Harla Journals

Harla Journal of Sustainable Development in Business and Economics

Journal home page: https://journals.ddu.edu.et/index.php/HJSDBE

Harla journal of Sustainable Development in Business and Economics

# Determinants of Market Outlet Choices by Smallholder Wheat Farmers in Farta District, South Gondar Zone, Amhara National Regional State, Ethiopia: A Multivariate Probit Approach.

**Walelgn Yalew**
**Debre Tabor University, Department of Agricultural Economics**
**Email: walelgnyalew@gmail.com;**
**Mobile: +251 945265251**

***Abstract***

*In Ethiopia, wheat is an important cereal crop, particularly in farta district. It is a source of food and provides cash income for majority of smallholder farmers. To commercialize wheat producers, selecting an appropriate market channel is not an easy task because there are different factors that influence market outlet choices. Therefore, this study aimed to describe the socio-economic characteristics of wheat farmers & to identify factors that influence wheat farmers market outlet choices. A two-stage random sampling procedure was used and a total of 154 smallholder farmers were randomly and proportionally selected to collect primary data. Multivariate probit model was employed to identify factors affecting wheat market outlet choices. The result of the study shows that the probability of wheat producers to choose consumer outlet is relatively high (56.9%) as compared to the probability choosing wholesaler outlet (54.2%), retailer outlet (49.4%) and cooperatives outlet (37.6%). This shows that consumer was the most likely chosen market outlet while cooperative was the less likely chosen market outlet. The likelihood of sample wheat producer farmers to jointly choose the four outlets was 6.4% which is nearly similar compared to their failure to jointly choose them (6.6 %). The result of multivariate probit model revealed that family size (AE), Members of cooperative, Other crops price, Lagged wheat price, Oxen number, Sex of household heads, Time of sale, Age of household heads, Distance to the nearest urban market, Formal education were found to be statistically and significantly affecting the market outlet choice behavior of wheat producers. Therefore, the study suggested that improving the existing production system, giving better price for farmers and being membership for any cooperative are important strategies to select the appropriate market outlet.*

***Keywords*:**
*Market Outlet Choice; Multivariate Probit Model; Wheat*

**Corresponding author: Walelign Y. walelignyalew@gmail.com, phone,* +251 945265251



*DOI:*
*© 2022 Harla Journals and Author(s). Published by Dire Dawa University on Open Access Policy under CC-BY-NC 4.0.*
*Received month year; Received 23.09.2022; Accepted in revised form 30.11.2022 ; accepted 15.12.2022*

## 1. Introduction

Wheat is an important food crop in the world, with an estimated 36 million tons of annual global production (Tidiane, *et al.,* 2019). The largest wheat-producing countries are Turkey, Canada, Italy, India, France, Greece, Morocco, Pakistan, Portugal, Kazakhstan, Russia, Spain, Australia, and sub-Saharan African countries (William *et al.,* 2011). In sub-Saharan Africa, Ethiopia is the largest producer of wheat, with approximately 0.6 million ha (Gebreselassie *et al.,* 2017). In Ethiopia, wheat has been selected as one of the target crops in the strategic goal of attaining national food self-sufficiency (Aleminew *et al.,* 2015).

Commercializing smallholder agriculture is an indispensable path toward economic growth and development for most developing countries which rely on the agriculture sector including Ethiopia (Gashaw *et al.,* 2015). According to MoFED (2011), the Ethiopian government, in its two-consecutive 5-year Growth and Transformation Plans (GTP-I and GTP-II), has given much emphasis for agricultural commercialization, among which the second pillar intends to achieve growth and thereby improve people's livelihoods and reduce poverty.

The government of Ethiopia implemented agricultural commercialization clusters with the primary goal of commercialization of smallholders' agriculture and agro-industrial development, offering a strategic entry point for private sector engagement (Pauw 2017). According to Getahun Tefera (2018), commercialization of agricultural production is conceived as the process of agricultural modernization, specialization, and structural transformation of the economy toward more rapid and sustainable growth. Commercialization entails agricultural production decision, intended for market-based signals, offered produce for sale and use of purchased inputs.

In Ethiopia, cereal production and marketing are the main means of livelihood for millions of smallholder households. Among cereals, wheat stands third in terms of land area coverage, after teff and maize (SA, 2016). wheat is a staple food and one of the most important crops for generating farm income, cultural heritage, national identity and nutritional security.

The Ethiopian agriculture sector is composed of the crop, livestock, forestry, and fishing subsectors of which the crop subsector takes the lion's share of the agriculture sectors, comprising 65.3%, followed by livestock production (25.3%) (National Bank of Ethiopia (NBE), 2017). As discussed by CSA (2018), the crop production subsector is showing improvement in terms of productivity and the extent and use of modern farm inputs and modern

farming system practices though the production comes from smallholder farmers. In Ethiopia, grain crop production is the most widely spread crop production activity both in terms of the extent of cropped land area and volume of production (CSA, 2015). Cereal crops that are classified within the grain crops category are also produced in greater volume compared to the other crops by commercial farms because they are the principal staple crops and export commodities (CSA, 2015; 2016).

But, the majority of the farmers in Ethiopia are smallholder farmers, producing mostly for own consumption and generating only a small marketed surplus (Kabiti *et al.,* 2016). Especially, five major bowls of cereal (teff, maize, sorghum, barley, and wheat) are the core of Ethiopia's agriculture, accounting for about 75% of the total area cultivated (Taffes *et al.,* 2012). Among cereal crops, wheat ranks third in total grain production and second in yield next to maize (Workineh *et al.,* 2015). In Ethiopia, wheat is one of the largest produced cereal crops in terms of the area coverage (1.6 million hectares), the volume produced (3.9 million tons), and the number of farmers engaged in wheat production (4.7 million farmers) with an average productivity of 2.4 tons per hectare (CSA, 2014).

Wheat production in Farta district is mainly produced for market demand besides to consumption by smallholder farmers. In spite of wheat is an economically, socially and culturally important crop, wheat market channel choices' study has not yet been undertaken and assessed in the study area. To maximize the benefits that they may earn, farmers have to make appropriate decisions as to where they should sell their product.

### 1.1.Statement Of The Problem

Wheat is an important market-oriented commodity and a major source of income for many smallholder farmers in Ethiopia (Goitom, 2009). Even though it has a huge potential, only 20% of the total wheat production is sold, while 80% of its total production is used for human consumption, seed, in-kind payments for labor, and animal feed (Abafita, 2016). the smallholders in the country are improving their way of life through growing and selling wheat produce so that the government promotes them to produce more for alleviating poverty. In spite of the conducive agricultural commercialization policy environment, the return and incentive for growth in wheat through agricultural commercialization face a number of demographic and marketing challenges (Pauw 2017). There is a lack of information in terms of identifying factors affecting market outlet choices of wheat producer particularly in Farta

district, South Gondar Zone, Amhara National Regional State, which is one of the potential areas of wheat production in Northwestern Ethiopia.

Market outlet choice is one of the most important farm household decisions to sell their produce in different marketing outlets and has a great impact on household income. Market outlet choices are household-specific decision and several drivers have to be considered as a basis for such decision. There is a need to understand the characteristics of the various wheat marketing channels, and to enhance the capacity of farmers to make informed decisions regarding marketing channels. Understanding the factors that influence the choice of marketing outlet selection strategies is imperative since the exploitation of such strategies has the potential to increase crop production,
investment and farm income (Soe *et al.,* 2015). The information could further assist in developing strategies to mitigate the effect of some factors, thereby enhancing smallholder farmers' market access and increasing their chances of running a sustainable and profitable crop farming business. Muricho *et al.* (2015) argue that understanding the relationships between the marketing channels and the factors that determine the utilization of each market channel is fundamental in profiling the markets, as well as establishing policy interventions that are carefully designed to benefit farmers. Considering that each market channel is characterized by different profitability, risk, cost structure and other requirements (Soe *et al.* 2015), understanding these characteristics is beneficial to a smallholder producer who aims to access these market outlets. Hence, this study aims to identify factors that influence wheat market outlet choices, in order to narrow the information gaps between producers, consumers, cooperatives, traders and other market participants. Hence, the objective of the study is to examine the socio-economic and demographic factors influence in choosing market outlet choices of wheat farmers and further address the under listed research question

### 1.2. Research questions

1. How the socio-economic characteristics of wheat farmers are be described?
2. What are the factors that influence wheat market outlet choices of small holder farmers in the study area?

## 2. Material and Method

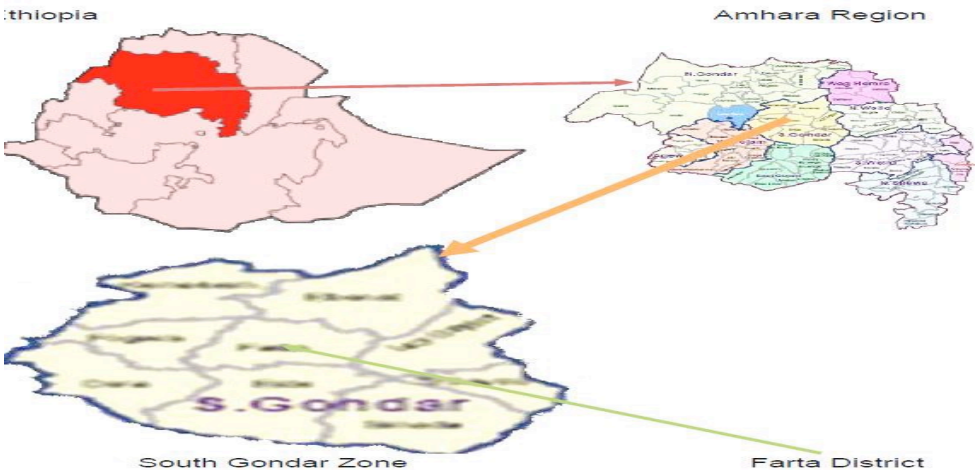
### 2.1. Description of the study area

Farta District is bordered on the South by Misraq Este district, on the West by Fogera district, on the North by Ebenat, and on the East by Lay Gayint. The District specific location lies between $11^0$32' to$12^0$ 03'latitude and $37^0$31' to $38^0$ 43' longitudes. Based on the 2014 national

census conducted by the Central Statistical Agency of Ethiopia (CSA, 2014), this District has a total population of 264,273 with male 133,923 and female 130,349 With an area of 1,070.77 square kilometers, Farta has a population density of 246.81, which is greater than the Zone average of 145.56 persons per square kilometer. A total of 49,986 households were counted in this district, resulting in an average of 4.64 persons to a household, and 48,465 housing units. Largest ethnic group reported in Farta was the Amhara (99.95%), Amharic was spoken as a first language by 99.96%, and 99.57% of the population practiced Ethiopian Orthodox Christianity.

The main economic and commercial crops grown in the district are barley, wheat, linseed, teff, sorghum, maize; beans, peas, chickpeas, oil crops, vegetable crops like cabbage, tomato, pepper and root and tuber crops like potato, onion, garlic and sweet potato. Potato is the first and most dominantly produced crop among root and tuber crops and it compared to other grain crops produced in the area, potato ranked the third crop produced next to wheat and barley.

**Figure 2: Map of the study areas**




Geographical location of the study area.

Source: (Mequanint, 2010).

### 2.2. Data sources and types

In this study qualitative and quantitative type from both the primary and secondary data will be collected.

**Primary data**: its source will be smallholder farmers randomly selected from nine different rural Pas and traders at different levels ranging from farmers to wholesales supply to regional level.

**Secondary data:** these are data which will be collected reviewing documents of secondary sources from relevant published and unpublished reports namely woreda office of Agriculture and Rural Development, Office of Small-Scale Trade and Transport, books of Central Statistical Authority (CSA).

### 1.1. Sampling procedures

A two-stage sampling procedure was employed to select potential wheat producer households. First, six potential wheat producer kebeles from the District were selected through purposive sampling method. During the selection, the kebele's potential for wheat production and the accessibility of the areas to travel were taken into consideration. In the second stage, using the population list of wheat producer farmers from sample kebeles, the intended sample size was determined proportionally to population size of wheat producer farmers. Then, 154 representative households were randomly selected using simple random sampling technique using Yamane (1967) formula;

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

where *n* is the sample size, *N* is the population size (total household size) and *e* the level of precision. The population is homogeneous in terms of wheat production in the sample kebeles. Due to the homogeneity of the population, 8% precision level was used for this study to avoid incurring additional costs and taking more time for collecting the same set of information on different small-scale wheat producer farmers. Based on the number of the total households (9852) in the sampling frame, the formula equated and reached a minimum of 154 respondents to be drawn.

### 1.2. Method of data collection

Both primary and secondary data on a wide variety of variables were gathered to meet the objectives of the study. Primary data were collected through the administration of semi-structured and personal interview by a team of five trained enumerators to 154 small-scale wheat farmers. Secondary data were collected from past reports and studies conducted by institutions and researchers.

### 1.3. Method of data analysis

Two types of analyses, namely descriptive and econometric analyses, were used for analyzing the collected data.

### 2.2.1. Descriptive statistics

The main descriptive statistics indicators that were employed are frequency, percentage, mean and standard deviations. This method of data analysis refers to the use of ratios, percentages, means, and standard deviations in the process of examining and describing marketing facilities, services and household characteristics.

### 2.2.2. Econometrics analysis

The appropriate econometric models that can help to identify the factors affecting market outlet choices of sample households are multivariate probit and multinomial logit model. Multivariate probit model was employed because of its advantages over multinomial logit model. multivariate probit model simultaneously set out the influence of a set of explanatory variables on choice of market outlets, while allowing for the potential correlations between unobserved disturbances as well as the relationship between the choices of different market outlets. In the study area, smallholder wheat producers face different choices of market outlets like wholesalers, consumers, retailers and cooperatives and assemblers. Thus, in this study wheat is one of the cash crops that enable producers to choose more than one outlet that are not mutually exclusive to get better price. Considering the possibility of simultaneous choices of outlets and the potential correlations among these market outlet choice decisions, multivariate probit model (mvprobit) was appropriate and applied to capture household variation in the choice of market outlets and to estimate several correlated binary outcomes jointly. The selection of appropriate market outlet i by farmer j is $Y_{ij}{}^{A}$ defined as the choice of farmer j to transact market channel i ($Y_{ij}{}^{A} = 1$) or not ($Y_{ij}{}^{A} = 0$) is expressed as follows;

$$Y_{ij}{}^{A} = \begin{pmatrix} 1\ if\ Y_{ij}{}^{A} = x_{ij}{}^{A}\alpha_{ij} + \varepsilon^{A} \geq 0 \leftrightarrow Y_{ij}{}^{A} \geq -\varepsilon^{A} \\ 0\ \ if\ Y_{ij}{}^{A} = x_{ij}{}^{A}\alpha_{ij} + \varepsilon^{A} < 0 \leftrightarrow Y_{ij}{}^{A} \geq -\varepsilon^{A} \end{pmatrix},$$

where $\alpha_{ij}$ is a vector of estimators, $\varepsilon^{A}$ a vector of error terms under the assumption of normal distribution, $Y_{ij}{}^{A}$ is dependent variable for market outlet choices simultaneously and $X_{ij}{}^{A}$ is combined effect of the explanatory variables.

Univariate probit estimation of choice of each type of market outlet would be misleading for the expected problem of simultaneity. The selection of one type of market outlet would be dependent on the selection of the other, since smallholder farmers' choice decisions are interdependent, suggesting the need to estimate them simultaneously. To account for this problem, a multivariate probit simulation model was employed (Getahun Tefera, 2018; Dine

*et al.,* 2015). Since smallholder farmers' market outlet choice decisions were expected to be affected by the same set of explanatory variables.

$$\begin{cases} Wholesalers_j = X'_1\beta_1 + \varepsilon^A \\ Retailer_j = X'_2\beta_2 + \varepsilon^B \\ Cooperative_j = X'_3\beta_3 + \varepsilon^C \end{cases}$$

$$Consumer_j = X'_4\beta_4 + \varepsilon^D$$

Where $Wholesalers_j$ , $Retailer_j$ , $Cooperative_j$ and $Consumer_j$ are binary variables taking values 1 when farmer *j* selects wholesalers, retailers, consumers and cooperatives, respectively, and 0 otherwise; $X_1$ to $X_4$ are vector of variables; $\beta_1$ to $\beta_4$ a vector of parameters to be estimated and Ɛ disturbance term. In multivariate model, the use of several market outlets simultaneously is possible and the error terms jointly follow a multivariate normal distribution (MVN) with zero conditional mean and variance normalized to unity and $\rho_{ij}$ represents the correlation between endogenous variables, given by;

$$\begin{pmatrix} \varepsilon^A \\ \varepsilon^B \\ \varepsilon^C \\ \varepsilon^D \end{pmatrix} \ldots N \left[ \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \begin{pmatrix} 1 & \rho_{12} & \rho_{13} & \rho_{14} \\ \rho_{21} & 1 & \rho_{23} & \rho_{24} \\ \rho_{31} & \rho_{32} & 1 & \rho_{34} \\ \rho_{41} & \rho_{42} & \rho_{43} & 1 \end{pmatrix} \right]$$

$$Ɛ(\varepsilon/X = 0$$

$$\text{Var}(\varepsilon/X) = 0$$

$$\text{Cov}(\varepsilon/X) = \rho.$$

## 3. RESULT AND DISCUTIONS

### 3.1. Demographic and socio-economic characteristics of sample households

The total sample size of the farm respondents handled during the survey was 154. Out of the total sample respondents, 86.36% were male-headed households and the rest were female-headed households. Majorities of sample respondents were male-headed households in the study area. This implies that male-household heads have access of marketing information with

good market networks due to the interaction ability with one or more wheat product buyers than females who are in most cases restricted to home tasks.

**Table 1 Mean and proportion of sample households' characteristics.**

| **Continuous variables** | **Means** | **Standard deviations** |
|---|---|---|
| Age (years) | 47.49 | 1.08 |
| Family size (adult equivalent) | 2.99 | .071 |
| Areas allocated to wheat(hectare) | .33 | .016 |
| Oxen numbers (number) | 1.37 | .069 |
| Distance to the nearest urban market (hours) | 31.87 | 1.01 |
| Lagged wheat price (birr) | 545.43 | 6.78 |
| Other crops price (birr) | 563.43 | 6.32 |
| Non-farm income (birr) | 1062.67 | 223.7 |
| **Dummy variables** | **Frequency** | **Percentage** |
| Sex (male) | 133 | 86.36 |
| Formal education (attend for schooling) | 67 | 43.51 |
| Uses of Improved input (yes) | 133 | 86.36 |
| Access to market information (yes) | 96 | 62.34 |
| Access to credit (yes) | 43 | 27.92 |
| Access to extension services (yes) | 147 | 95.45 |
| Members of cooperatives (yes) | 113 | 73.38 |
| Time of sale (immediately after harvest) | 80 | 51.95 |

Source: Survey data result, 2020

As it is displayed under Table 1 above, the mean age of sample household heads was 47.49 years with standard deviation of 1.08 years, which implies that most of the sample households/farmers were experienced in crop production. Similarly, the mean of wheat land allocated for production by market sample households was 0.33 hectare/year with standard deviation of 0.016. If the amount of wheat land allocated for production by sample households is high, farmers will select the appropriate market outlet for selling their yield because the land area for wheat production is high which intern the increases in amount of wheat produced and then farmers will have the probability of more appropriate market channel.

An average numbers of Oxen per household heads were 1.37 with standard deviations of 0.069. Whereas the family size in adult equivalent of the household heads in the study woreda was 2.99 with standard deviation of 0.071. In terms of distance to the nearest market, the result indicated that the mean distance of household head from their home to the nearest market was 37.87 min with standard deviation 1.01. This implies that farmers who have nearer market have the possibility to sell their product to the appropriate market channel as compared to farmers who live far apart from the market. Most of the sample farmers have to walk a long distance from home to the nearest market to sell their agricultural products. Access to physical market infrastructure, like vehicle road, is fairly low in the villages thus farmers to take their commodities to the nearest market. Likewise, the average lagged price of wheat was 545.43 ETB per quintal with standard deviation 6.78. whereas the average price of other crops was

563.43 EBR with standard deviation of 6.32 while the average non-farm income of the household heads was 1062.67 with standard deviation of 223.7.

In terms of education status, the result of the study indicates that about 43.51% of sample households were literate attending formal schooling while the remaining was illiterate. The educational background of the sample household heads is believed to be an important feature that determines the readiness of household head to accept new ideas and innovations. More educated farmers are expected to adopt new technologies to increase their land and labor productivities and also, they have a tendency to select the appropriate market channel. Likewise, about 73.38% of sample households were memberships to rural cooperatives while the remaining was not a member of cooperatives. Moreover, about 27.92% of sample households have credit access while the remaining was not having credit access. Farmers with access to credit can minimize their financial constraints and they try to select the appropriate market outlets.

62.34% of household heads had access to market information. Hence Producers that have access to market information are likely to supply more wheat to the market and chose appropriate market channel. Likewise, 86.36% of sample household heeds were using improved inputs to produce wheat. Hence Use of improved inputs is the basic factors boosting productions if producer use improved seed and fertilizers, this will increase production and productivity thus, increases the market supply and chose appropriate market outlets. Most of the farmer was engaged in advisory by extension agents. Hence about 95.45% of them had access to the extension services. Whereas as 51.95% of household heads were selling their wheat output immediately after harvest to earn better price while the remaining were selling latter on. Because a farmer that supplies his wheat to the market soon after harvest is assumed to get better price than a farmer supplies lately.

**Table 2 Proportion of market outlets chosen by sample wheat producers.**

| **Decision to choose** | **Market outlets for wheat producers** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Consumer** | | **Retailer** | | **Wholesaler** | | **Cooperatives** | |
| | N | Percent | N | Percent | N | Percent | N | Percent |
| Yes | 88 | 57.14 | 77 | 50 | 83 | 53.90 | 58 | 37.66 |
| No | 66 | 42.86 | 77 | 50 | 71 | 46.10 | 96 | 62.34 |

Source: Survey data result, 2020

As indicated in table 2 above, wheat producers in the study area sell their product in four market outlets. These were consumers which accounts for 57.14% of total sells followed by wholesalers, retailers and cooperatives with total sales of 53.90%, 50% and 37.66%,

respectively. This implies that farmers have limited market outlets to sell their produce. Therefore, the concerned body should give enough information for farmers to maximize the return of farmer from the sales of agricultural products.

### 1.1. Determinants of market outlet choices of wheat farmers

The multivariate probit model was used to estimate several correlated binary outcomes jointly. In this study, the decisions of teff producers choosing wholesalers, retailers, consumers and cooperatives outlets are correlated. Since the decisions are binary, the multivariate probit model was found to be appropriate for jointly predicting these four outlet choices on an individual-specific basis and the parameter estimates are simulated maximum likelihood (SML) estimators. Thus, an econometric approach was employed to test the effects of the explanatory variables on the selection of a particular market outlet.

The Wald Chi2, $\chi 2$ (64) = 87.95, is statistically significant at 5% significance level (Table 3), which indicates that the subset of coefficients of the model is jointly significant and the explanatory power of the variables included in the model is acceptable. The results of likelihood ratio test in the model show that likelihood ratio test of $x^2$ (6) = 6.89308, Prob > $x^2$ = 0.000 is statistically significant at 1% significance level, indicating the null hypothesis that choices of the four market outlets is independent is rejected. That means the likelihood ratio test of the null hypothesis of independency between the market outlets' decisions (rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0) is significant at 1% level of precision, which shows the goodness of fit of Multivariate probit model. Therefore, the likelihood ratio test of independency indicated that there are different market outlet choice behaviors among smallholder wheat producer farmers. In this study, samples are drawn 5 times to increase the accuracy, which indicates the precision level of the sample (Table 3).

**Table 3 Overall models of fitness, probabilities, and correlation matrix of market outlet choices from the MVP model.**

| Variables | Consumer | Retailer | Wholesaler | Cooperative |
|---|---|---|---|---|
| Predicted probability | 56.9 | 49.4 | 54.2 | 37.6 |
| Joint probability of success | 0.064 | | | |
| Joint probability of failure | 0.066 | | | |
| Estimated correlation of market outlets | | | | |
| $\rho_{21}$ | | 0.456 | | |
| $\rho_{31}$ | | 0.272 | | |
| $\rho_{41}$ | | 0.886 | | |
| $\rho_{32}$ | | 0.151 | | |
| $\rho_{42}$ | | 0.060* | | |
| $\rho_{43}$ | | 0.817 | | |

| |
|---|
| Likelihood ratio test of $\rho_{21}$=$\rho_{31}$ = $\rho_{41}$=$\rho_{32}$=$\rho_{42}$=$\rho_{43}$=0 |
| $\chi^2$ (6) = 6.89308, Prob > $\chi^2$ = 0.000*** |
| Numbers of draws ((SML, #draws) = 5 |
| Number of observations= 154 |
| Log likelihood = -365.774 |
| Wald $\chi$2 (64) = 87.95 |

*** and * are statistically significant at 1% and 10% significance level, respectively

Source: Survey data result, 2020

The ρ values (ρij) indicate the correlation of each dependent variable (market outlet choices). The ρ42(the correlation between the choice of cooperatives and retailer outlets) is positively and statistically significant at 10% significance level. The result indicates that farmers selling their wheat produce to the cooperative outlet are less likely to deliver to wholesaler and consumer outlets (Table 3).

The result in Table 3 also indicated the marginal success probability of each market outlet choices. The simulated maximum likelihood (SML) estimation result showed that the likelihood of choosing consumer outlet is relatively high (56.9%) as compared to the probability choosing wholesaler outlet (54.2%), retailer outlet (49.4%) and cooperatives outlet (37.6%). This result revealed that cooperative outlet is less likely chosen by wheat producer farmers as compared to other outlets.

As indicated in Table 3, the joint probabilities of success or failure of choosing four outlets suggest that the likelihood of sample farmers to jointly choose the four outlets is nearly much similar to failure to jointly choose the four outlets. The likelihood of sample wheat producer farmers to jointly choose the four outlets was 6.4% which is nearly similar compared to their failure to jointly choose them (6.6 %). This evidence suggests that choosing the right mix of market channels will be determined by different factors for each market channels.

**Table 4: Multivariate probit estimations for determinants of market outlet choices of wheat producers.**

| Variables | Coefficients (choice of market outlet) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Consumer (1) | | Retailer (2) | | Wholesaler (3) | | Cooperative (4) | |
| | Coe. | p-value | Coe. | p-value | Coe. | p-value | Coe. | p-value |
| Sex of household heads | .967** | 0.033 | .959** | 0.031 | -.241 | 0.565 | .302 | 0.469 |
| Age of household heads | .025** | 0.017 | .013 | 0.166 | .011 | 0.249 | .016* | 0.081 |
| Formal education | .189 | 0.436 | .023 | 0.923 | .827*** | 0.001 | .137 | 0.570 |
| Family size | -.399** | 0.022 | -.309* | 0.070 | .036 | 0.824 | -.016 | 0.922 |
| Area allocated to wheat | .113 | 0.870 | .934 | 0.146 | -.796 | 0.217 | -.040 | 0.952 |
| Oxen number | -.352** | 0.019 | -.358** | 0.019 | .022 | 0.881 | -.238 | 0.130 |
| Improved inputs use | .414 | 0.244 | -.252 | 0.476 | .363 | 0.321 | -.054 | 0.877 |
| Distance to the nearest urban market | .011 | 0.238 | -.001 | 0.928 | -.001 | 0.914 | -.020** | 0.026 |
| Time of sale | .040 | 0.876 | .491** | 0.050 | .452* | 0.076 | -.411 | 0.119 |
| Lagged wheat price | -.006** | 0.018 | .004* | 0.078 | .001 | 0.827 | .004* | 0.054 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Access to market information | -.207 | 0.430 | -.276 | 0.283 | .047 | 0.855 | .156 | 0.547 |
| Other crops price | .005** | 0.036 | -.003 | 0.167 | .000 | 0.854 | -.004* | 0.086 |
| Access to credit | .101 | 0.698 | -.062 | 0.811 | -.109 | 0.672 | .139 | 0.595 |
| Access to extension service | .282 | 0.655 | -.026 | 0.965 | -.463 | 0.470 | -.239 | 0.707 |
| Members of cooperative | -.475* | 0.083 | -.211 | 0.437 | -.924*** | 0.001 | .217 | 0.442 |
| Non-farm income | -.000 | 0.129 | .000 | 0.300 | -.000 | 0.443 | 8.14e-07 | 0.984 |

Source: Survey data result, 2020

The result in Table 4 indicated that out of 16 explanatory variables used in multivariate probit simulation model; family size (AE), Members of cooperative, Other crops price, Lagged wheat price, Oxen number, Sex of household heads, Time of sale, Age of household heads, Distance to the nearest urban market, Formal education were found to be statistically and significantly affecting the market outlet choice behavior of wheat producers.

**Family size (AE):** Family size was found to have a negatively and significantly effect with the likelihood of choosing consumer and retailer market outlet at 5% and 10% significance level. This result revealed that for those farmers who were members of cooperatives, the likelihood of choosing consumer and retailer market outlet decreased by 2.2% and 7%, ceteris paribus, respectively, as compared to those farmers who were not members of any cooperatives. This implies that the households will sell fewer amounts of wheat in the consumer and retail market as compared to cooperative. This is mostly related to the reality that those multipurpose cooperatives passing down production and market information they accessed directly or indirectly to their members.

**Sex of house hold heads:** Gender difference highly affects the likelihood of participation in market outlet decisions positively and statistically at the 5% level of significance. the finding implies that males have a higher probability of choosing market outlet strategies than female farmers.

**Age of household heads:** Age of household head was found to have a positive and significant effect in choosing consumer wheat market outlet at 5% and 10% significance level. This implies that as the age of household increases by a year, the probability of farmers to sell their product to the consumer market outlet increases by 2.5 % and 106 %, ceteris paribus. This might be due to the fact that older peoples in Ethiopia are relatively illiterate as compared to younger peoples. Due to this, the older people do not know how much price can be received for selling a product from consumer market outlet that is relatively higher than selling a product to other market outlets.

**Formal education:** The education level of wheat producer farmers was found to have a positive and significant relation with the likelihood of choosing wholesaler market outlet less than 1% significance level, ceteris paribus. This implies that as a wheat farmer is more educated and literate, the likelihood of joint probability of choosing four market outlets is more than uneducated and illiterate person. Educated farmers may have a greater ability to decide to choose any of better outlets from market channel

**Oxen number:** Oxen number of household heads was found to have a negative and significant relation with the likelihood of choosing consumer and retailer market outlet at less than 5 % significance level, ceteris paribus. This implies that as the number of oxen increases by a one, the probability of farmers to sell their product to the consumer and retailer market outlet decreases by 35.2 % and 35.8 %, ceteris paribus respectively.

**Distance to the nearest urban market:** Distance to the nearest urban market was found to have a negative and significant relation with the likelihood of choosing cooperative market outlet at less than 5 % significance level, ceteris paribus. This result revealed that those households whose residence from the nearest market increases by a kilometer, the likelihood of households choosing cooperative market outlet decreases by 2 % ceteris paribus. This implies that households located far from the nearest market are less likely in delivering wheat produce to cooperative market outlet. The reason for this is that farmers located distant from the market are weakly accessible to the cooperative market outlet, and the closer to the market the lesser will be the transportation cost and time spent.

**Time of sale:** Time of sale of household heads was found to have a positive and significant relation with the likelihood of choosing retailer and wholesaler market outlet at less than 5 % significance level, ceteris paribus. This is due to the fact that those households who decide to sale their wheat output to the market immediately after harvest, the likelihood of households choosing retailer market outlet increases by 49.1% while the likelihood of households choosing wholesaler market outlet increases by 45.2%, ceteris paribus.

**Lagged wheat price:** The lagged price of wheat was found to have negative and significant relation with the likelihood of household heads choosing consumer market outlet at 5% significance level while positively and significantly related with the likelihood of household heads choosing retailer and cooperative market outlet at 10% significance level. This indicated that as the lagged market price of wheat increases by a birr/kg, the probability household heads to choose consumer market outlets decreases by 0.6% while the probability household heads

to choose retailer and cooperative market outlets increases both by 0.4 %, ceteris paribus. In contrary to this study, Takele *et al,.* (2017) found that price of mango is negatively correlated with the probability of choosing retail market outlet. The reason for this study result was households/producers receive higher market price from the sale of wheat as in retail and cooperative market outlet as compared to consumer and wholesale market channel.

**Other crops price:** The price of other crops was found to have positive and significant relation with the likelihood of household heads choosing consumer market outlet at 5% significance level while negative and significantly related with the likelihood of household heads choosing cooperative market outlet at 10% significance level. This indicated that as the price of other crops (teff) increases by a birr/kg, the probability household heads to choose consumer market outlets increases by 0.5% while the probability household heads to choose cooperative market outlets decreases by 0.4 %, ceteris paribus. This means that farmers receive higher price from consumer market outlet as compared to cooperative market outlet from the sale of wheat product.

**Members of cooperative:** Membership in any cooperative by wheat producers was found to have a negative and significant relationship with the likelihood of choosing consumer and wholesaler market outlet at 10% and 1% significance level, respectively. This result revealed that for those farmers who were members of cooperatives, the likelihood of choosing consumer and wholesaler market outlet decreased by 47.5% and 92.4%, ceteris paribus, respectively, as compared to those farmers who were not members of any cooperatives. This implies that the households will sell fewer amounts of wheat in the consumer and wholesaler market as compared to cooperative. This is mostly related to the reality that those multipurpose cooperatives passing down production and market information they accessed directly or indirectly to their members. This result is in line with Ebrahim *et al,* (2020) who found that households that were a member of any cooperatives negatively influence the probability of choosing collector market outlet. This result is also consistent with Tefera (2014), who found that households that were members of any cooperatives negatively influence the probability of choosing wholesale, retail and consumer market outlet.

## 1. CONCLUSION AND RECOMMENDATION

The result of this study affirms that family size (AE), Members of cooperative, Other crops price, Lagged wheat price, Oxen number, Sex of household heads, Time of sale, Age of household heads, Distance to the nearest urban market, Formal education were found to be

significantly influencing the choice of households' wheat market outlet. The result of the study also shows that consumers are the most likely chosen market outlet while cooperatives are the less likely chosen market outlet. The likelihood of sample wheat producer farmers to jointly choose the four outlets was nearly similar compared to their failure to jointly choose them. Hence, based on the finding of this study, the concerned bodies should give information for farmers on the importance of being a member of cooperatives because farmers get inputs at a lower price and at convenience time for wheat production and get better price in marketing activities of their wheat products and facilitate the time to search the appropriate market channel. Appropriate policies should be strengthening to facilitate all necessary infrastructures for improving wheat production and marketing system. This means that the concerned body should establish wheat market center near to farmer's residence or production area. The study also suggested that improving the existing production system, giving better price for farmers and being membership for any cooperative are important strategies to select the appropriate market outlet. Generally, strong intervention could be taken by government to upgrade producers through improving trade regulation of wheat.

## 2. REFERENCES

Abafita, J. Atkinson, and C. Kim (2016). "Smallholder commercialization in Ethiopia: market orientation and participation," *International Food Research Journal*, vol. 2, no. 1, 2016.

Aleminew, G. Alemayehu, E. Adgo, and V. Herrero. (2015) "Response of noug (*Guizotia abyssinica* Cass.) to Np fertilizers application and seeding rates on yield and yield components in Ebinat District, Amhara Region, Ethiopia," *World Journal of Agricultural Sciences*, vol. 1170-83, 2015.

CSA (2014) Agricultural sample survey. Report on livestock, poultry & beehives population (private peasant holdings), in *Statistical Bulletin (532)*, Vol. 6, available at: SF55.E75 A63 2013/2014.

Central Statistical Agency, Federal Democratic Republic of Ethiopia; Addis Ababa: (2016). Agricultural Sample Survey 2015/2016, Vol. 1: Area and Production of Major Crops. [Google Scholar].

Dine A. A. Arinloye, Stefano Pascucci, Anita R. Linnemann, Ousmane N. Coulibaly, Geoffrey Hagelaar & Onno S. W. F. Omta (2015) Marketing Channel Selection by Smallholder Farmers, Journal of Food Products Marketing, 21:4, 337-357, DOI: 10.1080/10454446.2013.856052.

Ebrahim Endris, Jema Haji, Bosena Tegegne (2020). Factors Affecting Vegetable Producers Market Outlet Choice in Case of Habru District, North Wollo Zone, Ethiopia, *European Business & Management*. Vol. 6, No. 1, pp. 1-9. doi: 10.11648/j.ebm.20200601.11

Gashaw BA, Habteyesus DG, Nedjo ZS (2015) Analysis of marketed surplus of coffee by smallholder farmers in Jimma zone, Ethiopia. J Biol Agri Healthcare 5(5):242–252.

Gebreselassie, Samuel; Haile, Mekbib G.; Kalkuhl, Matthias (2017). The wheat sector in Ethiopia: Current status and key challenges for future value chain development, ZEF Working Paper Series, No. 160, University of Bonn, Center for Development Research (ZEF), Bon.

Getahun Tefera (2018) Determinants of commercialization and market outlet choices of Tef: the case of smallholder farmers in Dendi District of Oromia, Central Ethiopia, Haramaya University. [Google scholar]

Goitom.AB (2009) Commercialization of smallholder farming: determinants and welfare outcomes, a cross-sectional study in Enderta district, Tigrai, Ethiopia, An MSc Thesis Presented to the University of Agder, Kristiansand, Norway.

Kabiti H.M, Raidimi N.E, Pfumayaramba T.K, & Chauke1P.K (2016) Determinants of Agricultural Commercialization among Smallholder Farmers in Munyati Resettlement Area, Chikomba District, Zimbabwe, Journal of Human Ecology, 53:1, 10-19, DOI: 10.1080/09709274.2016.11906951.

MoFED (2011) Ethiopia's Growth and Transformation Plan: A Computable General Equilibrium Analysis of Alternative Financing Options, working paper Available at: see http://www.ifpri.org/book-757/ourwork/program/ethiopia-strategy-support-program or http://essp.ifpri.info/ or http://www.edri.org.et/.

Muricho, Geoffrey & Kassie, Menale & Obare, Gideon, (2015). "Determinants of Market Participation Regimes among Smallholder Maize Producers in Kenya," 2015 Conference, August 9-14, 2015, Milan, Italy 212515, International Association of Agricultural Economists. DOI: 10.22004/ag.econ.212515.

Pauw S (2017). Agricultural commercialization in Ethiopia: a review of warehouse receipts in the maize, wheat, sorghum and teff value chains. USAID/Ethiopia Agriculture Knowledge, Learning, Documentation and Policy Project, Addis Ababa.

Soe, W. P. P., Moritaka, M., & Fukuda, S (2015). An analysis of the factors influencing marketing channel choice by paddy rice farmers in Myanmar. Journal of the Faculty of Agriculture, Kyushu University, 60(2), 535-542.

Taffes A. S, Dorosh. P and Gemessa. S. A (2012) "Crop production in Ethiopia: regional patterns and trends," in *Food and Agriculture in Ethiopia: Progress and Policy Challenges*, University of Pennsylvania Press, Philadelphia, PA, USA.

Takele H, Endrias G, Amsalu M (2017). Determinants of Market Outlet Choice of the Smallholder Mango Producers: The Case of Boloso Bombe Woreda, Wolaita Zone, Southern Ethiopia: A Multivariate Probit Approach. Global Journal of Science Frontier Research, [S.l.], apr. 2017.ISSN2249-4626.Availableat: <https://journalofscience.org/index.php/GJSFR/article/view/1999

Tidiane.A, Chiari.T, Legesse.W, Kemal.S, (2019). "Durum wheat (*Triticum durum* desf.): origin, cultivation and potential expansion in sub-saharan Africa," *Agronomy*, vol. 9, no. 5, p. 263, DOI: 10.3390/agronomy9050263

William J., Alain P., Maarten.V.J (2011). The World Wheat Book, Volume 2. A History of Wheat Breeding. *Journal of Cereal Science.* 55, pp. 77-78. https://doi.org/10.1016/j.jcs.2011.10.001

Workineh.A, Nega.Y and Habte D (2015). "Planting density, and nitrogen and phosphorus fertilization effect on different bread wheat (*Triticum aestivum* L.) genotypes in Southern Tigray, Ethiopia," *World Journal of Medicine and Medical Science Research*, vol. 32, pp. 020–028, 2015.

Yamane T (1967) Elementary sampling theory. Prentice-Hall, Inc., Englewood Cliffs, pp 371–390 https://doi.org/10.1080/01621459.1968.11009297

Received 23.09.2022; Accepted in revised form 30.11.2022

Harla Journal of Sustainable Development in Business and Economics is licensed under a Creative Commons Attribution-Noncommercial 4.0 International License.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.