligned}
 Z_i^* &= W_i' \alpha + \mathcal{E}_2 \\
 Z_i &= Z_i^* \text{ if } Z_i^* > 0 \\
 Z_i &= 0 \\
 \text{If } Z_i^* &\leq 0
 \end{aligned}
 \text{-----eq(3)}$$

Where,

Z_i^* = latent variable representing desired or optimal value of maize market added or sold which is observed if $Z_i^* > 0$ and unobserved otherwise

Z_i = is the observed value of maize added or sold

W_i = vector of covariates for unit i for selection equation which is a subset of Z'

α = vector of coefficients for selection equation

\mathcal{E}_2 = random disturbance for unit i for selection equation One problem with the two equations (2 and 3) is that the two-stage decision-making processes are not separable due to unmeasured variables determining both discrete and continuous decision thereby leading to the correlation between errors of the equations. If the two errors are associated, the expected parameter values on variables members' participation decision and the level of participation in the maize market through cooperatives supply is biased Woodridge (2002). Therefore, it is must to identify a model that adjusts for selectivity bias while estimating determinants of the level of participation and quantity of supply.

For this reason, first, the Mills ratio is created using predicted probability values gotten from the first-stage probit regression of participation decision. Then, in the next step, Mills ratio is comprised as one of the independent variables in the level of participation and amount of supply regression. So, the level of participation and quantity of supply equation with correction for sample selection bias becomes:

$$V = W_i \alpha + \lambda \left(\frac{\phi(W_i \alpha)}{\Phi(W_i \alpha)} \right) + \mathcal{E}_3 \quad \text{-----eq (4)}$$

Where,

$\phi(\cdot) / \Phi(\cdot)$ = is the Mills ratio.

λ = is the coefficient on the Mills ratio.

ϕ = denotes standard normal likelihood density function. Φ = denotes standard cumulative distribution

function. \mathcal{E}_3 = is not correlated with \mathcal{E}_1 , \mathcal{E}_2 and other independent variables. Under the null hypothesis of no sample selection bias is not significantly different from zero. V = is the level of participation and quantity of supply (quintals).

The data covered information necessary to make household level indices of social, economic, demographic and institutional indicators comparable across different categories of households and maize products market. Thus continuous and discrete variables were identified based on economic theories and empirical studies.

Table 2 Variables Definition and Hypothesis.

Variables	Description of Variable	Type	Measurement	Sign
AGE	Age of HHS	Continuous	Years	-
EDUC	Educational status of HHS.	Continuous	School year	+
SEX	Sex of household head	Dummy	1 = male & 0 = female	-
FAMSIZE	Family size	Continuous	Number of family member	-
NONINCO	Non-farm income	Continuous	Income in Birr	+
FARMEXP	Farming experience of HHS	Continuous	Farming practice in years	+
FARISIZE	Farm size	Continuous	Hectares	+
TLU	Live stocks in TLU	Continuous	In number	+
CREDIT	Credit access	Dummy	1 if there is access, 0 otherwise	+
TRAIN	Training	Dummy	1 if trained 0 otherwise	+
MKTDIS	Market distance	Continuous	In kilometer	+
DISCOO	Distance to the coop office	Continuous	In kilometer	-
FREQEXT	Frequency of Extension. Service	Continuous	Number of days	+
MEMBST	Members' satisfaction	Dummy	1 if satisfied, 0 otherwise	-/+
MAIZEPRD	Maize production	Continuous	In quintal	+

III. RESULTS AND DISCUSSION

1. Descriptive Analysis

From the total interviewed sampled households, 73.64% of the farmers have marketed maize through the cooperative (participants of maize marketing in their cooperative) while 26.36 % of the farmers didn't market maize through the cooperatives (non-participants of the maize marketing) in the year 2019.

1.1. Age of household (AGE): the average age of the participant farmers of maize marketing through cooperative was about 47.84 years and the non-participants average year was 46.5 years. This means the cooperative members participated in maize market are more aged than the non-participants of maize marketing but there is no statistically significant mean difference.

1.2. Sex of household head (SEX): Out of the total 129 sampled households of the cooperative members, the male-headed households of participants and non-participants of maize marketing through cooperative were 85 (89.47%) and 26(76.47) respectively. And the female-headed household of the participants and non-participants were 10(10.53%) and 8(23.53%) respectively. This result implies that male-headed households are more participants in the maize market through cooperative than female-headed households. Statistically, significant mean difference between male-headed and female-headed households in maize market through cooperative at less than 10% probability level. This implies that most of women headed farmers are demanded in different workloads including social issues and they are not able to actively participate in maize marketing through the cooperative.

1.3. Family size of household (FAMSIZE): The average family size of maize market participants and non-participants were 6.29 and 5.82 with the standard deviation of 2.30 and 2.36 respectively. It implies that the maize market participant has more family size than non-participants which is in line with the expectation that the households with large family sizes are expected to participate in more which can demand more labor force. There was no a significant mean difference between participants and non-participants of the maize market through cooperative.

1.4. Educational Status of household heads (EDUC): The average school years of maize market participants and non-participants were 4.2 and 2.9 respectively. The education status of rural households enables them to acquire knowledge and skill and this, increases their productivity of maize. Comparison between participants and non- participants respect to education was statistically significant mean difference at less than 5% probability level. This implies that educated household head is in a

better position to participate in maize marketing through cooperative than less or not educated one.

1.5. Non-farm income in Birr (NONINCO): Non-farm income refers to income earned from non-agricultural activities in which households working as casual activities outside agriculture, petty trade or self-employed in similar activities. The annual average non-farm income of participants and non-participants households of maize market through cooperative was 2873.68 and 676.47 birr respectively. The mean difference between the two groups is statistically significant at less than 5% probability level indicating that participants of the maize market could generate better income from non-farm income-generating activities which encouraged farmers to participate in maize marketing through their cooperative.

1.6. Households land holding size in hectares (FARSize): The average landholding size of participants and non-participants of maize market through cooperative was 3.56 and 1.75 ha respectively. It shows that the farm size of participants is relatively higher than non-participants. It implies that the participants have a relatively better landholding size than the non-participants in the maize market through cooperative. In respect to landholding there is no significant mean difference between the two groups. The sampled households have relatively rich experiences of agriculture, especially in maize production.

1.7. Number of years farming experience (FARMEXP): The distribution of farming experience among participants and non-participants households in Maize market through cooperative have an average of 28.3 and 27.29 years respectively. The implication is that participants and non-participants in the maize market through cooperative have almost similar years of farming experience and no significant mean difference between the two groups.

1.8. Number of livestock (TLU): Livestock plays an important role in the mixed farming system in the area. Livestock holding size is one of the indicators of the wealth of the household in the study area. To indicate the livestock holding of each household in terms of total livestock unit (TLU), per household calculated. Based on the survey result, the average livestock size owned by participants and non-participants in the maize market through cooperative was 5.12 and 3.19. Participants in the maize market through cooperative have relatively large livestock size than non-participants. Further justification, farmers who have better livestock ownership status are able to participate in agricultural production than those have less. TLU had found to be significant mean difference at 5% significance level and affect cooperative members' maize market participation positively.

1.9. Training (TRAIN): Training is the most essential technique which can help to introduce certain new agricultural technology and to enable farmers to participate in agricultural produce marketing. It is also the most important means through which farmers get agricultural information. During the focus group (FGD) farmers raised different issues about the benefit of training that help to build their confidence and initiate them to have a better understanding of their cooperative in general and maize marketing particularly. Out of 95 maize market participant, 70 (73.68%) have attended the training and 34 non-participant 9(26.47 %/) have attended the training where as 25(26.32%) from participant and 25(73.53) from non-participants were didn't attended training concerning maize market through cooperative. With respect to training, chi-square test reveals training had significant association between' participants and non-participants in maize marketing through cooperative at less than 1% probability level.

1.10. Agricultural Credit (CREDIT): Agricultural credit is an important institutional service to finance poor farmers in a rural area. From 95 maize market participant, 48(50.53%) had access to credit and 47(49.47%) had no access to credit service whereas from 34 non-participants, 15(44.12%) had access to credit and 19(55.88%) were not accessed the credit to support their finance. The Chi-square analysis revealed that there was no significant association between the two groups.

1.11. Frequency of extension service (FREQEXT): The average number of visits to the sampled participant and non-participant households through extension workers was 8.26 and 0.58 respectively. The t-test revealed that there was a significant mean difference between the two groups at less than 1% significance level.

1.12. Market Distance (MRTDIS): Farmers are also motivated to use improved agricultural technologies if they have access to an attractive market for their output to sell at good price. If farmers are closer and having access to market services, they can easily purchase improved agricultural inputs and sell their agricultural outputs without moving long distances. In this study, the longer the market distance can be expected in time units and the cost of transportation may lessen the loose market value. It was hypothesized that those farmers who live far from the main market are expected to sell their Maize to their cooperative. The relation to market centers and participation in the maize market through cooperative indicates that farmers located far off from market centers have a better probability of selling their maize to the cooperative. The average market distance for maize market participants and non-participants was 4.87 and 3.63 km respectively. The t-test shows that there was a statistically significant mean difference between the participants and non-participants at a less than 5% probability level. The average distance of the cooperative

office for the participants and non-participants were 0.60 and 0.68 km respectively. As expected, it was negatively affected the participation but statistically, there was no significant mean difference between the two groups.

1.13. Members Satisfaction (MEMBST): Out of 95 participants in maize marketing through cooperative, 76(80%) were satisfied by the service including marketing system of the cooperative while 19(20%) of participants were not satisfied. Again out of 34 non-participants in the maize marketing through cooperative, 12(35.94%) were satisfied and the rest 22(64.71%) didn't satisfied with the service which was provided by their cooperative. This implies that cooperative members who satisfied by the service provided by their cooperative have more tendency to participate in the maize market through cooperative. The chi-square reveals that there was a significant relation between the two groups at 1% significance level.

Table 3 Statistical summary of sampled Maize market Participants and Non-participants on Continuous Variables.

Variables	Market Participant(n=95)	Market Participant (n=34)	t-value
	Mean(Std. Dev)	Mean (Std. Dev)	
AGE	47.84 (1.15)	46.5 (1.93)	1.342 NS
EDUC	4.20 (0.39)	2.94 (0.59)	1.258**
FAMSIZE	6.294737 (2.30)	5.82 (2.37)	0.471NS
NONINCO	2873.68 (7133.65)	676.42 (1718.2)	2197.21**
FARMEXP	28.30 (12.18)	27.29 (11.38)	1.011NS
FARSize	3.57 (3.34)	1.75	1.817NS
TLU	5.12 (5.00)	3.19 (3.48)	1.928**
MRTDIS	4.87 (3.13)	3.63 (3.41)	1.237**
FREQEXT	8.26 (3.32)	0.588 (1.87)	7.674***

Note: “**” and “***”, denote significance at 5, 1 % levels respectively

Table 4 Statistical summary of sampled Maize market Participants and Non-participants on Dichotomous variables.

Variables	Description	Market Participant (n=95)		Non-Market Participant(n=34)		χ^2 -value
		No.	%	No.	%	
SEX	Male	85	89.47	26	76.47	3.52*
	Female	10	10.53	8	23.53	
CREDIT	Yes	48	50.26	15	44.12	0.41
	No	47	49.74	19	55.88	
MEMBST	Yes	76	80	12	35.29	23.08***
	No	19	20	22	64.71	
TRAIN	Yes	70	73.68	9	26.47	23.51***
	No	25	26.32	25	73.53	

Note: “*”, “***” represent significance at 1, 10 % levels respectively

Source: Field Survey, 2019/20

Determinants of Members' Participation decision and level of participation in Maize marketing through Cooperatives

According to the first stage analysis, the Probit (selection) model which shows the determinants of members' participation in Maize market through cooperative. The variables such as age, education level and sex of the household head, non-farm income in birr, farm experience, farm size, credit access, market distance,

distance to cooperative office, frequency of extension contact, cooperative members satisfaction, training, and Maize production has been used for analysis. From these variables education, sex, farm size, farm experience, non-farm income, distance to market, members' satisfaction and maize production were significantly affects the members' of maize market participation decision through cooperative.

The second stage analysis, OLS outcome equation considered factors influencing the extent of Maize market participation of cooperative members. In the second step thirteen variables such as age, education level and sex of the household head, family size, TLU, non-farm income in birr, farming experience, farm size, credit access, market distance, distance to cooperative office, cooperative members satisfaction and training were used to analyze the extent/level of members participation in maize market and out of that only 4 explanatory variables were significantly affects the level of participation in maize marketing through cooperative.

1.14. Education (EDUC): As expected, the level of education was positively influenced members' participation decisions in the Maize market at less than 5% probability level. It indicated that an increase in educational level by one unit leads to an increase in the level of participation decision in the maize market through cooperative by 0.048 percent at ceteris paribus. The possible justification for this finding was that educated farmers have a better tendency to use modern agricultural technologies, use agricultural extension advice and information than illiterate farmer households. The higher the education level, the better would be the knowledge of the farmer towards the cooperative and acquire news and education about the benefits of the cooperative easily. Hence, those farmers with higher levels of education are in a better position to know the benefits off cooperative and to market their maize through the cooperatives. The result is in agreement with the statement of Agbola et al.. (2010) that farmers with a higher level of education are more exposed and are better at agricultural marketing, especially when using formal marketing systems like the private sector.

1.15. Sex of the household head (SEX): it was positively and significantly influencing the cooperative members' participation decision in maize marketing through cooperative at less than 5% probability level. The positive sign indicates that being male would have a better participation decision in maize marketing through cooperative. This result is consistent with the result of Jemal (2008). The positive sign indicates that male-headed households were in a better position to participate in cooperatives: input purchasing, using loan services, output marketing and other affairs of cooperatives which involve decision. Being a male-headed household increases the participation by one person probability of

maize marketing through cooperative increases by 0.17 percent.

1.16. Farming experience of the household head (FARMEXP): The prior expectation was to be positive but it was negative and significant at less than 10% probability level. This may be because of that more experienced farmers will engage in crop diversification and animal husbandry to improve their livelihood so that, they might produce less amount of maize for family consumption only. This result has found a positive and significant influence on farmer's maize market participation and experience of market channel. This result implied that as the farming experience of the household head increased by one year the probability of participation in maize marketing through cooperative decrease by 0.05 percent.

1.17. Farm Size of the household (FARSIZE): Farm size had a positively and significantly influencing household participation decision and level of participation at less than 1% and 10% probability level respectively. The results show that an increase in farm size of households has the probability of increasing Maize market participation. Other variables kept constant, marginal effect indicates that each additional hectare of land increases the probability of participation decision and level of participation of maize marketing through the cooperatives by 0.12 per cent and 0.1882 respectively. Farmers with better farm size have the probability to allocate more land for better maize production. A similar research conducted by Jemal (2008) states that farmers with larger land size in hectares more used the cooperative as marketing than farmers with smaller land size in hectare. He found that farmer land size in hectare influences the usage of the cooperative marketing.

1.18. Non-farm income in Birr (NONINCO): Non-farm income influencing the amount of marketable supply of Maize positively and significantly at less than 1 % probability level. Having extra income from non-farm activities provide financial freedom to the level of participation, which in turn, positively influence to invest in the marketing of maize through cooperative. This implies that other variables kept constant, an increase in family income by one birr would lead to increase the probability of the participation decision of the household in maize market through cooperative by 0.14 per cent. This result is consistent with the finding of Jemal (2008).

1.19. Distance to Market (MKTDIS): As expected, distance to the market was found to have negatively and significantly influencing participation decision and level of participation at less than 1 and 10% probability level respectively. Farmers who live far away from the market structure in the residence area might lead to participate in the maize market through their cooperative due to transportation cost and time value. The reverse is true for

cooperative members' those who live nearby to the market place would have better possibility to participate in other market outlets. This finding is consistent with the result of Luo, W. et al., (2008) reveals that the distance of the producer to the town has negatively and significantly affects the participation decision and level of participation in dairy input-output marketing. It implies that the probability of cooperative members' participation and level of participation in maize marketing through cooperative increases by 0.004 and 0.078 as the household residence is being far away from the market place by one km.

1.20. Cooperative Members' satisfaction (MEMST): It was positive and significant at less than 10% probability level. When cooperative members are satisfied with the service provided by the cooperative, the leadership of cooperative management, etc, their participation probability in maize marketing through cooperative will be increased and the reverse is true for the cooperative members those did not satisfied by the cooperative. This result is in agreement with the result of Jemal (2008) reveals that it has a positive and significant association to the probability of members' participation. The members' participation decision in maize marketing through cooperative increases by one unit would lead to increase the participation decision and level of participation increase by 0.5 per cent and 0.112.

1.21. Maize Production (MAIZEPR): As expected, maize production found to have positively and significantly influencing the members' participation decision in maize marketing through cooperative at less than 1% probability level. The positive sign implies that the amount of maize sold in the market would be higher if the farmers increase maize production. This might be described by a reason that small householder farmers with more maize production would have more leftover to sell to the cooperative as the marketing of maize is positively related to the product obtained. This result agrees with the findings of Habtamu (2015), Amare (2014), Ayelech (2011), Muhammed (2011), Tekle and Adisu (2018), and Abraham (2013) who found that the amount of potato, pepper, avocado and mango, teff and wheat, and vegetables (potato, cabbage, and tomato), respectively, produced by farmers/households influence quantity of supply to the market for each commodity positively and significantly. Hence, the volume of Maize produced by households is one of the key factors that determine the amount of Maize provided to the market. Maize production increase by one quintal would lead to increase the members' participation decision in maize marketing through cooperative by 0.16 per cent.

1.22. Training (TRAIN): As prior expectation, the model result reveals that training was significantly and positively influencing level of participation in maize marketing through cooperative at less than 1% probability level. The

positive sign shows farmers who received different trainings related to marketing are in a better position to participate in maize marketing through cooperative than those cooperative members did not accessed. Farmers with better access for training have good opportunity to participate in maize marketing through cooperative. The level of training increase by one unit would lead to increase the probability of members' participation in maize marketing through cooperative increases by a factor of 0.006. This result is similar to the finding of Abdullah et al., (2019) and Tekle and Adisu (2018)

Table 5 Heckman Two-Stage Sample Selection Estimates Results for Participation Decision in cooperative marketing

Factors	Market Participation Decision		
	Coeff(St. Error)	Marginal effect	Z-value
AGE	0.0023(0.0015)	.004(0.002)	1.50
EDUC	0.0130(0.0066)**	.004(0.004)	-1.98
SEX	0.0650(0.0292)**	0.017(0.0481)	2.22
NONINCO	4.07e-06(1.41e-06)***	0.014(0.024)	2.89
FARMEXP	-0.0026(0.0015)*	0.050(0.044)	-1.76
FAMSIZE	0.0116(0.0035)***	-0.012(0.008)	3.31
CREDIT	-0.013(0.018)	0.047(0.029)	-0.74
MKTDIS	0.1122(0.0635)***	-0.005(0.011)	2.91
DISCOO	-0.0128(0.0233)	0.023(0.006)	-0.55
FREQEXT	0.0025(0.0023)	-0.003(0.001)	1.11
MEMBST	0.0454(0.0273)*	-0.032(0.045)	1.66
TRAIN	0.0273(0.0260)	0.035(0.031)	1.05
MAIZEPR	0.0028(0.0002)***	0.061(0.033)	9.66
Constant	0.7871(0.0956)	-----	8.23
Mills lambda	0.0765(0.0442)*	0.0442	
Rho	1.00		
Sigma	0.0765		

Note: “*”, “**”, “***” represent statistical significance at 10, 5, 1% respectively; Wald $\chi^2(20) = 72.02$; Censored observations = 103; Uncensored observations = 129; Probability $> \chi^2 = 0.000$. Source: Field Survey result, 2019/20

Table 6 Heckman Two-Stage Sample Selections Estimates Results for level of participation in cooperative marketing

Factors	Coefficients	St. Error	Z	p-value
Age	0.0382	0.0382	1.00	0.317
Education	0.0115	0.1523	0.08	0.939
Sex(Male)	0.4343	0.5019	0.87	0.387
Family size	-0.0420	0.0858	-0.49	0.624
Nonfarm income	0.0000	0.0000	1.24	0.215
Farm experience	-0.0463	0.0361	-1.28	0.200
Farm size	0.1882*	0.0998	1.89	0.059
Livestock(TLU)	0.0000	0.0541	0.00	0.999
Credit access	-0.4685	0.3721	-1.26	0.208
Distance to Market	0.1122*	0.0635	1.76	0.078
Distance to cooperative	-0.0963	0.4546	0.21	0.83
Cooperative members satisfaction	1.1270***	0.3762	3.00	0.003
Training	1.1104***	0.4026	2.76	0.006
Constant	-1.9468	1.3551	-1.44	0.151
Mills lambda	0.0765*	0.0442		
Rho	1.00			
Sigma	0.0765			

Note: “*”, “***” represent statistical significance at less than 10, 1% levels respectively; Wald 2 (20) = 72.02; Censored observations = 103; uncensored observations = 129; Probability $> \chi^2 = 0.000$.

Source: Field Survey result, 2019/2020

IV. CONCLUSION AND RECOMMENDATIONS

This study was conducted to identify the determinants of cooperative members' participation in maize marketing through cooperatives in Boreda District of Gamo Zone, Ethiopia. It was based on primary data from respondents of cooperatives members and secondary data obtained from the journals, different offices and reviews of articles. Multi-stage sampling technique was employed and 129 sampled households were interviewed to gather data. The descriptive analysis result shows that out of 15 explanatory variables, eight variables such as: educational level, sex of household head, total livestock unit, frequency of extension contact, training access, market distance and members' satisfaction were significantly influences the members' participation in maize marketing through cooperative. Heckman two-stage regression model was used to identify the factors determining cooperative members' participation in maize marketing through cooperative. The model results revealed that among 13 explanatory variables involved in the probit regression, eight variables such as, education status of the household head, sex of the household head, farming experience, farm size, non-farm income, market distance, cooperative members satisfaction and Maize production were significantly influences the members' participation decision in maize marketing through cooperative. Again, Heckman two-stage selection model the second step revealed that, among 13 explanatory variables, 4 variables such as farm size, training, distance to cooperative office and members' satisfaction were found to be significantly influences the members' level of participation in maize marketing through cooperative. This has been observed from economic analysis and findings of this study. These results have important policy implications to be recommended.

- Efforts should be geared towards increasing the qualified and skilled manpower in maize marketing cooperative. Enhancing the management capacity of the cooperative executive boards, employed workers, and members through education and information dissemination in cooperative maize marketing is very important to farmers to be active participant in their cooperatives.
- The District level cooperative promotion and development office should capacitate and empower female-headed household farmers, by providing appropriate advice and extension service to be implemented and easily adopted by their capacity and context which in turn will make them very pro-active in their cooperative.
- The District level cooperative promotion and development office and coordination with agriculture and natural resource management office, private sectors, and cooperative management bodies should provide short and long term training, and frequent

extension service to the farmers to be motivated and encouraged to use crop diversification and to produce different crops, so that they can get other crops for consumption and they can supply enough maize for sale through their cooperative. Continuous awareness creation sessions have to be organized to the cooperative members and exposure visits should be facilitated to members for peer learning exchange which in turn will empower them to engage on different non-farm income to diversify the household income source.

- Attention has to be given to all the cooperative members during maize marketing through cooperative considering the market distance from the members' residence, village collecting center has to be arranged and transportation facilities should be considered for cooperative members who are living away from the market place. Farmers should be awarded about the comparative advantage while they market their crop including maize to their cooperative that will lead them to have sense of ownership.
- The cooperative leaders should be transparent, they should coach their members, produce bi annual and annual report of the progress and clearly share to the members to address members' interest and need to increase their satisfaction and to build trust among the members.

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