ANALYSIS OF WHEAT MARKETING PERFORMANCE ROBE DISTRICT ARSI ZONE OROMIA REGIONAL STATE, ETHIOPIA

M.SC. THESIS

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ANALYSIS OF WHEAT MARKETING PERFORMANCE IN ROBE DISTRICT ARSI ZONE OROMIA REGIONAL STATE, ETHIOPIA

M.Sc. Thesis

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Program of study:Degree of Master of Science (M.Sc.) in Agricultural Economics

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DEDICATION

This manuscript is dedicated to my family and beloved friends.

STATEMENT OF THE AUTHOR

I declare that this thesis is my real work and all sources of materials used in this thesis have been properly acknowledged. This thesis has been submitted to Jimma University, College of Agriculture and Veterinary Medicine in partial fulfillment of the requirements for M.Sc. degree in Agricultural Economics and is deposited at the Library of the University to make accessible for borrowers under rules of the Library.

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BIOGRAPHICAL SKETCH

The author was born on 19th January, 1995 in Robe district of Southern Eastern Arsi zone, Oromia. She attended her elementary education at mesaranje abu primary school, and her secondary at habe high school and her preparatory education at Robe Didea School. After successfully passing the Ethiopian Higher Education Entrance Qualification Certificate Examination of grade twelve, the author joined Assosa University, Department of Agricultural Economics in 2015 and graduated with B.Sc. degree in July, 2017. Since her graduation, she has served in Assosa University for one years as graduate assistant. Then, she joined Jimma University in September 2018 to pursue her MSc degree in Agricultural Economics in regular program.

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ABBREVIATION AND ACRONYMS

AISE	Agricultural Input Supply Enterprise
ATA	Agricultural Transformation Agency
CIA	Central Intelligence Agency
CSA	Central Statistical Authority
EGTE	Ethiopian Grain Trade Enterprise
ESE	Ethiopian Seed Enterprise
FAO	United Nation Food and Agricultural Organization
GDP	Gross Domestic Product
GMM	Gross Market Margin
IFPRI	International Food Policy Research Institutes
NBE	National Bank Of Ethiopia
NGO	Non- Governmental Organization
NMM	Net Marketing Margin
OLS	Ordinary Least Square
ONRS	Oromia National Regional State
RDARD	Robe District Agriculture Rural Development
SCP	Structure- Conduct- Performance
SNNP	South Nation National People
SSA	Sub-Saharan Africa
TGMM	Total Gross Margin
TLU	Tropical Livestock Unit
UNDP	United Nation Development Program
UNIDO	United Nation Industry Development Organization
USAID	United State Agency For International Development
USDA	United State Department of Agriculture
VCA	Value Chain Analysis
WHO	World Health Organization
WMP	Wheat Market Participation

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ABSTRACT

This study was initiated with the general objective of analyzing wheat-marketing performance in robe District of Oromia Region, Ethiopia. Both qualitative and quantitative data for this study were collected from primary and secondary source of data. The primary data was collected from 156 sampled households, and 24 traders. A two-stage random sampling procedure was employed to select 156 households from 4 kebeles. Much of the marketed surplus of wheat was channeled through producer, assembler, cooperatives, wholesalers, retailers and consumers. Concentration ratio of the largest four traders trading in four markets was 56.05%, which indicate that strong oligopolistic form of market structure. Marketing performance of wheat was analyzed by estimating the marketing margin considering associated marketing costs. Producers obtained average profit of Birr 730.95 per quintal in 2019/20 cropping year from wheat production. The average total costs incurred by assemblers, wholesalers, and retailers of wheat were 57, 137.6, and 106.15 Birr per quintal, respectively. Structure, conduct and performance analysis, descriptive statistics and econometric models (i.e Heckman twostage) were used for data analysis. Heckman twostage model was employed to identify factor affecting wheat market participation decision and the level market participation. The model results showed that six explanatory variables significantly affected market participation decision such as age of household, frequency of extension contact, distance from the nearest market, lagged wheat market price, number of oxen owned and family size were significantly affect wheat market participation decision and four explanatory variables significantly affected the volume of wheat marketed by smallholder wheat producers. Total land size owned, land allocated for wheat product, farm income, wheat harvested product were positively and significantly affecting wheat market supply. Absence of improved seed, absence of information on how to use credit, shortage of land, lack of transport facility, quality problem, poor actors linkage, lack of market information, and high cost of seed and fertilizers were the major challenges of wheat marketing performance. Therefore, policy aiming at systematic approach to wheat market performance, increase in farmers training centers, and strengthening of family planning education through rural health extension, land intensification, improved infrastructure, supplying production inputs timely, improving yield and increasing wheat production, knowledge, and creating and strengthening linkages between actors were forwarded by the study to improve wheat marketing performance in the study area. Both the public and private sectors have a role to play in achieving this.

Key words: Bread wheat, Heckman two-stage model, Market participation, Market performance, Robee district, Smallholder farmers.

1, INTRODUCTION

1.1, Background of Study

Agriculture plays an important role for increasing the growth domestic products (GDP) of the world, which accounts 31.3% (CIA, 2014); more than 60 percent of the world's population depends on agriculture for survival (FAO, 2015). Form this, Latin America and Sub Saharan Africa covers the highest percentage (90%) so that the economy of most African countries is depending on the agriculture. Smallholder farming constitutes the livelihoods of many rural households in developing economies. Rural areas are the home of the majority in Africa and small scale agriculture is the mainstay of the rural economy serving mainly as a source of food income (Omiti *et al.*, 2007). Ethiopian economy is highly dependent on agricultural sector which account for about 38.8% of national GDP (Wondifraw *et al*., 2016), 87% of export earnings and remains the main source of employment; generating 72.7% of total employment (UNDP, 2015).

Wheat is an important industrial and food grain, which ranks second among the most important cereal crops in the world, after rice and traded internationally (FAO, 2009; Najafi, 2014; Falola *et al*., 2017). Importance of wheat production in world economy is proven by its share of 15% from 1500 million hectares arable land in the world (Kiss, 2011). Wheat production and consumption is grown rapidly as a result of income growth and rapid urbanization in Sub-Saharan Africa (produce 30% of their domestic requirements) (Sultan, 2016). Wheat production in Sub-Saharan Africa is at 10 to 25% of its potential and the region could easily grow more to improve food security. According to Mason *et al*., (2012), farmers in Sub-Saharan Africa produce 44% of the wheat consumed locally and import the rest from international markets, making the region highly vulnerable to global market and supply shocks. It is one of a staple food crop, which is produced in both developed and developing countries by serving as a source of food and cash. Recently, wheat has become one of the most important cereal crops (strategic crop) in terms of production and food security in Ethiopia (Tolossa, 2014).

Wheat production and productivity in the Ethiopia had grown recently (CSA, 2017; Kathryn *et al.,* 2012) but it cannot meet the growing domestic demand, as a result, government imports a large amount of wheat. In 2016 alone 1.5 million metric tons of wheat which is more than three

quarter of domestic production, was imported and this trend tends to continue in foreseeable future since population, urbanization, and change in preference and life style grow (USDA, 2017). In Oromia region, the total area covered by wheat was 898,455.57 hectare produced by 2.21 million smallholders with the total production of 2.66 million tons; and average productivity was 1.2 ton/ha (CSA, 2017). Arsi, Bale, and parts of Shoa are considered the wheat growing belt. The average wheat yield per hectare was 26.75 quintal in Ethiopia, 29.65 quintal in Oromia Region and 32.09quintal in Arsi zone. Altitude plays an important role in the production of wheat and has an influence on rainfall, temperature, and diseases. Rainfall distribution (end of June up to end of September) was good in most parts of the wheat growing areas.

Arsi Zone is widely perceived to be among the most productive regions in the country, with enlightened farmers well disposed to using purchased inputs. According to (CSA, 2017), Arsi Zone produces about 75% of Ethiopian bread wheat. Robe woreda is one of the 28 districts in Arsi zone. Within the region, Robe Woreda is also a wheat belt area in which wheat is the main source of income and food for households and about 76% of the farmers planted wheat. The district is characterized by high input and output. The district has a high potential for production of wheat and other cereal crops. According to Agricultural and Natural resource Office of the woreda, the major crops grown include wheat, barley, maize and *teff* for both household consumption and marketing in 2018/2019 production season (RDARD, 2019). This district is endowed with natural resources that offer high potential for development and have the capacity to grow different annual crops including wheat. Even though the woreda is more favorable for cereal crops production in particularly wheat production number of factors hindered wheat producers' market benefit. Hence, this study will explore wheat marketing performance by identifying factors affecting wheat market supply and estimating wheat marketing margin for market actors.

1.2. Statement of the Problem

The market creates networks among farmers, public and private agencies in buying superior technologies, and selling the produced farm outputs to expand their earning potential. It sets a legal and institutional setting of economic transactions. The importance of markets, the

opportunity for farm households and other rural enterprises to sell farm output tap farmers into a range of public and private services like credit and extension services. The more accessible the markets are, the greater the rural population capability to remain economically self-sufficient (Tigist, 2015). Due to low investment in the market infrastructure, segmentation of markets, persistence of high margins and limited progression move African towards more complex arrangements. Because of these and other factors like inefficient and costly transport services farmers do not getting the right share of consumer price (Colman, 1999). In the absence of well-developed markets, marketing facilities, and marketing efficiency, farmers are not at profit by selling their increased marketable surplus to traders in the market as they get low prices due to insufficient time, knowledge and skills for the precise marketing of their produce (Thakur et al., 1997).

Despite there are a growing number empirical literature of wheat grain sub sector like value chain (Haymanot, 2014; Sultan, 2016 and supply chain Tura, 2015; and Zewdie *et al*. 2016), and market chain Muhammad (2011) studies in the country was on durum wheat rather than bread wheat. Therefore, they have the following shortcomings, first these studies did not exclusively analyze bread wheat marketing performance, second most of the studies concentrated in Bale Zone and Shewa Zone third they give less emphasize to the growing impact of middle stream market actors. There has been very limited empirical information on how gross marketing margin volatility is affected by other variables such as poor infrastructures, lack of access to agricultural credit, lack of market information and poor institutional services. So this research intended to empirically address those shortcomings. For instance, the study conducted by Tesfaye (2014) on adoption of improved wheat varieties in the district was not give any attention on wheat marketing performance. There will be a need to employ a marketing performance approach to fully understand and resolve problem of wheat marketing performance in study area.

Even though wheat production plays an important role in the livelihood of the Ethiopian people, there is no compiled and rigorous analysis on wheat marketing performance and determinants of market participation decision and level of participation in wheat marketing in different parts of the country, especially in the study area, which is Robe woreda of Oromia regional state. Even if

the district is one of the potential wheat producer districts in southern eastern Arsi Zone, wheat market participation could not reach at its required level. This is due to the existence of production and marketing problems, lack of institutional services, and shortage of agricultural inputs. The production and marketing systems of wheat in the study area is poorly implemented due to different production and market constraints. Moreover, information concerning the wheat production and marketing system, major constraints and opportunities, the determinants for wheat product supply in the market, factors that hinder wheat marketing performance function and the distribution in profit margin along the wheat market channel have not yet been studied in the study area. This study is, therefore, proposed to fill the knowledge gap in how the wheat marketing performance functions and their constraints and also provide information regarding wheat production and management system, challenge and opportunities of wheat production and marketing, factors determining wheat supply and marketing decision, profit margin along the market channel in order to narrow the information gap on the whole wheat marketing performance.

1.3. Research Questions

❖ How the wheat marketing is performing in the study area? Who gets more benefit?

❖ What are factors that determine wheat producers' market participation and the level of participation in the study area?

❖ What are the major opportunities and challenges in wheat marketing and production in study area?

1.4. Objectives of the Study

1.4.1 General objective of the study

➢ The general objective of this study is to analyze wheat marketing performance in Robe district of Arsi zone Oromia Regional State, Ethiopia

1.4.2 Specific objectives of the study are:

➢ To analyze the performance of wheat marketing
➢ To identify factors affecting wheat market participation decision and their level of participation

➤ To Identify major challenges and opportunities of wheat production and marketing

1.5. Significance of the Study

The study was provide a holistic picture of existing challenges, opportunities and entry points in the wheat marketing performance in the study area. Moreover, the study will provide information on analysis wheat supply to the market and contributes to purposeful decision in the study area. The information generated in this study could help a number of organizations including national and international research institutions, development organizations, traders, producers, policy makers, extension service providers, government and non-governmental organizations to assess their activities and redesign their mode of operations in study area. Finally, it could also help different market actors to identify and analyze the new ways of stimulation improvement.

1.6. Scope and Limitations of the Study

The study mainly focused on the analysis of wheat marketing in performance only one of the 28 districts of Arsi Zone. The area coverage of this study was limited to four out of 32 *kebeles* found in Robe district and 156 randomly selected sample wheat producer households for formal survey. Regarding the limitation of the study, the study only focused on the wheat marketing performance of one district. On the other hand, the data used was cross-sectional data and as far as market concerned market integration was not included. Hence, the generalizations of the finding are only possible to the study area and locations with similar socioeconomic characteristics.

2. LITERATURE REVIEW

This chapter comprises theoretical, empirical reviews and conceptual framework. Theoretical review comprises basic concepts and definitions related to wheat producer household marketing performance and Empirical studies on market participation decision and level of market participation are discussed below.

2.1. Definitions and Basic Concepts

Market: A market is an arrangement that provides opportunity for exchanging goods and services for money or money worth. Markets can be viewed as social arrangements that allow buyers and sellers to discover information and carry out a voluntary exchange of goods and services. For instance, according to Armstrong (2016), marketing is a social and managerial process by which individuals and organizations obtain what they need and want through creating and exchanging value with others. It is also stated as engaging customers and managing profitable customer relationships (Kerin and Hartley, 2017).

Marketing: Marketing refers to anybody, persons or institution that is in business relation and carries on extensive transaction in any product. Marketing is an activity by which individual and groups obtain what the need and want by creating and exchanging products and values with others. And the most evident features of a market are its pricing and exchange processes (Kerin and Hartley, 2017). According to Kohls (2002), because of marketing, or more specifically agricultural marketing, projects have different impression to different groups of people in a society, like farmers, traders, and consumers; the term marketing is a very problematic concept. .

Marketing system: a system is a complex of interrelated components parts, which have a defined common goal. A marketing system is a collection of channels, intermediaries and business activities, which facilitate the physical distribution and economic exchange of goods. According to Islam (2001), marketing system operates through a set of intermediaries performing useful commercial functions in chain establishments; all the way from the producer to the end user.

Marketed surplus: it was estimated by considering the actual quantity sold by farmers during the reference year. It is the actual quantity sold or the residual that remains with the producer after meeting the requirement of seed, payment in kind, and consumption by farmers.

Accordingly, marketed surplus may be equal to marketable surplus, it may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during transit (Thakur, 1997).

Marketable surplus: refers to the quantity retained after meeting all requirements of the farmers. Marketable surplus is the excess product, which is made available after meeting producer needs. For that reason, marketable surplus shows the quantity left out for sale in the market (Thakur, 1997).

Supply chain: it is a sequence of processes and material, information, product flow that aim to meet final customer requirement that take place within and between different stages along a continuum, from production to final consumption. It is a longer channel stretching from raw (inputs for production of that product) materials to components to finished products carried to final buyers (Kotler, 2012).

Marketing performance is defined as way in which market and marketing are contribute to various aspect of economic performance. Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output Also by analyzing the level of marketing margin and their cost components, it is possible to evaluate the impact of the structure and Conduct characteristic on market performance (Scott,1995).

Marketing margin: It is defined as the price of a collection of marketing services that is the outcome of the demand for and the supply of such services. And also it is the difference between the price paid by consumers or retailers in this thesis case and that obtained by producers (William *et al*., 2006).

Marketing costs: refers to those costs, which are incurred to accomplish different activities of marketing in the transportation of goods from point of production to the end consumers. Marketing costs includes storage costs, handling costs (packing and unpacking, costs of searching for exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners and officials to reach an agreement, transferring the product, monitoring the agreement to see that its condition.

The total marketing margin (TMM) is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between retail price and farm price (Mendoza, 1995).

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TMM =End buyer price - first seller price /End buyer price X 100

That is, calculating the total marketing margin is done by the following formula:

TGMM = Consumer price - Farmers price x 100

Consumer price

Where TGMM=Total gross marketing margin ns are fulfilled, and enforcing the exchange agreement etc. (Holloway and Ehui, 2002).

Net Marketing Margin (NMM) is the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted. The equation tells us that a higher marketing margin diminishes the producer's share and vice-versa. It also provides an indication of welfare distribution among production and marketing agents.

2.2. Theoretical Framework of Performance of Cereal Markets

Assessment of market performance requires analyses of prices (over time and space) and the process that influences price formation. This follows from the simple fact that the price of a commodity is the outcome of an exchange process, which we call the market. In the absence of public interventions, three important determinants of an efficient exchange process (market fundamentals) are infrastructure, institution and information. If there is inadequacies/incompleteness in these fundamentals, it will be reflected in the prices. For instance, if the markets are not connected with adequate infrastructure and efficient information flow, price shocks in one market location may not be transmitted to the other, which can be detected through spatial integration of market locations. Similarly, if farmers do not have access to credit or risk-mitigating institutions, they are compelled to sell immediately after harvest when prices are low. The presence of such institutional incompleteness can be detected though analysis of price seasonality. However, price analysis over time and space does not provide direct information about market fundamentals and hence misses some critical aspects of market performance. For example, prices between two locations can be integrated even when transaction costs are high due to high search costs (finding buyers and sellers) or high transport costs due to poor infrastructure.

Market performance can be defined as how well the agricultural marketing system performs what the society and the market participants expect of it (Kohl and Uhl, 1980). Evaluating marketing performance raises the question of "What do we expect of the agricultural marketing?" The marketing systems have multiple and often-conflicting goals, where compromises and trade-offs will be necessary if the various participants such as consumers, farmers and the society in the marketing system are to be satisfied. According to (Kohl and Uhl, 1980), one way to begin the study of agricultural marketing performance is to list some common concerns about the industry. For instance, consumers frequently complain about high and fluctuating food prices, deceptive labels and advertising. Producers voice other complaints such as declining number of farm product buyers, reduced competition for supplies, buyers of agricultural products with control over price, the failure of the retail and farm prices to move together, excessive marketing costs and prices, and below cost prices. The society on the other hand, might be more concerned with such issues as the agricultural marketing sector's contribution to employment, investment, and economic growth; the standard of living and quality of life; resource use and conservation; and overall health and prosperity of the rural economy.

Rhodes (1983) indicated that the evaluation of market performance requires specific measures. Trends in retail prices, share of consumers' income spent on food, the farm retail price spreads and the farmers' share of the consumers' food dollar are popular measures of market performance. Margins, profits and trends in food marketing costs also indicate something of the market performance. However, each of these has some value and limitations in the measurement of agricultural marketing performance, and no single one tells the whole story. Market performance is a complex notion, and using a single market characteristic in its evaluation may lead to misleading conclusion and recommendation. Therefore, care must be taken in their use and interpretation, and also compromises must be made in public policies that are designed to improve agricultural marketing performance. A balance need to be struck between the demands and dissatisfactions of each group in the marketing channel. Rhodes (1983) indicated that the balance of these criteria is frequently disturbed by a new technology, a new marketing procedure, a change in markets, or a change in political power, thus, making the analysis of agricultural marketing performance an ever-changing and dynamic area.

Assessing the performance of wheat marketing requires utilization of a combination of well-developed analytical techniques. The analytical techniques include marketing margins, profitability analysis, market integration analysis and forecasting techniques needed to be used in order to assess the efficiency of the marketing system. Among the marketing research techniques, market margin analysis is the relevant and widely used technique; and as a result, coupled with time and budget constraints, this case study employed marketing costs and margin analysis to evaluate the performance of wheat markets in the study area. Marketing margin refers to the portion of the consumer's food dollar that goes to agricultural marketing firms. This is the difference between what the consumer pays for food and what the farmer receives. In other words, marketing margin is the price of all utility-adding activities and functions performed by agricultural marketing firms, which includes the expenses of performing marketing functions and also agricultural marketing firms' profits. Different types of marketing margins can be used to analyze the performance of agricultural markets.

2.3. Role of Market Participation

There is general consensus that deeper market integration of smallholders is considered an important means of achieving food security status and to move out of poverty (Von Braun, 1995). Cognizant of this, recent studies and policy initiatives have focused on ways to enhance smallholder's agricultural productivity, and enable them to achieve greater market participation. Greater market participation is not an end goal, rather the ultimate of market participation is to bring the needed improvement of the welfare of society and enable them to sustainably progress out of the multifaceted poverty (Gutu, 2017).

According to Gutu (2017), welfare aspects are expressed through poverty, inequality and vulnerability. He represented welfare in terms of consumption of basic food (grains), high-value foods (livestock products) and expenditure on clothes and shoes, durable goods, education and healthcare in his analysis of welfare effects of market participation. In this context, those who have enough resources to meet their food needs are usually referred to as food secure. On the other hand, those with resources to meet both food and non-food needs are referred to as non-poor households (not in poverty class) and the converse is also true. In his empirical work, he

found that positive relation between market participation and poverty status indicating that market participation enhances the welfare of participating households.

According to UNCTAD (2015), importance of smallholders' participation in markets is gauged by analyzing the extent to which they interact with input and output markets. Smallholders participate in markets either to buy food, procure inputs or sell their produce. The extent of smallholders' participation in input and output markets partly determines their productivity, and hence their earnings. Better linkages with markets can induce rural populations to consider farming as a profitable, and therefore a viable, livelihood choice. Participation in well-functioning agricultural input markets can enable farmers to increase yields, thus producing a marketable surplus, which, if sold in competitive output markets, can enable them to obtain higher prices and consequently increase their incomes. The resulting income is then used to buy consumer items that households need but cannot produce. This in turn improves their capacity to cope with risks and market instability.

Moreover, a study by Geoffrey *et al* (2015) showed that greater market participation significantly reduces food insecurity and poverty among households with high market participation when compared against households with low market participation. Arias *et al*. (2013) in their report on smallholder's integration in changing food markets clearly explain that reducing poverty and enhancing food security require greater smallholder integration into markets and more inclusive value chains. They also emphasize that, adoption of new technologies and productivity growth will be limited if smallholder's integration to the market is weak. In addition, the findings of Ntakyo and Berg (n.d), Mmbando, (2014), and Kirimi *et al*., (2013) clearly outline contribution of market participation to dietary diversity and per capita consumption expenditure, reduced risk of being in the chronically food poor, and transition households out of food poverty.

2.4 Challenges and Opportunities of Wheat Marketing in Ethiopia

2.4. 1 Wheat Marketing Challenges

There are a number of problems in Ethiopia grain markets in general. They are mainly related with the commodity production, quality, distribution, warehousing, and market information and

so on. Some of the major problems observed include weak infrastructures affect marketing performance. In terms of infrastructure, prominently the weak access of smallholder farmers to roads, as well as limited telecommunications and storage infrastructure both on the surplus and deficit areas. These infrastructure problems may affect market coordination, market information and market integrity between buyers and sellers and contribute to the high transaction costs (Muhammed, 2011). Buyers and sellers in agricultural markets of Ethiopia operate within narrow market channels. This narrow market is characterized by market actors conduct business across short distances, with few trusted trading partners, in few markets, and with limited storage. Therefore, the Ethiopia agricultural markets are fragmented, unregulated, lacking in open market information systems, saddled with high transaction costs, constrained by inadequate liquidity, tending to operate only when price differentials are considerable. All these constraints limit the extent to which any commodity can move from an area of surplus to an area of deficit and most Ethiopian markets (Ibid).

The grading and certification should be important to get proper price for commodity traded in the market. However, the Ethiopia agricultural markets so far have not used grading through qualified laboratory to certify the standard of the commodity traded in the market. The market has used the local grading such as white wheat, mixed wheat, etc. This local grading does not use parametric figure for impurities and other foreign materials. Although grain trade licenses are not difficult to obtain, there is widespread unlicensed trading due to lack of enforcement of the appropriate codes. Even those with a license in one type of trading (e.g., wholesaling) may participate in the other (here retailing) without a license (FAO, 2008).

Agricultural marketing is a very important factor in economic development and lack of a well-functioning agricultural market and marketing system severely hinders the increase of social welfare, income distribution, and food security of developing countries. Moreover, markets and marketing system do not develop simultaneously with economic growth. Markets and marketing system should be organized deliberately to enable economic development, (Wolday, 1994). Grain marketing in Ethiopia is characterized by weak institutional support and inadequate

infrastructure. With no effective systems in place for identifying grades and standards, existing market information systems are of limited value to famers and other actors along the marketing of grain produce. The efforts of increasing agricultural production and productivity have to be accompanied by a well- performing marketing system that satisfies consumer demands with the minimum margin between producers and consumer prices.

Higher prices for producer can encourage farmers to adopt new technologies, increase production (Wolday, 1994). However, there are external and internal problems that influence the marketing efficiency in Ethiopia. This has to do with lack of pertinent market information, development of marketing institutions and marketing infrastructure such as storage, transportation etc. Indeed, producers and traders have difficulty making sound decisions based on price information that does not specify grades and standards. Since mixing different grades of grain compromises quality, the lack of common standards and grades has also hindered the production and marketing of wheat in the country. Furthermore, trade associations are weak and have limited capacity to regulate them; establish and enforce standards; and modernize wheat marketing. High transport costs severely influence farmers located far away from wholesale markets (points of competition) such as Addis Ababa. High costs are due to long distances, poor infrastructure, limited processing and the lack of bulk handling and transporting systems. Indeed, grain is transported in small trucks at a high cost per unit. Currently, only about 21 percent of Ethiopia's total wheat production is marketed.

2.4.2 Challenges and opportunities of wheat market chain in Ethiopia

According to Ashenafi (2010) and Gebremeskel (1998), there are many challenges that hinder the participants from wheat market in Ethiopia. Form these, the following are the main one:

Table 1: market challenges and opportunities

Challenges	Opportunities
✓ Shortage of capital and lack of credit use ✓ Lack of market information ✓ Unfair pricing and cheating of traders during weighting ✓ Unfair competition with unlicensed traders Market infrastructure and Transportation cost ✓ Poor product quality and high cost of input ✓ Weak market linkages among market participants	✓ increment of the demand ✓ expansion of establishment of food processing plants ✓ provision of infrastructure facilities like telecommunication, power supply and financial institutions

2.5. Wheat Production and Marketing in Ethiopia

2.5.1 Wheat production in Ethiopia

According to CSA (2018) the Ethiopia wheat production accounts for 4.2 million tons, with yield and area harvested to remain unchanged at 2.6 metric tons per hectares and 1.6 million hectares, respectively. This out year estimate assumes favorable weather conditions; sufficient availability of inputs, and minimal disease and pest pressures it making the largest wheat producer in sub-Saharan Africa by a considerable margin. The second-largest producer is South Africa with 1.7 million tons, followed by Kenya with just 0.5 million tons. On the other hand, Ethiopian production is relatively small by global standards. Its production is surpassed by two North African countries, Egypt and Morocco, with more than 7 million tons each, and 27 other countries (FAO, 2015b). Wheat is mainly grown in the central and southeastern highlands during the main (*Meher*) rainy season (June to September) and harvested in October-November. The short rains (*belg*), starting in March, are less reliable in most parts of Ethiopia; however, in the south east of the country (Bale zone of Oromia Region), rainfall distribution is bimodal. Arsi, Bale, and parts of Shoa are considered the wheat-growing belt.

Bread wheat is the major variety of wheat grown in Ethiopia. However, farmers grow durum and bread wheat (mixed together) in some parts of the country. Wheat is produced on large state-

owned farms covering around 124,000 ha of land in the Arsi and Bale regions. The total area of production of both durum (*Triticum turgidum L)* and bread wheat (*Triticum aestivum L)* is about 1,696,082.59 hectares. Although small-scale farmers dominate Ethiopian wheat production (and Ethiopian agriculture in general), there are some large-scale commercial farms growing wheat. Large-scale commercial wheat production covers about 50-80 thousand hectares of land and produces 150-200 thousand tons of wheat. Within Ethiopia, the Oromia and Amhara regions produce 59 % and 28% of the country's wheat, respectively, with an additional ten percent coming from the Southern Nations, Nationalities, and Peoples Region (SNNPR) and 3 % from others (CSA, 2017); (IFPRI, 2015). In Ethiopia, statistical data shows that area harvested and volume of wheat produced has grown year-over-year. Increase in trends of wheat production was attributed due to different factors that include good rainfall, national and international efforts to combat wheat stem rust outbreaks, and the rising use of improved seed and fertilizer. In addition, the government's extension package continues to have a positive impact on production. The extension services among other activities provides for the distribution of improved seed and fertilizer, education on the optimal application of inputs (e.g. seed) and other agronomic techniques. Further, USAID with its partner, are working in the wheat value chain to increase productivity and quality, while reducing post-harvest losses (USDA, 2015).

2.5.2. Wheat marketing in Ethiopia

Wheat marketing is incentive for farmer to improve production. Wheat marketing is the process by which transfer wheat product from producer to final destination (consumer). Regional patterns of marketed surplus of wheat indicate that, Amhara region is the second largest supplier of marketed wheat next to Oromia region, which accounts for about half of all marketed wheat. Marketing patterns by farm size indicate that, those farmers with less than 0.5 hectare sold 9% of their harvest while those with more than 5 hectares sold an average of 39% of their wheat output. Farmers with 2-5 hectares of land sold 28% of their wheat output but they account for more than half (55%) of wheat marketed in Ethiopia as they are large in number. In Ethiopia, estimated proportion of marketed wheat generated by large-scale commercial farmers is 15-20% (IFPRI, 2015). Participants in wheat market in Ethiopia include smallholder and commercial producers, wholesalers, retailers, part-time farmer-traders, brokers, agents, assemblers, processors, cooperatives, the Ethiopian Grain Trade Enterprise (EGTE), and consumers. There is significant

price fluctuation in wheat market. Generally, prices follow the annual pattern of relatively low post-harvest January prices followed by a period of rising prices that peak during the main rainy season (July and August) (EPAR, 2010) Unlike other staple grains, wheat is imported in large volumes. The percentage of domestic wheat consumption coming from imports varies between 25% and 35%, depending on the size of the harvest and other factors (IFPRI, 2015).

2.6. Framework for Evaluation of Marketing System

The structure-conduct performance (SCP model) is one of the most common pragmatic methods of analyzing a marketing system. To study the functioning of markets, many scholars have used the Structure-Conduct-Performance (SCP) paradigm. The framework differentiates among three interconnected levels; the structure of the market, the conduct of the market, and performance of the market. A causal relations starting from the structure, which determine the conduct, which together determine the performance of agricultural marketing system (Meijer, 1994) as sited in (Wolday, 1994). This analytical method is based on the theory that market structure and market conduct determine the performance of a marketing system.

2.6.1. Structure of the Market

It is refers to the relative numbers and size of firms in industry. Market structure is defined as characteristics of the organization of a market, which seem to strategically influence the nature of competition and pricing behavior within the market. Market structure is the characteristics of the organization of a market which seem to influence strategically the nature of competition and pricing behavior within the market. It can be analyzed by the number of buyers and sellers within the system, degree market concentration, product differentiation, market integration, market transparency and or market information, and barriers to entry and exit (Wolday and Eleni, 2003; Pender *et al.,* 2004).

2.6.1.1. Market concentration of wheat in Ethiopia

Market concentration is the number and size of distribution of sellers and buyers in the market (Kohls and Uhl, 2002); (Solomon *et al*., 2017). In determining degree of market concentration, the objectives of the firm, barriers of entry, economics of scale and assumption of the rival firm's behaviour are important (Schere, 1980). For an efficient market, there should be sufficient number of firms (buyers and sellers); firms of appropriate size are needed to fully capture

economies of size; there should be no barriers to entry into and exit from the market and should have full market information (Tadesse, 2011). To measure the wheat market concentration, CR4 ratio, Herfindhal Hirschman index, Gini coefficient methods can be used. But using concentration ratio (CR4) is better so that in order to measure the market concentration of wheat in this review, CR4 is focused. A CR4 of over 50% is generally considered as strong oligopoly; CR4 between 33% and 50% is generally considered a weak oligopoly and a CR4 of less than 33% is un-concentrated market (Kohls and Uhl, 1985). According to Mohammed (2011), the average market concentration of wheat (CR4) in Alaba Qulito Market of Halaba Special Woreda, Southern Ethiopia, is 71.5%, which was oligopolistic market, indicating the existence of market imperfection. Similarly Sultan (2016) found that the market concentration ratio of wheat in Sinana District, Bale Zone, Oromia Region, Ethiopia, was 88.7% of the total amount of wheat sold in market during peak production season at Robe town, indicated that the market structure is oligopoly market. In contrast to these, Hailu (2010) found that the market concentration ratio (CR4) of wheat in Mekele market, Tigray, was 22.31%, indicates competitive market. Besides this other study reveal that the average market concentration was 27.54%, indicated that the market structure was weakly competitive markets (Gebremeskel *et al*., 1998).

2.6.1.2 Barriers to entry and exit in wheat market

According to different authors, the following factors are the main barriers to enter and leave the wheat market in Ethiopia:

Working Capital: Working capital refers to the amount of money required by wheat traders to enter into the trading business. Fulfilling the initial capital requirement is compulsory for entry into wheat market. This means that large amount of start-up capital required for financing wheat trade operations is a needed. But for those who cannot afford it, cannot enter the wheat market that is why it is considered as a barrier to enter market (Mohammed *et al*, 2011).

License: trade license is obligatory for the wheat traders to enter the wheat market. But some wheat traders were not licensed because of the fear of high tax and costs incurred to get license card (initial capital), so that it is a great barrier to entry in the wheat market (Sultan *et al*, 2016).

Lack of trading experience: for those who have not yet experienced entering the market is very difficult so that experience is the barrier to enter wheat market. But for the experienced traders it is not a barrier to enter wheat market (Amentae *et al*., 2017).

High Competition: Competition among licensed and non-licensed traders, competition with marketing cooperatives and organized large wholesalers were the main barriers to entry in wheat markets. This means that the large traders, who have enough capital, can buy large volume of wheat in the harvesting season and control the market so that the smaller traders cannot enter the wheat markets (Amentae *et al.*, 2017).

2.6.2. Conduct of the market

Market conduct refers to the patterns of behavior that firms follow in adopting or adjusting to the markets in which they sell or buy (Bain, 1968). The main focus of the market conduct is on the marketing strategies and the behavior of the actors to maximize profit and the return to investment in trading business. It is focused on the policies and strategies regarding to price setting, product quality setting, and policies coercing the rivals (Tadesse, 2011; Solomon, 2017).

2.6.2.1. Wheat producers market conduct

Different studies reveal that the farmer, the market through negotiation, and traders, determines the price of wheat produce in the market. According to Amentae *et al.* (2017), 82%, 14.7% and 3.3% of the respondent, in Arsi to Finfinnee, reported that the wheat price was set by buyers, the market through the interactions between supply and demand by negotiation and farmer respectively. Similarly in Halaba Special Woreda, 49%, 37.5%, 11.5% and 2% of the respondent reported that market price was set through negotiation and haggling with traders, market, farmers and traders respectively. In order to solve the low price problem, the farmers of wheat take different measures. From these measures taking their produce back to their home and waiting till next market day, storing their produce in the home of their relatives who live near to the market are the main solution for it. For instance, in Halaba special Woreda, the wheat suppliers/producers took their wheat produce to their home (72.6%), sold with existed price (17.2%) and store in their relatives' home (10.2%) when the there is a price problem (Mohammed, 2011).

2.6.2.2. Wheat traders market conduct

Price information is very crucial for wheat traders in the market. It is one of the main marketing strategies that cereal traders in Ethiopian use. Therefore, using different strategies for obtaining market information (price information) is compulsory for wheat traders. In Ethiopia, the

strategies for setting the price of wheat are varied from one area to the other area. For instance, in the southern zone of Tigray, the traders, follow an average of two markets on a weekly basis and use their cell phone to obtain the market information of grain including wheat (Ashenafi, 2010). According to Mohammed (2011), the use of regular partner, long term relation with clients or suppliers, the use of intermediaries, trading with personalized network, feasibility of alternative market outlets and price setting practices were the main strategies that traders used for maximizing profit and developing their bargaining power. Regarding to the payment node in selling their products, the traders sold their products through cash and credit (42%), cash only (30.2%), credit (4.6%) and combination of cash, advanced payment and credit (23.2%). Regarding to the attraction of their suppliers, the traders used different systems such as fair scale-weighing (81.2%), giving better price relative to others (8.24%), giving credit (7.06 %), and visiting their suppliers (3.53%). The traders also used quality (good looking seed, free from foreign materials, well dried and preferred wheat varieties by their customers) as a strategy to attract buyers, which accounts about 88% (Amentae *et al*., 2017).

2.6.3. Market Performance Analysis

Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output Also by analyzing the level of marketing margin and their cost components, it is possible to evaluate the impact of the structure and Conduct characteristic on market performance (Scott,1995). According to Bain and Qualls (1987), market performance also refers to the composite of end results, which firms in the market arrive at by following whether lines of conduct they adopt end results in the dimensions of price, output, production and selling cost, product design, and so forth. For (Bain and Qualls, 1987), the principal aspects of the market performance are: the relative technical efficiency of production so far as this is influenced by the scale or size of plants and firms (relative to the most efficient), and by the extent, if any, of excess capacity; the selling price relative to the long-term marginal cost of production and to the long run average cost of production (usually about the same as long-run marginal cost), and the resultant profit margin; the size of industry output relative to the largest attainable consistent with the equality of price and long-run marginal cost; the size of sales promotion costs relative to the costs of production; the character of product

including design, level of quality and variety; and the rate of progressiveness of the industry, both products and technologies of production relative to rate which are attainable and also economic in view of the costs of progress.

Marketing cost: It refers to those costs, which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (packing and unpacking), costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (officials) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement (Holloway, 2002), cited in (Ayelech, 2011). Marketing costs refers to those costs, which are incurred to perform various marketing activities in the shipment of goods from producers to consumers.

Marketing margin: a marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. It is defined as the price of a collection of marketing services that is the outcome of the demand for and the supply of such services. Refers to the portion consumer food dollar that goes to agricultural marketing firm. Margin can be calculated all along the market chain, and each margin reflects the value added at that level of the market chain (USAID, 2008).

2.7. Review of Empirical Study

Marketing margin estimation for wheat market actors

Different scholars conducted research on agricultural commodities marketing using market concentration ratios, marketing costs and margins and profit analysis. The result indicates that margin and profit received by marketing actors and level of market efficiency varied with respect to location and size of marketing channel.

Scott (1995) used marketing margin analysis on potato marketing in Bangladesh and found out that producer's price and margin were 1.27 and 67% respectively. Rehima (2006) used marketing margin analysis on pepper marketing chains in *Alaba* and *Siltie* zones in southern Ethiopia and found that the gross marketing margin was 43.08% of the consumer's price. Producer's share by retailers was 50.7% of the consumer's price.

Solomon (2007) used marketing cost and margin analyzed performance of cattle marketing system in *Borena* and found that butchers at Addis Ababa (*Kera*) market received relatively a larger share from total gross marketing margin (69.5%, 63.4% and 61.6%) for cattle supplied from *Yabelo, Negelle* and *Dubluk* markets, respectively. Regarding producer's portion, he found that the highest percentage was found for cattle supplied from *Dubluk* market (21.9%), followed by *Negelle* and *Yabelo* with gross margins of 20.6% and 18.6%, respectively.

Beyene and Phillips (2007) have designated that absences of research and market information in Ethiopian honey value chain have wasted the nation's incalculable benefits. This study was further evidenced by Belay (2003) who stated that, lack of government support such as: inadequate research and training, policies and strategies, have increased knowledge gap among the Ethiopian small scale farmers. Efficiencies of wheat marketing activities (revenue, growth, and market share). It is evaluated by considering associated costs, returns and marketing margins. Wheat marketing cost is the total cost associated with delivering goods or services to customers. It may include expenses associated with transferring title of goods to a customer, storing goods in warehouses pending delivery, promoting the goods or services being sold, or the distribution of the product to points of sale. Different study result indicated that the average marketing costs of wheat in Ethiopia is 162 birr per quintal (Table 2). The following table shows the average costs incurred by the different actors in wheat markets in Ethiopia:

Table 2: Marketing costs of wheat in Ethiopia

No.	Production cost(B/Qt)	Market costs (B/Qt)	Total cost (B/Qt)	Reference
1	260	-	260	Elias *et al.*, 2017
2	450	206	656	Amentae, 2017
3	480	118	798	Minot *et al.*,2015
4	-	-	169.56	Mohammed, 2011
Avg.	463.33	162	470.89	

Marketing margin is the difference between the price the consumers pay and the price the producers receive. Marketing margin is one of the commonly used measures of the performance of a marketing system. The different values of wheat marketing margin are depicted in the following table:

Table 3: Marketing margins of wheat in Ethiopia

Wheat market participant	Amentae *et al*., 2017			Sultan, 2016			Mohammed, 2011		
	SP (birr/kg)	GMM	TGMM	SP (birr/kg)	GMM	TGMM	SP (birr/kg)	GMM	TGMM
Producer	7.5	30			80.75		2.71	74.2	
Collector	8.5	1			0.57		2.93	5.93	
Wholesalers	9.85	1.35			0.44		3.04	3.17	
Retailers	10	1			0.69		3.65	16.7	
Processor	13.5	4			1.6				
Average	9.87	2.07	44.44		16.81	20.73	3.08	25	25.8

✓ The average selling price of wheat in the country was ranging from 3.08-9.87birr/kg.
✓ The average growth-marketing margin was 14.63%.
✓ The average total growth marketing margin was 30.32%

Market participation decision and levels of participation

There is small literature marketing participation decision in Ethiopia. However, thesis, attempts have been made to review the available finding. A study conducted by different scholars on wheat market performance identified that number of livestock, sex of household, distance from nearest market centers, access to credit, market price frequency of extension agent contact, and market information would be found to be vital for market participation and to sale volume.

Feyisa (2016) conducted study on market value chain analysis in Ethiopia: market participation decision and level of participation on ware potato. They employed Heckman's two-stage model to identify factor affecting smallholder market participation and its intensity. The market participation decision of farmers is found to be affected by age of the household head, frequency of extension contacts, and access to credit services whereas variables like being male, lagged price of ware potato, use of improved seed variety and total cultivated land affected it positively. Regarding the extent of participation, age of household head appeared to negatively determine it. Furthermore, education level of the household, lagged price, use of improved seed and access to credit services seemed to motivate households increase the supplied quantity. According to the survey result, different actors handled ware potato in the area and producers in the study area had different marketing channel alternatives. Sales of ware potato to wholesaler, collector, and retailer market were the dominant ones.

Tura (2016) Employed double hurdle model to identify factors affecting market participation and intensity of marketed surplus of *teff*. Accordingly, among different set of explanatory variables, market participation decision and its intensity was significantly affected by some of the variable used in the model. Market participation decision of smallholder farmers was positively affected by access to credit, farm size, agro ecology, ownership of transport equipment. Whereas, perception of farmers on lagged market price of *teff* and family size found inversely related with participation decision. The intensity of marketed supply in the second hurdle result shows that farm size, perception of current price, income from other farming and off-farm activity have positive effect and family size, agro ecology, distance to the nearest market and livestock holding have negatively related with marketed surplus of *teff* in the study area.

Fekadu (2017) conducted study on market value chain analysis in Ethiopia: market participation decision and level of participation on bread wheat. They employed Heckman's two-stage model to identify factor affecting smallholder market participation and its intensity. Heckman selection equation shows that bread wheat harvested, type of wheat seed, frequency of extension contact and ownership of communication assets affected output market participation decision positively and non-farm income, family size and distance from nearest market affected participation decision negatively. Heckman outcome equation shows that bread wheat harvested and non-farm income affected bread wheat marketed supply positively and age of household affected marketed supply negatively in study area.

As the study of Tariku (2018) used double hurdle estimation to identify factors that affected the market participation decision and its level of participation. Double hurdle model regression result showed that, perception on lagged wheat price, quantity of wheat produced, size of land allocated for wheat and education level of household head had significant positive effect on market participation decision, while distance to nearest market, distance to extension service and size of land allocated for other crops had significant negative effect. Level of market participation affected positively and significantly by perception on lagged wheat price, and quantity of wheat produced, while it was affected significantly and negatively by family size.

The study result indicated that, provision of training on contract farming, increasing of productivity and production of wheat, strengthening of farmers' education through adult education, rural infrastructural development and transportation system, increase in farmers training centers, and strengthening of family planning education through rural health extension as a means to enhance wheat market participation and level of participation of smallholders.

2.8 Conceptual Framework

This framework is focused on the household level of analysis the wheat marketing performance. The basis for this conceptual framework were the work of major authors cited in theoretical and empirical section of this study like (Hasen, 2016; Haymanot *et al.*, 2014; Fekadu, 2017; Tariku, 2018; and Nuri *et al*., 2016). There are also determinants, which mainly affect market participation and level of participation of wheat marketing. These determinants can be categorized as demographic factors like sex, family size, level of education, age and socio-economic factors like number of oxen owned, farm income, income from non-farm activity, wheat harvested and institutional factors and market related factor like access to credit, frequency of extension contact, access to market information, perception on lagged market price and distance to nearest market. Figure.1 shows the conceptual framework of the socio economic factor, demographic factor, institutional factors and other factors determining farm household decision of market participation and level of market participation.
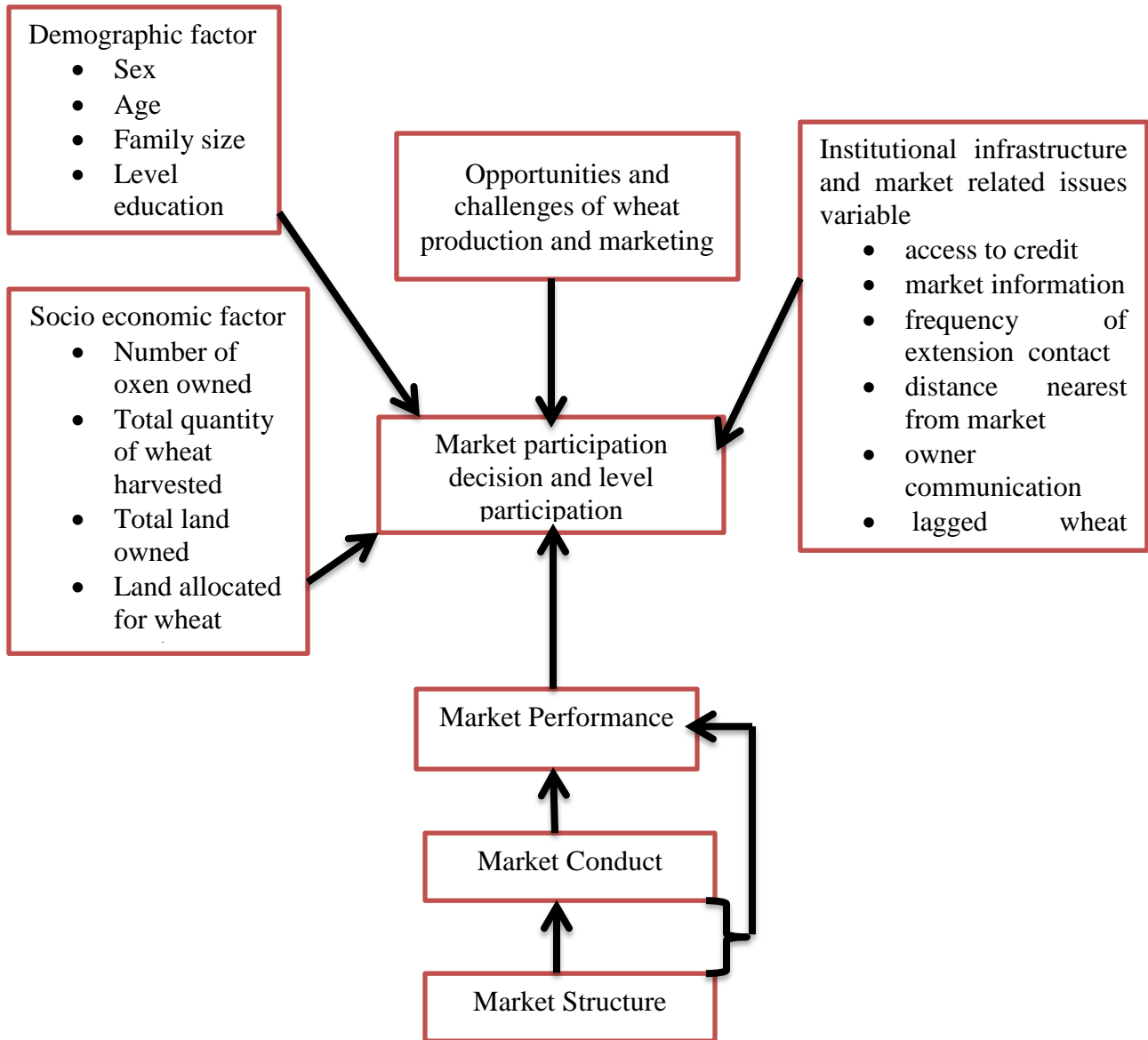
Figure 1: Conceptual framework for market participation and Levels of Participation

Source: Own sketch (2019)

3. RESEARCH METHODOLOGY

This chapter contains the description of the study area where the research is conducted, the data type and source of data, the sampling technique and the sample size determination, data collection method. It also explains the analytical framework of the descriptive statistics and econometric models, giving the reasons why models were chosen.

3.1 Description of the Study Area

Robe is one of the woreda in the Oromia National Regional State, Arsi zone, Ethiopia. It is named after the Robe River, 80 kilometers of which flows through the woreda. As part of the Arsi Zone, Robe district is bordered on the south by the Shebelle River, which separates it from the Bale Zone, on the southwest by Sherka, on the west by Tena, on the north by Sude, on the northeast by Amigna, and on the east by Seru. The administrative center of the woreda is Robe; other towns in Robe include Habe, and Sedika. The altitude of this woreda ranges from 1200 to 4000 meters above sea level. The two main rivers flow 45 and 40 kilometers are Hulull River and Wabe River respectively. The gorge of the Wabe River is a local landmark. A survey conducted by Woreda Agriculture Office on the land use pattern in the woreda indicates that 51.1% is arable or cultivable land, 4.9% pastureland, 16.3% forest, and the remaining 27.7% are considered swampy, mountainous or otherwise unusable (CSA, 2017).

Arsi Robe district has three agro ecological zones in which the highland covers 62% of the total land and the rest 24% and 14% are midland and lowland, respectively. The mean annual temperature ranges from a minimum of 15°C to a maximum of 30°C. It has an altitude that falls within a range of 800-2800 m.a.s.l with annual rainfall ranging from 700 to 1300mm. Total area of the district is 127,443 ha, from which cultivated and forestland cover 42,423 and 1,211 ha of land, respectively (CSA, 2017). The rest 14,706 ha and 69,103 ha of land is covered by grazing land and arable area, respectively. Topographically, 71% of the district is plain, whereas, mountain and plateau accounts for 27% and 2%, respectively. There are two rainy seasons, main and short rainy seasons. The main rainy season occurs in the months of June to October, whereas, the short rainy season occurs in the months of February to April and the rest months belong to the dry season period. The two rainy seasons determine the success of livestock and

crop production for the year. Coniferous trees with some bushes coverage dominate the vegetation type of the study area. The soil type of the district is dominated by black soil (68%) and the rest 22% and 10% are covered by clay loam red soil type, respectively. The human population of Arsi Robe was reported to be 233,313. In Arsi Robe, total male population from Urban and Rural areas would be 117,986, whereas, total female population were 115,327 (Woreda Report, 2019).
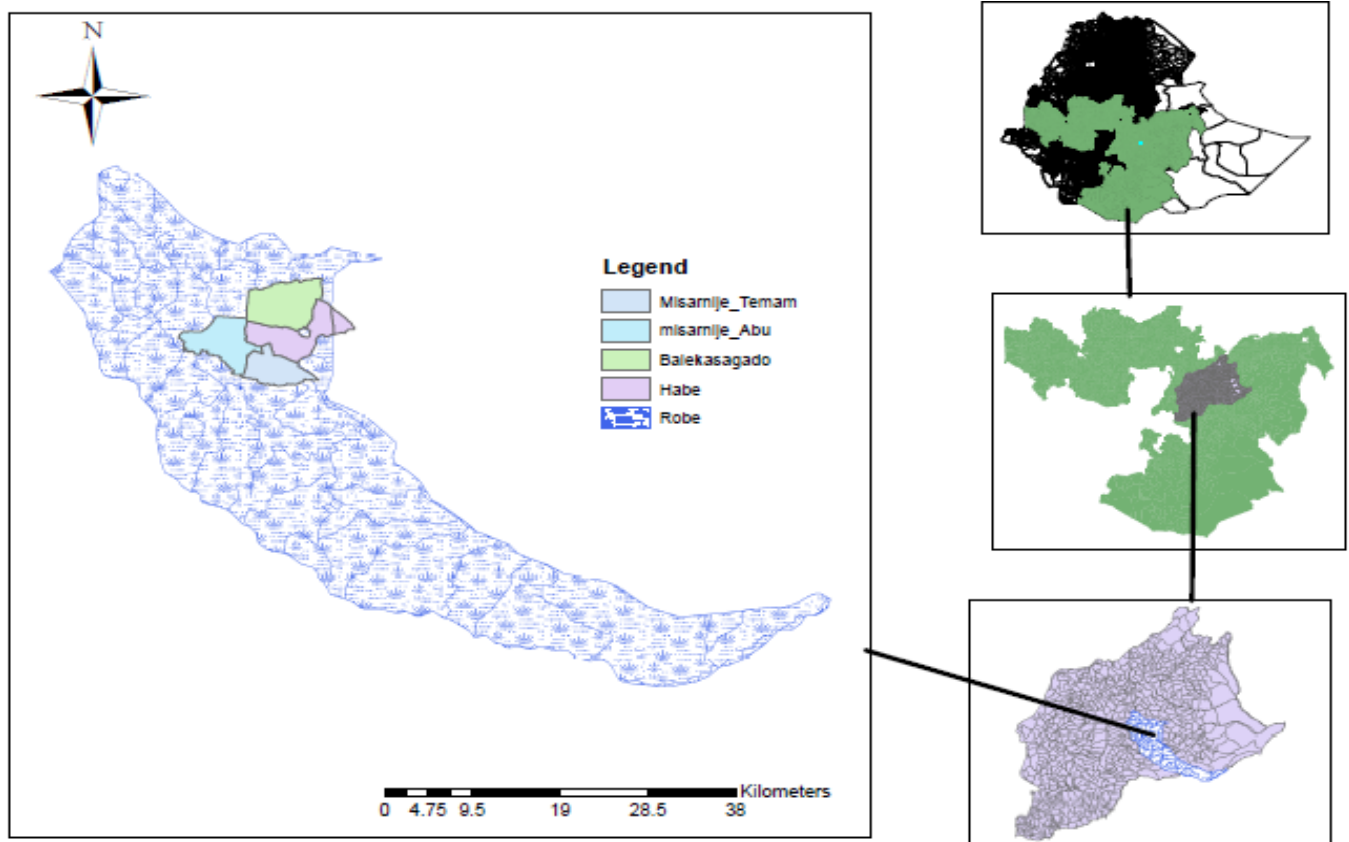
Figure 2: Location of the study area

3.2 Data Sources and Types

The qualitative and quantitative data for this study were collected from primary and secondary sources. Primary data were collected from producers, wholesalers, assemblers, retailers, and agricultural input suppliers. The main data types collected include production, buying, selling, pricing, input delivery and distribution, market supply of wheat, market outlets, constraints and opportunities characteristics of the actors involved in wheat crop production and marketing in the study area. Secondary information were gathered from published and unpublished materials,

district agriculture and rural development offices, farmers' organizations, input suppliers, marketing agencies and from different development organizations of the study area.

3.3. Sampling Technique and Sample Size

Cross sectional data were collected from the sampled households. The target population for this study was smallholder wheat producers in Robe woreda. The sample for this study was drawn from wheat producing households randomly by using two-stage random sample method. Robee woreda was selected purposively based on the wheat production potential. In the first stage four *kebele* were selected by simple random sampling method from the total of 32 *kebele* of the district because all the kebeles have equal potential. In the second stage, from the selected four *kebele*, 156 samples of wheat producing household was selected randomly using probability proportionate to size of *kebeles* wheat producing households. The reason for choosing simple random sampling technique over other sampling techniques for selection of *kebeles*, because it gives equal chances for *kebeles* and households to be included within the sample frame. Collecting information from total population is economically not feasible in terms of money and time. Thus, taking optimum, manageable and representative sample size is recommended to infer about the population. Sampling is one of the methods, which allows the researcher to study a relatively small number of units representing the whole population. Sample size was determined following a simplified formula provided by (Yamane, 1967). Accordingly, the required sample size at 95% confidence level degree of variability of 5% and considering time and resource limitation, level of precision equal to 8% was used to determine a sample size required to represent the population.

$$\frac{N}{1+N(e)^2} = \frac{25874}{1+25874\,(0.08)^2} \approx 156 \ldots\ldots\ldots\ldots\ldots\ldots \text{(1)}$$

Where, n= is the sample size for the research use, N= is the household size in the district.

e = is the level of precision = (0.08)

Table 4: Sample size determination

Name of kebele	Number of wheat Producer household Heads	Proportionality	Number of sampled household heads
Habee dangazeela	1,164	0.27	43
Maranjee tamama	764	0.18	28
Maranjee abuu	1,092	0.26	40
Balaka gadoo	1,228	0.29	45
Total population	4,248	1	156

Source: Own calculation (2019)

The attempts of the work were to capture the actual practice and behavior of the wheat traders in the district market. The number of sample traders was selected purposively from Robe market in order to obtain largest four traders based on researcher judgment to analyze performance of wheat marketing of Robe. The first four largest firms in the district were identified from 24 sampled traders. The sites for the traders' survey were Robe market of the district where wheat is mostly sold.

3.4. Method of Data Collection

Different method of data collection tools was used for this study. Primary data were collected from sample households using interview schedule. The questions have been pre-tested to increase the precision of the data. Five enumerators including the researcher were employed for the data collection. Besides, Personal observations, and Key informant interview were employed to supplement the survey data. Key informant interview were made with local community elders, development agents in each selected *kebeles* and experts in woreda agricultural development office. The secondary data were collected from different sources such as agricultural research center available in the area, Agriculture and Natural Resource and Trade and Market development Offices of the district, and non-governmental organizations operating in the district. In addition, different and relevant published and unpublished reports, bulletins and websites were consulted to generate relevant secondary data on bread wheat production and marketing.

3.5. Method of Data Analysis

Two types of data analysis, namely descriptive statistics and econometric models were used to analyses the data collected from sampled households.

3.5.1. Descriptive Analysis

The statistical values of mean, standard deviation, percentages, and ratios were employed to examine the socioeconomic characteristics of sample households. Besides, inferential statistics such as chi-square and t-test were used in order to compare statistical significance of the mean of household characteristics, institutional, and different socioeconomic variables of both dummy and continuous variables.

3.5.1.1. Structure-Conduct-Performance (S-C-P) of Wheat Market

The model examines the causal relationships between market structure, conduct, and performance, and is usually referred to as the structure conduct and performance (S-C-P) model. In agricultural economics, the most frequently used model for evaluating market performance is based on the industrial organization model. Different scholars like Wolday (1994) and Mohamed (2011) also used this model to evaluate food grain market in Halaba special district. I also, used S-C-P model to evaluate how efficiently wheat market in the study area is functioning.

Market Structure: structural characteristics like market concentration, product differentiation, barriers to entry, and diversification were some of the basis considered in the study.

Barriers to entry: A barrier to entry is simply any advantage held by existing firms over those firms that might potentially produce in a given market.

Market concentration: this refers to the number and size, distribution of sellers and buyers in the market. The greater the degree of concentration the greater will be the possibility of noncompetitive behavior, such as collusion exists in the market.

The concentration ratio is given as:

$$C = \sum_{i=1}^{r} Si \qquad i = 1, 2, 3, 4 \ldots, r \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where, C= concentration ratio

Si= the percentage market share of the ith firm

r= the number of relatively larger firms for which the ratio is going to be calculated

Kohls and Uhl (1985) bring into play as a rule of thumb, four largest enterprises" concentration ratio of 50% or more (an indication of a strongly oligopolistic industry), 33-50 % (a weak oligopoly) and less than that (competitive industry).

Market conduct: it is a systematic way to detect indication of unfair price setting practices and the conditions under which practices are likely to prevail. Conduct is pattern of behavior which enterprises follow in adopting or adjusting to the market in which they sell or buy and in other words the strategies of the actors operating in the market**.**

Market performance refers to the impact of structure and conduct on performance of the industry as measured in terms of variables such as prices, costs, and volume of output (Pomeroy and Trinidad, 1995). Analysis of the level of marketing margins and their cost components could help to evaluate the impact of the structure and conduct characteristics on market performance.

Marketing margin

This amount can be interpreted as the cost of providing a mix of marketing services. Marketing margin can be defined alternatively as the price of a collection of marketing services that is the outcome of the demand and the supply of such services. Margin determination surveys should be conducted parallel to channel survey. To determine the channel, one asks the questions "From whom did you buy?" and "To whom did you sell?" (Mendoza, 1995) pointed out to obtain information concerning the margins, agents have to answer the question "what price did you pay?" and "what was the selling price?" The cost and price information used to construct marketing cost and margin were gathered during fieldwork. Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$TGMM = \frac{Consumer\ price - Producer\ price}{Consumer\ price} * 100 \qquad (3)$$

Where, TGMM = Total gross marketing margin

Producers' gross margin is the proportion of the price paid by the end user or end buyer that goes to the producer.

$$GMMp = \frac{Consumer\ price\_Marketing\ gross\ margin}{Consumer\ price} * 100 \qquad (4)$$

Where, GMM_p = the producers share in consumer price

The producer's share is the commonly employed ratio calculated mathematically as, the ratio of producer's price to consumer's price. Mathematically expressed as:

$$P_s = \frac{P_x}{P_r} = 1 - \frac{MM}{P_r} \qquad (5)$$

Where: P_s = Producers share,

P_x = Producer's price of wheat,

P_r = Retail price of wheat, and

MM = Marketing margin.

3.5.2 Econometric Model

Econometric model was useful to analyses market participation decision and level of participation, was specified below. Heckman two-stage model was used to analysis the market participation decision and level of participation. It is assumed that smallholder farmers who cultivate wheat may or may not participate in output marketing, i.e., may sale or not sale. Therefore, the dependent variable in this model is discrete consisting of two outcomes, yes or no. In this case, the use of Ordinary Least Square/OLS technique for such variables poses inference problems, and thus not appropriate for investigating dichotomous or limited dependent variables. In such circumstances, maximum likelihood estimation procedures such as logit or probit models are generally more efficient (Gujarati, 1995). However, it is conceivable to use Heckman's (1979) two-step procedure in case of anticipated problem of selection bias in the sample. Selection bias was anticipated in this study because among the representative not all households are believed to participate in output market. When two decisions are involved such as participation decision and level of participation, the Heckman two-step estimation procedures were appropriated. Because other model for analysis the market participation decision and the level of participation like double hurdle model an event that some participants in the sample did not sell, then the researcher is faced with the selection bias problem and it is inappropriate due to its failure to account for the selection bias.

Heckman has developed a two-step estimation procedures model that corrects for sample selectivity bias. The first stage of the Heckman model, a participation equation, attempts to capture factors affecting market participation decision. This equation is used to construct a selectivity term known as the "inverse Mills ratio" which is added to the second stage outcome equation that explains factors affecting values of wheat. The inverse Mill"s ratio is a variable for controlling bias due to sample selection (Heckman, 1979). The second stage will involve including the Mills ratio to the value of wheat sales equation and estimating the equation using Ordinary Least Squares (OLS). If the 'selectivity' value (Inverse Mill's ratio) is significant, the null hypothesis that state there is no unobserved selection process which governs the participation equation is rejected or in other words, the alternative hypothesis that state: the presence of unobserved selection process which governs the participation equation is accepted/confirmed. The ordinary least squares (OLS) can be used to analyze determinants of level of participation in wheat market surplus. But, some wheat producer households may prefer not participating in wheat market surplus in search of other alternatives while other wheat producer households may be totally expelled from participation due to asset limitations. Then, if OLS regression is employed excluding the non-participants from analysis, a sample selectivity bias will be formed in the model. So, to overcome this problem, Heckman (1979) two-stage selection model was employed to analyze determinants of the likelihood of smallholder wheat producers' participation decision and level of participation. Heckman Two-Stage model was employed because of its advantages over the Tobit model in its ability to eliminate selectivity bias and it separates the effect of variables on the probability of market participation from the effect on the volume of wheat that can be sold (Heckman, 1979).

The Heckman two-step selection model allows for separation between the initial decision to participate in market ($d > 0$ $versus$ $d \leq 0$) and the intensity of their participation in wheat output market. The model uses in the first step a probit regression to assess the probability of participation and in the second step uses ordinary least squares (OLS) to determine the intensity of market participation (Green, 2007) and the method correct sample selection bias. This technique used in order to control the selectivity bias and endogeneity problem and to obtain consistent and unbiased parameter estimates (Green, 2007). In selection model procedure,

sample bias is determined by the relationship between the residuals of the two stages (stage 1 and stage 2). Estimates are biased if the residuals in the stage 1 and 2 are correlated. Similarly, Stage 1 does not affect stage 2 results if the residuals are unrelated. Positive and negative correlations between residuals are indicated respectively, by positive and negative mu (μ) values, which is the correlation between error terms of two-regression model.

The first stage heckman two-step or the probit model that analyze the factors determining the probability of market participation decision specified as:

$$d_i^* = Z_i\gamma_+ u_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(6)}$$

$$d_i = \left\{ 1, \text{ if } d_i^* > 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(7)} \right.$$
$$\left\{ 0, \text{ otherwise} \right.$$

Where an d_i^* is latent variable, γ is Kx1 vectors of parameters, is a Kx1 vectors of observation K is exogenous variables and is u_i random disturbance. Together equ1 and equ2 define what is called latent variable. The second equation is the linear model of interest. The ordinary least squares regression technique would be to estimate the effect of the program using the equation.

$$y_i = xi \beta + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\text{(8)}$$

Where yi an observed is random variables, β is Mx1 vectors of parameters; xi is a 1xM vector of exogenous variables and is a random disturbance. The objective is to estimate β, taking account of the fact that observations on the random variable y_i are available only if $d_i > 0$. One way to conceive of a regression model is as an attempt to find the expectation of y_i conditional upon its determinants x_i ; in this instance it needs to be recognized that the expectation must also be conditional upon $d_i = 1$.

As mentioned above, to estimate these models, Heckman has introduced the Heckman two-step estimator, which is as below.

$$E[yi|di > xi] = xi\beta + \frac{\rho\sigma\varepsilon \, \emptyset(Zi\gamma))}{\Phi (Zi\gamma)} \ldots\ldots\ldots\ldots\ldots\ldots.9$$

Where the quantities $\lambda_i = \dfrac{\phi(z_i \gamma)}{\Phi(z_i \gamma)}$ are the inverse Mill's ratio evaluated At zi γ. $\phi(\cdot)$ and $\Phi(\cdot)$ are the Normal density and cumulative distribution functions, respectively. R is the correlation between unobserved determinant ui and unobserved determinants e_i, s_e is the standard deviation of e_i. The

coefficient on the inverse mills ration will indicate if there is selection bias. If the coefficient is statistically significant, then there was selection bias. The inverse mills ration is sometimes called control functions, i.e., literally a function that controls for selection bias.

3.6. Definition of Variable and Hypothesis

In this section, definitions of two dependent variables and sixteen independent variables were presented together with the related hypotheses.

3.6.1. Dependent variables

It is crucial to understand the effects of different factors on wheat market participation decision and level of participation of producers.

Market participation decision: It is a dummy dependent variable that takes a value of 1 if the household participates in wheat output market and 0 otherwise.

Quantity of wheat supplied to the market: Continuous dependent variable is measured by the quantity of wheat sold in the market in quintal. It shows the volume of bread wheat sold in 2019/20 by a smallholder farmer.

3.6.2. Independent Variables

Age of the household head (Age): age is continuous variable and measured in years, older farmers may be more experienced in marketing management and tend to have stronger networks and more credibility, thus facing lower transaction costs. Dagmawit (2016) found positive relation between market participation of maize and age of household head but alternative hypothesis that younger farmers are less risk averse which induced market participation (Makhura, 2001) such as (Nurilefebo, 2016) found both in participation and level of participation of *Kocho*. So we expected both positive and negative relation between age, market participation and level of participation.

Sex of the household head (Sex): this is a dummy variable. It takes a value of 1 if the household head is male and 0 otherwise. The variable is expected to be positive. Due to less access to production input and information, surplus generated out of women headed households are low which prevents them not to participate in these markets (Adjognon, 2012). Such as Haymanot (2014) found in durum wheat and Dagmawit (2016) found in maize but opposite relation can

also found like Nurilefebo (2016) identified between sex and both participation and marketed surplus of *Kocho.* As a result, this research expects both positive and negative relation between sex of household and participation decision.

Family size (Famsize): it is a continuous variable measured in adult equivalent and expected to be negative or positive. When there are fewer opportunities to contribute productively, household units will be more of consumption unit, as is the case in the developing countries (Makhura, 2001). (Haymanot, 2014; Tura, 2014: Hasen, 2016 and Sultan, 2016) found an inverse relationship between family size and marketed surplus of wheat. In this study, family size is expected to be inversely related with wheat producers' market participation decision and their level of participation.

Education level of the household head (Education): It is categorical variable measured in terms of years of schooling and expected to have positive sign. Household head with higher education level is expected to acquires knowledge and gets information about the production and market than household with no or low education. Intellectual capital or education is assumed to have positive effect on the market participation, sale decision like (Minot *et al*, 2015) found in wheat, and (Dagmawit, 2016) found in maize. Education allows farmers to interpret information about the market. So, farmers with better education are more likely to participate in the market (Makhura, 2001).Sometimes, however, because of cultural and socio economic characteristics, education have opportunity costs in alternative enterprises (Lapar *et al.,* 2002). So it is not possible to have a definite expectation of the effect of education on market participation and sales volume.

Frequency of extension Visit (frequency): It is a continuous variable measured in number of day's household contact with Development Agent (DA) during production season. The variable is hypothesized to be positive. Number of extension visits improves the household's intellectual capitals, which improves production and divert product resources to market such as different forms of products as stated by (Makhura, 2001) Extension contact makes farmers aware of possible market outlets for their products. As such, farmers with better contacts have a better chance of participating in the markets. Again Zewdie *et al* (2016) found more extension contact result more marketed surplus of wheat in Arsi Zone and also (Nurilefebo, 2016) found direct

relation between market surplus of *bula* and number of extension visit. Therefore, number of extension expected to has direct influence on market participation and sale volume.

Distance from nearest periodic market (Distance): It is a continuous variable and is measured in walking hours which farmers spend time to sale their product to the market and it is expected sign is negative. Efa *et al* (2016) found negative association between marketed surpluses of *teff* and distance from nearest market. Again Makhura (2001) explained that those households located closer to market centers will experience lower costs since they can get information more easily. Similarly, study conducted by Wolday (1994) on food grain market in Alaba Siraro identified that poor access to market and volume of food grain supplied to market related negatively. The variable is expected to influence participation and marketed surplus negatively.

Access to market information (mktinfo): dummy variable, which is expressed as if they have access to market information and zero otherwise. Market information is very important for farmers to supply their produce at the right time and at the right place. Seyoum *et al* (2011) found that access to market information is positively related with market participation and extent of potato market participation. The variable is expected to influence participation and marketed surplus positively.

Lagged market price (Lmp): This is dummy variable. The variable measured in perception of farmers of lagged price (1 if it is high or 0 otherwise). According to Makhura *et al.* (2001) if prices in one year are bad, farmers will often respond by planting less in the next year. This will lead to lower production and higher prices, so encouraging more plantings in the following year and a consequent fall in prices. This cyclical nature of production and prices is quite common. Successful farmers are sometimes those who do the opposite to what is being done by other farmers. Boughton *et al*. (2007) also discussed that local maize prices had a strong positive and significant effect on the probability of market participation as a seller on his study on maize market participation in Mozambique. So the variable is hypothesized to affect participation and level of participation positively.

Total quantity of bread wheat harvested (wheatharvested): It is a continuous variable measured in quintals. It refers to the total production of bread wheat by a farmer in a production year 2018/19. If higher amount of bread wheat is harvested, the more will be supplied to the market. Similarly, Muhammad (2011) and Sultan (2016) found that the quantity of wheat

produced affected marketed surplus positively and also (Ashenafi, 2010) and (Dagmawit, 2016) found direct relation between quantity produced and both participation and level of participation decision, the farmer related to grain and the latter related to maize. Hence, it was expected to affect level of participation positively.

Size of land allocated for wheat crop (landallwheat): The size of land used for wheat production was measured in hectare and it was expected to affect the household participation decision and level of participation positively because, for a household who allocates a large area of land under wheat production, probability of participation and level of participation is higher than a household who allocates less area of land. Mebrahatom (2014) found significant relationship between intensity of *teff* market participation and proportion of land allocated for *teff*. Efa *et al* (2016) have also found positive and significant relationship between extents of *teff* marketed surplus and land allocated for *teff*. Hence, it was expected to affect level of market participation positively.

Total land area owned (Land): It is a continuous variable measured in hectare/timad. It is a total farmland owned by the household. When farmers have more land their production will be higher, thus making it sufficient for market participation since the per unit transaction costs will be lower due to the economies of scale and the more the farmer can produce the more will be marketed. Again, (Haymanot, 2014; Minot *et al*. 2015; Sultan, 2016 and Zewdie *et al,* 2016) found positive relation between land size and supply of wheat so it is expected to have a positive relation with both participation and intensity of bread wheat.

Annual gross farm income (farmincome): It is a continuous variable that refers to total annual income obtained by wheat sale from farm sources and was converted in to natural logarithm to avoid the effect of outliers. According to Getachew (2009), income from farm and off farm activities, are directly related to the amount of marketed surplus of honey. Farm income creates a good production capacity to cover all production costs to wheat produce and thus it was hypothesized that the variable would exhibit positive relation with amount of wheat supplied to market.

Number of oxen owned (Oxen): It is a continuous variable measured by number of oxen owned by the household. Livestock ownership tends to serve as a security for risk of market failure on the one hand, and contributing to productive assets on the other hand (Makhura, 2001). Hasen

(2016) found positive relation between market supply of wheat and oxen size so it is expected to influence market participation positively.

Credit use (credit): dummy variable, which is expressed in the form that whether household gets credit or no during production season. Expected to have positive sign. Access to credit would enhance the financial capacity of the farmer to purchase the necessary inputs. Haymanot (2014) and Muhammad (2011) found direct relation between volume of wheat supply and access to credit but Tura (2015) found an opposite relation between supply of wheat and access to credit. Therefore, it is hypothesized that access to credit would have both positive and negative influence on market participation and volume of sale.

Non-farm income (nonfar): A continuous variable obtained annually in average from non-farming activities by the household head measured in thousand ETB and Expected to have positive or negative sign. As stated by Makhura (2001) access to liquid assets, such as non-farm and pension earnings allows farmers to invest in marketing activities. Tura (2015) found positive influence of non-farm income and bread wheat supply. Again Ashenafi (2010) and Efa *e t al* (2016) found positive relation between volume of sale of grain and non-farm income but a study by (Hasen *et al*, 2016) confirmed that non-farm income has affected the decision of farmers to sell their wheat output negatively. From this context non-farm, income is expected to have positive or negative impact on bread wheat market participation and level of participation decision.

Access to improved Seed (improvedseed): This is a dummy variable taking a value of 1 if the farmer use improved bread wheat seed and 0 were not use improved bread wheat seed. It is believed that improved seed can enhance productivity, which increased surplus. Haymanot (2014) and Tura (2015) found positive relation between seed type and marketed supply of wheat so this variable will be expected to affect the household participation decision positively.

Ownership of communication equipment (Mobile): It is dummy variable. It takes a value of 1 if the household owns mobile or TV or 0 otherwise Ownership of communication equipment can enhance farmers" information access. Again Olowande and Mathenge (2012) found ownership of communication equipment to positively and significantly associate with a greater likelihood of participating in vegetables, fruits and milk markets. They also found positive and significant influence on the amount sold for maize in Kenya so this research expects a positive relation

between ownership of communication asset and market participation decision and level market participation.

Table 5. Description of dependent and independent variables used in probit model

Notation	Variable label	Type	Variable definition and measurement	Expected sign
Dependent				
Mrkpartc	Market participation	Dummy	1, yes 0, no	+
Independent				
Land	Total land owned	Continuous	Hectare	+
Age	Age of household	Continuous	Year	+/-
Sex	Sex of household head	Nominal	1, Male, 0,female	-/+
Education	Education level household head	Categorical	1,illiterate 2, attend primary school 1-8 3, attend high school 9-12 4 , certificate and above	+
Owencom	Ownership of communication equipment	Dummy	1, Yes 0, No	+
Nonfam	Non-farm income	Continuous	Birr	+/-
Frequency	Frequency of extension Visit	Continuous		+
Credit	Credit use	Dummy	1, Yes, 0, No	+/-
Distance	Distance from nearest periodic market	Continuous	Kilometer	-
Oxen	Number of oxen owned	Continuous	TLU	+
Lmp	Lagged market price	Dummy	1, Good, 0, unless	+
Famsize	Family size of household	Continuous	Head count	+/-
Mktinfo	Access to market information	Dummy	1, yes 0, no	+
Improvseed	Access to improved variety	Dummy	1,yes 0.no	+

Table 6. Description of dependent and independent variables used in OLS model

Variable	Description of Variable	Type	Measurement	Excepted Sign
Dependent				
Qsold	Quantity of wheat supplied to the market	Continuous	Quintal	+
independent				
Land	Total land owned	Continuous	Hectare	+
Age	Age of household	Continuous	Year	+/-
Education	Education level household head	Categorical	1,illiterate 2, attend primary school 1-8 3, attend high school 9-12 4 , certificate and above	+
Owencom	Ownership of communication equipment	Dummy	1, Yes 0, No	_
Nonfam	Non-farm income	Continuous	Birr	+/-
Frequency	Frequency of extension Visit	Continuous		_
Credit	Credit use	Dummy	1, Yes, 0, No	+/-
Distance	Distance from nearest periodic market	Continuous	Kilometer	-
Lmp	Lagged market price	Dummy	1, Good, 0, unless	-
Famsize	Family size of household	Continuous	Head count	+/-
Mktinfo	Access to market information	Dummy	1, yes 0, no	+
Wheatharvested	Total quantity of wheat harvested	Continuous	Quintal	+
Landallwheat	Land allocated for wheat product	Continuous	Hectare	+
Farmincome	annual farm income	Continuous	birr	+

Source: Own computation (2020)

4. RESULTS AND DISCUSSIONS

This chapter present the results from various analyses conducted to analyses the performance of wheat marketing in Robe Woreda. First, it summarizes economic and demographic characteristics of smallholder bread wheat producers sampled from the study district. Second, it discusses analyses of structure, conduct and performance of bread wheat marketing. Third, it discuss the empirical results from econometric analysis that was conducted to determine farmers decision to participate in the market and the factors affecting the quantity of bread wheat market supplied. Finally, it described opportunities and constraints faced by bread wheat producers and traders.

4.1. Socio-economic and Demographic Characteristics of Respondents

In order to design an appropriate research and development initiative one needs to understand the basic characteristics of the decision-making unit. Descriptive statistics of the household demographic characteristics, socio-economic and institutional variables which were believed to influence decision-making were assessed and the following results were obtained.

4.1.1. Demographic Characteristics of Wheat Producers

It begins by discussing findings on demographic characteristics such as sex, education level, family size, and age distribution of wheat producer households. The study showed that, out of 156 households in the survey, 73.1% were market participant while the remaining 26.9% were non-participants.

Sex of household head: Gender was analyzed by checking the number of male and female headed households. The sample population of farmer respondents considered during the survey was 156. As shown in Table 6, out of total households head interviewed 60.9% were male-headed households while 39.1% were female headed households. Among market participants, male headed and female-headed households constitute 60.5% and 39.5% respectively. Out of non-participants, 61.9% were male headed while the remaining 38.1% were female-headed households.

Education level of household; Education is important for household's participation in the crop commercialization as literate households are expected to have better skills and information on agricultural production and marketing. This helps them to increase productivity of agriculture

(wheat in this case) which in turn increases their wheat output market participation. The survey result shows that about 16.1% of the sampled household heads were illiterate. However, 58.3% and 20.5% attended primary school and secondary school, respectively, whereas the smallest proportion 5.1% were certificate holders and above. Among market participants, illiterate, primary school, secondary school and certificate holder and above constitute 15.7%, 62.3%, 17.6 and 4.4 respectively. Out of non-participants, 54.7% were illiterate, 45.3% were primary school attended household. Education level plays an immense role in ensuring household access to basic needs such as food, shelter and clothing. Skills and education amplify the working efficiency resulting into more income and food security. Furthermore, education is important to manage the business as well as in decision-making (Kadigi, 2013).

Table 7. Demographic and socio economic characteristics of sample wheat producer

Dummy variable	Total	Participant (73.1%)	Not participant (26.9%)	chi-square
Sex household				0.024
Male	60.9	60.5	61.9	
Female	39.1	39.5	38.1	
Education level				28.49***
Illiterate	26.3	15.7	54.7	
Primary school	57.7	62.3	45.3	
Secondary school	12.8	17.6	_	
Certificate and above	3.2	4.4	_	
Continuous variables	Total	participant	Non participant	T-value
Age of household	43.7	41.4	49.95	63.27***
Family size	4.24	4.07	4.7	21.96***

Source: Own computation (2020)

Age of household head: The survey on this major demographic factor, measured in years, provided a clue on working ages of households. The mean age of the sample household heads was 43.70 years with the minimum and maximum age of 27 and 70 years, respectively. The average age of household headed taken among participants and non-participants was 41.4 and 49.95 respectively. The statistical value of the t-test result (t= 63.27) indicates the existence of significant mean difference between the ages of the wheat market participant and non participant

households at the 1% level of significance implying that, market participants were younger than non-participants.

Family size: The livelihood of rural farm households mainly relies on agriculture, which requires more labor for various activities like land preparation, planting, weeding, cultivation, harvesting, threshing, animal keeping, fetching water and firewood collection and so on. The family size with age composition is important to carry out different agricultural activities. The average family size in the study area was 4.24. The average family size of household headed taken among participants and non-participants was 4.07 and 4.7 respectively. But the statistical analysis result from t-test (t= 21.96) showed that, there was significant mean difference between household size of wheat market participant and non-participant households.

4.1.2. Smallholder wheat producers' access to institutional services and market related issues

Credit use: Likewise, other factors, it is important to understand access to institutional and market access factors in market participation analysis as they proxies the accessibility of production technologies, information, and transaction costs. Survey result shows that, among participant 55.2% of the households had use credit and 44.7% had not use credit because of high interest rate and wheat producer household had depend seasonal because that the household is fear to repay and out non participant 59.5% were credit user and 40.47% were not use non participant.

Distance from market center: Distance from market center where farmers often sale their wheat product influences their market participation. On average, the sampled households are at a distance of about 3.95 kilometers from the nearest market center. Wheat market participant households are at a closer distance from market center. This is because, the longer the distance from market center; the higher the transportation cost in terms of time spent and value gained, which can decrease farmers' market participation. The mean distance from the nearest market for the whole sample was 3.95 kilometers. The mean distance from the nearest market for market participants was 3.8 kilometers while it was 4.3 kilometers for non-participants.

Frequency of extension contact: Extension service provision expected to have direct influence on the production and marketing behavior of the farmers. The higher access to extension service the more likely that farmers adopt new technologies and innovation. To this end, the government

has been attempting to fill the required knowledge and achieve food self-sufficiency in the country. *Kebele* level extension agents are the most important sources of extension services to transfer agricultural technologies and innovations to farmers. The extension advice of the development agents are land preparation, plowing, sowing, weeding, harvesting and post-harvest handling, marketing and others. As presented in Table 7, the mean extension contact provided for wheat producers in the study area was found to be 1.97 and 1.46 for participant and non-participant households respectively. The t-value(22.16) indicate that there is positive and significant difference among participant and non-participant by extension contact that implies participant households more contact with extension agent than non-participant households.

Access to market information: Having market information about season price variation of wheat, demand and supply situation can affect farmers' market participation. Market information refers to the availability of updated and relevant information about supply, demand and current price of the product in the market. The result of the study revealed that, out of the participant household 72.8% had access to market information and only 27.2% of the total household had no access to market information about the current price, demand and supply. On the other hand 35.9% has access to market information and 64.1% has no access to market information from non-participant households. The $\chi 2$ (13.94) indicate that there is positive and significant difference between participant and non-participant households in terms of access to market information.

Lagged price of wheat per quintal: Household's perception on lagged market price of wheat is important in altering marketing decisions of households. It represents the average price of wheat that a farmer received during the period of 2018/19 production year. In this study, out of the total sample, 62.8% of the households perceived as the lagged market price of wheat was high. Among participants, 80.7% of the households perceived as lagged price of wheat was high, while out of non-participants, 14.3% of the households were perceived lagged price of wheat as high. Statistically significant difference was observed between the participants and non-participants in terms of perception on lagged market price of wheat.

Use of improved wheat variety: It is important variable in analyzing smallholder farmers' wheat market performance, as the use of improved variety would enhance wheat productivity, which in turn increases farmers' likelihood of participation in the wheat market. *Danda.a,*

ogolcho, digalu, ejersa, wena and *gadhale* were the major six-wheat variety widely used in the study area. Regarding the utilization, 35.9% of the respondents did not use improved wheat seed during the 2018/19 production seasons. Among participants, 72.8 % of the households were use-improved seed of wheat production, while out of non-participants, 40.8% of the households were not used improved seed of wheat production. The chi-square result (χ2=13.94) also confirmed that, there was a significant percentage difference between market participants and non-participants in applying improved wheat seed at the 1% level of significance (Table 7).

Table 8: Access to Institutional Services and marketed related issue

Variable	Participant	Non participant	Chi-square/T-value
Use of Credit			0.435
Use	67.5	61.9	
Non use	32.5	38.1	
Access to market information			13.94***
Yes	72.8	40.5	
No	27.2	59.5	
Used Improved seed			13.94***
Yes	72.8	40.8	
No	27.2	59.2	
Lagged market price			57.96***
Yes	80.7	14.3	
No	19.3	85.7	
Membership of cooperative			42.72***
Yes	83.3	28.6	
No	16.7	71.4	
Ownership of communication asset			9.04***
Yes	85.9	64.2	
No	14.1	35.8	
Distance from the nearest market	3.8	4.3	26.18***
Frequency of extension contact	1.97	1.46	22.16***

Source: Own computation (2020)

4.1.3. Cash income sources of sampled households

As Table 6 shows, the major cash income sources of sample households in the study area were sale of crops, livestock, and non-farm income. The mean cash income from livestock and its product's was 4260.75 Birr for the pooled sample, with participants having Birr 7260.07, while non-participants had 12,192.92 Birr. There was a statistically significant difference between the

participants and non-participants in terms of cash income from livestock and its product's sale at 1% significance level.

Cash income from all crop sales had the highest mean value of Birr 45,241.83 for the total sample households indicating that crop sale is the major income source of sample households in the study area. Market participants had the mean income from all crop sales of Birr 25,601.75, while non-participants had Birr 10,452.38.

Participation in off-and/non-farm activity: It is an activity from which the households earned cash other than regular agricultural activities. Farmers in the study area were engaged in various off-and/non-farm activities for 2018/19 production seasons. Some of these activities were; sale of local drinks, guard, black-smith, wage-labour, handcraft, and grinding mills. The average non-farm income of household headed taken among participants and non-participants was 1667.54 and 3421.42 respectively. Sale of labor, and petty trade were among non-farm income sources of households. There was a statistically significant difference between the participants and non-participants in terms of annual non-farm income. Income from all crop sales and non-farm activities was significant. While total average cash income was significantly different between the participants and non-participants at 1% significance Level. The total average cash income among sample households was 60669.83. The participants and non-participants had a total average cash income of Birr 67779.64 and Birr 26700.74 respectively.

Table 9: Sources of cash income sources for sampled households

Variable	Participant	Non-participant	Total	T-value
	Mean	Mean	Mean	
Livestock & its product's sale (Birr)	7244.57	12755.92	8198.46	11.81***
Income from all crop sale (Birr)	54181.20	2531.48	45241.83	13.58***
Non-farm income (Birr)	1667.54	3421.42	2139.74	7.06 ***
Total average income	67779.64	26700.74	60669.83	17.65***

Source: Own computation (2020)

4.1.4 Socio economic characteristics of sample wheat producer

Table 7 highlights resource ownership, land allocation, and the production and consumption patterns of wheat producer households in the study area. Physical resources such as land, oxen ownership, and others were among the resources owned by households.

Oxen ownership: In the study area oxen power is the major input in wheat production and all wheat producers' use oxen for cultivation of their land, the average oxen owned by the sample household heads in TLU were 2.21 with the minimum and maximum ownership of 0 and 6 heads. The mean oxen owned in TLU for participant and non-participant was 2.68 and 0.95 respectively. The T-test of variability between the groups showed that there was a statistically significant difference in terms of size of land allocated wheat between participants and non-participants at 1% significance level.

Ownership of communication equipment: Recent studies shows the impact of mobile phones on farmers' marketing decisions (spatial arbitrage, buyer's choice, frequency of selling, and size of transaction) and prices they receive based on household and village level information. To this effect, ownership of mobile phones was used as a proxy for market information. The study showed that, on average, 80.12% of households were owned mobile phones. Out of participants, 85.9% of households were owned mobile phone while 64.3% of households from non-participants owned mobile phone. The chi square test showed that, there was statistically significant proportional difference between participant and non-participant in terms mobile phone ownership at 1% significance level.

Land ownership: On average, size of land allocated for market participants was 1.63ha; while for non-participant was 0.67ha and, for the pooled sample, size of land allocated was 1.34ha. The T-test of variability between the groups showed that there was a statistically significant difference in terms of size of land allocated wheat between participants and non-participants at 1% significance level.

Land allocated for wheat: On average, size of land allocated under wheat for market participants was 0.89ha; while for non-participant was 0.35ha and, for the pooled sample, size of land allocated for wheat was 0.74ha. The T-test of variance between the groups showed that there was a statistically significant difference in terms of size of land allocated wheat between participants and non-participants at 1% significance level.

Total quantity of wheat harvested: Production characteristics of sample households' showed that mean amount of wheat produced by participants was 52.29 quintal, and by non-participants was 16.3quintal. For the total sample households mean amount of wheat produced was 52.29 quintal. There was statistically a significant mean difference in amount of wheat produced between participants and non-participants at 1% significance level. Distribution of output among sample households shows that, on average, 16.04quintal of wheat was consumed at home for all sample households, while average wheat consumption among market participants and non-participants was 15.94quintal and 16.3quintal, respectively. Out of the total production, mean amount of wheat sold was 26.56 kg for the total sample; while for participant and non-participant it was 36.35 quintal and 0, respectively. A significant mean difference was also observed in quantity of wheat sold between the two groups at 1% significance level indicating that, on average market participants sold more quantities of wheat than non- participants.

Table 10. Sample household resource ownership in Robe District

Variable	Participant	Non-participant	Total	T-value/χ2
Land holding size (ha)	1.67	0.67	1.37	20.9***
Land allocated for wheat(ha)	0.89	0.35	0.74	21.64***
Quantity of wheat produced (Qt)	52.29	16.3	42.6	19.58***
Quantity of wheat consumed (Qt)	15.94	16.30	16.04	32.18***
Quantity of wheat sold (Qt)	36.35	-	26.56	13.49***
Oxen owned	2.68	0.95	2.21	18.06***

Source: Own computation (2020)

4.2. Demographic and Socio-economic Characteristics of Sampled Traders

Table 8 summarizes the demographic characteristics of traders in terms of sex, marital status, religion, household size, education level and experience. The survey result indicates that 62.5% of the sample traders were male while 37.5% were female. About 45.8 of traders were Muslims while the remaining 54.2% were Orthodox Christians. With regards to marital status, from total sample traders 75% were married, 4.2 were divorced and 20.8 were widowed. Business experience refers to the number of years that wheat traders engaged in trading activity where their business experience plays crucial role in decision making activity. The survey result indicates that average of experience 14.16 years in wheat trading ranging from 4 to 37 years.

Table 11: Demographic and socio-economic characteristics of sampled traders

Variable	Assembler	Wholesaler	Retailer	Total
Sex of trader				
Male	66.7	100	11.1	62.5
Female	33.3	_	88.9	37.5
Education level				
Illiterate	0	30	16.7	16.7
Primary school	100	50	50	62.5
Secondary school	0	20	16.6	16.7
Certificate and above	0	0	16.7	4.2
Marital status				
Married	33.3	100	66.7	79.17
Single	_	_	_	_
Divorced	66.7	_	33.3	20.83
Widowed	_	_	_	_
Age of trader	34.25	41.1	41.5	40.12
Trading experience	7.25	13.3	9.6	11.08
Family size	4	4.41	4.62	4.41

Source: Own computation (2020)

Socio-economic characteristics include financial assets such as initial capital, working capital, sources of capital and sources of loan. As depicted in Table 11, the average initial capital of the sampled wheat traders was birr 11458.33 ranging of 2000 to 30000 birr. Furthermore, the survey result shows that the average working capital of sample wheat traders was birr 43437.5 ranging from 5000 to 150000 birr in 2020.

Table 12: Financial capital of sampled traders

Variable	Number	Mean	SD	Max	Min
Initial capital	24	12187.5	9242.31	30000	2000
Working capital	24	45062.5	39982.41	150000	5000

Source: Own computation (2020)

As indicated in Table 10, about 41.7% of the sampled traders were using their own capital while about 12.5% use sharing with other. For about 20.8% of traders, the source working capital was by combinations of own, capital and loan. Furthermore, about 37.5 borrowed working capital from bank, and the remaining 8.3% of traders borrowed from friends. This indicates that major source of loan for a trader was bank.

Table 13: Sources of working capitals for sampled

Traders' Source of working capital	Frequency	Percentage
own capital	10	41.7
Banks	9	37.5
MFIs	0	0
Friends/Relatives	2	8.3
Share	3	12.5

Source: Own computation (2020)

4.3. Structure, Conduct and Performance of Wheat Market

4.3.1. Structure of wheat market

In this subsection, the nature of wheat market structure is presented and discussed with respect to the concentration ratio, barriers to entry, degree of market transparency and product differentiation. During the survey, it was confirmed that almost all of the sample producer respondents reported that they produce improved variety of wheat during the survey year.

4.3.1.1. Degree of market concentration

The four-firm market concentration ratio was calculated using the data from the trader's survey. Four firm concentration ratios' refers to the proportion of the marketed volume that controlled by the biggest four firms in a market (Kohls and Uhl, 1985). In these studies, also market concentration was computed from 24 traders selected.

The concentration ratio is expressed in terms of CRx, which stands for the percentage of the market sector controlled by the biggest X firms. The extent of concentration represents the control of an individual firm or group of firms over the buying and selling of the produce. Four firms (CR4) concentration ratio is the most typical concentration ratio for judging the market structure (Kohls and Uhl, 1985). A CR4 of over 50% is generally considered as strong oligopoly; CR4 between 33% and 50% is generally considered a weak oligopoly and a CR4 of less than 33% is not concentrated market. For these study major actors which participate in wheat buying and selling activity was taken for considering market structure. Calculation of the concentration ratio by considering an average volume of wheat handled by largest wholesaler per week in peak production season basing the four firm criteria indicated the existence of Oligopoly Market

power. Four firms control 56.05% of the total amount of wheat sold in market during peak production season at Robe district market. Hence, based on the rule of thumb criteria, a strong Oligopolistic Market structure was observed in Robe markets, it is concluded that wheat market at woreda level is inefficient and non-competitive.

Table 14.Concentration ratio of traders in Robe market

Number of Trader	Cumulative frequency of traders	% shares of traders	Cumulative %of traders	Quantity purchase in Qt	Cumulative quantity of purchase in Qt	% share of purchase	% cumulative purchase
1	1	4.17	4.17	1800	1800	21.3	21.3
1	2	4.17	8.33	1080	2880	12.76	34.06
1	3	4.17	12.5	960	3840	11.35	45.41
1	4	4.17	16.7	900	4740	10.64	56.05
1	5	4.17	20.83	850	5590	10.05	66.1
2	7	8.33	29.17	650	6240	7.7	73.8
3	10	12.5	41.7	450	6690	5.3	79.1
2	12	8.33	50	340	7030	4	83.1
1	13	4.17	54.17	280	7310	3.3	86.4
2	15	8.33	62.5	250	7560	2.95	89.35
2	17	8.33	70.83	245	7805	2.9	92.25
2	19	8.33	79.17	200	8005	2.36	94.61
2	21	8.33	87.5	180	8185	2.12	96.73
2	23	8.33	95.83	150	8335	1.77	98.5
1	24	4.17	100	125	8460	1.5	100

Source: Own computation (2020)

C4= C1+C2+C3+C4=21.3 + 12.76 + 11.35 + 10.64 = 56.05%

4.3.1.2. Degree of market transparency

There is system of dissemination of market information. There is transparent market information among wheat traders in sample markets and farmers. In the sample markets, all traders had information through different sources. Wheat traders in the district markets were obtain information by contacting with traders in Adaama regarding price in the central market. Moreover, information on price in the market is unevenly distributed among all sample traders indicating that they had access to their information. It is the reliability and timeliness of market information that the traders have for marketing decision. Most participants have adequate

information about their competitors regarding to source of supply and buying prices for better decisions in a transparent market. According to Readon and Timmer (2005), it is commonly known that accurate and timely market information enhances market performance by improving the knowledge of buyers and sellers concerning supply and demand. Exclusive access to market information or the control or concentration of information asymmetry and concentration of capital at the disposal of very few traders is important sources of monopoly which affects the nature of horizontal and vertical relations. More balanced knowledge of the markets provides a fair distribution of the gains from efficient market price formation.

There was no organized system to provide reliable market information to all market participants in the study area. About 37.5% were though telephone, 25% were from other trader,12.5% were from friends and neighbor, 12.5% were from TV and radio and 12.5% from broker of wheat .Since sources and means of obtaining information by different categories of traders varied significantly, the timeliness and quality of information obtained depends on the traders' access to market information channels and their individual judgment on the level of supply, demands and prices collected from different sources and in different times. Despite the fact that, media like television and radio play great role in provision of market information in shortest possible time over larger area of coverage. Its effect in addressing grain market information to users is very limited; no traders had accessed mass media as an information source. But they still complained that, market information is one of the major problems they faced in trading wheat in the study area, their buyers are located in far areas and even tell them lower price below they decided during transaction.

Table 15: Source of market information

Source of information	Percentage
Though telephone	37.5
From other traders	25
From friends and neighbor	12.5
From TV and radio	12.5

Source: Own computation, (2020)

4.3.1.3. Barriers to Entry

License: It is obvious that in many business activities business license is a major barrier to enter in the market. As a rule, a trader who has license in one business is not allowed to perform any

other businesses other than the business for which he/she is licensed. However, this was not the case as most of the traders operating in the study area had no specific cereal trade license. About 75% of the sample trader respondents were licensed in grain trading while 25% of the traders had no licenses most of them are rural assembler and wholesaler in the study area. The assessment implied that, absence of trading license for wheat trading activities had not restrict traders to enter in wheat trading businesses in the study area. Therefore, license is not a barrier to entry into wheat trade business. Even though, theoretically it is compulsory to have license to enter in to the grain market, the simplicity to have grain license and absence of strong restriction to enter into the grain market with respect to licensing made grain marketing relatively free to enter. Thus, entry in to wheat trading is easy.

Road: Core competency of Robe bread wheat producers were good climate for bread wheat production and proximity (relatively) to urban market (Balee, Shashemene, Adama, and Addis Ababa) where bread wheat consumption is high (Minot *et al.*, 2015). Nevertheless poor road quality was identifies as an entry barrier by 30% of rural assemblers.

Capital: Capital is the basis for thinking a business venture in any aspects. 41.7, 37.5 and 20.8% of sample trader respondents were using their own capital, loan, and both loan and own in the study area, respectively. The collateral asked by moneylenders like banks and micro financial institutions (MFI) make the system complex and boring. Thus, access to capital was one of the major factors discouraging entry into grain trading in the study area.

Lack of trading experience: trading experience of sample traders range from 4 to 20 years with an average experience of 11.08 years. The presence of wider range of years of experience among traders indicates that experience is not a barrier to enter into grain market. And also, it is not barriers to exit because a new entrant and long lasting traders will have the same buying potential, citrus paribus.

Product differentiation: According to the response obtained during discussion, traders in the study area classified wheat into bread wheat and durum wheat and pay different prices. They used variety to classify wheat in to bread and durum wheat. According to traders response durum wheat was directly supplied to pasta and macoroni processing factory. Additionally traders consider quality of seed (size), cleanness and season of production to afford different price for

suppliers. Respondent farmers also approved that different price was paid based on variety difference; quality of product supplied and season of production.

4.3.2. Wheat market conduct

Market conduct is the way firms or individual traders behave in order to influence or adjust to the market they are operating. In this report, conduct of the wheat market is analyzed in terms of traders and producers' behavior in the market.

4.3.2.1. *Traders' market conduct*

The survey result indicated that the transactions made on wheat marketing of the study area takes place with direct contact between sellers and buyers. There were no observed operational brokers in the wheat-marketing channel during the survey period. Report shows that the traders purchase 100 percent of wheat from producers without involvement of brokers. There is no contractual agreement between traders and suppliers of wheat. As survey, result indicates that 100 percent of traders were not made agreement between them and suppliers of wheat. The method of price formation is critically importance for traders and producers. About 50% of the sampled traders set purchasing and selling price by negotiation, 20.8% of sample traders reported that they set price by colluding with other traders, 12.5% of sample traders set price by trade industry office and 16.7% of the traders set price themselves.

Farmers took their produce to the market in large amount following the harvest season. This also shaped the way traders behave, during the harvest season they set the prices by themselves. The supply of wheat available in the market following harvest season; in the wheat market to increase their benefit from the agricultural marketing traders set the prices as they want. At the harvest time producers are price takers, they sale their wheat at the price given to them. Most of the respondents from the producers' side and a market extension expert from the agriculture office informed that at harvesting time traders offered low prices for agricultural commodities because of bulk wheat commodity mobilized to the market.

Traders in the study areas respond to changes in local supply and demand in deciding where to buy and sell wheat. Wholesalers sell wheat to processors and cooperative out of the district. About 29.2% of traders had contractual agreement with their buyers before sale of the product to

them. Their agreement was based on wheat market price. Traders' used different criteria to choose their suppliers and clients. According survey result 82.2% and 27.8% of traders provided better price relatively as compared to other trader and fair scaling (weight) respectively in order to attract more customers to them. This suggests that, though profits maximization is objective of traders' in social networks play an important role to traders to have more customers. About 87% of the sample traders claimed that prices of wheat in 2018/19 production season increased compared to the previous year. Contrary to these supply decreased while demand for wheat increased due to shortage of rainfall all over in the country. Since there was an increase in price of stable food, the demand for wheat came from other areas in to the district market too.

Table 16. Price setting strategies

Price setting strategy	Percent
Negotiation	50
colluding with other traders	20.8
trade industry office	12.5
the traders set price	16.7

Source: Own computation (2020)

4.3.2.2. Producers market conduct

Wheat is the most important stable food among the cereal crops in Robe district. The suppliers sold their product to traders they want. As survey, result indicates 82.7% of households generated their cash income by selling crops. Out of these, 73.1% of households supplied wheat to the market in the production year. During the survey 7.7% of households supplied wheat to the market mainly from November to December, which is during the harvesting time. According to survey, report indicates about 49.4%, 34%, and 9% of yearly sale of wheat was made after one months, after two months, and after twelve months of storage respectively.

As report indicates that strong farmers store wheat for 12 months until there is scarcity of wheat in the market. About 79.5% of sample households reported that selling price of wheat set by the buyer these indicate that the farmers have no power in decision of price especially at harvesting season due to much wheat supplied to the market at these time. While remaining 20.5% of households set the price by negotiation with buyers. The term of the sale was on cash basis. About 26.9% of households were not supplied wheat to the market in 2018/19 production year due to low production of wheat in the year. They use only for home consumption and seed

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purpose. Instead, they supplied other cereals like barely and pulses crops. According to sample, households reported that, for the last three years, price of wheat showing an increasing trend. One of the reasons for the increase in price was mainly due to an increase in demand of wheat increase from customers and processing factors occur in. As well as government import of wheat from abroad was not enough to stabilize market. Drought in the country also resulted in an increase in price of wheat in production season of 2018/19.

Table 17. Method of price setting

Price setting strategy	Percent
Negotiation with buyer	20.5
By buyer	79.5

Source: Own computation (2020)

4.3.3. Wheat market performance

This section deals with production costs and profitability of wheat to know costs associated with production and marketing at producers' level per hectare (Table 17). Average costs producers incurred were used in the calculation. Ramakumar (2001) suggested four parameters that are volume handled, producers share, total marketing margin, and rate of return to measure efficiency of market channel. In this study, marketing performance of wheat was analyzed by estimating the marketing margin considering associated marketing costs. Wheat market performance was evaluated based on the level of marketing margins by taking into consideration associated marketing costs for key marketing channels. Therefore, based on the 2019/20 production year of sampled households in Robe district, wheat-marketing margins were analyzed based on cost and the average sale price of different marketing agents in the marketing channels of producers, rural assembler, wholesalers and retailers.

4.3.3.1. Costs and profitability of wheat production

Method employed for the analysis of wheat market performance was marketing margins by taking into account associated marketing costs for key marketing channels. Hence, on the consideration of 2019/20 production year, costs and purchase price of channel actors, margin at farmers, assemblers, wholesaler's, retailer's, cooperatives and processors level was conducted. This section focused on activities and associated costs in producing wheat at farm household level. This is to know costs associated with wheat production and marketing at farmers' level.

This provides an insight about the performance of wheat market. Land rent takes the lion share among the producers' total cost followed by harvesting and inputs costs per hectare. These is due to land rent was expensive in the area farmers who want additional land for wheat production incur more cost. The second highest cost the farmers incur was for harvesting because farmers in the area use machine for harvesting wheat. The average profit farmers obtained per hectare was 29,512.37Birr per hectare and the cost they incurred per quintal was 419.05Birr per quintal. The average yield reported in the study area during survey year was 40 quintals per hectare.

Table 18. Marketing costs of wheat producer actors (Birr/Qt)

Input	Production cost in birr(qt)	Percentage
Seeding cost	32.09	7.7
Land preparation	24.07	5.8
plowing	4.06	1
labor	19.39	4.74
DAP cost	34.34	8.32
UREA cost	29.18	7.1
Weeding cost	18.11	4.4
Harvesting cost	94.83	23
Material cost	10.5	2.6
Storage cost	0.9	0.24
Tax cost	8.64	2.1
Land rent	135.94	33
Total production cost in birr/qt	419.05	100
Total price of wheat production one quintal/birr	1150	
Profit/qt		730.95

Source: Own computation (2020)

Producers obtained average profit of 730.95 Birr per quintal in 2019/20 cropping year from wheat production. The total average cost they incurred per quintal was 419.05 Birr per quintal (Table 17).

4.3.3.2. Wheat marketing cost

Different marketing cost when wheat product is passed from one actor to the other is given. The cost of transport is high since it travels long distance to reach the place of exchange. Among the actors of wheat market performance in the study area, the transportation cost of wholesalers is very high as compared to other actors since sometimes they sold to the Adama wholesaler. Table 16 shows that, producers had 397.8 total cost per quintals. As the product passed from one stage

to the next, the value is added at each stage. The cost of assembler, wholesalers and retailers was calculated based on information obtained from each of the actors. Next to farmers, wholesalers who purchase from farmers, collectors and cooperatives incurred high cost as compared to other actors. Wholesalers incur high cost next to farmers which is 397.8birr.

Table 19: Analysis of profitability of wheat traders (Br/Q)

Lists of average costs	Assemblers	Wholesalers	Retailers	Total
Purchase price	1150	1170	1200	1173.33
Sack price	12	10.6	12.66	11.75
Loading and unloading	-	20	16	18
Transportation	40	60	50	50
Packing cost	-	10	5	7.5
Storage and other losses	-	10	5	7.5
Market search costs	5	7	4.16	5.38
Other costs	-	20	13.33	16 .66
Total cost	57	137.6	106.15	100.25
Selling price	1235	1420	1350	1335
Gross margin= sp-pp	85	250	150	161.66
Net profit/ loss = gm-tc	28	112.4	43.85	61.42

Source: Own computation (2020)

4.3.3.3. Marketing channel of wheat producers

Marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination. It starts with growers and end on consumers (Khushk *et al*., 2004; Rahim *et al*., 2007). Furthermore, the analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination of consumers. In the study area, farmers supplied their wheat products to different market channels, which pay a reasonable price within the same production year. There are farmers who sell their produce through all channels (multiple channels) among eleven channels (wholesalers, retailers, collectors, cooperatives, processor and consumers) for wheat marketing in the study area. Upon harvesting their products, the farmers sell their product to assembler, cooperatives, retailers, wholesalers, processor and consumers, but the quantity they sell to these channels varied from farmers to farmers.

In fact, there were many channels where households could sell wheat products; some of the channels were not substantial. Eleven marketing channel was identified based on their market share in the study area. The total amount of wheat products that produced by the sampled households during survey year was 6587.5 quintals and from the total quintals produced by sampled households 3767 quintals supplied to the market from *habee, balakasa gadoo, masaranje tamama and maranje abu*. These amounts of quintals on four *Kebeles* were sold through the following eleven channels. The survey result obtained revealed that eleven marketing channels of wheat identified.' It passed through different channels in the way to reach the ultimate users. As listed in figure 3, the main receivers of wheat from the farmers were wholesalers and assemblers who received 53.2% and 23.7% percent respectively. retailers, Processor, cooperatives and consumers received 7.7%, 7.1%, 5.8% and 2.6% amount of total wheat supplied by sampled smallholder farmer in the district respectively. Computation among the market actors was based on the volume of wheat flown in the marketing channels. Accordingly, the producer- wholesaler-processors -consumers channel carries the larger volume of wheat. The identified eleven different wheat-marketing channels are listed below as follows.

Channel I producers → Assemblers → Wholesalers → Retailers → Consumer (446.4 qts) (11.9%)

Channel II Producers → Assembler's → Retailers → Processors → Consumer (335.63 qts) (8.9%)

Channel III Producers → Assemblers → Consumer (110.8qts) (2.9%)

Channel IV Producers → Wholesalers → Cooperatives → Consumer (750qts) (19.9%)

Channel V Producers → Wholesalers → Processors → Consumer (999.4 qts) (26.6%)

Channel VI Producers → Wholesalers → Retailors → Consumer (250 qts) (6.7%)

Channel VII Producers → Retailers → Processors → Consumer (72qts) (1.9%)

Channel VIII Producers' → Retailers' → Consumer (218.1 qts) (5.8%)

Channel IX Producers → Cooperatives → Processors → Consumer (219qts) (5.8%)

Channel X Producers → Processors → Consumer (268 qts) (7.1%)

Channel XI Producers → Consumers (98qts) (2.6%)

Figure 3: wheat market channel

Table 20: Gross marketing margins and gross profits of actors

Actor	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Producer											
Selling price	1175	1175	1175	1150	1150	1150	1250	1225	1100	1250	1125
GMMp	91.27	67.03	93.6	88.2	65.47	92	73.53	96.5	97.35	73.53	100
Rural assembler											
Purchasing price	1180	1170	1175	_	_	_	_	_	_	_	_
Selling price	1265	1250	1260	_	_	_	_	_	_	_	_
GMMra	6.7	6.4	6.74	_	_	_	_	_	_	_	_
Wholesaler											
Purchasing price	1265	_	_	1150	1150	1150	_	_	_	_	_
Selling price	1285.25			1250	1255	1250	_	_	_	_	_
GMMw	1.57	_	_	8	8.36	8	_	_	_	_	_
Retailer											
Purchasing price	1285.25	1250	_	_	_	_	_	1225	_	_	_
Selling price	1291.25	1256	_	_	_	_	_	1270	_	_	_
GMMr	0.46	0.47	_	_	_	_	_	3.5	_	_	_
Processor											
Purchasing price	_	1256	_	_	1255	_	1250	_	_	1250	_
Selling price	_	1700	_	_	1700	_	1700	_	_	1700	_
GMMp	_	26.1	_	_	26.17	_	26.47	_	_	26.47	_
Cooperative											
Purchasing price	_	_	_	1250	_	_	_	_	1100	_	_
Selling price	_	_	_	1300	_	_	_	_	1130	_	_
GMMc	_	_	_	3.8	_	_	_	_	2.65	_	_
Consumer											
Purchasing price	1291.25	1256	1175	1250	1255	1150	1250	1225	1100	1250	1125
TGMM	8.73	32.97	6.4	11.83	34.53	8	26.47	3.5	2.65	26.47	_

TGMM, GMMp, GMMra, GMMw, GMMr , GMMp and GMMc representing gross marketing margin of total, producers, rural assembler, wholesalers, retailer, processor and cooperative respectively.

Marketing margin was employed to analyze the performance of market channels. So, to evaluate the performance of wheat marketing, it is important to consider market related marketing margin and share of producers as well as intermediary from consumer price of products. Table 19 clearly depicts the cost and benefit for the main actors in those eleven major channels: producers, rural assembler, wholesalers, cooperative, processor and retailers were engaged in wheat marketing. The result shows that wheat producers' gross profit was high in channel VIII when farmers sell to retailer, and channel IX when they sell to cooperatives and farmers captured small profit in channel V when they direct sell to wholesalers. The producers' market share was high in channel IX and VIII which is 97.35% and 96.5% when they direct sell to cooperative and retailer because

of the involvement of few intermediaries. So, producer's market share is high in channel IX. From traders, Wholesalers got the highest gross profit margin in channel V when directly sells to processor. Next to wholesalers, assembler gain the highest gross profit in channel II when direct sell to retailers. This implies wholesalers obtained the highest gross profit in the study area.

4.4. Econometrics Analysis.

Heckman econometric model assume an independent relation between error of first decision (participation) and error of second decision (level of participation) so (rho) must be different from zero and (rho) was 0.32 in the study. The model chi-square test applying appropriate degrees of freedom indicate that the overall goodness of fit for the Heckman selection model is statistically significant at the probability of less than 1%. Based on the pseudo R^2 (77.61 %), the model shows a good fit to the data. In addition, multicollinearity test, which is a common problem of cross-sectional data, was also checked. Multicollinearity test indicates whether there is linear relation between explanatory variables or not. To check the problem, VIF and CC were used for continuous and dummy variables, respectively. As shown in Appendix Table 1 and 2, there was no serious problem of multicollinearity test. The test indicated that, the largest VIFs value is 4.35 and that of CC is 0.6357, which are below the maximum value of 10 and 0.75 respectively as the rule of thumb for the presence of multicollinearity test.

Hence, multicollinearity, heteroscedasticity and endogeneity detection test were performed using appropriate test statistics. Endogeneity test results show that there is no endogeneity problem for wheat (F=0.48(p=0.44) (Appendix Table 3). To analyze the determinants influencing market participation of wheat producers in Robe district, a Probit model was estimated in the first step of the Heckman selection equation. In the second stage, regression (OLS) was fitted along with the probit estimate of the Inverse Mill's ratio to identify determinants that affect the volume of marketed supply of wheat. Results of first-stage probit model estimation of the determinants of the probabilities of the households to participate in wheat market are given in Table 20. About six variables (age, frequency of extension contacts, lagged price, number of oxen owned, family size and distance from the nearest market) were found to significantly influence farmers' decision to participate in wheat market.

Frequency of extension contact: As expected, this variable had a positive relationship with household bread wheat market participation decision and it was found to be statistically significant at 1% significance level. The marginal effect of the variable also confirms that a one unit increase in the number of formal extension contact leads to the rise of the probability of bread wheat farm households" market participation by almost 0.2% keeping all other factors constant. Farmers need training conserving to production like what to sell when and they are awarded on what varieties are newly arrived and son. This indicates that frequent contact with extension agents improves ways of production that enhances production in turn their likelihood of market participation increased. Generally, they get up to date information on agricultural technologies like improved varieties, recommended uses of fertilizer, pesticides etc. therefore increase market participation of wheat. It enhances farmer"s participation by supporting household through building capacity. This result is inline with Zewdie *et al*. (2016) and Fekadu (2017) found the same relation in wheat.

Age of the household head: The model result depicts that the age of the household head had a negative impact on bread wheat market participation decision and it was significant at 1% significance level. The marginal effect of 0.0022 implies each additional age of household resulted in decrease in probability of participation by 0.22% keeping all other factors constant. This could be from the fact that older heads have low enthusiastic to participate in market due to limited access to information whereas younger heads sell a relatively large portion of their product due to better access to market environment and information. The result is inline with the reports of Arega *et al*. (2007), Fekadu *et al* (2017), Chalwe (2011), Geoffrey *et al.* (2014) that indicated market participation declines with age, justifying that the characteristics of older farmers as risk aversion and reluctance to adopt technology and hence inability to produce for the market compared to younger farmers.

Family size (Adult equivalent): Family size as expected had a negative and significant effect on the wheat market participation decision significant at 10% significance level. The marginal effects of this variable indicate that a one member increase in adult equivalent in the family decreased the probability of wheat producers' market participation by 0.45% keeping all other factors constant. The negative and significant relationship indicates that households with more number of family members supply less amount of wheat to the market than those households

with relatively less family members because of the increase in consumption at home. This implies that most of the family members are consumers than being workers; or their contribution as a labor is less than being consumers. This result is in lined with Efa *et al (*2016) and Nigus *et al* (2018) show that family size decreases the likelihood of *teff* market participation by 2% and 12% respectively.

Distance from nearest market: As expected, this variable had a negative relationship with household bread wheat market participation decision and it was found to be statistically significant at 10% significance level. The marginal effect of the variable also confirms that an additional walking minute to nearest periodic market leads to the fall of the probability of bread wheat farm households" market participation by almost 0.6% keeping all other factors constant. This may be due to adverse impact of increased transportation cost on cereal market participation. This result is in lined with Tariku (2018) and Fekadu (2017) found the same relation in grain market participation. The latter found such relation in bread wheat specifically.

Lagged price of wheat: Households' perception on lagged market price of wheat affected probability of market participation positively and statistically significant at 10% significance level. Perception of the households on lagged wheat price is important in altering production and marketing decision of households. This is because; households form their expectations based on the lagged price of wheat and allocates available resources according to their expectations. Average marginal effect of this variable on probability of market participation shows that, as compared to households with low perception on lagged market price of wheat, probability of market participation for households with high perception on lagged market price of wheat increases by 3.67% keeping other all factors constant. The finding was in line with priori expectation. This study is in line with Tariku (2018) that states as the higher the lagged price of wheat they perceive, the more quantity of wheat they produce and the higher the probability they participate in market as seller.

Number of Oxen owned: As expected, this variable had a positive relationship with household bread wheat market participation decision and it was found to be statistically significant at 10% significance level. The marginal effect of the variable also confirms that a one unit increase in the number of oxen leads to the rise of the probability of bread wheat farm households" market participation by almost 0.91 % keeping all other factors constant. Owning a good number of

oxen could prepare their land in time and do plant in time as well. Being a power for plowing, wheat supply would increase as farmers increased their number of oxen ownership. The expected influence is positive on supply to market. As hypothesized number of oxen has a positive and significant relationship with marketed participation decision of wheat. This study is line with Hasen (2016) found positive relation between market supply of wheat and oxen size so it is expected to influence market participation decision.

Table 21: Factors influencing farmers' market participation decision

Variable	Coefficient	p-value	Marginal effect
Sex	- 0.0385	0.946	-0.0008
Age	- 0.0980 ***	0.005	- 0.0022
Family size	- 0.1933*	0.056	- 0.0045
Education level	0.5902	0.146	0.0138
Total Land size	0.7601	0.108	0.0177
Number of oxen owned	0.3910*	0.079	0.0091
Lagged market price	0.9990*	0.091	0.0367
Market information	0.5187	0.364	0.0159
Communication equipment	0 .4089	0.466	0.0131
Credit	-5.9086	0.986	-0.5769
Non-farm income	0.00002	0.696	- 5.70e-07
Market distance	-0.2697*	0.076	-0.0063
Frequency of Extension Contact	0.7187***	0.010	0.0168
Improved seed	0.984	6.8887	0.9790
Constant	1.8677	0.348	_

No of observation   156
Pseudo   R2 0.7761
Walldx^2(14),Pr>χ 141.04***
Log likelihood -20.3472 Predicted probabilities 0.9913

Note: "***", "*", shows the significance level of variables at 1% and 10% respectively. The dependent variable (market participation) is a binary variable that takes the value 1 if the household head had participated in wheat market, 0 otherwise.

A second step of the Heckman selection (two steps) or OLS indicates four variables out of 14 explain the volume of bread wheat supplied to market. Accordingly, quantity of bread wheat harvested, farm income, land allocated for wheat and total land size of household found positively and significantly affects the level of market participation.

Quantity of bread wheat harvested: As expected, this variable had a positive relationship with household bread wheat volume of market participation and it was found to be statistically significant at 1% significance level. As expected, this variable has a positive effect on bread wheat quantity sold per household per year in the production year of 2019/20 because it is statistically significant at 1% significance level. The model output predicts that the addition of one quintal produced causes the marketed surplus of bread wheat of farmer household to rise by 0.50 quintal per year. This result suggests that marketed bread wheat surplus of the household in the study areas are more responsive to amount of bread wheat produced. Farmers with more bread wheat output are usually market oriented since the higher production levels enable them to sell the surplus produce. This result was in confirmation with the study by Muhammad (2011) and Sultan (2016) who studied similar commodity.

Farm income: As expected, this variable has a positive effect on bread wheat quantity sold per household per year in the production year of 2019/20 because it is statistically significant at 1%. It was statistically at 1% probability level and the positive relation may be due to farm income creates a good production capacity to cover all production costs and thus it was hypothesized that the variable would exhibit positive relations with amount of wheat supplied to the market. The model output predicts that the addition of a thousand farm income causes the marketed surplus of bread wheat of farmer household to rise by 0.04quintal. This study is in line with Getachew (2009), income from farm, are directly related to the amount of marketed surplus of wheat.

Land allocated for wheat production: As explained in the OLS model result of land allotted for wheat production, the more land allotted for wheat results in more production and they decided to participate in the market; this in turn increases the amount of wheat flow to the market, citrus paribus. The result of OLS model indicates that as land allocated for wheat production increases by one hectare, wheat supplied to the market increased by 11.05 quintal. Tigist (2015) suggests that in a scarce land access areas and high population pressure the hypothesis of induced innovation such as land use intensification policy of yield increasing agricultural inputs per unit of land enables smallholders to produce marketable surplus crops. Haymanot (2014), Fekadu (2017), and Tariku (2018) found that expanding the area under durum wheat and bread wheat and crop increased the market supply, respectively.

Total Land size owned: Total land owned measured in hectare affects the intensity of wheat marketed surplus at 1% significance level. The model output predicts that a one unit increase in a total land ownership by farmers causes the marketed surplus of bread wheat to rise by 1.84 quintal. When farmers have more land their production will be higher, thus making it sufficient for market participation since the per unit transaction costs will be lower due to the economies of scale and the more the farmer can produce the more will be marketed. This study is in line with the finding of Haymanot (2014); Minot (2015); Sultan (2016) and Zewdie *et al, (*2016) found positive relation between land size and supply of wheat so it is expected to have a positive and significant relation with intensity of bread wheat.

Table 22: Factors affecting level of wheat market participation

Variable	Coefficient	p-value
Credit	-1.0469	0.159
Age	0.0114	0.849
Family size	-0.0579	0.715
Education level	0.0094	0.987
Total land owned	1.8421***	0.004
Wheat product harvested	0.5094***	0.000
Lagged market price	-0.7676	0.513
Access to market information	- 0.3202	0.761
Ownership communication equipment	-0.8903	0.408
Land allocated for wheat production	11.0598***	0.000
Non-farm income	0.00002	0.696
Market distance	0.3274	0.118
Frequency of extension contact	-0.3627	0.330
Farm income	0.0004***	0.001
Constant	-15.3796***	0.000
Lambda	7.1666*	0.079
Sigma	7.7768	
No of observation	156	
Censored obs	42	
uncensored 0bs	114	
Wald $\chi 2$ (14), = 3274.24***		
Prob >chi^2 = 0.00000		

Note: "*", and "***", shows the significance level of variables at 10 and 1%

4.5 Wheat Production and Marketing Challenges and Opportunities in the Study Area

4.5.1 Wheat production challenges in the study area

About 72.4% of the households reported that lack of improved wheat seed as a serious problem for wheat production in the study area (table 22). Statistical abstract of the district by RDAR (2019) also confirm that distribution of improved wheat was not made in the district. Wheat disease is another major problem in the study area, according to the percentage response of the households (53.8%). They complain that, stem rust (locally known as *Wagi*) in particular, destroying their wheat on farm thereby contributing to lower harvest.

Another binding constraint in production and marketing of wheat in the study area reported by sample households is high input cost. About 75.6% of the households reported that they are suffering from high input cost. Volatility in market prices of fertilizer, seed and labor highly discouraging producers from wheat production. A relatively low market price of wheat was also among production and marketing problems reported by about 49.33% of the households. Poor road infrastructure, inadequate means of transportation, and weather change were also identified as constraints in wheat production and marketing in the study area by 53.2%, 41%, and 57.7% sampled respondents respectively.

According to respondents, poorly developed road infrastructure in the area made them face difficulty in transporting their output and incur significant transportation cost, shortage land. In this regard, a study by Firdisa (2016) also shows that poor infrastructure being one of the major problems of crop production of rural areas. The wheat producer household was asked to rank constraints regarding wheat production in order of importance. Based on the computed index of production the major constraints were high price of input, shortage of improved seed, shortage of land, crop disease, poor infrastructure facility, inadequate transportation service and market linkage problem were ranked from $1st\ up\ to7th\ (Table\ 22)$. Production constraints were ranked using preference ranking methods.

Table 23: Major production challenge identified in the study area

Production challenge	Frequency				Rank	Rank index ratio
	Part		Non-part			
	Yes	No	Yes	No		
High price of input	76	38	42	0	1st	0.442
Shortage of improved seed	71	43	42	0	2nd	0.374
Shortage of land	50	64	40	2	3rd	0.194
Poor road infrastructure	34	70	39	3	4th	0.125
Inadequate transportation service	27	87	37	5	5th	0.099
Market Linkage problem	29	85	29	13	6th	0.084
Crop disease	14	100	35	7	7th	0.065

Source: Own computation (2020).

4.5.2. Challenges of wheat marketing

Wheat traders were asked to rank constraints regarding wheat marketing in order of importance. Based on the computed index of marketing constraints were: Fluctuation of price, Lack of credit, lack of capital, unfair price, lack of Transportation facility, shortage of supply, quality problem, lack of demand, lack of storage, unfair competition and lack of market information were ranked from $1st\ up\ to\ 7th$ ($Table$ 23) Marketing constraints were ranked using preference ranking methods.

Fluctuation of price: In the study area the price of wheat is fluctuated from time to time. Price fluctuation ranked as the first constraint by the wheat trader. During the harvesting time the price was very low because all farmers supply the product to the market to repay the money they borrowed from MFI and other. So, fluctuation is one of the major market constraints in the study area. The result suggested that 58.3% of the sampled households faced this problem.

Lack of transportation facility: According to the survey result, 37.5% of the sample respondents reported that lack of transportation facility was one the bottleneck in wheat market supply. Lacks of road, lack of transporting animals, long distance from the market are the main obstacles for farmers. Traders also reported shortage of wheat supply (37.5%), lack of storage facility (25%), lack of demand (33.3%), competition with licensed traders (10.2%), and farmers' reluctance to sell (66.6%) as additional constraints to wheat marketing. Table 23 shows traders' perceived constraints to grain marketing in the study area. In general, many of these constraints

confirm the results on the structure and conduct of the wheat market. Overall, 41.7% percent of traders stated that capital shortage is the greatest constraint to grain marketing. High amount of initial working capital was required to compute with the licensed and unlicensed traders and with the cooperatives. About 45.8% of the traders reported that shortage of financial credit was another limiting factor in operational and business expansion. The main reason given for not taking bank credit was the lack of collateral to be eligible for bank loans. The loan given by microfinance (OCSSO) was also very little for grain trading. From the total traders 20.8% of them reported that the competition with un-licensed traders as a major problem. Although the law requires traders to acquire a license in order to engage in grain trading, licensed traders allege that this is not well enforced, which provides an unlevel playing field in grain trading. As these unlicensed traders do not pay sales tax, profit tax, etc., the licensed traders is at a disadvantage.

Table 24: marketing constraints identified in the study area

Marketing challenge	Frequency								Rank	Rank index ratio
	Assembler		Wholesaler		Retailer		Cooperative			
	Yes	No	yes	No	Yes	No	Yes	No		
Fluctuation of price	3	1	6	4	3	3	2	2	1st	0.127
Lack of capital	3	1	3	7	4	2	0	4	2nd	0.065
Unfair price	1	3	5	5	3	3	1	3	2nd	0.065
Lack of storage	2	2	5	5	3	3	0	4	2nd	0.065
Shortage of supply	1	3	3	7	3	3	2	2	3rd	0.054
Quality problem	2	2	3	7	1	5	2	2	4th	0.045
Lack of demand	1	3	4	6	2	4	1	3	4th	0.045
Lack of credit	0	4	0	10	5	1	2	2	5nd	0.037
Lack of information	2	2	3	7	1	5	0	4	6th	0.03
Unfair competition	1	3	2	8	1	5	1	3	7th	0.023
Lack of transport facility	0	4	3	7	2	4	0	4	7th	0.023

Source: Own computation (2020).

4.5.3 Opportunities of wheat production and marketing in the study area

Among the major opportunities that prevailed in wheat production and marketing were the increased trends in wheat demand as a result of increased in the population trend. Also,

diversification of consumable products from wheat grain such as spaghetti, bread, macaroni and flour increased the demand for wheat production and marketing. Experience and neighborhood effect are much important in technology adoption. The start of row planting and improved wheat seed were to due attention. The natural advantage of good soil fertility and good agro ecological situation which increase the production and productivity of wheat was also among others. The existence of a good policy framework in agricultural development and manifested by deploying development agents and cooperative experts at each *kebeles*, and infrastructural development could facilitate cereal production and marketing. The increasing use of mobile telephone was also the other infrastructural advantages to improve the marketing system. Improved wheat seed which was produced by the model farmers can reduce the seed marketing cost. Cooperatives are nearest to the farmer's residence, which decreases the marketing costs of inputs. There is also availability of access to credit even at the *kebele* level. The study area agro-ecology is very comfortable for the production of wheat, soil type, timely availability of rain creates good opportunities for the production of wheat in the study area. The farmers of the study area have the large year of experience in production of wheat. Through experience, they grasp much information from their day-to-day agricultural activities, which used to boost their production and productivity of wheat was also among opportunities for farmers in the study area. Wheat production and marketing were asked to rank opportunities regarding wheat marketing in order of importance. Based on the computed index of marketing opportunities were: increment of demand, expansion of food industry and expansion of technology and based on the computed index of wheat production opportunities were: storage management, subsidize distribution of seed and subsidize distribution of fertilizer were ranked from $1st\ up\ to\ 3th\ (Table\ 24)$ wheat production and marketing opportunities were ranked using preference ranking methods.

Table 25: wheat marketing and production opportunities identified in the study area

Opportunities	Frequency								Rank	Rank index Ratio
	Assembler		Wholesaler		Retailer		Cooperative			
	Yes	No	Yes	No	Yes	No	Yes	No		
Increment of the demand	0	4	9	1	5	1	4	0	1st	1
expansion of establishment of food processing plant	2	2	6	4	4	2	1	3	2nd	0.39
provision of infrastructure facilities like telecommunication, power supply and financial institutions	2	2	3	7	5	1	2	2	3rd	0.33

Opportunities wheat production	Frequency				Rank	Rank index ratio
	Part		Non-part			
	Yes	No	Yes	No		
Storage management	95	34	11	16	1st	0.705
Subsidized distribution of seed	89	40	10	17	2nd	0.577
Subsidized distribution of Fertilizers	77	52	9	18	3rd	0.41

Source: Own computation (2020).

5. SUMMARY, CONCLUSSIONS AND RECOMMENDATIONS

5.1. Summary

The study was focused on analysis of wheat marketing performance in Robe Woreda, Arsi Zone Oromia Regional State, Ethiopia. The specific objectives include to analyze structure- conduct-performance wheat marketing, estimating the marketing margin of wheat market actors, identifying factor affecting of the wheat market participation decision and level of participation, and identifying the constraints and opportunities of wheat marketing and production in the study area. The data were generated from both primary and secondary sources. The primary data were collected from individual interview using pre-tested structured questionnaire and key informant interview. Primary data were collected from 156 sampled households, and 24 sampled traders. Secondary data was collected from CSA, agricultural office of the *Woreda*, the *Woreda*s office of trade and industries and DAs at *Kebeles* level. The analysis was undertaken by descriptive, gross margin and econometric analysis using appropriate software, SPSS and STATA. The marketing performance analysis of bread wheat conducted indicates that the core marketing performance functions were input provision, production, trading (collecting, wholesaling, retailing and (small scaled) processing) and consumption, which is performed by main actors such as private input suppliers, farmers, traders (wholesalers, retailers/processors, and collectors) and institution/individual consumers. Office of Agriculture and natural resources, Office of Trade and Market Development, private micro finances and input suppliers, Oromia saving and credit institution, zonal and district cereal marketing development department and Kulumsa agricultural research center were the main stakeholders involved in support providing activities in different intensities and forms. Much of the marketed margin of wheat was channeled through assembler, cooperatives, wholesalers, retailers and consumers. All households were wheat producers, but not all households participate in the wheat marketing. From 156 sampled households 114 (73.1%) of the total households were participated in the wheat market and the rest 42 (26.9%) were not participate in wheat market. From male headed households 60.5 and 61.9% were participants and non-participants in the wheat market, respectively, and from female headed wheat producers 39.5% and 38.1% were participants and non-participants, respectively. Out of the participant household 72.8% had access to market information and only 27.2% of the total household had no access to market information. Out of the non-participant households

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40.5% have access to market information and 59.5% has no access to market information. The average age of wheat participant' households was 44.64 years while that of non-participants was 40.5years. The average market price of wheat was 1250 Birr and the actual price was 1150 Birr. About 50% of sample wheat producer respondents reported that the price was decided by buyer and through negotiation. About 37.5% of traders obtain price information through phone call. From this we can conclude that there was market imperfection and non-competitiveness of traders in the District.

About 75% of traders were licensed indicated that license is not barriers to market entry. Capital was one of the barriers to entry since most of the traders used their small capital due to large collateral requirement of lenders like micro financial institutions (MFI) and banks. Moreover, trade experience was not a barrier to entry in the wheat trade. The market information system was not transparent between producers and traders in the study area. In the study, area eleven market channels were identified and from these channels the highest share of total volume of sales were through channel V which accounted 34.53% out of the total volume of sale. Generally, Structure and conduct of the market affect the entire performance of the market. From the S-C-P analysis, we observed that the concentration ratio of traders (structure) in the markets were strongly oligopolistic. This indicates market imperfection, and the conducts of traders were not as such transparent. The structure, conduct and performance analysis confirms that wheat marketing in Robe woreda was inefficient.

The Heckman model was used to identify factors affecting wheat market participation and level of participation. The probit part of the Heckman econometric model output revealed that market participation of wheat was affected by frequency of extension contact, lagged price of wheat, age of household headed, family size of household, number of oxen owned, and distance from the nearest market. The OLS part of the Heckman model revealed that market supply of wheat was affected by farm income, land allocated for wheat production, total land size, and quantity of wheat grain harvested. The major constraints identified at market and production level were absence of improved seed, high cost and fertilizer, absence of information on how to use credit, infects and pest disease, shortage of land, poor linkage of actors, quality problem, lack of

transportation facility, lack of information, lack of storage, fluctuation of price, and low cost of wheat were some of the constraints farmers faced in the study area.

5.2 Conclusion

This study concluded that, improving wheat production and marketing could enhance livelihood of the farmers. Farmers' livelihood was mainly depends on wheat production. In Robe District, there were eleven major wheat-marketing channels and among the channels producer received highest gross marketing margins in channel nine, where a producer sells directly to cooperative. In the district, six major market actors were identified, such as producer, retailer, wholesalers, rural collector, consumer and cooperative. In Robe District, farmer's wheat production and marketing constraints were identified to be an absence of improved seed, high cost and fertilizer, absence of information on how to use credit, infects and pest disease, shortage of land, poor linkage of actors, quality problem, lack of transportation facility, lack of information, lack of storage, fluctuation of price, and low cost of wheat were some of the constraints farmers faced in the study area. Therefore, improving both wheat production and marketing could improve livelihood of the farmers. The important role of wheat quantity produced was explained through its significant influence on market participation decision and the level of market participation, indicating the need for enabling environment for increasing smallholders' ability to produce quality wheat. Frequency of extension contact was a crucial factor that influenced wheat farmers' market participation decision. This implies that availability of Frequency of extension contact especially during planting could encourage farmers to produce a surplus and participate in the market. The market participation of wheat was affected by frequency of extension contact, lagged price of wheat, age of household headed, family size of household, number of oxen owned and distance from the nearest market. The market supply of wheat was affected by farm income, land allocated for wheat production, total land size, and quantity of wheat grain harvested.

5.3. Recommendations

Based on the finding of the study, the following recommendations are suggested to improve and develop sustainable wheat marketing performance that is adaptable locally and expected to increase competitiveness.

- Farmers of the study area complain that there is no improved wheat variety because model farmers produce variety and they sold to the farmers without keeping the quality of the seed. Therefore, the government needs to give attention on improving wheat production and marketing through alleviating production constraints like infrastructural, technical and input opportunities.

- The structure of the wheat market in the district is characterized by strong oligopolistic market structure and the conduct of the market deviated from competitive market norms. As the result wheat marketing performance in the study area is inefficient. Hence, there is a need to enhance wheat producers' bargaining power through the establishment of cooperatives and resolve the barriers to entry to the market so as to enable potential traders to enter and improve the competitiveness of the market. There is also a need of government or other stakeholder intervention to strengthen the linkage of wheat market actors through training and financial supports.

- The result of econometric analysis indicates that wheat producers' participation decision positively and significantly affected by frequency of extension contact. Those households who have gotten frequent contact with extension agents relatively have more wheat yield and tend to have active market participation. Therefore, based on the findings of the study, the government is supposed to ensure the availability of extension services for households. Since, recently, the governments' provision of extension services has been increased; policies that encourage development of farmers' training centers at village level along with capacity building of extension workers through training, upgrading their education and provision of incentives so that accessibility of this service more ensured will contribute to smallholders' market participation to enhance the wheat market participation decision.

- Family size negatively and significantly affected the wheat market participation decision, indicating that most family members were consumers than being workers. So, in order to enhance households' market participation, the rural health extension should be strengthened on promoting family planning programs by

providing trainings to spouses so that they will have a planned family size and will be able to secure more income from production of marketable surplus.

- Older farmers tend to sell less than younger farmers and this may be due to the risk averse nature of old farmers that causes older farmers to resist to new varieties and other technology so government or non-government organization can create awareness for older farmers through providing training in adopting new or improved technologies.

- Since the distance to the markets and transportation costs were found to negatively influence market participation, there is a need to invest in roads, rails and other transport networks. Therefore, attention should be given to rural infrastructure development in general and, road in particular and sufficient transportation system as well.

- Lagged price of wheat was a positive and significant factor affecting households' likelihood of market participation. This indicates that perceiving lagged price as high increases market participation. Thus, government or non-government organization train farmers about contract farming and storage facilities of producers, they feel confident on the price they receive from production of wheat and will take advantage of price fluctuation thereby increase their likelihood of participation in the wheat market as a seller.

- Number of Oxen owned also affected the market participation of wheat producer positively and significantly. It is advisable that wheat farmers in the study area should be encouraged owning a good number of oxen to prepare their land in time and do plant in time as well.

- Quantity of wheat produced was affected smallholders' intensity of market participation positively and significantly. Therefore, policies should aim in increasing productivity and production of wheat through making agro-inputs such as fertilizer, improved seeds, and others, and strengthen existing extension service provision. The

policy should also aim at stabilizing the price of these agro-inputs to ensure their affordability to farmers.

- Smallholders' volume of wheat market participate was affected by size of land allocated to wheat production indicating importance of land allocation decision in enhancing smallholders' market surplus. In this regard, policy should aim at ensuring efficient utilization of land resource. In the study area, wheat has high demand, and high price as compared with competitive crops grown in the area. Therefore, farmers should allocate their land according to market value of the crop to enhance their market surplus.

- Farm income is one of the important factors to increase market supply. So, encouraging households to diversify their sources of incomes increases the market supply. Farmers who got additional incomes have purchased the necessary inputs at the required time and could increase their productivity, which increases the market supply. Thus it is recommended that encouraging households participation in farming activities by creating favorable conditions and better opportunities for smallholders.

- The study found that size of land owned was positively and significantly influenced intensity of market participation. The findings suggest that policies that not only consider ownership of land, but also the size of land owned is an important variable that positively affected wheat market level of participation. Government should facilitate acquisition of farm land by farmers in the form of rent or lease. ensure that the land policy, which is being drafted, should consider the vulnerable society for land acquisition as a form of empowerment, but importantly should consider the size owned as this will improve market participation which in turn increases their income.

- Wheat marketing performance need to be strengthened by encouraging small farmers to organize and upscale their production and marketing. Investments in infrastructure, transportation, food industries and packaging industries are also required.

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7. APPENDIX

Appendix Table 1. Variance of inflation factor (VIF) for continuous variables

Variable	VIF	1/VIF
Land allocated for wheat product	4.35	0.230128
Total land owned	1.84	0.542717
Number of oxen owned	1.68	0.594751
Family size of household	1.11	0.897402
Nonfarm income	1.17	0.851892
Farm income	3.95	0.252941
Total livestock owned	1.14	0.877560
Distance nearest market	1.11	0.897402
Frequency of extension service	1.05	0.950779
Mean VIF	1.94	

Appendix Table 2. Contingency coefficient test for dummy variables

	Lmp	Mrkinfom	improv~d	Sex	educat~n	credit	Owncom
Lmp	1.0000						
Mrkinfom	0.4510	1.0000					
improvedseed	0.2815	0.2133	1.0000				
Sex	-0.1272	0.0804	0.0028	1.0000			
Education	0.2943	0.2031	0.0382	0.1044	1.0000		
Credit	0.0192	-0.0100	0.6357	-0.0156	-0.0684	1.0000	
Owncom	0.2484	0.0091	0.2301	-0.0040	0.0630	0.1130	1.0000

Appendix Table 3.

 Test for heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

chi2 (14) = 141.04

Prob > chi2 = 0.000

Appendix table 4: estat endog distance mrkinfom

 Tests of endogeneity

 Ho: variables are exogenous

 Durbin (score) chi2 (2)   = 1.60232   (p = 0.4488)

Wu-Hausman F (2,142)   = 0.736832   (p = 0.4804)

estat endog

Tests of endogeneity

Ho: variables are exogenous

Durbin (score) chi2 (1) = .998752 (p = 0.3176)

Wu-Hausman F(1,141) = .908535 (p=0.3421)

Appendix Table 4: Factors influencing farmers' market participation decision

Number of obs = 156

LR chi2 (14)   141.04

Prob > chi2 =   0.0000

Log likelihood = -20.347299   Pseudo R2 = 0.7761

Mrkpartc	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Mrkinfom	.5187089	.5715391	0.91	0.364	-.6014872	1.638905
Owncom	.4089128	.5613396	0.73	0.466	-.6912925	1.509118
Credit	-5.908613	344.5356	-0.02	0.986	-681.186	669.3688
Distance	-.2697404	.1521866	-1.77	0.076*	-.5680207	.0285399
Land	.760153	.472727	1.61	0.108	-.1663749	1.686681
Frequencyexc	.7187138	.2780953	2.58	0.010***	.173657	1.263771
Sex	-.0385777	.5703449	-0.07	0.946	-1.156433	1.079278
Age	-.0980881	.0347083	-2.83	0.005***	-.1661151	-.030061
Education	.5902018	.4057784	1.45	0.146	-.2051093	1.385513
Famsize	-.193392	.1012159	-1.91	0.056*	-.3917716	.0049875
Lmp	.9990646	.5904073	1.69	0.091*	-.1581124	2.156242
Nonfar	-.0000244	.0000624	-0.39	0.696	-.0001467	.000098
Oxen	.391007	.2227132	1.76	0.079*	-.0455029	.8275168
Improvedseed	6.888753	344.5364	0.02	0.984	-668.3902	682.1677
_cons	1.867755	1.989708	0.94	0.348	-2.032	5.76751

Appendix Table 5: Factors affecting the level of wheat market participation

Number of obs = 156

Censored obs = 42

Uncensored obs = 114

Wald chi2 (14) =3274.24

Prob > chi2 =0.0000

qsold	Coef.	Std. Err.	Z	P>z	[95% Conf Interval]	
Distance	.3274914	.2094098	1.56	0.118	-.0829443	.7379272
Landlallwheat	11.05985	2.583339	4.28	0.000***	5.996604	16.1231
Income	.0004982	.0001407	3.54	0.000***	.0002224	.0007741
Nonfar	.0000923	.0001165	0.79	0.428	-.000136	.0003206
Wheatharvested	.5094773	.0511271	9.96	0.000***	.40927	.6096845
Lmp	-.76769	1.17336	-0.65	0.513	-3.067437	1.532051
Mrkinfom	-.320220	1.050764	-0.30	0.761	-2.37968	1.739239
Owncom	-.890392	1.075464	-0.83	0.408	-2.99826	1.217479
Credit	-1.04697	.7437293	-1.41	0.159	-2.50466	.4107034
Age	.011458	.0601957	0.19	0.849	-.106523	.1294394
Education	.00949	.5664189	0.02	0.987	-1.10067	1.119651
Famsize	-.057995	.1590724	-0.36	0.715	-.369771	.2537812
Frequencyexc	-.362765	.3724701	-0.97	0.330	-1.09279	.3672626
Land	1.842135	.614781	3.00	0.003***	.6371868	3.047084
_cons	-14.7062	3.900509	-3.77	0.000***	-22.35108	-7.06137
Lambda	7.1666	5.678089	3.89	0.079	19.789	4.67098

Appendix Table 6: Conversion of Household Labor force into man equivalent

Age Group	Male	Female
Less than 10	0.0	0.0
10 – 13	0.2	0.2
14 – 16	0.5	0.4
17 – 50	1	0.8
Above 50	0.7	0.5

Source: (Samuel Gebreselassie and Sharp, 2007)

Dear Sir/Madam,

Good afternoon/Good Morning. My name is Beshadu Shifera I am one of the postgraduate students at Jimma University College of Agriculture and Veterinary Medicine (JUCAVM) department of Agricultural Economics and Agribusiness Management. I am conducting a survey on wheat market performance in Arsi Zone, Oromia National Regional State, South-East Ethiopia. The purpose of the survey is to gather information about the wheat production and market performance in the study area. The gathered data will be entered into a statistical package and inferences will be made from the pool of the information collected from all respondents. There is no situation in which your name or any information related to your privacy will appear in the results of the study. If there is a felt need for that, the result of the study will be communicated to you. Hence, please answer as many questions as you can so long as they apply to your situation. All information will be treated as strictly confidential.

Thank you for your cooperation!

Instructions to Enumerators
- Make a brief introduction to each farmer before starting the interview; greet them in the local way; know each other and ask his/ her name; tell them the purpose and objective of the study;
- After getting the informed consent of respondents, please, ask each question so clearly and patiently until the respondent understands;
- Please, fill up the interview schedule according to the respondent's reply (do not put your own opinion);
- Please, do not try to use technical terms while discussing with respondents and do not forget to use/record the local unit.
- During the process;
  1: Write the answer of the respondent on the space provided,
  2: Ask & write details where required,
  3: Tick or encircle the chosen answer;
  - Prove that all questions are asked and the interview schedule format is properly completed; and
  - At the end, leave farmers with words of thanks

A. General information
I, Name of Peasant Association (*kebele*) _____
II. Name of household head (respondents name) _____
III. Contact Address (Mobile Number) _____
IV. Enumerator name _____
V. Signature _____
VI. Date of Interview _____

B. Household Head Demographic Characteristics
1. Sex: 1 = Male   0 = Female
2. Age (in years) _____
3. Marital Status   1. Married   2. Single   3. Divorced   4. Widowed
4. Religion; 1, Orthodox   2, Protestant   3, Catholic   4, Muslim   5, Wakefata   6, others specify)
5. Educational level (year of schooling) _____
6. Number of total family members _____

7. Total amount of hired labor for the production year (2018/19)_____

8. Cost of a unit of labor_____

9. Distance of your residence from the nearest market center _____Km.

10. Distance of your residence to the nearest development center _____Km.

11. Distance to all weather road_____Km.

12, Distance of your residence from the nearest urban center_____Km.

C. Household endowment

1. What is the area of your total land _____ ha

2. What is total area of rented in land_____ ha, rented out land _____ha

3. What is the area of shared in land _____ ha, shared out land _____ha

4. Total area allocated for bread wheat in 2018/2019 production year _____ha

5. Have you grazing land?(√) 1. Yes [ ]   2. No[ ]

6. If No. 5 is „yes" what is the size of grazing land? _____ha

7. When did you started farming (farming experience) _____(years)

8. Do you have livestock? (√) 1. Yes [ ]   2. No [ ]

9. If your answer for **Q.8** is yes, livestock Number:

Type
Number
Oxen
Cow
Bull
Heifer
Calf
Sheep
Goat
Horse
Mule
Chicken
Donkey

10. Do you have your own transportation facilities? (√) 1. Yes [ ]   2. No [ ]

11. If your answer for Q. 10 is Yes, what type? (√) 1. [ ] Vehicle   2. [ ] Transport animals

3. [ ] Cart

D. Details on Production, Input and technology use

1. What type of cereal crops do you produce? Area and production during last season

Cereal type	Area (Timad)	Production (Qt)	% sold	% consumed	Income from sales (Birr)
Bread wheat					
Teff					
Maize					
Sorghum					

2. Inputs of cereal crop production during last season.

Cereal type	Labor (man/day)	Seed (kg) local / Improve	Dap (qt)	Urea (qt)	Compost (in local unit)	Manure (in local unit)	Pesticide (li or timad)
Bread wheat							
Teff							
Maize							
Sorgum							

3. If you have ever encountered problems with the use of improved seeds, what type? (√) (Multiple responses are possible).   1. [ ] There is germination problem   2. [ ] Unknown origin
3. [ ] Low quality (taste)   4. [ ] High price   5.[ ] disease   6. [ ] Others (specify) __

4. What type of crop production system do you adopt? 1. [ ] Sole cropping   2. [ ] Mixing different vegetable crops   3. [ ] Mixing with other crops [ ]   4. Others___

5. What type of farm implements do you use for bread wheat production?

Implements/equipment	Number	Years of purchase	Cost of purchase(birr/unit)
Plough			
Hoe			
Harrow			
Other specify			

6. Would you like to expand bread wheat production? (√) 1. [ ] Yes   2. [ ] No
7. If your answer for Q.6 is yes, why? _____
8. If your answer for Q.6 is No, why? _____
9. What are the crop production constraints on your farm? Rank horizontally (1, most severe, 2, second severe and etc.)

Crop type	Drought	Lack of pesticide	Fertilizer shortage	Improved seed shortage	Market related constraints	Disease
Bread wheat						
Teff						
Maize						
Sorghum						

Bread Wheat production

Input Supply

Have you used agricultural inputs (fertilizer, chemicals, improved seeds etc.) for the produce?

1, What Type of inputs and from which source did you get such agricultural inputs in the wheat production process? (*Multiple responses are possible).

Type	Sources(code)	How
1.Local seed	1. District Agricultural Office	Through purchase
2. Improved seed	2. primary cooperative	On credit bases
3. Fertilizers	3. Union	As gift
4. Pesticides/herbicides	4. Local market	Through exchange
5.Farm implements	5. research center	Others (specify)
6. Others (specify)	6. Asela University	
	7. Relatives	
	8.Niegbour	

2, Why did you prefer the chosen sources to get the needed inputs? _____

3, Do you always get inputs in the quantities that you need at the right time? (√)   1. Yes   2. No

4, If your answer for Q.10 is No, what are the reasons? (√) (*Multiple responses are possible)

1. I am not sure of the benefit   2. Too expensive   3. Not available on time

4. Cash shortage   5. Low quality

 6. Far distance   7. Others (specify) ___

5, Have you encountered problems in accessing these inputs? (√) 1. Yes   2. No

6, If your answer for Q.5 is yes, what are the problems? (*Multiple responses are possible)

1, unavailability   2, shortage of supply   3, costly

 4, remoteness of input selling site   5, others specify

E. Farm Income

1, From where did you get income you used to cover all family expenditures?

a. Crop sales   b. Livestock sales   c. Remittances   d. Credit

e. Labour sale   f. Others (please specify_____)

2. Estimate of annual cash income from

a. Sale of crop_____ Birr/year   b. Sale of livestock _____ Birr/year

c. Sale of livestock products (milk, butter, egg…) _____Birr/year   d. Off-farm income _____Birr/year   e. Other sources __ ____Birr /year (specify) ___

3. Which crops did you sale most of the time? _____ (Put in their order of importance by selecting from the following)   1. Bread wheat   2, Barley   3, *teff*   4, sorghum 5.other (specify) ___

 4. Did you participate in non-farm income generating activities in 2018/19 cropping season? 1, Yes   2, No

5. If your answer to question # 11 is "Yes", mention o`   off-farm /non-farm income during the year 2018/19 cropping season?

Source of non-farm income	Estimated annual income	Who participated in nonfarm income
Petty trade (crop livestock)		
Daily laborer		
Stone mining		
Hand crafting		
Black smith		
Firewood and/or charcoal selling		
Guard		
Others (Specify)		

F. Information about Credit services

1) Did you use credit in the last cropping year? (√)   1: Yes   2: No
2) If yes, have you received credit in cash last year? (√) 1: Yes   2: No
3) If Q. b is "yes", how much it was? _____ Birr
4) If Q. b is "yes", for what purpose you used? (√)(Multiple responses are possible)
1: To purchase fertilizer for wheat production   2: To rent in land to extend wheat production
3: To purchase seed/seedlings of wheat   4: To purchase transporting animals
5: To pay tax   6: To purchase food grain
7: Others _____
5) From where did you get the credit service? (√) 1: Relative   2: Bank   3: Micro finance institution   4: Friends   5: Traders   6: Peasant association/cooperatives
 7: local money lenders   8: Others (specify) _____
6) If your answer for Q. 2 is "no", why? (√) 1, High interest rate   2, No need
3: Lack of collateral   4. Fear of inability to repay
5. No service   6. Other (specify) _____
7) What was the precondition to get credit? (√)   1. Membership   2.Personal guarantees
3.Land holding   4. Collateral   5. Partial payment   6.others (specify)
_____

G. Access to Extension

1. Did you have extension contact in relation to cereal production in the 2019 cropping season?
 1, Yes   2. No

2, If your answer for Q.1 is No, why? (√) (Multiple responses are possible)   1. No service provider nearby,   2. Possessed the required information   3. Availability of contact farmers

4. Do not have time to get the service   5. Others_____

3, If yes, how often the extension agent contacted you Monthly? _____

4, What was the extension advice specifically on Cereal production? (√) (Multiple responses are possible)

1) Seed preparation   2) Spacing   3) Post harvest handling   4) Fertilizer and Chemical Applications   5) Marketing   6) If other (specify)

_____

5, who provides the advisory service? (√) (Multiple responses are possible)   1. Development agents

2. NGOs (specify)   3. Woreda Agricultural Office experts   4. Research centers (specify)   5. Neighbors and friends   6. Others (specify) _____

6. Traveling time from home settlement to extension services _____ (in minutes)

H) Farming associated costs

1) What do you use to plough your land? (√)   1: Own Oxen   2: Rented Tractor   3: Rented oxen

2) If rented tractor how much it costs you per hectare? _____birr

3) How about if rented oxen? _____birr/hectare

Activities	Sources of labor and quantity required in a year (days)				
	Family			Hiring	Wage/day
	Men	Women	Child	Quantity	
Plowing(Land preparation)					
Sawing					
Weeding					
Harvesting					
Threshing					
Others					

4) What is your average return of wheat? Please fill the following Table

Grain	Selling price	Total costs birr/qt								
		Packing material	Loading/ Unloading	Transportation	broker	Weight Loss	Store rent	tax	other	
wheat										

I. Information about Marketing

1. Do you owned communication asset (TV or Mobile) 1.Yes   2. No

2. If your answer for Q4 is yes, which of the following bread wheat related information you usually get from your communication asset?

1. Production related   2. Price related   3. Demand and supply   4. Other specify

3. Did you heard anything about the hotline 8028? 1, Yes   2, No

4. If your answer for Q1 is yes, from whom did you heard?   1. Promotion on multimedia
 2. Friend   3. DA   4.other specify

5. If your answer for Q1 is yes, did you used it to get information? 1, Yes   2, no

6. If your answer for Q3 is no why?

1. It is not user friendly   2, I think it is not that much helpful   3. other specify

7. If your answer for Q8 is yes? What type of information you usually dialed for?

a. Production related   b. harvesting related   c. post-harvest related   d. market related

d. other specify

8. How did you rate the information you acquire from TV/Mobile?

1. Very important   2. Important   3. Not important

9. Did you get training in the past five years 1. Yes   2. No if yes proceed to the table

Type of training	Yes 1	No 0	By whom (*)	How many times
Crop management				
use of input				
Use of cooperative				
Use of credit				
Natural resource				
Conservation				
Pre and post-harvest				
Management				
Seed production				
Field days/demonstration				

1. Research Centre   2. Bureau of agriculture   3.University   4. NGOs   5.Others (specify)

10) Did you sell wheat last year? (√) 1: Yes   2: No

12) If your answer for Q. 10" no" why didn't you sold? _____

13) If your answer for Q. 10 "yes", which type of wheat is sold? (√) 1: Bread wheat

2: Durum   3: Both

Crop type	Amount sold(qt)	*To Whom	1.wholesalers 2.retailers 3.consumers 4.rural assembler 5.cooperatives 6. Processers 7. Brokers 8.commetion agent 9.speculative 10.urban	Where did you sale?	1.on the farm 2.villagemarket 3.Woreda market, 4.zonal (major) market,

assembler
11. Others

_____

4) To whom do you usually want to sell? _____ (choose from above)

5) Reason for selling to the selected actor? (√) 1: Price difference from others   2: Closeness in distance   3: Transport availability   4: Others (specify) _____

6) For how many months you store wheat for sale? _____months

7) What was the price of wheat immediate after harvest in 2018/19? _____birr/100kg

8) Is there a difference in price due to differences in place of sale and the type of buyer? (√)
1: Yes   2: No

9. If yes, indicate the price when the product is sold to different actors and in different places.

Place of sale	Price /kg/quintal of wheat when sold to different actors				
	Consumer	Retailer	Wholesaler	Cooperatives	Rural Assembler
On farm / farm gate					
Village market					
Woreda market					
Zonal market					
Collection points					

10) Which type of transportation used to take wheat to the market? (√)
1: Cart   2. Pack animal   3: Vehicle   4: Others (specify) ____

11) Do you owned the type of transportation you used to supply to market place? (√)
        1: Yes   2: No

12) If "no", how much it costs you to reach market place per 100kg? _____birr

13) Do you have long-standing customer (buyer)? (√)   1: Yes   2: No

14) Do farmers sell their wheat product on credit basis? (√) 1: Yes   2: No

15) If "yes" how long do you wait for the payment? _____

16) When do you sold last year's wheat produce? (√)
1: Immediate after harvest   2: One month later   3: More than two months

17) If you sold immediate after harvest, why you did that? (√) 1: Better price   2: Storage problem
3: Fear of price fall   4: Bulk of production   5: Others (specify) _____

18) What do you consider to supply your wheat to the market? (√)   1: Assess price information and supply if better   2: When we need money   3: Others (specify) _____

J) Price information

1) What is the trend of Average Price per 100kg in Birr for the last years (2018/19)? _____

2) Who decides on price during selling? (√) 1: Traders   2: Producers   3: Brokers
4: Negotiation of farmers with traders   5: Set by demand and supply   6: Others (specify) ____

3) If broker/middlemen negotiates on price, who will pay for him? (√) 1: Farmer   2: Trader

4) If farmer, how much do you pay for him per quintal (Total payment per volume of sale)? _____ birr/qt

K. Market structure, conduct and performance related questions

A) Market structure related questions

1, Are there entry problems?   1, Yes,   2, No
2, Are there exit problems?   1, Yes,   2, No
3. Are there dominant traders in the market?   1, Yes,   2. No
4. How many grain traders are there? 1, Too many,   2, Many,   3, average,   4, Few,   5, Very few
5. Do you have supply problem?   1, Yes,   2, No
6. Is there competition among traders?   1, Yes,   2, No
7. Is there perfect information flow?   1, Yes,   2, No
8. Are you willing to pay for information?   1, Yes,   2, No
9. is there homogeneity of a product?   1, Yes,   2, No
10. Do you have an access to all weather roads?   1, Yes,   2, No
11. Do you have demand/ market problem?   1, Yes,   2, No

B. Market conduct related questions

1. Is the price trend in the past 4-5 years increasing?   1, Yes,   2, No
2. Is there price variation based on demand & supply? 1, Yes,   2, No
3. Who decides the price in the market? 1. Farmers   2. Traders   3. Consumers
4. The market   5. Bargaining   6. Others
4. Is there grade and standard base marketing/pricing?   1, Yes,   2, No
5. Is there truthful product claim in the market?   1, Yes,   2, No
6. Is there collusion among traders?   1, Yes,   2, No
7. Are there unfair trade practices?   1, Yes,   2, No
8. Is there transparency in the marketing process?   1, Yes,   2, No
9. is there investment & reinvestments to the market?   1, Yes,   2, No
10. How much is your average transaction cost per quintal in the marketing process in birr for different activities? Loading--------Unloading---------Packaging-----------transportation------------- Sorting ------ assembling --------- storage--------others specify --- --
11. is there perfection of measuring tools?   1. Yes,   2.No

C. Performance related questions

1. Is there profit margin difference between market actors?   1. Yes,   2. No
2. If yes who gets better? ---
3. What is your net profit from a quintal in birr?
4. What is the degree of benefit from the trade? 1, Very good,   2, good,   3, fair,   4, low, 5, very low
5. The monthly average quantity purchase wheat in quintals.
6. The average monthly quantity wheat in quintals

L. Opportunities and Constraints Wheat Production and Market

1, What problems do you face on wheat marketing?

Marketing challenge	1, if yes 0, if no	Remark / what are the main effect on wheat marketing	1, high	2.medium	3, low
Fluctuation of price					
Lack of credit					
Lack of storage					
Quality problem					
Lack of information					
Poor linkage of actors					
Lack of transport facility					
Lack of capital					
Unfair price					
Unfair competition					
Lack of demand					
Shortage of supply					

2, What problems do you face on wheat production?

Production challenge	1, if yes 0, if no	Remark / what are the main effect on wheat marketing	1, high	2.medium	3, low
Inadequate transportation service					
Poor road infrastructure					
Shortage of improved seed					
Low yield of wheat					
High price of input					
Linkage problem					
Disease					
Shortage of land					

3, What are the production and marketing opportunities of wheat?

Opportunities	1, if yes 0, if no	Remark
Increment of the demand		
expansion of establishment of food processing plants		
provision of infrastructure facilities like telecommunication, power supply and financial institutions		

M. Information about access to market information
1) Do you get market information before supplying your product to market in last year? (√)
1: Yes   2: No
2) If your answer for Q. 1 is" Yes", from whom did you get the market information? (√)
1: DA   2: Cooperatives   3: Friends and neighbors   4: Radio   5: Brokers
 6: From trader   7: Other's (specify) ____
3. Do you own mobile?   1, Yes   2, No
4. Do you own radio?   1, Yes   2.No
5. Do you own TV?   1, Yes   2, No
6) What type of information did you get? (√) 1: Price information   2: Market place information
3: Buyers information   4: Other (specify) _____
7) At what time interval do you get the information? (√)   1: Daily   2: Weekly   3: Monthly
4: Other (specify) _____
8) Did you know the market prices of wheat products before you sold? (√)
        1: Yes   2: No
N. Information about membership in Cooperatives
1) Are you a member of farmers' cooperative? (√) 1: Yes   2: No
2) If yes, what is the name of cooperative? _____
3) Which factors were/was limiting wheat productivity? 1: Disease   2: Insect pests
3: weed infestation   4: Frost and hail   5: Flooding   6: Lack of quality seed   7: Other_____
Check lists for key informant interview
1, What are the main food and cash crops grown in this district?
2, What services and assistance do the farmers get from agriculture office?
3, What efforts are done to integrate the smallholder farmers with the market?
4, What are the challenges and opportunities at this disposal?
5, How did you see the farmers' market orientation in terms of adopting technology to produce Surplus and quality product?
6, What need to done to solve the problems farmers face in wheat commercialization?
Thank you for your cooperation!

B. Traders Questionnaire
A. General Characteristics
1) Name of trader _____
2) Type of trader   a. Grain trader   b. processed wheat trader
3) Region _____District_____ *Kebele* _____
4) Age _____ Sex _____ 1.Male   2.Female
5) Marital status (√) 1.Married   2.Single   3.Divorced   4.Widowed
6) Family size _____: Male _____ Female _____
7) Education (√) 1.Illiterate   2. Primary school (1-8)   3. Secondary school (9-12)
4. Certificate and above
8) Religion: (√) 1, Orthodox   2, Protestant   3, Catholic   4, Muslim   5, others (specify)
9) Type of business: (√) 1.wheat wholesaler   2.wheat retailers   3. Cooperatives
4. Union   5. Flour wholesaler   6. Flour retailer   7.Others (specify) _____
10) Position of respondent on the business: (√) 1.Owner   2.Spouse of owner   3. Employed
manager   4.Relative of business owner   5. Others (Specify) _____
11) How long have you been operating the business? _____ Years
12) Did you trade alone or in partnership? (√); 1.Alone   2. Partnership
3. Other (specify) _____
13) If partnership, how many are you in the joint venture? _____
14) Total number of peoples employed in your business

	Female	Male	Total	Salary
Nonfamily member				

15) Year involved in trade (√) 1. Year round   2.When purchase price becomes
low   3. During high supply   4.Other (specify) _____
16) Initial working capital_____
17) Source Capital (√)   1. Own   2. Loan   3.Gift
     4. Share   5.Others (specify) _____
18) If Q17 answer is loan from where did you get Credit? (√) 1. Relatives/family   2.
Private   moneylenders   3.NGO (specify)   4.Friend
5.Other traders
 6. Micro finance institution   7.Bank   8. Others (specify)
_____
19) Reason of credit; (√)   1.To extends wheat trading   2.To purchase wheat
transporting vehicles/animals.   3. Others (specify) _____
20) Entry barrier for trading; (√)   1.Yes   2.No
21) Type of entry barriers (√)   1.Lack of continues supply   2. Lack of capital
3. Trade license   4. Others (specify)._____
B. Purchasing activities
1, How do you attract your suppliers? (√) 1. By giving credit to purchase inputs   2. By giving
better price relative to others   3. By fair weighing   4. By visiting them   5. Other (specify)
_____
2, How do you attract your buyers? (√) 1. By giving fair price relative to others   2. By
quality of the product   3. by giving bonus   4. Other (specify) _____

3, In which months does the demand/supply for products increases/decreases?

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jul	Jun	Agu	Semp
High demand												
Low demand												
High supply												
Low supply												

4, From which market and supplier did you buy wheat/ flour of bread in 2019 (Multiple answers are possible)?

Purchased from market (use code) 1. Village 2.Woreda 3.Zonal 4.Regional 5.A.A 6.Other (specify	Purchased from sellers (use code) 1.Farmers 2.wheat Retailers 3.wheat wholesales 4.union 5.Cooperaives 6.processor 7.flour wholesaler 8.Flour retailer 9. other specify	Average quantity purchased per market in a weekly at high supply season	Average quantity purchased per market in a weekly at low supply season	Average price per Kg/weekly		How many days did you operate in this market in a weekly (2018)
				Price of at high Supply season	Price of at low Supply season	

5) Who set the purchase price in 2018? (√) 1. Negotiation   2. By the market   3. Your Self
4. The seller   5.office of trade and industry   6. Other (specify_____
6, If you decide on the purchasing price, how did you set it? (√) 1. Agreeing with other traders
 2. Individually   3. Other (specify) _____

6, When did you set the purchasing price? (√) 1. One day before the market day   2. One week before the market day   3. Early in the morning of the market day   4. At the time of purchase   5. Other (specify)_____

7) Do traders provide premium prices for their permanent suppliers? 1. Yes   2. No

5) If "yes", how much (what percent of the price)? _____

8) Did you use brokers to purchase wheat? (√) 1. Yes   2.No

9) If brokers were used, what problems did they create? (√)

1. Cheating quality   2.Wrong price information
3. Cheating weighing   4. Charged high brokerage
5. Other (specify) _____

10, What was the advantage of using brokers? 1. You could get buyers and sellers easily 2. Reduce transaction costs 3. Purchased at lower price   4. Save your time   5. Sell at higher price 6. Other (specify) _____

11) Have you ever stopped purchasing due to lack of supply? (√) 1. Yes   2. No

12, If your answer to Q. 8 is "Yes", for how long? _____

13, At which season of the year was preferable to purchase vegetables in terms of price? Lowest price for potato _____months, for Tomato _____months, for Cabbage_____

14, How do you measure your purchase? (√) 1. By weighing (kg)   2. By traditional weighing materials

3. Other (specify)_____

15, Do you pack your purchase? (√) 1. Yes   2.No

16, If your answer for Q.14 is yes, what were your packing materials? (√) 1. Sisal sack „teka"
2. Plastic Sack (Madaberya)   3. Sisal sack (jonia)   6. Others___

17, what is the cost of packing? _____Birr/qt

C. Storing

1) Do you own your own storage? 1. Yes   2. No

2) If Q. 1 "yes" capacity of your storage? _____quintal at a time

3) If Q. 1"no" where done you store? 1. Renting   2. Friend's store   3. Others (specify)

4) If Q. 3 "renting", rental cost per month? _____birr/month

5) For how many months do you store products you bought? _____months

D. Transporting

1) How do traders transport wheat? 1. Head loading   2. Pack animal's   3.Animal cart 4.Trucks   5. Others____

2) If traders are transporting using Isuzu trucks, how many quintals can they transport in one load? _____Quintals

3) Indicate your average cost incurred per quintal in the trading process of wheat

Cost Components	Cost incurred in birr/qt
Packing cost	
Labor for packing & Sorting	
Loading/unloading	
Storage cost	
Transport cost	
Processing cost	
Telephone cost	
Watching and warding	
License and taxes	
Another (specify)	
Total cost	

E. Selling practice

1, To which market and whom did you sell wheat/ flour of bread?

Where did you sale market	To whom do you sell buyers	Average quantities of sold (qt)	Average price/kg	How many days did you operate in the week
	1.union 2.Retailers 3.Wholesalers 4.processor(flour) 5. Cooperatives 6.processor(bread) 7.flour wholesaler 8.Flour retailer 9.Other (specify)			

2. When did you get the money after sale? (√) 1. [As soon as you sold   2. After some hours
3. On the other day after sale   4. Others (specify)

2) Do you know the market prices in different markets (on farm, village market and other areas) before
you sold your wheat? (√) 1. Yes   2.No
3) What is your source of information? _____
4) Did you have wheat trade license? (√) 1. Yes   2.No
5) How much did you pay for vegetables trade license for the beginning? _____birr
6) Are there restrictions imposed on unlicensed wheat/ flour of bread? (√) 1. Yes   2.No
7. Are there charges (taxes) imposed by government or community officials at the market? (√)

1. Yes   2. No

8. If your answer to Q.7 is yes, _____Amount (birr) based on sales value of products? and what is the basis of payment?

9. Do you want to expand wheat trading? (√) 1. Yes   2. No

10. If your answer to Q.9 is yes, why? _____

11. If your answer to Q.9 is No, why? _____

12) Are there problems on wheat marketing? (√) 1. Yes   2.No

13) If your answer to Q. 13"yes", what are the problem? _____

Problems	Wheat
Credit	
Price setting	
Supply shortage	
Storage problem	
Lack of demand	
Inadequate information	
Quality problem	
Government policy	
Telephone cost	
Absence of government support	
Capital shortage	
Problem of road access	
High competition with unlicensed	
Traders	
Others (specify)	

43. What do you think the causes of the problems and what interventions is needed to solve this problem on your opinion? _____

Thank you for your cooperation!