

**ANALYSIS OF LIVE GOATS MARKET CHAIN: THE CASE OF
PASTORALISTS IN MOYALE DISTRICT, BORENA ZONE, OROMIA
REGIONAL STATE, ETHIOPIA**

MSc THESIS

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**Analysis of Live Goats Market Chain: The Case of Pastoralists in Moyale
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DEDICATION

I dedicate this thesis manuscript to my beloved families, all my valuable teachers from my early stage of school life to this point and my best friends for their affection and dedicated partnership in the success of my life and this paper as well.

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this thesis is the result of my own work. I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of this thesis. Any scholarly matter that is included in the thesis has been given recognition through citation.

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BIOGRAPHICAL SKETCH

The author was born in Moyale district, Borena Zone on August 10, 1991 GC. He attended his primary, secondary and preparatory education at Moyale primary, Secondary and preparatory schools respectively.

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ACRONYMS AND ABBREVIATIONS

CR ₄	Four Large Firm Concentration Ratio
CSA	Central Statistical Agency
ETB	Ethiopian Birr
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GMM	Gross Marketing Margin
HHI	Herfindahl-Hirschman Index
IGAD	Intergovernmental Authority on Development
MDOF	Moyale District Office of Finance
MDOS	Moyale District Office of Statistics
MDPDO	Moyale District Pastoralist Development Office
MoA	Ministry of Agriculture
MVP	Multivariate probit
OLS	Ordinary Least Squares
S-C-P	Structure-Conduct-Performance
SNNPR	Southern Nation and Nationalities Peoples Region
TGMM	Total Gross Marketing Margin
TLU	Tropical Livestock Unit

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Analysis of Live Goats Market Chain: The Case of Pastoralists in Moyale District, Borena Zone, Oromia Regional State, Ethiopia.

ABSTRACT

Goats are important to the socioeconomic wellbeing of the pastoralists in Moyale district in terms of nutrition, income and intangible benefits. However, the development of the subsector faces challenges such as information about market actors, what determines goat market participation and supply, information about market margin and outlet preference. Therefore, this study was aimed to analyze goat market chain in Moyale district. Both primary and secondary data were used for the study. Primary data were collected from randomly selected sample of 196 goat producers and 32 goat traders. The data was analyzed using both descriptive and econometric methods. The result indicated that the major goat market actors in the district being goat producers, cooperatives, collectors, small-scale traders, large-scale traders, hotels and restaurants, and consumers. In the structure-conduct-performance analysis, four firms concentration ratio (CR_4) of goat traders in the district market was 44.72 indicating weak oligopolistic market. Lack of capital is reported as the main barrier to entry particularly for large-scale traders and collectors. Negotiation is the main price setting strategy and the cash on hand is the mode of payment traders are mainly using in the district. Producers' share of the consumers' price was highest when they directly sell to consumers and lowest when they sell to collectors. Heckman 1st stage result showed that family size, credit use and lagged price positively and significantly affected households' goat market participation decision while it is negatively affected by distance to market and income from non-goat. Again the 2nd stage result indicated that sex, number of goat owned and credit use positively and significantly affected number of goat supplied to the market. While distance to market and number of other livestock owned negatively and significantly affected number of goat supplied to the market. Multivariate probit model result show that distance to market and selling price significantly affected the entire outlets. Distance to market negatively and significantly affected large scale traders, small-scale traders and consumer market outlets, while it affected cooperatives and collectors market outlets positively and significantly. Selling price of goat positively and significantly affected the large-scale traders, small-scale traders and ultimate consumers' market outlets, while it affected the choice of cooperatives and collectors market outlets negatively and significantly. The study recommends the need to enhance market competitiveness, market infrastructures, improve the capacity of productive labor, promote credit institutions, and provision of awareness creation training towards goat trading business.

Key words: Actors, Concentration ratio, Heckit, Marketing margin, Outlet choice.

1. INTRODUCTION

1.1. Background of the Study

Agriculture is the base for Ethiopian economy and livestock sub sector is an integral part of agriculture. Ethiopia has the largest livestock population in Africa and the livestock sector has been contributing in livelihood improvement of smallholder farmers (CSA, 2017). Ethiopia is one of the African countries with the largest population of small ruminants in the continent (Abebe, 2013), and Ethiopia's estimated goat population is accounted for 7.2 % and 2.6 % of the African and global goat population, respectively (FAOSTAT, 2015).

The livestock sub-sector contributes 42% of agricultural GDP, about 16% of total GDP and 62% of the household income on average (Birara and Zemen, 2016). Goats were considered as most important livestock species followed by sheep and cattle. This is due to their ability of utilizing various browse plant species and climb to browse from shrubs, and goats were able to survive, reproduce, and provide milk, meat, and were source of income to smallholder farmers (Gebreyowhens and Kumar, 2018). On average, goats provided a 3.5 times lower and 1.6 times higher gross margin than cattle in the semi-arid agro-pastoral and arid agro-pastoral systems, respectively. It is worth noting that goats contributed more than sheep to household gross margin in all production systems (Tatek *et al.*, 2016).

There is about 30.2 million goats' population in Ethiopia. Nearly all goat population of the country is local breeds. The population of livestock in Borana zone, Oromia region was estimated to be 1,056,040 cattle, 573,369 sheep, 868,571 goats and 51,607 camels (CSA, 2017). The livestock population of Moyale district was estimated to be 48,863 cattle, 58,792 goats, 13,861 sheep, 14,540 camels, 4,725 donkeys, 14 mules and 14,446 poultry (MDPDO, 2017).

Goat production provides a number of socio-economic benefits which improves the livelihoods of communities. Regular cash income from selling of goats was the most important

reason for keeping goats, followed by other tangible and intangible benefits (Charles *et al.*, 2015). The increase in international demand for meat in general and the high demand for shoat meat in the Middle East are another incentive for the production of shoats in the country (Hassen *et al.*, 2013). The country development is characterized by rise in income, combined with rapid population growth of major cities in general, the demand for meat products with quality as well as value-added products such as special meat cuts is increasing as ever (Legese and Fadiga, 2014).

Goat production and marketing already support a large number of people, making a sizeable contribution to the regional economy. Reinvesting some of these revenues could help further stimulate the market, encourage pastoralists to participate and produce more goats for the quality consumers demand (Gebremariam and Yemiru, 2015).

Despite its importance in income generation and nutrition source for pastoralists in Ethiopia, the current goat market is characterized by lack of proper linkage between producers and other actors in the market which make a market chain longer and artificially inflated prices which in turn make difficult for the low-income groups in society to afford goat to the market. Again despite the general increase in demand for goat meat both in the domestic and export markets, the supply of animals to both markets is not well strategized as production is not market-oriented (Legese *et al.*, 2014).

1.2. Statement of the Problem

Livestock trade is the main economic activity and critical source of livelihood for the pastoralists in Moyale and an important link between the borderlands in Ethiopia and Kenya. Economically, the trade provides incomes for herders, traders, middlemen, transporters and local authorities in the two countries (Mahmoud, 2010). Likewise, the main purposes of keeping goats were to generate income and for saving. Sale of goats is mainly to fulfill immediate household cash needs (Selamawit and Matiws, 2015).

Even though there is a general increase in demand for goat meat both in the domestic and export markets, the supply of goat to both markets is not well strategized as production is not market-oriented. Moreover, there is no market information system that informs farmers who are the potential buyers and prices for the different class of animals (Legese *et al.*, 2014). Despite the valuable contributions of goats to the livelihoods of farmers in rural areas, the sector has been given low research and development attention particularly in marketing aspect (Solomon *et al.*, 2014).

Moyale market supplies significant number of small ruminant destined to North of Moyale district (Ethiopia) and to South (Nairobi markets). There is a limitation of information about who are potential goats buyers in the district, the nature of the goat market is unknown, it is not clear about why all goats producers are not market participants and factors that determine the participation is also unknown, supply of goats in the district market is not market oriented, it is not very clear what informs producers of the market margins to justify goat market outlet preference and why producers who are major supplies to these markets still live in poverty conditions is also unidentified. This information gap continues to hamper competence of live goat market.

To seal these gaps and develop a workable guide on marketing of live goats for the pastoral community that rears large proportion of goats, undertaking research on goats market chain analysis is believed to enhance its marketing by providing updated information and characterization of goat marketing. The study again is believed to identify determinants of goat market participations and supply. It also aimed to identify market outlets and factors affecting outlet choice. This will ensure a complete understanding of goat market chain with a view of suggesting possible policy recommendations aimed at empowering goat producers and other market chain participants to gain from marketing.

1.3. Research Questions

The following research questions were addressed in the study:

- 1) Who are goat market chain actors and what are their roles?
- 2) How is the structure-conduct-performance of the goat market in the study area?
- 3) Who will benefit more from goats marketing
- 4) What are the main market channels of goats in the district?
- 5) What are the major factors that influence the decision of producers to participate in goats marketing and the supply of goats?
- 6) What are the major live goats' market outlets and factors affecting outlet choice?

1.4. Objectives of the Study

The general objective of the study is to evaluate market chain of live goats in Moyale district.

The specific objectives of the study are:

- 1) To identify goats market chain actors and their roles;
- 2) To analyze the structure, conduct and performance of goats market in the study area;
- 3) To investigate the determinants of households market participation and market supply of goats; and
- 4) To identify live goats' market outlets and factors affecting their choice

1.5. Significance of the Study

Enhancing of goats market chain is one of the many components in the agricultural sector that can increase production and market participation, generate income, create asset and improve the living standard of the pastoralists. The study attempted to generate realistic information on goat market chain for the pastoralists and other marketing agents involved in the production and marketing of goats in the study area. It also helps researchers, development planners and policy makers in designing appropriate policies that enhance producers' participation in the

goats market and sales volume, and choice of appropriate goat market outlets. Moreover, the information helps governmental and non-governmental organizations who are interested in the business so that large scale goat farms will emerge.

1.6. Scope and Limitations of the Study

This study was conducted in Moyale district. Hence, the investigation is limited spatially to one district among several districts in the Borena zone and was limited to a cross sectional data. Moreover, the study is also limited to investigation of live goats and does not address value chain due to broadness of the value chain concept, and it does not include other livestock. Furthermore, the study does not address cross-border trade which cannot be captured by single study due to the multi-direction aspects of informal livestock cross-border trade. These limitations would not enable the study to capture various dynamisms of the subject under interest.

1.7. Organization of the Thesis

The thesis has been organized under five chapters. Chapter one constituted the introduction, which consists of the background, statement of the problem, research questions, objectives, significance of the study, and scope and limitations of the study. Chapter two presents review of literatures where the basic marketing concepts and relevant empirical evidences are presented. Chapter three deals with description of study area and research methodology briefly presented. Chapter four presents the results and discussion. Chapter five summarizes the main findings of the study, draws conclusion and provide appropriate recommendations.

2. LITERATURE REVIEW

2.1. Definitions and Concepts

Market: Market is a gathered group of buyers and sellers of a particular good or service. The groups that determine the demand of the product is buyers and that determine the supply of the products are sellers (Mankiw, 2015). According to Kotler and Armstrong (2016) market is defined as the set of definite and potential buyers and sellers of a product or service. These buyers share a particular need or want that can be satisfied through exchange relationships.

Market is physical place or arrangement that brings buyers and sellers of ruminants together with a view of the exchanges of small stocks for cash (Onyango, 2013). According to Olukosi *et al.* (2008) market is said to exist whenever a transaction is done between a buyer and seller, be it through physical contact, letter writing, telephone, and telex or through other means of communication.

Marketing: It is the procedure of scheduling and executing the conception, pricing, promotion, and distribution of ideas, goods, and services to create exchanges that satisfy customers and sellers objectives (Burnett, 2011). It is also defined as performance of all business activities involved in the flow of goods and services from the point of production until they are in the hands of the ultimate consumer (Panda, 2011).

Marketing is delivery of values to customers at profit. The basic function of marketing is to attract and retain customers at a profit (Fahy and Jobber, 2015). Marketing plays a vital role in an economy because it provides the means for competition to take place. In a competitive market place, businesses try to create new or better-quality products at lower prices than their rivals (Farese *et al.*, 2006).

Agricultural marketing: It is the process by which agricultural products flow physically and economically from the producers to the consumers in order to affect exchange of goods and

services that satisfy the needs of individuals, groups or the entire society. Generally, an effective and efficient marketing system enhances consumption, output and economic development (Olukosi and Isitor, 1990). Kotler (2002) also defined agricultural marketing as the performance of all business activities involved in the flow of food products from the point of initial agricultural production to the hands of final consumers.

Market Chain: It refers to a series of linked intermediary traders between the producer of livestock or other commodities and the final consumer. The series is also linked back ‘upstream’ from the producer to the input suppliers. Branching may occur at any stage of the chain. Market chain is the system that consists of actors and organizations, relations, functions, and product, cash and value flows that make possible the transfer of goods or services from the producer to the final consumer. Functions conducted in a marketing chain have three things in common; they use up scarce resources, they can be performed better through specialization, and they can be shifted among channel members (FAO, 2005). It can also be defined as the flow of commodities from producers to consumers that brings into place economic agents who perform complementary functions with the aim of satisfying both producers and consumers (Islam *et al.*, 2001).

Supply Chain: supply chain can be defined as producing a product or service and making it available to buyers. It requires building relationships not only with customers but also with key suppliers and resellers in the businesses. This supply chain consists of upstream and downstream partners which is from input suppliers, business service providers, product creator or producer experts, marketers (like wholesalers and retailers) to the final consumers (Kotler and Armstrong, 2016). Perreault *et al.* (2017) defined supply chain as the complete set of practices, facilities and logistic activities that are involved in acquiring material, converting them in to intermediate and finished product, and distributing them to customers.

Marketing channel: Marketing channel is set of interdependent organizations that range from the point of product origin to the final consumer that help make a product or service available for use or consumption by the consumer or business user (Kotler and Armstrong, 2016). This

channel may be short or long depending on kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam *et al.*, 2001).

Pastoralists: Peoples who herd or raise livestock in pastoral system. Pastoralists can further be defined in two dimensions. In the dimension of production it is a group of people who depends on animal husbandry concerned with the care, tending and use of grazing livestock in dry or cold rangeland areas. In the dimension of livelihood it is a group of people experiencing a subsistence living pattern of tending herds of large animals (Blench, 2001)

2.2. Approaches to the Study of Agricultural Marketing

The study of marketing involves various approaches. The most commonly used are functional, institutional, commodity and structure-conduct-performance (SCP) approaches.

2.2.1. Functional Approach

Functional approach to the study of agricultural marketing includes many activities that are executed in getting farm products from the producer to the final destination and this nature and size of the marketing functions will vary enormously according to the nature of the company and organization and the market that it serves (Baker and Hart, 2008). Using the functional approach, it is feasible to compare the costs of similar middlemen or against other middlemen doing the same job and/or different commodities and cost and benefits of different marketing functions like exchange (buying and selling), physical (processing, storage, and transportation), and facilitating (standardization, financing, risk bearing, and market information) (Cramers and Jensen, 1982; Kohls and Uhl, 1985).

2.2.2. Institutional Approach

Institutional approach to the study of agricultural marketing deals with the activities of business organizations or people involved in agricultural marketing. The institutional approach

focuses on the study of the various institutions, which perform the marketing activities. This approach is based on the identification of the major marketing channels and it considers the analysis of marketing costs and margins (Mandoza, 1995).

Marketing intermediaries include resellers, physical distribution firms, marketing service agencies, and financial mediators which help the firm promote, sell and distribute its products to final consumers. Physical product distributors help the firms stocks to move from the point of initial producer to the point of final consumer (Kotler and Armstrong, 2016). Middlemen offer many important services, such as making products available to customers at place and time required, breaking bulk and providing high-quality services such as merchandising and connection. Developments in distribution can have a significant impact on the performance of producers (Fahy and Jobber, 2015).

2.2.3. Commodity Approach

Commodity approach to the study of agricultural marketing considers a specific commodity or groups of commodities involved in marketing and thus analyse the functions and institutions involved in the marketing process. It study about what is being done to the specific commodity or group of commodities after it is transferred from its farm gate to the place of final destination (Kohls and Uhl, 1985). The approach is concerned with describing what is done to, how to handle the commodity more efficiently and it helps in identifying specific marketing problems of each commodity and the way to improve it (Purcell, 1979).

2.2.4. The Structure, Conduct, Performance Approach

The S–C–P paradigm is mainly focused on analyzing competitive conditions of the prevailing market framework. Basically, the participants of the market are evaluated based on the extent at which they affect performance and conduct of the market (Woldmiceal, 2008). The structure of the industry refers to factors such as technology, concentration, and market conditions. Conduct refers to how individual firms behave in the market; it involves pricing decisions, advertising decisions, and decisions to invest in research and development. Performance refers

to the resulting profit and social welfare that arise in the market. The S-C-P paradigm views these three aspects of industry as being integrally related. The casual view of industry asserts that market structure causes firms to behave in certain way. In turn this behavior or conduct causes resource to be allocated in certain ways, leading to either good or poor market performance (Baye and Prince, 2014).

Market structure is determined by the entry and exit decisions of individual producers. These decisions are driven by past profit rate and expectations of future profits which, in turn, depend on the nature of competition within the market. Essential market structure characteristics include the number and size distribution of the sellers and buyers, the type of product offered for sale, barriers to entry, and whether any asymmetry of information exists between buyers and sellers. Market conduct is determined by firm's pattern of behavior in executing its pricing and promotion strategy, research and development and its response to the realities of the market it serves. It can also be defined as the way in which buyers and sellers behave, both amongst themselves, and amongst each other (Johann, 2013). Market performance is the strategic end result of market adjustment engaged in by buyers and sellers. It is the appraisal of the extent to which the interactions of buyers and sellers in a market stimulate results that are consistent with social purposes (Ajala and Adesehinwa, 2008).

According to Onyango (2013), the relationship of the market players affects the conduct (either negatively or positively) and consequently affects the market performance and vice versa. The Structure-Conduct-Performance paradigm believed that firms' performance is highly related with the existence of concentration which directly leads to collusion among firms in the market and create monopoly power in which all the firms in the industry get monopoly profit (Kumlachew, 2012).

In S-C-P approach, structural components include marketing channels, amount marketed, degree of market concentration, and existence and non-existence of barriers to market entry. As market structure deviates from the paradigm of a perfect competition, the degree of competitive conduct will decline and there will be a consequent decrease in supply and

allocative efficiency and an increase in prices. This in turn implies that the performance of markets can be assessed based on the level of competition and efficiency in those markets (Williams *et al.*, 2006).

2.3. Methods for Evaluating Market Structure, Conduct and Performance

2.3.1. Methods for Evaluating Market Structure

Market structure describes characteristics that identify departures from perfect competition, which includes the number and size distribution of firms, the degree of entry and exit barriers, and whether or not products are differentiated (Tremblay and Tremblay, 2012). Market structure is determined by the entry and exit decisions of individual producers. These decisions are driven by past profit rate and expectations of future profits which, in turn, depend on the nature of competition within the market. Essential market structure characteristics include the number and size distribution of the sellers and buyers, the type of product offered for sale, barriers to entry, and whether any asymmetry of information exists between buyers and sellers (Johann, 2013).

Economists' commonly classify markets by assuming many buyers and then differentiating among markets by the number and distribution of sellers. In this context, markets may be classified as competitive (many sellers), monopolistic (a single seller), and oligopolistic (a few sellers). Another category that is sometimes used is monopolistic competition, which is defined as many firms selling similar but differentiated products. Markets are also classified by assuming many sellers and varying the number of buyers. A monopsony is defined as a single buyer, and oligopsony is defined as a few buyers. The oligopsony market structure is relevant for some commodity markets where many farmers are selling to a few buyers. Other market structures can be defined that depend on the varying combinations of numbers of buyers and sellers and of product differentiation (Tomek and Kaiser, 2014).

2.3.1.1. Market concentration

Market concentration is defined as the number and size distribution of sellers and buyers in the market. It plays great role of determination of market behavior within an industry because it affects the interdependence of action among firms. The greater the degree of concentration the greater is the possibility of non-competitive behavior (Iveta, 2012). When the number of active firms in the market is large, there is a decent chance that one of the firms may aggressively seek a profitable position and such aggression leads to intense competitive activity as firms react (Jain, 1999).

Concentration ratio (CR): Concentration ratio is a method used to measure market domination by small number of firms with static. It is the percentage of total output in the market supplied by the largest firms (Mankiw, 2015). The commonly used measure of market power, or seller concentration, is given by the proportion of total industry sales accounted for by the four large firms in the industry (Iveta, 2012). The greater the degree of concentration, the greater will be the possibility of non-competitive behavior, such as collusion, existing in the market (Johann, 2013).

Concentration ratio measures the percent of traded volume accounted for by a given number of participants. It shows whether an industry is dominated by a few large firms or many small firms. As a rule of thumb, literatures specify a four enterprise concentration ratio of 50 percent or more is indicative of a strong oligopolistic industry; 33-50 percent ratio denotes a weak oligopoly, and less than that un-concentrated industry. Thus, the more the market is dominated by a few large firms the large the concentration ratio will be (Wisdom *et al*, 2014). Concentration ratios are usually used to show the extent of market control of the largest firms in the industry and to illustrate the degree to which an industry is oligopolistic (Ariss, 2010).

Herfindahl index: Another measure of concentration in an industry can be expressed using the Herfindahl index. The Herfindahl index is simply the sum of the squares of the market percent shares for each firm within the industry. Industry's characteristics include profit

margins, concentration ratio, growth rate, capital intensity and specific workers skills. Profit margin determines the attractiveness for new firms to enter into the industry, but it could also be associated with imperfect competition. In the former case, the expected effect on entry is positive, while in the latter, the reverse is expected. The concentration is an indicator of the easiness to enter a market. It is easier to enter perfectly competitive industries in which many small firms produce standard products (Sekkat, 2010).

A market with an HHI less than 1,000 is regarded as competitive. HHI in the range below 1000 show a very low concentration, in the range 1000–1800 show a moderate concentration, in the range above 1800 show a very high concentration of the marketing system, whereas the index value equal to 10000 shows a full concentration monopoly (Iveta, 2012). If there were thousands of firms competing, each would have nearly 0% market share, and the HI would be close to zero, indicating nearly perfect competition. It also considers the number and size distribution of all firms. In addition, squaring the individual market share gives some more weight of the larger firms, which is an advantage over concentration ratio (Scarborough and Kydd, 1992).

Gini-coefficient (GC): Gini coefficient is an aggregate numerical measure of inequality ranging from 0 to 1 which is from perfect equality to perfect inequality respectively. The higher the inequality of output distribution; the lower it is, the more equal the distribution of output (Todaro and Smith, 2012). If Gini coefficient equals to one then the market is imperfect and if Gini coefficient is equals to zero the market is perfect and competitive. Gini coefficient is most easily calculated from unordered size data as the “relative mean difference,” that is the mean of the difference between every possible pair of individuals, divided by the mean size (Taru *et al.*, 2010). The problem associated with Gini-coefficient is that it favors equality of market shares without any regard for the number of equalized firms.

This study used concentration ratio to measure the structure of live goat market for its wide application and simplicity.

2.3.1.2. Barrier to Entry

New entrants can raise the level of competition in an industry; they have the potential to reduce its attractiveness. The threat of new entrants depends on the barriers to entry. High entry barriers exist in some industries, whereas other industries are much easier to enter. Key entry barriers include: economies of scale, capital requirements, switching costs, access to distribution, expected retaliation (Fahy and Jobber, 2015). A number of factors can create barrier to entry making it difficult for other firms to enter a business. One potential barrier to entry is the explicit cost of starting the business, such as capital requirements and economies of scale (Baye and Prince, 2014).

Economists describe many types of entry barrier, including high capital requirements, scarce raw materials, scale economies, favorable locations, patents and licenses. But the two most common barriers are the linked advantages of brands and core competences based on organizational effectiveness. The core competences of the business are the special technical and marketing skills built up by its operate which, within an effective organization, are deployed to continually update, innovate, and enhance the value it offers to its customers (Doyle and Stern, 2008).

2.3.2 Methods for Evaluating Market Conduct

Market conduct refers to strategies of the actors operating in the market or pattern of behavior which enterprises follow in adopting or adjusting to the market in which they sell or buy. Market conduct is measured using pricing strategies of market actors and terms of payment they used. In measuring market conduct, pricing role of market actors and mechanisms of pricing are evaluated. Terms of payment include payment in the form of cash, credit and or both (Johann, 2013).

The most common strategies that firms implement on their path towards economic growth are based on pricing strategies, channel structure and advertising strategies, which are seen as the

most effective tools to reach customers and to develop a sustainable firm's strategies (Marmullaku and Ahmeti, 2015). Pricing strategies is widely used evaluation methods which are activities aimed at finding a product's optimum price, typically including overall marketing objectives, consumer demand, product attributes, competitors pricing and economic trends. There are three methods used by managers to set prices; the first of these is cost-based pricing which reflects a strong internal orientation and, as its name suggests it is based on costs, the second is competitor-orientated pricing in which the major emphasis is on the price levels set by competitors and how individual firms price compare with those, the final approach is market-led pricing which focuses on the value that customers place on a product in the marketplace and the nature of the marketing strategy used to support the product (Fahy and Jobber, 2015).

2.3.3. Methods for Evaluating Market Performance

Market Performance refers to the ultimate result derived from the market. It encompasses the outcome from various market activities. Market performance may be assessed by use of the generated profit margin so that, market benefits can be quantified to particular players and ascertain largest and smallest market share. Market performance feeds off conduct and is reflected in the degree of production and allocative efficiencies, equity, and technological progress Lipczynski *et al.*, (2009). Market Performance can be evaluated by analysis of costs and margins of marketing agents in different channels. A commonly used measure of market performance is the marketing margin or price spread. Margin or spread can be useful descriptive statistics if it used to show how the consumer's food price is divided among participants at different levels of marketing system (Getachew, 2002).

Marketing margin

A marketing margin measures the share of the final selling price that is captured by a particular agent in the marketing chain. It refers to the difference between prices at different levels in the marketing system. The total marketing margin is the difference between what the

consumer pays and what the producer/farmer receives for his produce. In other words, it is the difference between retail price and farm price (Cramers and Jensen, 1982).

Marketing margins provide neither a measure of farmers' well-being nor of marketing firms' performance. However, they give an indication of the performance of a particular industry or an indication of the market's structure and efficiency. Marketing margins are the result of demand and supply factors, marketing costs, and the degree of marketing channel competition. Thus, margins reflect aggregate processing and retailing firm behavior which influence the level and variability of farm prices and may influence the farmer's share of the consumer food dollar (Tomek and Robinson, 1990). Mankiw (2003) defined competitive market as a market in which there are many buyers and sellers so that each has a negligible impact on the market price. As opposed to a competitive market structure where all market players are presumed to operate and grow in an environment with unconditional freedom, monopoly structure has a conditional institutional framework that in many cases does not favor majority of the market players (Onyango, 2013).

Marketing margin of traders and brokers vary along different channels. Producer's share of final price in formal channel is higher than that of informal, which shows that formal channel is preferable for pastoralists. However traders and brokers attain relatively better market margin in informal channel, it is difficult to compete for formal traders with informal traders in the district. That is why most of the traders and pastoralists take-part in informal channel (Zekarias, 2017).

Marketing costs

Marketing costs are those costs which are incurred to perform various marketing activities in the movement of live goats from producer household to consumer. The more complex and lengthy the marketing chain the higher are the marketing costs. Thus simple comparison of farmer price with retail prices is a poor indicator of marketing efficiency, as it does not take in

to account the costs it takes in moving produce along the marketing chain from farmer to consumers (Shepherd, 2007).

Agricultural marketing costs are costs incurred between the moment an agricultural product leaves the farm and the moment it is purchased by end users or consumers. These costs vary widely across agricultural commodities, depending for example on the extent of processing or the distance between production areas and consumption centers. The main costs incurred are in time, form, place and possession. These could include payment for all initial assemblage, storage, processing, transporting, warehousing and retailing (Wandschneider and Yen, 2006). Marketing costs can be defined as the sum of charges paid for any marketing activity such as cost of transportation, and cost of capital invested in trading and transaction costs including fees paid to intermediaries, trucking and trekking, costs for agents for entry and exit of animals, administrative charges as well as official and illicit taxes. The proportions indicate the significance of each cost item against other marketing cost component (Hailemariam *et al.*, 2009).

2.4. Small Ruminants Production and Marketing Systems in Ethiopia

Small ruminant production systems in Ethiopia is classified traditional into four subsystems: small ruminant in annual crop-based system located in northern, northwestern, and central highlands; small ruminant in perennial crop-based, mostly found in southern and southwestern highlands; small ruminants in cattle based systems, these systems usually exist in agro pastoral and semi-arid areas; small ruminant dominated systems found in pastoral and arid areas of eastern and northeastern Ethiopia, where shoats are the dominant livestock species (Getahun, 2008).

In Ethiopia shoat are reared in extensive systems with no or minimal purchased inputs. Small ruminants are virtually kept as scavengers, particularly in the mixed crop–livestock systems. Traditionally extensive systems of production share common characteristics such as limited number of animals per unit area, low productivity per animal, relatively limited use of

improved technology and use of on-farm by-products rather than purchased inputs (Solomon *et al.*, 2010).

Shoat production and productivity in Ethiopia are generally low. This is mainly due to low per capita production. Low productivity is in turn a result of a combination of low reproduction rate, high mortality rate and slow growth rate. Low per capital production levels are reflected in total production volume. Flock dynamics and off-take rates can be taken as proxy pointers to production volume. There are indications that average annual growth rate in the livestock population is slow, stagnant or negative. Off-take rates due to sale are low, being exceeded by mortality rates in some cases indicating low flock productivity (Solomon *et al.*, 2010).

The livestock marketing structure follows a four-tier system, of which different actors involve in buying and selling of livestock. Some traders may specialize in either small or large animals. Those small traders come from different corners bring their livestock to the local market. Traders purchase a few large animals or a fairly large number of small animals for selling to the secondary markets. In the secondary market, both smaller and larger traders operate and traders and butchers from terminal markets come to buy animals. In the terminal market, big traders and butchers transact larger number of mainly slaughter type animals. From the terminal markets and slaughterhouses and slabs, meat reaches consumers through a different channel and a different set of traders/businesses. Livestock market locations in primary and secondary markets are typically not fenced; there are no permanent animal routes, no feed, no watering and infrastructures. Yet buyers and sellers are subjected to various service charges by the local authority as well as other bodies (Kefyalew, 2012).

The major import animals are sheep, accounting for 83% of the total, followed by goats (14%). Cattle and camels constitute 3%. At the national level, shoats contribute for about 40% of fresh skins and 92% of the value of semi-processed skin and hide value of country's export (Adane and Girma, 2008). Over 90% of the meat exported to different countries is shoat meat. Ethiopian shoat meat is exported mainly to the Middle East and North Africa (Legese *et al.*, 2014).

Live goat exports have always been below those of sheep. From a historic high just above 31,000 in 2007, exports fell to 5100 in 2008. A recovery that started in 2009 reached 11,300 and 14,800 in 2012. Goat exports are expected to follow the historic trend, reaching 17,000 in 2020 and 21,000 in 2023 (Legese and Fadiga, 2014).

Livestock that come from developed countries have a disease free status that has given them comparative advantages within their regions, Europe and the Middle East. As compared to others, Ethiopia has certain advantages on its competitors which it can capitalize upon. These are the preferred animal types, location and stable supply. The Ethiopian livestock (cattle and shoat) are the preferred breeds in the Middle East, as they are organically produced and the meat is of good tastes. The proximity of the country to the Middle East has also cost advantage due to lower transport costs (Hailemariam *et al.*, 2009).

Live animal exports are high, as an estimated 1.6 million livestock are exported from the country annually although the vast majority of these (approximately 1.4 million) pass through informal channels (Elisabeth, 2010). This being the potential for export, the actual performance has remained very low, leaving most (from 55% to 85%) of the projected livestock off take for the unofficial cross-border export and the domestic market (Kefyalew, 2012).

During the seven years up to 2012, goats are the major species informally exported at 49% of the total, followed by cattle with 27%. The largest difference between formal and informal exports is goats (informal goat exports are more than 63 times formal exports), followed by cattle and sheep. About 74% of goats cross the border through Somali region, 24% through Afar region, 1% through Oromia and 1% through SNNPR (Legese and Fadiga, 2014).

According to Zekarias and Teshale (2015), total economic value of livestock traded via formal channels from Moyale district to north is 17 million birr, while the value of the livestock trade

through informal channels from Moyale district to Kenya is in excess of 27 million birr. The government collects less than 47,000 birr in taxes from this trade.

Small ruminants are mainly kept for income generation in many parts of Ethiopia to obtain cash income for household expenses, such as buying grains for household consumption, buying agricultural inputs such as fertilizer and seed and paying the medical and school expenses of household members (Urgessa *et al.*, 2012). However, traditional small ruminant production technologies and practices render the production and productivity as well as benefits to producer falls below expectations. This is due to health constraints, inadequate feed, low genetic potential and various management problems. Infectious diseases pose major constraints to small ruminant production in the country (Gizaw *et al.*, 2010).

Demand for Ethiopian small ruminant has increased both for local and export markets. Shoa meat is consumed by domestic and foreign consumers. Over 90% of the meat exported to different countries is shoa meat. Ethiopian shoa meat is exported mainly to the Middle East and North Africa. However, domestic demand for shoa meat is quite seasonal as it follows the religious calendar of fasting periods and festivities such as New Year, Christmas, Easter, Ramadan and Arafa. Shoa milk and milk products are consumed by domestic consumers. Consumption of small ruminant milk gives high nutritional value and considers it as a medicine and consumed either in its fresh state (boiled whole milk) or skimmed milk (Legese *et al.*, 2014).

Goat production provides a number of socio-economic benefits which improves the livelihoods of communities. Regular cash income from selling of goats was the most important reason for keeping goats, followed by other tangible and intangible benefits (Charles *et al.*, 2015).

2.5. Analytical Framework in Market chain analysis

2.5.1. Determinants of Market Participation and Supply

There are alternative analytical methods to handle factors that affect the market participation and number of goats supplied. Ordinary Least Squares (OLS) is applicable when all households participate in the market. But in reality not all households participate in a specific commodity market. Some households may not prefer to participate in a particular market in favor of another, while others may be left out by market conditions. If the OLS regression is estimated excluding the non-participants from the analysis, a sample selectivity bias can be introduced into a model and OLS become biased and inconsistent.

Other important model in this category is the Tobit model. Tobit model is an extension of the Probit model and it deals with the problem of censored data, level or magnitude of the data (Verbeek, 2008). In case of Tobit model, pastoralists market participation is modeled just as one decision problem and considers whether the decision to participate in the market or not and how much to sell are assumed to be made jointly and hence factors affecting the two level decisions are influenced by similar factors.

Double Hurdle model also known as two tier models, is corner solution model in which zero values associated with non-participation are assumed to be outcome of rational choice (Wooldridge, 2002). Double hurdle model is an extension of Tobit model which relaxes the restriction imposed by Tobit model by allowing different mechanisms to determine the discrete probability of participation and volume of transaction, conditional on participation.

The number of goat sold is observed only for households that participate in the goat market, in this case there may be a selectivity bias. Hence, Heckman two-stage procedure is appropriate model to solve this issue. Heckman two-step procedure allows the producer to decide whether to participate in a particular market, and if so, to supply animals to the market. The first step of the Heckman procedure 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 step ‘outcome’ equation’ that explains factors affecting quantity of goats supplied. The inverse Mill’s ratio is a variable for controlling bias due to sample selection. If the coefficient of the ‘selectivity’ term is significant then the hypothesis that an unobserved selection process governs the participation equation is confirmed. Moreover, with the inclusion of extra term, the coefficient in the second stage ‘selectivity corrected’ equation is unbiased.

Among these alternative analytical methods in this study Heckman two-step selection model was used to analyze determinants of participation in goats market and its supply to the market, since it controls selectivity bias.

Different studies such as Alealign (2017), Jemal (2017), Tessema (2017), Ababo (2016), Feyissa (2016) and Shambel (2013) also employed Heckman two-step model in order to identify factors that affect market participation and amount of crop and livestock products supplied to the market.

2.5.2. Determinants of Market Outlet Choice

The economic outcome to model sometimes is a discrete choice among a set of alternatives, rather than a continuous measure of some activity. The individual faces a pair of choices and makes that choice between the two that provides the greater utility (Greene, 2012). The choice over two alternatives can be modeled in to two popular functional forms, the logit and the probit. These two models are similar except differ only in the tails; the logit resembles logistic distribution, whereas the probit have standard normal distribution. Therefore, these two forms give similar predictions unless there are an extreme number of observations in the tails (Baltagi, 2011).

The choice decision over the different groups of market outlet can be modeled in two ways; by either multinomial logit or multivariate probit regression analysis. One of the underlying

assumptions of multinomial models is the independence of irrelevant alternatives that is error terms of the choice equations are mutually exclusive (Greene, 2012). Thus, multinomial models are appropriate when individuals can choose only one outcome from among the set of mutually exclusive, collectively exhaustive alternatives. However, the choices among the market outlet are not mutually exclusive as producers are selling to more than one market outlets at the same time and therefore the random error components of the market outlets may be correlated (Arinloye *et al.*, 2014). Multivariate probit model which is an extension of the probit model would be to allow more than one equation, with correlated disturbances. Thus an individual only choose a particular alternative that gives them the greater utility possible (Greene, 2012).

In this study, the researcher used a multivariate probit model for it capture the influence of the set of explanatory variables on each of the five outlet choices in the study area, while allowing the error terms to be freely correlated.

Different studies such as Takele *et al.* (2017), Kassa (2017), Engida (2017), Melkamu (2016), Addisu (2016) and Nuri (2016) also employed multivariate probit model in order to identify factors that affect producers' market outlets choices.

2.6. Review of Empirical Studies

2.6.1. Livestock Market Chain Actors

Solomon *et al.* (2017) who did study on analysis of market structure, conduct and performance of beef cattle in Dugda district identified commodity chain actors such as producers, small traders, large traders, small-scale feedlot operators, butchers and other farmers who purchase for draft purposes. Zekarias (2017) mentioned actors in cattle market chain in Moyale district as pastoralists, small traders, medium traders, big traders, hotels and restaurants, and consumers. Gezehagn (2015) highlighted the involvement of various actors who participated

in the beef cattle value chain of the Konso district. These actors include producers, butchers, hotels and restaurants, small traders, large traders and consumers.

Gebremariam and Yemiru (2015) identified market chain actors in live goat market chain in Asaita district. These actors include pastoralists, local collectors, small-scale traders, medium-scale traders, butchers and hotels, and consumers. Hassan *et al.* (2013) explained in their study on analysis of shoats value chain in Shinelle district, that the primary actors in the shoats value chain are producers (pastoralists), brokers, collectors, small-scale traders, large-scale traders, hotels, shoats butchers and individual and domestic consumers. Zemeda (2016) explained the actors such as producers, collectors, small traders, large traders, hotels and restaurants, butchers, and consumers that participate in small ruminant value chain in Tahtay Adehabo district.

2.6.2. Structure Conduct and Performance of the Market

Solomon *et al.* (2017) have conducted a study on analysis of structure, conduct and performance of beef cattle in Dugda district, East Shoa zone. The authors applied concentration ratio and barriers to entry to identify market structure of beef cattle in the study area; price setting strategy and Buying and selling strategies to measure market conduct; and channel comparison and marketing margin to analyze market performance. The result indicated that the concentration ratios for the four large enterprises (CR4) for beef cattle market in the study area was 93% which indicated that the beef market in the study area was characterized by a strong oligopolistic market structure. The study revealed that trade license and capital requirements are barrier to entry to the beef cattle market. The survey result indicated that beef price decision was set by negotiation between farmers and traders. The survey result again indicated that the selling system was based on cash payment. The authors further revealed that the producers' share of final selling price or the consumer's price was found to be highest when producers directly sell to consumers.

Jemal (2017) who conducted a study on analysis of camel milk value chain in Degahbour woreda, Jarar zone, Somali region, Ethiopia used concentration ratio to identify market structure; pricing strategies to assess conduct; and channel comparison and marketing margin to assess camel milk market performance. The study showed 59%, 63%, and 87% of buyers' concentration ratio for Hodale, Obale and Aga-sur kebeles respectively which indicates the existence of strong oligopsonistic market. The study results again revealed that the price is mostly determined by the interaction of the market forces. The study further identified that gross marketing margin increases with the length of the vertical chain and the associated costs. The consumers of the main market were paying a relatively higher price where the gross marketing margins were higher which in turn diminished the producers' share in some channels.

Mowlid (2015) who conducted a study on performance of cattle marketing in agro-pastoral area of Fafan zone of Somali region used market concentration, barriers to entry and the degree of transparency (market information) to evaluate the structure of cattle market; traders purchasing strategies and selling strategies to assess cattle market conduct; and marketing costs and margins to measure performance of cattle market. The author concluded that Lafa isse and Obosha cattle markets were characterized by weak form of oligopolistic market because in these markets, the four largest traders handled 36%, 39% of the total volume of cattle traded in each market, respectively. The study result again showed lack of capital as one of the real barrier to enter into the cattle markets in the study area. About 45% of the sampled traders set selling price themselves. This indicates that the cattle traders had significant role in price setting. The result further revealed butchers incurred the highest cost of marketing (245 Birr/head) while the pastoralists incurred 104.5 Birr/head.

Gezehagn (2015) using market margin to measure market performance of beef cattle found that producers in beef cattle value chain get lower profit margin relative to other value chain actors. By just buying from the farmers and selling to consumers, other actors took 86% of the total profit margin which means butchers, smaller traders, hotel and restaurant owners and larger traders are responsible for 16%, 15%, 25% and 29%, respectively. While farmers,

performing all the work of producing beef cattle and bearing the associated risks, took only 14% of the profit margin.

2.6.3. Determinants of Market Participation Decision and Marketed Surplus

Berhanu (2012) used Heckman two stage estimation procedures to identify factors that determine market participation decision and volume of dairy milk supply in Wolaita zone. The study found that age of household head, milk yield per day and milk cow ownership are positively and significantly affect milk market participation. While dairy farming experiences and landholding size affect milk market participation negatively and significantly. In addition, the study found that the volume of milk supply affected positively and significantly by milk yield per day. While on the other hand it is negatively and significantly affected by household size and dairy farming experience.

Shambel (2013) applied Heckman two steps model to identify factors that determine farmers' cattle market participation decision and value of cattle marketed in Wolaita zone. The study identified total number of cattle owned, access to grazing land, access to market and lagged price were the positive and significant determinants of market participation decision while age of household negatively and significantly affected the participation decision. On the other hand the value of cattle marketed, access to credit, total number of cattle owned, average lagged price of cattle, access to market information and number of new born calves affected the value of cattle marketed significantly and positively.

Demissie *et al.* (2014) used Heckman two stages econometric model to identify factors that determine market participation decision and marketed surplus of cow milk of the households in Gursum and Babile districts. The study revealed that milk market participation decision is positively affected by family size, access to market information, number of milk cow and income from non-dairy sources. In the same study, the marketed milk volume was found to be positively and significantly affected by access to milk market information, number of milk cow, income from non-dairy sources and market price of cow milk. In addition, the study

revealed that access to livestock extension service negatively and significantly influenced the marketed milk volume.

Gezehagn (2015) used Heckman two stage econometric estimation model to identify the determinants of beef cattle market participation decision and number of beef cattle supplied to the market in Konso district. The study found that sex of the household head, age of the household head, household size, distance from farmland to provide feed, access veterinary service, body condition of beef cattle and access to credit service have positively and significantly affected beef cattle market participation of the sample households. The number of beef cattle supplied to the market is affected negatively and significantly by the access to veterinary service, distance from the nearest market and access to credit while it is positively and significantly affected by the household income.

Zemeda (2016) used Heckman two stages econometric model to identify the determinants of small ruminants market participation decision and level of participation in Tahtay Adyabo District, Tigray, Ethiopia. She found that small ruminant market participation is positively and significantly affected by experience in small ruminant production, family size, access to market information, non/off farm income and access to veterinary service. While on the other hand the small ruminant market participation is negatively and significantly affected by distance to the nearest livestock markets, other livestock owned and distance to all weather roads. In addition, the study found that the number of small ruminant supply to the market is affected positively and significantly by access to credit, experience in small ruminant production, non/off farm income and access to veterinary service. While it is negatively and significantly affected by distance to all weather roads and distance to the nearest livestock market.

Zekarias (2017) found that the number of cattle owned and number of camel owned affected live cattle market participation positively and significantly. In the same study he found that total number of cattle owned affected the supply of live cattle positively and significantly

while it is affected negatively and significantly by age of household head and amount of income obtained from non-cattle market.

Jemal (2017) used Heckman two steps selection model and found that educational status of the household heads, membership in milk selling group and access to information had significant and positive relation with camel milk market participation decision of the producer households. On the contrary, income from non-camel milk and distance to nearest market center negatively and significantly influenced camel milk market participation decision of the producers. Furthermore, access to information and quantity of camel milk produced were found to have positive relation with volume of camel milk sales to the market; while, distance to market center, number of milking camel owned and inverse Mill's ratio (LAMBDA) had significant negative impact with volume of camel milk sales of the producer households. The study also revealed that access to information and distances to markets were the common underlying factors that have determined both participation decision and the market supply of camel milk in the study area.

2.6.4. Determinants of Market Outlet Choice

Berhanu (2012) found that access to dairy extension services, dairy farming experiences, landholding size and cooperative membership affected cooperative milk market outlet positively and significantly as compared to accessing individual consumer milk market outlet. While the study revealed that as compared to individual consumer milk market outlet, access to cooperative milk market outlet is negatively and significantly affected by price offered by market outlets and milking cow ownership. The same study revealed that milk cow ownership and access to dairy extension services positively and significantly affected access to hotel/restaurant milk market outlet as compared to access to individual consumer milk market outlet. While distance to the nearest urban center negatively and significantly affect access to hotel/restaurant milk market outlet as compared to individual consumer milk market outlet.

Mutura *et al.* (2015), in their analysis of the vertical and horizontal integration as determinants of market channel choice among smallholder dairy farmers in lower central Kenya, found that number of milking cow negatively and significantly related to choice farm gate and through middleman market channels and positively related to choice of cooperative market channel. They added that farmers training and market information positively and significantly related to choice of own distribution marketing channel over farm gate and middlemen channels, while level of education negatively related to choice of middlemen and positively related to choice of cooperative market channel.

Nyaupane *et al.* (2016) used multivariate probit model to identify farmer's selection of goat meat marketing channels and found that larger-scale producers sell through volume buyers (wholesalers and cooperatives) as they can minimize per-animal transaction costs associated with individual animal. Producers selling higher percentages of animals for slaughter were greater users of dealers, brokers, and meat packers; live auctions; and cooperatives; sold more goat meat, and were less likely to sell directly to consumers.

Engida (2017) used multivariate probit model to identify factors affecting coffee market outlet choice and found that the probability of choosing private trader market outlet was significantly affected by quantity of coffee supplied, education level of household, land allocated under coffee, distance to nearest market, and off/nonfarm income. The probability of choosing cooperative market outlet was significantly affected by quantity of coffee supplied, years of coffee farming experience, land allocated under coffee, cooperative membership, distance to nearest market and access to transport. The probability of choosing rural collector market outlet was significantly affected by quantity of coffee supplied, household size, cooperative membership, distance to nearest market and frequency of extension contact. Similarly, the probability of choosing consumer market outlet was significantly affected by household size and off/non-farm income.

Melkamu (2016) applied multivariate probit model and found that quantity produced, value addition, distance to market, distance to roads, non/off farm income, current price, potato

market experience, sex of the household head, family size, and total livestock number (TLU) significantly affected farmers' market channel choice decisions. Sultan (2017) also indicated that the likelihood to choose wholesalers market outlet was significantly influenced by frequency of extension contact, distance from market place, own price of the commodity and membership to cooperative as compared to accessing assemblers wheat market outlet. The likelihood of accessing cooperative wheat market outlet was significantly influenced by price given to the commodity at different outlets as compared to accessing assembler market outlet. Similarly the likelihood of accessing processors market outlet was significantly influenced by price of commodity given at different market outlets, ownership of transportation facilities and distance of processors from production place.

Takele *et al.* (2017) applied multivariate probit model and indicated that variables such as family size, distance to the market, quantity of mango produced and price offered are the significant determinants of the choice of wholesale market outlet. Family size, distance to the nearest market, quantity of mango produced, price offered and access to non-farm income significantly determined farmers' choice of collector market outlet. The choice of retailer market outlet is determined quantity of mango produced and price offered. Quantity of mango produced, price offered and access to market information determined consumer market outlet choice.

2.7. Conceptual Framework of the Study

To structure the research paper and to make efficient and effective data collection guide, the conceptual framework is needed to be developed. Conceptual framework helps to indicate the most useful area in which to focus the limited research resources, and ensure that data collected are relevant to meet the objectives of the research (Scarborough and Kydd, 1992).

The conceptual framework of this study indicates how different factors influence goat market participation, number of goat supplied and households' choice of outlets. Demographic, socio economic and institutional factors are categorized as the factors determining the goat market

participation decision, number of goat supplied and households' choice of outlets. The improvement in market participation, increment in the number of goat supplied and better market outlets choice can enhance development of the subsector, improves goat producers share and reduce poverty.

Depending up on the review of the literature the conceptual framework shown in figure 1 were developed to depict the most important variables expected to influence households' goat market participation decision, number of goat supplied and producer's outlet choice in the study area.

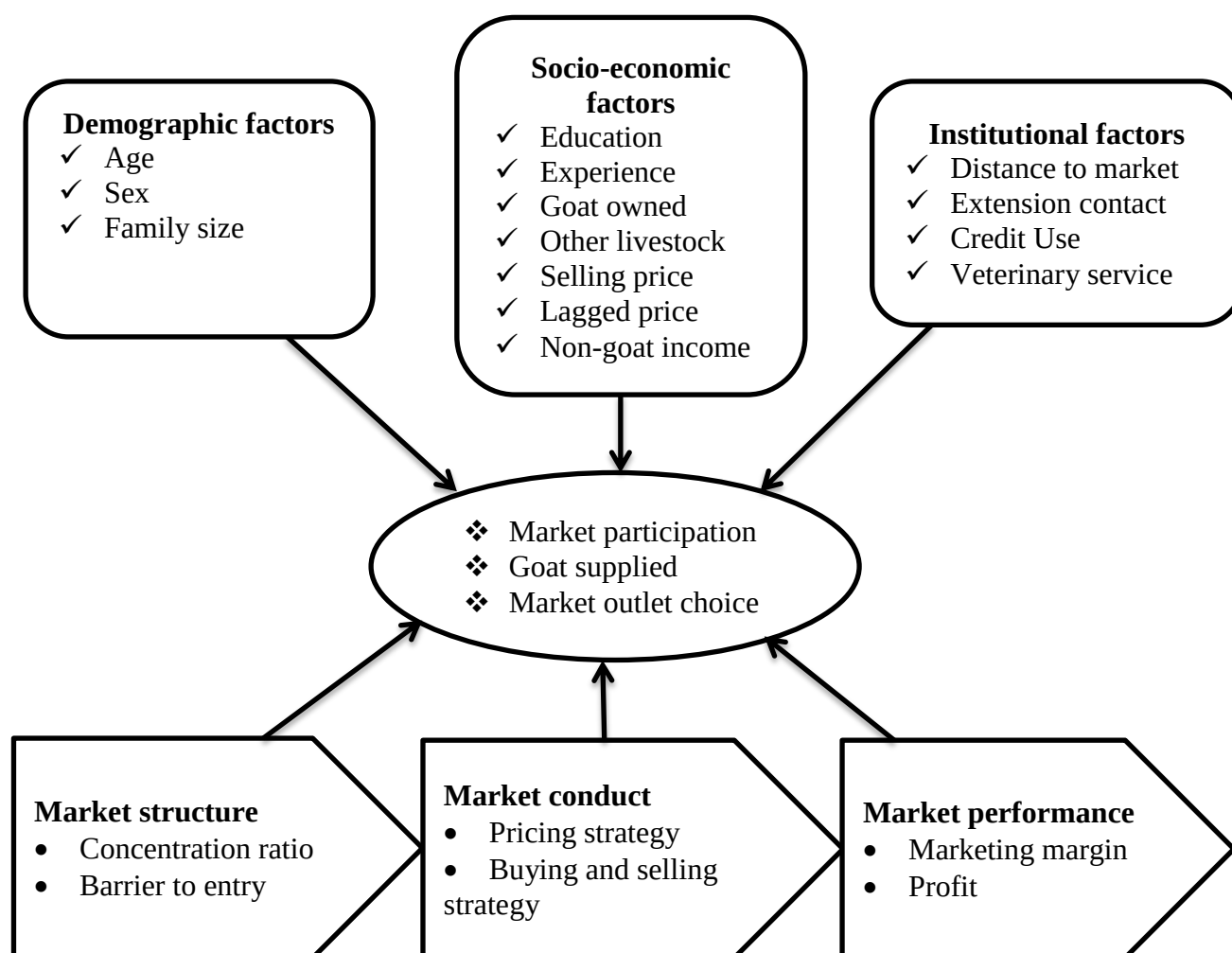


Figure 1: Conceptual framework of the study

Source: Own compilation from literature review

3. RESEARCH METODOLOGY

This chapter presents description of the study area; data types, sources and methods of collection; sampling technique and sample size; methods of data analysis both descriptive and econometric analysis; and definition of variables (both dependent and independent variables) and working hypothesis.

3.1. Descriptions of the Study Area

Moyale district is one of the thirteen districts in Borana zone and lies about 770km south of Addis Ababa, The districts has an area of 14,810km² and is divided into 19 kebeles, two of which are in Moyale Town (Desta *et al.*, 2009). Moyale Town is divided between two countries and includes two of Ethiopia's regions. The larger part is in Ethiopia's Oromia and Somali regions and the smaller part in Kenya. It is a busy market for the informal and formal trade of food commodities and livestock (FAO, 2013).

According to Moyale District Office of Statistics (MDOS) estimation report (2017), Moyale district has a total population of 142,084 of which male population is 67,298 and female population is 74,790. About 56.34% of the inhabitants practiced Muslim as their religion, while 38.68% of the population practiced traditional beliefs, 2.88% were Protestant and 1.99% practiced Ethiopian Orthodox Christianity.

According to socio economic profile of the Borena zone, the survey of the land in Moyale district shows that 9% is arable, 60% pasture, 21% forest and the remaining 10% is considered swampy, degraded or otherwise unstable. The district borders with Dawa River in the North, Kenya in the South, Somali region in the East, and Dire district in the West. Among others, the major local languages spoken, which are defined by geographic location and ethnic groups in the study area are Oromic, Somali, Amharic, Burji, Wolayta, Silt'e and others. The altitude of this district ranges from 1150 to 1350 meters above sea level. The geographical coordinate of the area is 394°59.880" E longitude and 334°9.012" N latitude (TipTopGlobe, 2009).

The population of livestock in Borana Zone was estimated to be 1,056,040 cattle, 573,369 sheep, 868,571 goats and 51,607 camels (CSA, 2017). The livestock population of Moyale district was estimated to be 48,863 cattle, 58,792 goat, 13,861 sheep, 14,540 camel, 4,725 donkey, 14 mule and 14,446 poultry (MDPDO, 2017).

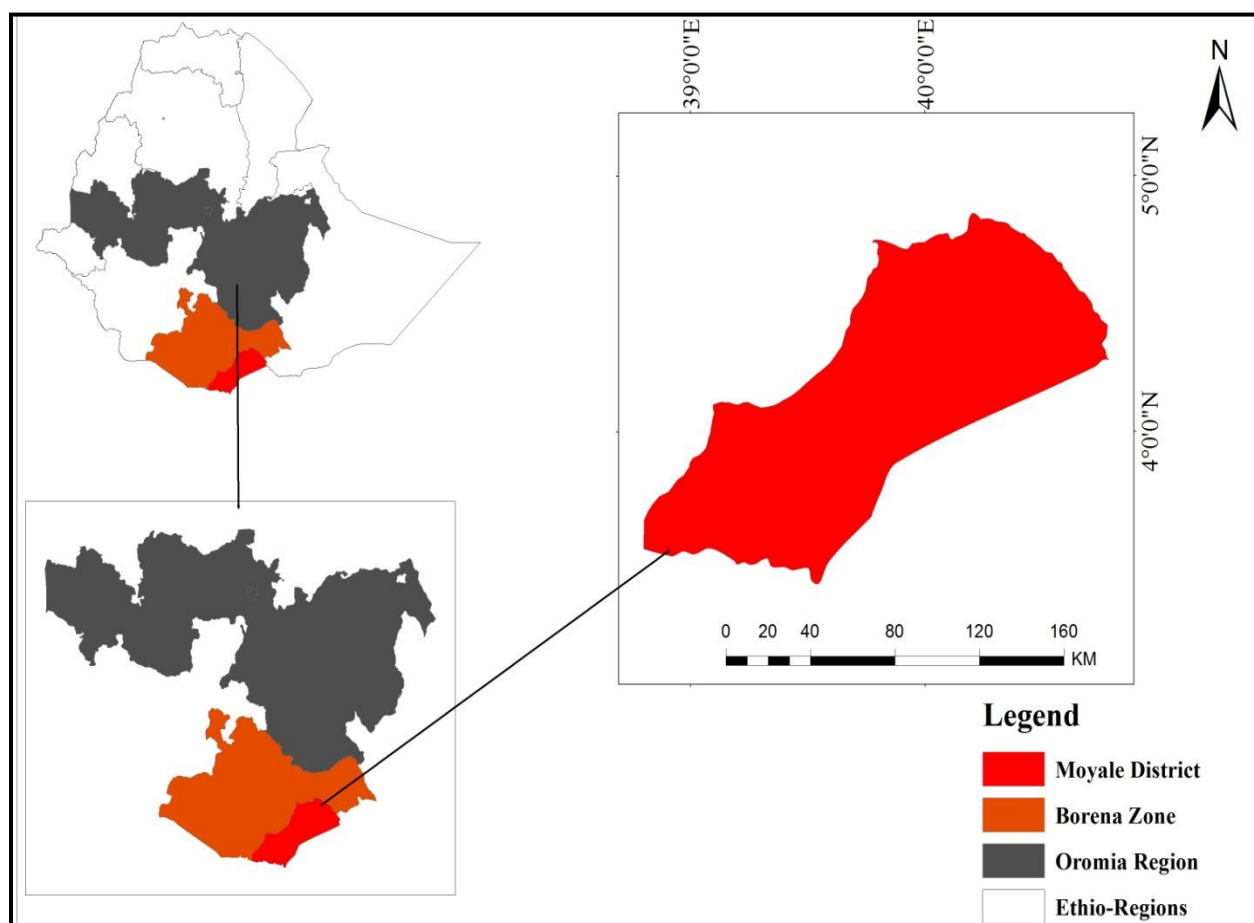


Figure 2: Geographical location of Moyale district

Source: GIS Map

3.2. Data Types, Sources and Methods of Collection

Both primary and secondary data were used in this study. From secondary sources, the study requires data on price, output, and number of licensed goat traders, goat marketing system and legal requirements to enter in to goat trading business. Secondary data were collected from different records of district office of agriculture, MDOF, MDOS, MDPDO, CSA, web sites and other relevant sources. To collect primary data, structured questionnaires were used. The questionnaire were pre-tested and amended based on feedbacks from the pre-test. Personal observations and group discussions with community members were also done for triangulation. The data were collected using two types of questionnaires, one for goat producers focusing on factors affecting goat market participation and market supply; the other for goat traders focusing on traders' financial capital, marketing strategies, annual number of purchase and sell, marketing cost and margins, price, demographic and social economic characteristics of traders and major goats marketing channels of the study area.

Trained enumerators were used to collect data under the supervision of the principal researcher. Enumerators were given training by the researcher on data collection, interview techniques and on how to approach respondents.

3.3. Sampling Technique and Sample Size

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3.3.1. Producers

Goats producing *kebeles* and sample households were selected by utilizing a two-stage sampling procedure. From 19 *kebeles* in the district 10 goat producing *kebeles* were purposively selected. At the first stage, three representative *kebeles* namely Kabanawa, Mado Migo and Chamuk were selected randomly from selected 10 goat producing *kebeles*. In the second stage, from three randomly selected *kebeles*, 196 sample households head were selected randomly based on the probability proportional to size. Sample size of goat producers were determined by using

Cochran (1977) formula which is developed to calculate a representative sample for proportions by considering the 95% confidence level and 7% level of precision. The formula is:

$$n = z^2 pq / e^2 \quad 1$$

Where, ' n ' is the sample size of goat producer households ' z ' is the selected critical value of desired confidence level ($z = 1.96$) and e is the desired level of precision ($e = 0.07$), p is the expected proportion of market participants from population of the goat producers ($p = 0.5$) and $q = p - 1 = 0.5$. Hence, the sample size is:

$$n = \frac{1.96^2 \times 0.5(0.5)}{0.07^2} = 196$$

The distribution of goat producers and sample households are given in the table 1.

Table 1: Sample size distribution for each sample *kebeles*

Name of <i>kebeles</i>	Number of goat producing household	Number of sample household
Chamuk	6,776	45
Kabanawa	14,017	94
Mado Migo	8509	57
Total	29,305	196

Source: Own computation based on *kebele* administration data, 2017

3.3.2. Traders

Sampling of traders was difficult due to lack of complete data on the number of goat traders. A total of 32 traders (8 large-scale traders, 14 small-scale traders and 10 collectors) were taken based on the number of goats marketed in order to include the top largest traders in the analysis. Discussions were also made with key informants (brokers, cooperative members, hotels and restaurant owners, and livestock extension experts from Moyale District Pastoralist Development Office), for cross checking the survey result and to control the consistency of the responses.

3.4. Methods of Data Analysis

Two types of data analysis, namely descriptive statistics and econometric model were used to analyze data.

3.4.1. Descriptive Statistics

Descriptive statistics such as frequencies, percentages, mean and standard deviation were used to describe demographic, socio-economic and institutional characteristics of goat producers and traders. Test statistics such as t- and χ^2 -tests were also used. In addition, market concentration ratio and marketing margin were used along with qualitative description of barriers to entry and traders pricing strategy and mode of exchange to analyze market structure, conduct and performance of goats market in the study area.

3.4.1.1. Market structure

Market concentration ratio

Concentration ratio is one of the commonly used measure market structure, which refers to the number, and relative size distribution of buyers and sellers in the market.

It is given by:

$$C = \sum_{i=1}^r S_i \quad i=1,2,3,4. \quad (2)$$

Where, S_i is the percentage market share of the i^{th} firm and r is 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 which is an indication of a strongly oligopolistic industry, 33-50 % indicate a weak oligopoly and less than that is a competitive industry. The problem associated with this index is the arbitrary selection of the number of firms that are taken to compare the ratio (r).

Barriers to entry

The existence of barriers to entry, the more it will deter new entrants and long-standing firms use their power to their advantage. In fact interviewing traders about barriers to entry might be difficult since all are in the market. Rather, observation of the age, sex, and ethnic distribution of traders, employees of different sizes of enterprises and the extent to which fluctuations in the number of active traders creates rises and falls in profitability can be considered (Scarborough and Kydd, 1992).

3.4.1.2. Market conduct

Pricing strategies is widely used evaluation method of market conduct which are activities aimed at finding a product's optimum price, typically including overall marketing objectives, consumer demand, product attributes, competitors pricing and economic trends (WebFinance, 2009). There are several pricing strategies; the basic four are: Premium pricing, penetration pricing, economy pricing and skimmed strategy (Bennett, 2011).

3.4.1.3. Market performance

Marketing margin

Estimates of the marketing margins are the best tools to analyze market performance. Marketing margin will be calculated by taking the difference between the final price paid by the consumer and the price received by the producer. Calculating the total gross marketing margin will be done by using the following formula. Computing the Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as a percentage (Mendoza, 1995).

$$\text{TGMM} = \frac{\text{End buyer price} - \text{First seller price}}{\text{End buyer price}} \times 100 \quad (3)$$

Where, TGMM is useful to introduce the idea of ‘producer’s participation’, ‘farmer’s portion’, or ‘producer’s gross margin (GMMP) which is the portion of the price paid by the consumer that goes to the producer. The producer’s margin is calculated as a difference:

$$\text{GMMP} = \frac{\text{End buyer price} - \text{gross marketing margin}}{\text{End buyer price}} \times 100 \quad (4)$$

Where, GMMP is the producer's share of consumer price

Precise marketing costs are frequently difficult to determine in many agricultural marketing chains for the reasons that costs are often cash and imputed, the gross and not the net marketing margin will be calculated. Thus, the marketing margin in this study will be understood as gross marketing margin (Scott, 1995).

3.4.2. Econometric Analysis

This part of the analysis deals with identifying the determinants of household’s market participation and supply of goat and also identifying determinants of goats’ market outlets choice. For managing this, appropriate model were Heckman two-step procedure model for the former and multivariate probit model for the latter.

3.4.2.1. Determinants of household’s market participation and supply of goat

Heckman two-steps selection model was found to be appropriate to analyze factors affecting goat market participation decision and factors affecting number of goats supplied to the market simultaneously since it controls selectivity bias.

Specification of the Heckman two-step procedure is given written in terms of the probability of goat market participation (GMP), and goat market supply (GMS) is:

The participation Equation/the binary probit equation

$$Y_{1i} = \chi_{1i}\beta_1 + u_{1i} \quad u_{1i} \sim N(0,1) \quad (6)$$

$$GMP = 1 \text{ if } Y_{1i} > 0 \quad (6a)$$

$$GMP = 0 \text{ if } Y_{1i} \leq 0 \quad (6b)$$

Where Y_{1i} : The latent dependent variable which is not observed.

χ_{1i} : Factors that are assumed to affect the probability of sampled household market participation

β_1 : Vector of unknown parameter in participation equation

u_{1i} : Residuals that are independently and normally distributed with zero mean and constant variance

The observation equation/the supply equation

$$GMS = Y_{2i} = \chi_{2i}\beta_2 + u_{2i} \quad u_{2i} \sim N(0, \delta^2) \quad (7)$$

Y_{2i} is observed if and only if $GMP = 1$. The variance of u_{1i} is normalized to one because only GMP , not Y_{1i} is observed. The error terms, u_{1i} and u_{2i} , are assumed to be bivariate, normally distributed with correlation coefficient. β_1 and β_2 are the parameter vectors.

Y_{2i} , is regressed on the explanatory variables, χ_{1i} , and the vector of inverse Mills ratios (λ_i) from the selection equation by ordinary least squares.

Where: Y_{2i} : The observed dependent variable

χ_{2i} : Factors assumed to affect sale volume

β_2 : Vector of unknown parameter in the supply equation

u_{2i} : Residuals in the supply equation that are independently and normally distributed with zero mean and constant variance.

$$\lambda_i = \frac{f(\chi\beta)}{1-F(\chi\beta)} \quad (8)$$

$f(\chi\beta)$ is density function and $1-F(\chi\beta)$ is distribution function

3.4.2.2. Goats' market outlets and factors affecting outlets choice

Multivariate probit model was found to be appropriate to analyze factors affecting goat producers' market outlets choice decisions since it capture the influence of the set of explanatory variables on each of the five outlet choices in the study area, while allowing the error terms to be freely correlated.

The observed outcome of market outlet choice can be modeled following random utility formulation for individual choice (Greene, 2012). Consider the i^{th} farm household ($i=1, 2, \dots, N$), facing a decision problem on whether or not to choose available market outlets. Let U_0 represent the benefits to the goat producing households who chooses large scale traders, and let U_k represent the benefit of goat producing household to choose the K^{th} market outlets: where K denotes choice of large scale traders (Y1), small scale traders (Y2), cooperatives (Y3) collectors (Y4) and consumers (Y5). The farmer decides to choose the K^{th} market outlets if $Y^*_{ik} = U^*_k - U_0 > 0$. The net benefit (Y^*_{ik}) that the farmer derives from choosing a market outlets is a latent variable determined by observed explanatory variable (X_i) and the error term (ε_i):

$$Y^*_{ik} = X_i \beta_k + \varepsilon_i \quad (k = Y_1, Y_2, Y_3, Y_4, Y_5) \quad (9)$$

Using the indicator function, the unobserved preferences in equation (9) translates into the observed binary outcome equation for each choice as follows:

$$Y_{ik} = \begin{cases} 1 & \text{if } Y^*_{ik} > 0 \\ 0 & \text{otherwise} \end{cases} \quad (K = Y_1, Y_2, Y_3, Y_4, Y_5) \quad (10)$$

In multivariate model, where the choice of several market outlets is possible, the error terms jointly follow a multivariate normal distribution (MVN) with zero conditional mean and variance normalized to unity (for identification of the parameters) where $(\mu_{y1}, \mu_{y2}, \mu_{y3}, \mu_{y4}) \sim MVN(0, \Omega)$ and the symmetric covariance matrix Ω is given by:-

$$\Omega = \begin{bmatrix} 1 & \rho_{y1y2} & \rho_{y1y3} & \rho_{y1y4} \\ \rho_{y2y1} & 1 & \rho_{y2y3} & \rho_{y2y4} \\ \rho_{y3y1} & \rho_{y3y2} & 1 & \rho_{y3y4} \\ \rho_{y4y1} & \rho_{y4y2} & \rho_{y4y3} & 1 \end{bmatrix} \quad (11)$$

Of particular interest are off-diagonal elements in the covariance matrix, which represent the unobserved correlation between the stochastic components of the different type of outlets. This assumption means that equation (11) generates a MVP model that jointly represents decision to choice particular market outlets. This specification with non-zero off-diagonal elements allows for correlation across error terms of several latent equations, which represents unobserved characteristics that affect the choice of alternative outlets.

Following the form used by Cappellarri and Jenkins (2003), the log-likelihood function associated with a sample outcome is then given by;

$$\ln L = \sum_{i=1}^N \omega_i \ln \Phi(\mu_i, \Omega) \quad (12)$$

Where ω_i is an optional weight for observation i , and Φ is the multivariate standard normal distribution with arguments μ_i and Ω , where μ_i can be denoted as:-

$$\mu = (k_{i1} \beta_1 X_{i1}, k_{i2} \beta_2 X_{i2}, k_{i3} \beta_3 X_{i3}), \text{ While } \Omega_{ik} = 1 \text{ for } j = k \text{ and} \quad (13)$$

$$\Omega_{jk} = \Omega_{kj} = k_{ij} k_{ik} \rho_{jk} \text{ for } j \neq k, k = 1, 2, 3 \dots \text{ with } k_{ik} = 2y_{ik} - 1 \quad (14)$$

3.5. Definition of Variables and Working Hypothesis

3.5.1. Variables Used in Heckman Two Steps Selection Model

Dependent Variables

Participation in goat market (mktprt): It is a dummy dependent variable that measures sample households participation in goat market. It takes a value of 1, if a given household participates in goat market and 0, otherwise.

Number of live goats supplied to the market (mktsply): It is a continuous dependent variable that measures the actual supply of goat to the market measured in TLU.

Independent Variables

The dependent variables are assumed to be influenced by some or all of the following independent variables. Each variable is defined with the hypothesis based on economic theory and the findings of different empirical studies.

Age of household head (age): Age of the household is a continuous variable hypothesized to influence goat market participation and supply. Gezehagn (2015) found that age of the household head affected the market participation of beef cattle producers positively. However, Shambel (2013) indicated that age of household heads influenced cattle market participation decision negatively, and again Zekarias (2017) indicated that the older pastoralists are more grateful to institutional matter of just owning large herd size of cattle for self-respect and to be considered as rich person, they often supply less number of cattle to market as compared to young age pastoralists. Therefore, this variable was hypothesized to positively or negatively influence market participation and level of supply.

Sex of household head (sex): This variable is a dummy variable, which took 1 if sex of respondent is male, 0 otherwise. According to Asresu (2014), male headed households have higher probability of participation in goat market than female headed households. Habtamu (2015) also found that being male headed household had positively and significantly affected the quantity supplied. Therefore, it was expected that male headed households will be better in goat market participation and in supplying more goats than female headed household.

Family size (manequi): Family size of a respondent is a continuous variable measured in man equivalent. Dawit (2010) revealed that family size negatively and significantly influenced the market participation decision of poultry market. However, according to Gezehagn (2015), household size as an independent variable positively affected producers' beef cattle market participation decision. Nasir (2016) also found that family size affected the level of supply positively and significantly. In this context family size was expected to affect market participation and level of participation positively or negatively.

Total number of goats owned (goatown): Total number of goats a respondent owned is a continuous variable measured in TLU (both young and adult goats). According to Gebremedhin *et al.* (2015), as herd size of small ruminants increases the more will be the participation. This is again supported by Zekarias (2017) who found that the number of cattle kept by pastoralists increases the probability of cattle market participation decision and the number of live cattle supplied to the market. The more the number of goats owned by a given households, the more will be the probability to decide to participate in goat market and the more will be supply of goats to the market.

Livestock owned other than goats (othrliv): This is a continuous independent variable indicating total number of livestock holding of the household measure in tropical livestock unit (TLU), excluding goat. According to Zemeda (2016), other livestock ownership influenced farmer's participation decision in small ruminant marketing negatively and significantly. Households with relatively large number of total livestock size are supposed to be less concern about the small ruminant. However, Nuri (2016) found that livestock holding measured in

tropical livestock unit (TLU) is found to be positively and significantly influenced the probability of market participation decision and quantity of marketed surplus. Therefore, this variable was expected to affect market participation and goats supply positively or negatively.

Education level of a household head (edu): This is continuous variable measured in years of schooling the household head attended formal education. Jemal (2017) found that education positively and significantly influenced camel-milk market participation decision. Astewel (2010) also reported education improves level of sales and thus positively affects the marketed surplus. Therefore, education level of the respondent was hypothesized to affect market participation and supply of goats positively.

Other income excluding income from goat (othrinc): It is a continuous variable measured as annual income earned in birr by the household members from non-goats sales activities including other farming and off/non-farm income activities. Jemal (2017) indicated that non-camel milk income of the household measured in thousand birr had negatively affected milk market participation decision. Shambel (2013) also found that the off-farm income negatively affected number of cattle marketed and further explained that good cash injection for cattle farmers helps them to survive from both production and business risks and not sale cattle. Therefore, the variable was expected to influence both market participation and level of goat supply negatively.

Veterinary service use (vetser): This is a dummy variable with value of 1 if the households use veterinary service and 0, otherwise. According to Gezahagn (2015), veterinary service use increases the probability of beef cattle market participation decision. Further, Zemeda (2016) found that access to veterinary service affected marketed supply of small ruminant positively and significantly. Therefore, receiving veterinary service was expected to have positive relation with market participation decision and number of goats supply.

Lagged price of live goat (lgprice): This is a continuous variable that measures seasonal average lagged price per goat in the previous year and measured in Birr. If market prices were relatively high in the previous year, there is a possibility of increasing market participation

decision and goat supply to the market. This is supported by Shambel (2013) who found that lagged price of cattle positively affected cattle market participation decision. Therefore, the variable was expected to have positive influence on market participation decision.

Distance to the market (dismkt): It is a continuous variable measured in kilometer (km). According to Zemeda (2016), distance to nearest livestock market negatively and significantly influenced market participation decision and number of small ruminants supplied. So, the variable was hypothesized that distance to market to be negatively related to market participation and supply of goat.

Credit use (credit): This is dummy variable with value of 1 if a household had credit use and 0, otherwise. According to Gebremedhin *et al.* (2015), use of credit facilities increases market participation as well as supply of small ruminant. This is further supported by the finding of Gezehagn (2015) who found that access to credit service affected the probability of producers' participation in beef cattle markets positively and significantly. Therefore, it was expected that the producer household that use credit will have a better likelihood of market participation and thereby supply more goats.

Extension contact frequency (extfrq): This is count variable which is the number of days that pastoralist household had contact with extension agent for goat production work supervision per month. The livestock development extension program increases the probability of selling consistent with its core objectives of promoting households involvement in market-oriented livestock production (Gebremedhin *et al.*, 2015). This is further supported by Kassa (2017) who indicated that frequency of extension contact positively and significantly related to the volume of honey supplied to the market. Therefore the extension contact frequency was hypothesized to have positive contribution to market participation and number of goat supply.

Table 2: Summary of explanatory variables used in Heckman two steps model

Name of variables	Notations	Type	Measurement	Expected sign	
				Participation	Supply
Age of household head	Age	Continuous		+/-	+/-
Sex of household head	Sex	Dummy	Male=1, Female=0	+	+
Family size	Famsz	Continuous	Man equivalent	-/+	-/+
Number of Goat owned	Goatlu	Continuous	TLU	+	+
Education level	Edu	Continuous	Years of schooling	+	+
Distance to market	dismkt	Continuous	Minutes	-	-
Extension contact frequency	Extfrq	Count	Number of days	+	+
Other livestock owned	othrtlu	Continuous	TLU	+/-	+/-
Credit use	Credit	Dummy	User=1, otherwise=0	+	+
Veterinary service use	vetserv	Dummy	User=1, otherwise=0	+	+
Off/non-goat income	othtinc	Continuous	Birr	-	-
Lagged price	lgprice	Continuous	Birr	+	

Source: Own completion based on literature

3.5.2. Variables Used in Multivariate Probit Model

Dependent variable

Market outlet choice (mktout): It is categorical dependent variable defined as 1 = large-scale traders, 2 = small-scale traders, 3 = cooperatives, 4 = collectors and 5 = ultimate consumers. It is measured by the probability of producers' sales of goat to either of the alternative market outlets such as large-scale traders, small-scale traders, cooperatives, collectors, or ultimate consumers. Large-scale traders and small-scale traders are differentiated depending up on the number of animals they purchase on a given marketing day and traders financial background.

Independent variables

The dependent variable is assumed to be influenced by some or all of the following independent variables. Each variable is defined with the hypothesis based on economic theory and the findings of different empirical studies.

Age of household head (age): Age of the household head is a continuous variable expected to have relationship with outlet choice decision. Nasir (2016) found that age of the household heads affect the use of collector outlet positively and significantly. Again Bongiwe and Masuku (2012) also found that age of the households positively and significantly determine the choice of non-wholesale market channel over other-wholesale market channel. In this study, age of household head was hypothesized to influence the decision of household head to choose the nearby outlets such as collectors and cooperatives market outlets positively as compared to large and small-scale traders.

Sex of household heads (sex): It is a dummy variable which took a value of 1 if the household head male and 0 otherwise. Both men and women goat market participants sell their goat to different market outlets to generate income. Girma and Abebaw (2012) reported that male household heads are better in searching market alternative than female household heads. According to Fischer and Qaim (2011) female farmers were more likely than male farmers to join a marketing group and most likely to sell to cooperative. Addisu (2016) also found that male headed households positively and significantly associated with use of collector outlet. As a result, male household heads have more chance to choose appropriate goats market outlets than female household heads.

Family size (manequi): It is a continuous variable measured in man equivalent. Availability of active labor force in a household is assumed to affect households decision in choosing a given market outlets in goat market chain. Tewodros (2014) and Takele *et al.* (2017) indicated that large family size positively and significantly affected wholesaler market outlet. This implies that

better labor endowment help households to travel to get large-scale traders market outlet which are located in the district market and buy large number of goats.

Distance to the market (dismkt): It is a continuous variable measured in kilometer (km) which producers spend to reach the market. Djalalou *et al.* (2015) found that market distance has positive relationship with rural market and negative relationship with urban markets. Nuri (2016) also found that increase in distance to the market center would decrease the probability of choosing wholesalers outlet, but increase the likelihood of choosing collectors outlet. Therefore the variable was expected to influence large and small-scale traders negatively, while it positively influences the collectors' market outlet.

Total number of goats owned (goatlu): Total number of goats a respondent owned is continuous variable measured in TLU (both young and adult goats). Nyaupane *et al.* (2016) found that producers with large number of goats sell through volume buyers (large-scale traders) as they can minimize per-animal transaction costs associated with individual animal. Similarly, Nuri (2016) found that quantity produced is positively and significantly affected mass buyers as compared to collector market outlet while, Melkamu (2016) found that quantity produced negatively and significantly correlation with consumers outlet choice. Therefore, the variable was expected to affect the outlets of those who purchase in large number (large-scale traders) positively and the outlets of those who purchase in small number negatively.

Education level of a household head (edu): This is continuous variable measured in years of schooling the household heads attended formal education. Nuri (2016) found that education level has a significant and positive effect on the chances of choosing large-scale buyers and a negative relationship with collector market outlet choice. Therefore education level of household heads was hypothesized to affect the large-scale traders outlet positively and collectors market outlet negatively.

Livestock owned other than goats (othrliv): This is a continuous independent variable indicating total livestock holding of the household heads measure in tropical livestock unit

(TLU), excluding goats. Nasir (2016) indicated that number of livestock owned in tropical livestock unit negatively and significantly associated to collector outlet choice. Other livestock owned excluding goat was expected to affect the market outlets choice.

Extension contact frequency (extfrq): This is count variable which is the number of days that pastoralist household heads had contact with extension agent for goat marketing supervision per month. According to Addisu (2016) number of extension contact has positive and significant influence with wholesaler outlet choice decision. Nasir (2016) found that access to extension contact was negatively and significantly associated with the use of collector market outlet. Therefore the variable was expected to influence large-scale trader outlet positively and collector outlet negatively.

Credit use (credit): This is dummy variable with value of 1 if a household had credit use and 0, otherwise. Nuri (2016) who found that access to credit has a positive and significant effect on mass buyers' market outlet choice. Therefore the variable was hypothesized to influence the large-scale traders' market outlet which buys in large number.

Selling price (price): It a continuous variable that is measured in birr. It is the actual price received by a household per goat sold to goat market outlets. Sultan (2017) found that price offered by market outlets significantly and negatively affected accessing cooperative market outlet. According to Takele *et al.* (2017) the probability of selling to collector market outlet is negatively correlated with the price paid. This indicates that low price at farm gate discourages farmers from selling to the collectors outlet. Melkamu (2016) also found that selling price affected wholesalers and consumer outlets positively and significantly and negatively affected collector outlet choice. Therefore the variable was hypothesized to affect large-scale traders and consumers market outlets positively. While, it is expected to negatively affect collector and cooperatives market outlets.

Table 3: Summary of explanatory variables used in multivariate probit model

Name of variables	Measurement	Expected sign				
		Large-scale traders	Small-scale traders	Cooperatives	Collectors	Consumers
Age of household head	Number of year	+/-	+/-	+	+	+
Sex of household head	Male=1, Female=0	+	+	+/-	+/-	+/-
Family size	Man equivalent	+	+	-	-	+
Number of goat owned	TLU	+	+/-	+/-	-	-
Education level	Years of schooling	+	+/-	+/-	-	+/-
Other livestock owned	TLU	+/-	+/-	+/-	+/-	+
Distance to market	Kilometer	-	-	+	+	+/-
Credit use	Use=1, otherwise=0	+	-	+/-	-	+
Extension contact frequency	Number of days	+	+/-	-	-	+/-
Selling price	Birr	+	+/-	-	-	+

Source: Own completion based on literature

4. RESULTS AND DISCUSSION

This chapter presents the findings of descriptive and econometric analysis and discuss in comparison with results of other studies. First, descriptive analysis results of demographic and socio-economic characteristics of the sample households are presented. Secondly, the description of major actors and their roles were done. Thirdly, the structure, conduct and performance of goat market are presented. Fourthly, the results of the econometric analysis on the determinants of goat market participation and supply are presented. Finally, the econometric analysis of the determinants of market outlet choice of goat producer households is presented.

4.1. Characteristics of Sample Households and Traders

4.1.1. Demographic and Socio-economic Characteristics of Goat Producer Households

This sub-section represents the descriptive statistics of sampled goat producer households. Sample households were divided into goat market participants and non-participants to assess the differences and similarities among them in terms of their demographic, socio-economic and institutional characteristics.

Table 4: Demographic and socio-economic characteristics of respondents (categorical variables)

Variables		Non-participants		Participants		Total		χ^2 -value
		N	%	N	%	N	%	
Sex of household head	Male	52	71.2	110	89.4	162	82.7	10.5813***
	Female	21	28.8	13	10.6	34	17.3	
Marital status	Single	7	9.6	2	1.6	9	4.6	7.9956**
	Married	48	65.8	92	74.8	140	71.4	
	Divorced	9	12.3	19	15.5	28	14.3	
	Widowed	9	12.3	10	8.1	19	9.7	

*** and ** denote the level of significance at 1% and 5% respectively.

Source: Own survey results, 2017

Sex of household head: In this study, out of the total of 196 sample households, 162 (82.7%) were male-headed and the rest 34 (17.3%) were female-headed households. The proportion of

male-headed households was 89.4% for participants and 71.2% for non-participants, whereas the proportion of female-headed households for the participants was (10.6%) which is less than that of non-participants which was 28.8% (Table 4). The χ^2 result revealed that the mean difference between participants and non-participants with respect to sex of household head was statistically significant at 1% significance level.

Marital status of the household head: As indicated in Table 4, about 4.6% of sample households were single, 71.4% were married, about 14.3% were divorced and 9.7% of sample households were widowed. Out of total participants goat producer households 1.6% were single, 74.8% were married, and a considerable proportion of the participants (15.5%) were divorced and the remaining 8.1% of the participants were widowed. With regard to non-participants about 9.6% were single, 65.8% were married, 12.3% were divorced and the remaining 12.3% were widowed. The result of the study revealed that the difference between participants and non-participants with respect to marital status of household head was statistically significant at 5% probability level.

Table 5: Demographic and socio-economic characteristics of respondents (continuous variables)

Variables	Non-participants		Participants		Combined		t-value
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Age	40.75	7.32	49.60	8.88	46.31	9.35	-7.19***
Education level	2.63	2.33	2.98	2.25	2.81	2.29	-1.65*
Family size	1.30	1.13	3.66	2.22	2.78	2.20	-8.45***
Total goat owned	1.73	0.91	4.06	2.47	3.19	2.32	-7.76***
Other livestock	17.64	6.26	9.32	6.88	12.42	7.77	8.46***
Off/non-goat income	8014.3	4009.7	3072.5	2977.5	4853.5	4219.3	9.88***
Lagged price	935.6	287.04	1156.5	353.1	1074.2	346.2	-4.53***

*** and * denotes the level of significance at 1% and 10% respectively.

Source: Own survey results, 2017

Age of the household head: As indicated in Table 5, the mean age of sample respondents at the time of the survey was 46.31 years with standard deviation of 9.35. The age structure of the

sample respondents showed that the participants were older (average age of 49.6 years with standard deviation of 8.88) than non-participants (average age of 40.75 years with standard deviation of 7.32). The two groups were found to be significantly different in terms of age at 1% probability level.

Education level of household head: Education is assumed to increase farmer's ability to search process and use information relevant to the goat market participation and supply. As shown in Table 5, the mean level of formal education of sample respondents during survey was 2.81 years with standard deviation of 2.29. The education level of the sample respondents indicated that the participants were more educated (average education level of 2.98 years with standard deviation of 2.25) than the non-participants (average education level of 2.63 with standard deviation of 2.33). The two groups were found to be significantly different in terms of education level at 10% probability level.

Family size: The availability of number of individuals in the households is considered as active working labor force in the household to perform production activities. In this study, the average family size measured in man equivalent was about 2.78 with standard deviation of 2.20. The average family size measured in man equivalent of sample participant and non-participant households was 3.66 and 1.3 with standard deviation of 2.22 and 1.13 respectively. Results showed that there was significant mean difference in family size among the participation categories at 1% significant level (Table 5).

Number of goats owned: Number of goats owned by pastoralists are likely to improve the supply of goats to the market. The survey result in Table 5 shows that the average goat owned by sample household heads was about 3.19 TLU with standard deviation of 2.32. From the entire sample household heads, the average goats TLU owned by the participant was 4.06 TLU with standard deviation of 2.47 whereas for non-participant it was 1.73 TLU with standard deviation of 0.91. Results showed that there was significant mean difference in number of goats owned among the market participants and non-participants at 1% significant level.

Livestock owned other than goats: Other livestock owned in TLU by pastoralists is directly or indirectly related to participation and supply of goats to the market. The survey result in Table 5 shows that the average TLU of other livestock owned by sample household heads was about 12.42 TLU with standard deviation of 7.77. From the entire sample household heads, the average TLU of other livestock owned by the participant was 9.32 TLU with standard deviation of 6.88 whereas for non-participant it was 17.64 TLU with standard deviation of 6.26. Results showed that there was significant mean difference in TLU of other livestock owned among the market participants and non-participants at 1% significant level.

Income other than income from goat: Market participation and level of participation are directly or indirectly related with the level of income of the users. This indirect relation is most of the time due to the existence of better income source for the higher income groups than low income groups which reduces the probability of goat market participation by goat producing household. As Table 5 depicts, the average off/non-goat income of sample households in the survey year was about 4853.47 ETB with standard deviation 4219.32. On average, off/non-goat income of participants was about 3072.5 ETB with standard deviation 2977.52 while non-participants had 8014.32 ETB with standard deviation 4009.74. This study indicated that, mean difference among participation categories related to income other than income from goat was statistically significant at 1% probability level.

Lagged price: The average lagged price in the previous year was 1074.2 birr with standard deviation of 346.2. The sample market participant households were charged an average price per goat of 1129.76 birr in previous year with standard deviation 471.17. The result in Table 5 indicated that, mean difference among participation categories related to previous year price was statistically significant at 1% probability level. The variation in households previous year price were mainly due to goat quality, body size of goat, bargaining ability and choosing better offering outlets.

4.1.2. Institutional Characteristics of Goat Producer Households

Table 6: Institutional characteristics of sample households

Categorical variables							
Variables	Categories	Non-participants		Participants		χ^2 -value	
		N	%	N	%		
Credit use	Users	5	6.8	62	50.4	38.6313***	
	Non-users	68	93.2	61	49.6		
Veterinary service use	Users	15	20.55	72	58.5	26.7822***	
	Non-users	58	79.45	51	41.5		
Continues variables							
Variables	Non-participants		Participants		Total		t-value
	N	%	N	%	N	%	
Distance to market	10.66	2.22	6.81	3.13	8.24	3.38	9.20***
Extension contact frequency	2.89	2.33	7.02	4.33	5.48	4.21	-7.51***

*** denotes the level of significance at 1%.

Source: Own survey results, 2017

Credit use: Credit use is an important source of finance for the poor farmers to buy inputs for agricultural production and ultimately to adopt new technologies. As shown in Table 6, out of the total sample respondents, about 34.2% were credit users from the district credit service delivering institutions for their goat production accordingly. On the other hand, about 65.8% of the total sample households were not credit users. Additionally, 50.4% of the participants and 6.8% of non-participants sample households were credit users during the survey year. The remaining 49.6% of participants and 93.2% of non-participants had not used credit. The chi-square analysis result revealed that the difference between the two groups with respect to credit use was found to be statistically significant at 1% probability level.

Veterinary service use: As shown in the Table 6, about 44.4% of the sample households were veterinary service users from both public and private veterinary service providers, while 55.6% of sampled households are non-users of veterinary service. The proportion of veterinary service users are 58.5% for participants and 20.55% for non-participants, whereas, the proportion of

veterinary services for non-users were 41.5% for participants and 79.45% for non-participant households. The result from chi2 indicated that there is mean difference between the two groups with respect to veterinary services was statistically significant at 1% probability level.

Distance to the market: As indicated in Table 6, the average distance of sample respondents' home from the nearest market place was found to be 8.24 km with standard deviation of 3.38. On average participants were located about 6.81 km with standard deviation of 3.13 and non-participants were about 10.66 km with standard deviation of 2.22 away from the nearest market place. The t-test result revealed that the mean difference of distance from market between participants and non-participants was found to be significant at 1% probability level.

Frequency of extension contact: Extension service is important institutional service that is required to increase goat productivity and marketing through the adoption of new technologies and improved marketing strategies. It enables farmers being aware of the benefit of new production technologies and marketing strategies. The survey results in Table 6 shows that, sample households average extension contact of 5.48 with standard deviation of 4.21 in the survey year. The participant's average extension contact was 7.02 with standard deviation of 4.33 whereas for the non-participants it was 2.89 with standard deviation of 2.33 during the same year. The t-test result revealed that the mean difference of extension contact frequency between participants and non-participants was found to be significant at 1% probability level.

4.1.3. Demographic and Socio-economic Characteristics of Traders

The data about traders were collected from eight large scale traders, fourteen small scale traders and ten collectors. This is to assess the differences and similarities among different goat traders in terms of their demographic and socio-economic characteristics.

Table 7: Demographic and socio-economic characteristics of traders (categorical variables)

Variables	Trader type					χ^2 -value
	Category	Large-scale traders (8)	Small-scale traders (14)	Collectors (10)	Total (32)	
Sex	Male	7 (87.5)	13 (92.9)	10 (100)	30 (93.8)	1.2190
	Female	1 (12.5)	1 (7.1)	0 (0)	2 (6.2)	
Marital status	Single	0 (0)	1 (7.1)	1 (10)	2 (6.2)	2.9114
	Married	6 (75)	10 (71.4)	7 (70)	23 (71.9)	
	Divorced	1 (12.5)	1 (7.1)	2 (20)	4 (12.5)	
	Widowed	1 (12.5)	2 (14.3)	0 (0)	3 (9.4)	

Source: Own survey result, 2017

As depicted in Table 7, around 93.8% of sample traders were male and only 6.2% of them were female traders. Moreover, result about marital status depicted that 71.9% were married, 12.5% were divorced, 6.2% were single and 9.4% were widowed.

Table 8: Demographic and socio-economic characteristics of traders (continuous variables)

Variables	Mean	Std. Dev	Minimum	Maximum
Age	44	9.197	28	58
Family size	6.09	3.276	1	12
Trading experience	10.19	5.699	2	21
Education level	3.94	2.526	0	10

Source: Own survey (2017)

As indicated in Table 8, the average age of traders was 44 years ranging from 28 to 58 years. Traders' average family size was 6 persons and ranged from 1 to 12. The mean trading experience of traders was 10 years, and the experience of traders' ranges from 2 to 21 years of trading experience. Traders' level of formal education ranged from 0 to 10 years of schooling with mean of 4 years of formal education.

Table 9: Financial capital of goat traders

Variables		Trader type			Total (32)
		Large-scale traders (8)	Small-scale traders (14)	Collectors (10)	
Initial capital (ETB)	Mean	40,625	4,282	10,670	15,364
	Minimum	25,000	1,800	7,200	1,800
	Maximum	55,000	8,000	14,500	55,000
Current capital (ETB)	Mean	184,750	14,814	65,650	73,184
	Minimum	15,0000	8,300	42,000	8,300
	Maximum	23,0000	23,000	89,000	230,000

Source: Own survey (2017)

The working capital needed to run the goat trading business differ among the different trader types as buying capacity and volume of transaction differs among those traders. The average initial working capital of the sampled traders was 40,625ETB for large scale traders, 4,282ETB for small scale traders and 10,670ETB for collectors. While the mean current working capital of the sampled traders was 184,750ETB for large scale traders, 14,814ETB for small scale traders and 65,650 for collectors in goat trading business. Both initial and current working capital was highest for large scale traders while it is lowest for the small scale traders.

4.2. Goat Market Chain Actors and their Roles

Goat market chain actors are direct chain actors (those who commercially involved in the goat exchange function) and indirect actors (those who provide financial or non-financial support services in facilitating goat market). According to survey result the direct goat market chain actors in the study area are identified to be producers/pastoralists, collectors, cooperatives, small-scale traders, large-scale traders, hotels and restaurants, and ultimate consumers.

Producers/Pastoralists: Livestock rearing is the main economic activity of pastoralists in study area. They have various functions in marketing processes as the first and one of major market actors in goat market. The main role of producers/pastoralists are supplying goat that is competent in the market. Of all the total sample goat market participants supplied to the market;

ultimate consumers purchased (10.6%), cooperatives bought (20.4%), small-scale traders purchased (25.7%), collectors (32.4%) and large-scale traders (10.9%).

Cooperatives: Cooperatives are market actors who collect goat from those producers who are member of cooperatives and purchase goat from non-members to resale it to large-scale traders, and hotels and restaurants, while on the other hand market out of the district. Their role is to improve pastoralists' market participation and increase their market share. As indicated in the Figure 3 cooperatives supplied 19.5% of their total sale to hotels and restaurants, 55.4% to large-scale traders and the remaining 25.1% were traded out of the district.

Collectors: Collectors are village traders who purchase goat at farm gate in purpose of reselling it to small-scale traders, large-scale traders and ultimate consumers. They serve as a bridge in connecting goat producers with small-scale traders and large-scale traders, while doing this they mainly use traders money and their close relationship with pastoralist producers to purchase goat available at village gate. Of all 32.4% of goat they purchased from pastoral producers 53%, 35.5% and 11.5% was supplied to large-scale traders, small-scale traders and ultimate consumers respectively.

Small-scale traders: Small-scale traders are intermediate traders who use their own limited capital to buy up to average of 18 goats per week in the district. Small-traders are responsible in supplying goat to large-scale traders, hotels and restaurants, and ultimate consumers. According to Figure 3, small-scale traders supplied 44.5% of their sale to large-scale traders, 35.4% to hotels and restaurants and 20.1% to ultimate consumers. This is supported by Solomon *et al.* (2017) who indicated that small-scale traders buy up to 6 beef cattle per week on average using their own capital or big traders' money and they have trade ties with affiliated large traders. They supply their animals to large-traders, butcheries and others.

Large-scale traders: As their name indicates large-scale traders are market actors who are financially strong and purchase larger number of goats (up to 46 goats per week on average in the district) than any other market actors. They mainly buy goat from collectors, cooperatives,

small-scale traders and pastoral producers. They supply goat to hotels and restaurants and again on the other hand they are permanent transporters of goat out of district through Hawassa-Modjo road to Bishoftu, Adama and capital Addis Ababa using trucks (FSR). As indicated in Figure 3 out of the total goat purchased by large-scale traders 63.6% were traded out of the district, while the remaining 36.4% were supplied to hotels and restaurants. Zemeda (2016) also found that large traders buy up to 60 small ruminants from collectors and resale it to hotels and restaurants.

Hotels and restaurants: It includes hotels and restaurants that purchase live goat to slaughter and sell it to final consumer in the form of meat/meal. During the time of purchase they give greater consideration to the body size/ body condition of goat. Cooperatives, small-scale traders and large-scale traders are the main sources of supply for business slaughterers.

Ultimate consumers: Ultimate consumers are the last goat market chain actors purchasing live goat for their household consumption. Ultimate consumers purchase and slaughter live goat for religious festivity and special family events. Pastoral producers, collectors and small-scale traders were the main suppliers of live goat to the ultimate consumers.

4.3. Analysis of Structure, Conduct and Performance of Live Goat Market

The study used structure, conduct and performance approach to evaluate the degree of competition, conduct of the market actors and performance of live goat market in the district.

4.3.1. Analysis of Goat Market Structure

In this study, the structure of live goats market was analyzed in terms of the degree of market concentration and barriers to entry.

Market concentration ratio: Concentration ratio is one of the commonly used measure of market structure, which refers to the number, and relative size distribution of buyers and sellers in the market. In this study, major actors participating in buying and selling activities of live goat

market was considered to evaluate the market structure. The degree of market concentration for live goat market was estimated using concentration ratio (CR_4) for four large goat traders. As indicated in Table 10 the concentration ratio for top four goat traders were found to be 44.72%. Depending up the ‘rule of thumb’ suggested by Kohls and Uhl (1985), the market structure for goat market in the study area was found to be weak oligopoly in which four largest traders share lay in the range between 33% and 50%. This result is in line with the finding of Gebremariam and Yemiru (2015) who found that the concentration ratio for goat market in Asaita district was 44.81%, which shows a weak oligopoly market. Additionally, Zekarias (2017) found that the nature of cow market structure in Moyale district were loose oligopoly with the degree of market concentration of 46.40%.

Table 10: Goat market concentration ratio

No of traders	Cumulative frequency of traders	No of goat purchased (in TLU)	Total number of goat purchased (in TLU)	% share of purchase	% of cumulative purchase
1	1	31.62	31.62	12.61	12.61
1	2	28.32	28.32	11.3	23.91
1	3	27.49	27.49	10.97	34.88
1	4	24.68	24.68	9.84	44.72
1	5	15.22	15.22	6.07	50.79
2	7	11.21	22.42	8.94	59.73
3	10	9.54	28.62	11.42	71.15
2	12	7.31	14.62	5.83	76.98
3	15	5.48	16.44	6.56	83.54
4	19	3.06	12.24	4.88	88.42
5	24	2.63	13.15	5.25	93.67
6	30	2.04	12.24	4.88	98.55
2	32	1.82	3.64	1.45	100
			250.7	100	

Source: Own survey result, 2017

Barriers to entry

The existence of barriers to entry reduces potential entrants to the markets and hence increases the market shares of few participants, which in turn increases their market power and eventually

decrease efficiency of the market. According to traders' survey result 43.8% of goat traders reported absence of barriers to entry in to goat market. From those traders who reported existence of barriers 31.2% reported lack of working capital as barriers to entry, while 12.5% of goat traders reported that licensing procedure being barrier to entry in to goat market.

Table 11: Barriers to entry in to goat market

Barriers	Business type							
	Large scale		Small scale		Collectors		Total	
	traders		traders					
	N	%	N	%	N	%	N	%
No barriers	3	37.5	8	57.1	3	30	14	43.8
Lack of Capital	4	50	2	14.3	4	40	10	31.2
Licensing procedure	1	12.5	2	14.3	1	10	4	12.5
Business experience	-	-	2	14.3	2	20	4	12.5

Source: Own survey, 2017

Lack of capital: Capital is the amount of money required by traders to enter and run goat trading business. Lack of sufficient capital was reported one of the major barrier to entry in goat marketing, which limits the demanding participation of large scale traders, collectors, and butchers and hotels in goat marketing. Large-scale traders require relatively large capital as compared to other market actors as they buy large number of goat. According to the survey result, about 50% large scale traders and 40% collectors reported capital as the major entry barriers to goat trading. However 57.1% of small scale traders reported absence of barriers to entry in to goat trading as small scale trading require less initial and working capital to start up and run the business.

Licensing procedure: There is no license for goat marketing alone but rather for livestock marketing in general. This allows traders to trade different livestock at the same time. In survey result, 12.5% of the total traders reported that licensing procedure was a barrier to entry in goat

marketing. More than 50% of small scale traders and collectors were operating without trade licensing so as not to pay tax, however they pay for market place.

Business experience: Business experience is the years of marketing experience in goat marketing. According to survey result, 12.5% of sampled goat traders reported goat trading experience as a barrier to entry in goat trading, but the remaining 87.5% of sampled goat traders did not report goat marketing experience as a barrier to entry. Hence, the survey result approves that business experience looked not to create barrier to entry in to goat trading.

4.3.2. Analysis of Goat Market Conduct

This study analyzed the conduct of goat market by strategic behavior of competing traders in terms of the traders' price setting, purchasing and selling strategies.

Traders' price setting strategies

The survey result indicated that 78.1% and 81.3% of the sample traders reported that their purchasing price and selling price respectively was set by negotiation, while the remaining 21.9% and 18.7% of sampled goat traders set purchase price and selling price respectively based on the market force. The result is in line with Solomon *et al.* (2017) who found that about 75% of the sampled beef cattle traders reported that beef price decision was set by negotiation between farmers and traders. The survey result again showed that 56.3% sample traders depend up on the body condition of goat and goat quality to set the purchase price, while 28.1% and 15.6% of sampled goat traders set price based on the number of goat supplied to the market and price offered by other traders respectively. This shows body condition of the goat and supply forces are the top criteria in determining goat purchasing price.

Table 12: Traders pricing strategies

Variables	Criteria	Frequency	Percent
Mode of purchase price setting	By negotiation	25	78.1
	By market	7	21.9
Criteria in determining purchasing price	Body condition of goat/Goat quality	18	56.3
	Other traders offer	5	15.6
	Supply force	9	28.1
Mode of selling price setting	By negotiation	26	81.3
	By market	6	18.7
Time to set purchasing price	One day before the market day	4	12.5
	Early in the morning of market day	8	25
	At the time of purchase	20	62.5

Source: Own survey result (2017)

Furthermore, the survey result revealed that 62.5% of sample traders set price at the time of purchase, while 25% and 12.5% sample traders set their purchasing price early in the morning of the market day and one day before the market day respectively.

Goat traders purchasing and selling strategies

According to survey result 84.4% and 15.6% of sample traders attracted their suppliers by paying better price as compared to others and by offering credit respectively, while 46.9% and 53.1% of sample traders attracted their buyers by giving quality goat and offering lower price as compared to other goat suppliers respectively.

Table 13: Traders purchasing and selling strategies

Strategy		Criteria	Sample traders (N=32)	
			Frequency	Percent
Purchasing strategy	Way to attract sellers	Giving better price	27	84.4
		Giving credit	5	15.6
	Goat purchaser	Traders themselves	22	68.8
		Friends/Family member	6	18.7
		Commission agent/ Broker	4	12.5
Selling strategy	Way to attract buyers	Giving lower price	17	53.1
		Giving quality goat	15	46.9
	Mode of exchange	On cash	28	87.5
		On credit	4	12.5

Source: Own survey result (2017)

Furthermore, the survey result indicated that 68.8% of sample traders purchased goat by their own, while 18.7% and 12.5% sample traders purchase goat using friends/family member and commission agent/broker, respectively. The result again showed that 87.5% of sample traders received cash in hand at the time of sale, while the remaining 12.5% of sampled traders sold their goat on credit. This result is in line with Solomon *et al.* (2017) who found that about 92% of beef cattle traders sell their cattle based on cash payment at the time of transaction.

4.3.3. Analysis of Goat Market Performance

The performance of goat market was evaluated by conducting marketing margin along with channel comparison by taking average sales prices of different actors in the market chain. The analysis of market channels was intended to provide organized information of the flow of goats from producers to hotels and restaurants, and final consumers.

Goat marketing channels

In the study area eight main alternative channels were identified for live goat marketing. The amount of live goats that market participants supplied to the market was 250.7 TLU (both adult and young goats considered). According to survey result collectors and small-scale traders were the dominant buyers of goat from goat producers with percentage share of 32.4% and 25.7% respectively followed by cooperatives (20.4%). From view point of goat market flow, out of total goats sold by sample market participants 40.7% (102.03 TLU) were marketed outside of the district. From which 74.7% (76.21 TLU) of goats were informally traded through Kenyan border and the remaining 25.3% (25.82 TLU) were traded formally to (Hawassa, Modjo, Adama, Addis Ababa) through large-scale traders and cooperatives, while the remaining 59.3% (148.67 TLU) were marketed to hotels and restaurants, and ultimate consumers in the district through eight channels. Of the goats supplied to the district market the largest amount has passed through channel III (34.09 TLU) and channel I (26.51 TLU) followed by channel VII (22.89 TLU) and then by channel IV (18.73 TLU), while the smallest amount has passed through channel II (9.37 TLU) followed by channel VI (9.98 TLU).

Channel I: Producers→Ultimate consumers (26.51 TLU)

Channel II: Producers→Collectors→Ultimate consumers (9.37 TLU)

Channel III: Producers→Collectors→Large-scale traders→ Hotels and restaurants (34.09 TLU)

Channel IV: Producers→Collectors→Small-scale traders→Ultimate consumers (18.73 TLU)

Channel V: Producers→Collectors→Small-scale traders→Hotels and restaurants (10.08 TLU)

Channel VI: Producer→Cooperatives→ Hotels and restaurants (9.98 TLU)

Channel VII: Producers→Small-scale traders→ Hotels and restaurants (22.89 TLU)

Channel VIII: Producers→Large-scale traders→ Hotels and restaurants (17.02 TLU)

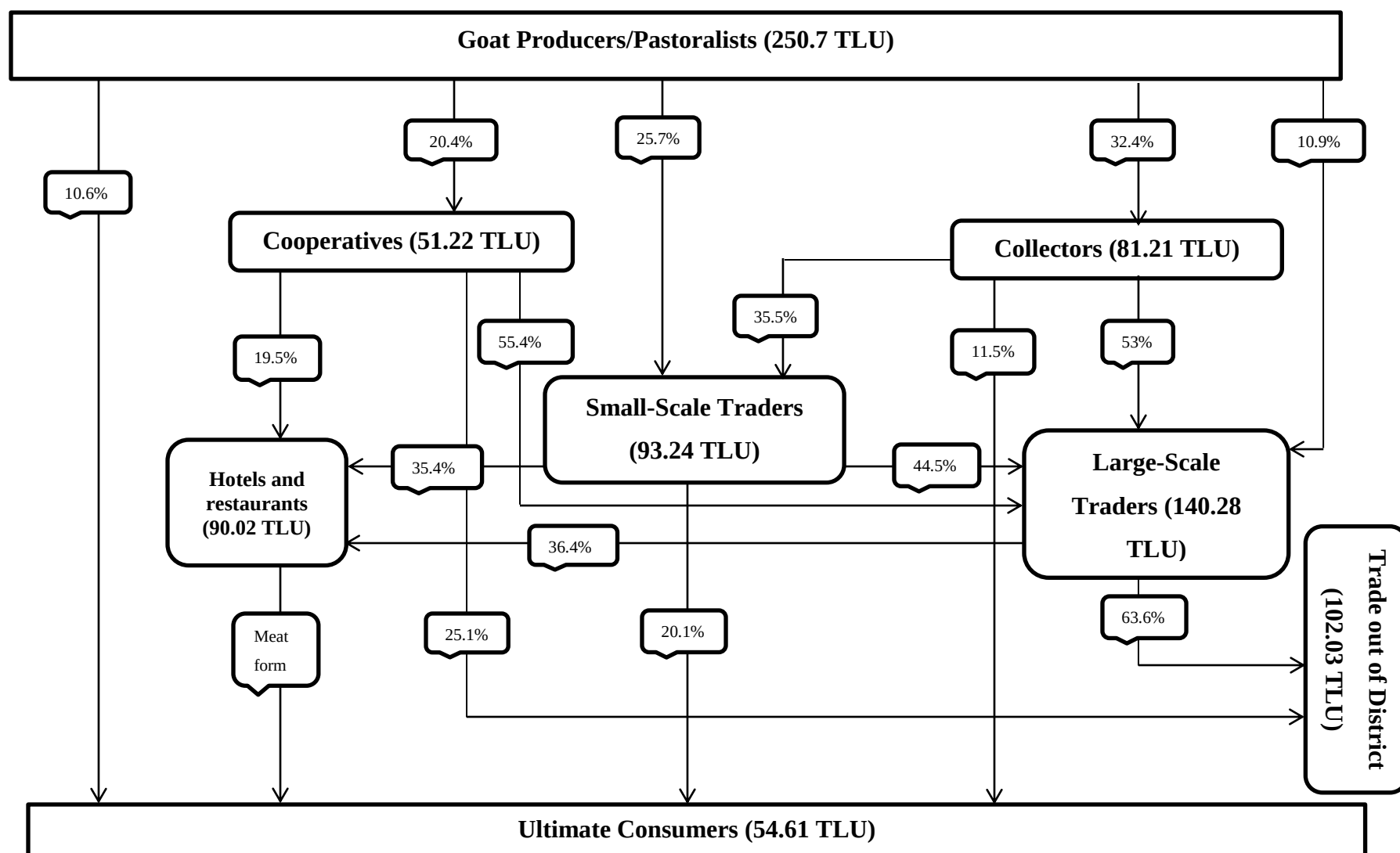


Figure 3: Live goat market channels Source: Own sketch based on survey result, 2017

Goat marketing margin

Goat marketing margin is the difference between prices at two market stages to determine the returns grasped by each marketing actors as goat move from producers to consumers. Margin analysis was conducted for each channel separately by taking average price of goat (both adult and young) for each particular channel.

Table 14: Average marketing margins (in birr) for actors in different market channel of goat

Market actors	Marketing measure	Marketing channels							
		I	II	III	IV	V	VI	VII	VIII
Producers	Selling price	1004.1	927.8	927.8	927.8	927.8	1013.5	1038.1	1125.3
	GMMp (%)	100%	83.2%	58.4%	64.4%	63.2%	74.6%	70.7%	70.9%
Collectors	Marketing cost	-	42.5	42.5	42.5	42.5	-	-	-
	Selling price	-	1114.7	1138.9	1127.4	1127.4	-	-	-
	Gross profit	-	144.4	168.6	157.1	157.1	-	-	-
	GMMcl (%)	-	16.8%	13.3%	13.8%	13.6%	-	-	-
Cooperatives	Marketing cost	-	-	-	-	-	125.9	-	-
	Selling price	-	-	-	-	-	1358.2	-	-
	Gross profit	-	-	-	-	-	218.8	-	-
	GMMcp (%)	-	-	-	-	-	25.4%	-	-
Small scale traders	Marketing cost	-	-	-	106.4	129.5	-	129.5	-
	Selling price	-	-	-	1441.9	1467.3	-	1467.3	-
	Gross profit	-	-	-	208.1	210.4	-	299.7	-
	GMMst (%)	-	-	-	21.8%	23.2%	-	29.3%	-
Large scale traders	Marketing cost	-	-	147.4	-	-	-	-	151.7
	Selling price	-	-	1587.6	-	-	-	-	1587.6
	Gross profit	-	-	301.3	-	-	-	-	310.6
	GMMlt (%)	-	-	28.2%	-	-	-	-	29.1%
TGMM		0	16.8%	43.1%	35.6%	36.8%	25.4%	29.3%	29.1%

Source: Own survey (2017)

As shown in Table 14, total gross marketing margin (TGMM) was highest in channel III (43.1%) followed by channel V (36.8%). According to survey result producer's share (GMMp) was highest in channel I (100%) followed by channel II (83.2%) and lowest in channel III (58.4%) followed by channel V (63.2%). Collectors gross market margin (GMMcl) is highest in channel II (16.8%) while that one of small-scale (GMMst) and large-scale (GMMlt) traders are highest in channel VII (29.3%) and channel VIII (29.1%) respectively.

Due to difficulty in obtaining data on production and marketing costs of goat producer's, profitability analysis is conducted only for traders. The result indicated that small-scale traders attain highest gross profit in channel VII (299.70 birr) while large-scale traders gain highest gross profit in channel VIII (310.60 birr) when they directly purchase from producers. Large-scale traders attain lowest gross profit in channel III (301.30 birr) when they purchase from collectors (Table 14).

In general the S-C-P result showed that the goat market in the study area is non-competitive in nature. In non-competitive market traders may possibly get-together to lower purchase price so that they grasp a higher profit at the time of resale. Higher market concentration causes traders to collide which in turn causes larger share of the market margins remain with the traders, giving them more control than goat producer households. Therefore, goats market in Moyale district can be concluded to have poor performance. This result agreed with the finding of Gebremariam and Yemiru (2015) who found live goat market in Asaita to be non-competitive characterized by loose oligopoly nature, with higher margins for traders and inefficient.

4.4.1. Determinants of Live Goats Market Participation Decision

To identify determinants of pastoralist's goat market participation decision, twelve explanatory variables were hypothesized. Among the hypothesized variables, five of them were found to significantly influence goat market participation decision. Among the hypothesized variables family size, credit use and lagged price affected the goat market participation decision positively

and significantly. Whereas distance to the nearest livestock market and other income from off/non-goat activities reduces the probability of live goat market participation (Table 15).

Family size (manequi): As hypothesized this variable influenced the live goat market participation decision positively and significantly at 5% level of significance. As households labor force increase by one man equivalent, the probability of producer household participation decision in live goat market increases by 4.6%. The reason behind might be that those households who have higher family labor force can manage to drive the goat flock to the market easily and acquires the benefit to be obtained from goat market participation and thus improves level of participation. This is in line with Gezehagn (2015) who found that household size positively and significantly affected beef cattle market participation decision.

Distance to market (dismkt): As expected this variable influenced household's goat market participation decision negatively and significantly at 5% level of significance. As distance to the nearest livestock market increase by one km the probability of the household to participate in goat market reduced by 2.09%. This might be due to the far distance the household resides from the nearest livestock market; the less likely the household involved in selling live goat due to long trekking time and relatively high marketing costs. This is in line with Gebremedhin *et al.* (2015) and Zemeda (2016) who found that distance to nearest livestock market negatively and significantly influenced small ruminants' market participation decision.

Credit use (credit): Credit use was found to determine the probability of participation in goat markets significantly and positively at 1% probability level. As compared to households who are non-users of credit those households with credit use participate in live goat markets by 8.7% more. The reason behind this might be that credit helps household in covering marketing costs and pave way for better market participation. This is in line with Gezehagn (2015) who found that having access to credit service in beef cattle production increases the probability of participation of producers in beef cattle markets.

Table 15: Results of Heckman first-step determinants of goat market participation decision

Variables	Marginal effect	Std. Err.	z	P>z
Age of household head	0.0017	0.025974	0.49	0.627
Sex of household head	0.0641	0.341269	1.18	0.239
Education level	0.0158	0.114534	1.05	0.295
Family size	0.0459**	0.14707	2.38	0.017
Distance to market	-0.0209**	0.074344	-2.13	0.033
Number of goat owned	0.0344	0.185403	1.41	0.159
Other livestock owned	-0.0041	0.027882	-1.12	0.263
Extension contact frequency	0.0014	0.075031	0.14	0.889
Credit use	0.0873*	0.425632	1.82	0.069
Veterinary service use	0.0436	0.347096	0.98	0.329
Lagged price	0.00003**	0.000472	2.18	0.029
Off/non goat income	-0.0002***	4.36E-05	-4.58	0.000
Constant	-	1.506305	-0.29	0.768

Note: Dependent variable is mktprt. ***, ** and *are statistically significant at 1%, 5% and 10% significance levels respectively.

Source: Own computation from survey result, 2017

Lagged price (lgprice): The seasonal average lagged price of goat in the previous year was found to determine the probability of participation in live goat markets positively and significantly at 5% level of significance. As lagged price per goat increase by one birr the probability to participate in live goat market increases by 0.003%. The intuition behind this might be that the relative high market price in previous year may motivates/encourage the households to participate in the live goat market. The study by Shambel (2013) also reported the same result.

Other incomes excluding income from goat (othrinc): This variable influenced goat market participation decision negatively and significantly at 1% significance level. The study indicated that involvement in other activities excluding goat marketing decreases the probability of participation of producers in goat marketing by 0.02%. This is mainly due to the fact that,

households participating in other non-goat activities are gaining the income from on/off farm activities rather than goat market, this makes the household to abstain from goat market participation and decreases pastoralists goat market participation. This result is in line with the findings of Shambel (2013) and Jemal (2017) who reported the same results.

4.4.2. Determinants of Number of Live Goat Market Supply

The second step in Heckman two step estimation procedures is used to identify determinants of number of goats goat supplied to the market and it includes those variables used in Heckman first step procedure except one or more exclusion restriction variables. This study used lagged price as selection variable in participation equation which was found to affect live goat market participation decision but has no significant effect on number of goat supplied to the market in order to predict inverse of the Mills' ratio correctly. The results of second-step Heckman selection estimation for the number of goat supplied to the market are given in Table 16. The coefficient of Mills ratio (Λ) in the Heckman second-step estimation is significant at 5% probability level. This indicates sample selection bias, which is the existence of some unobservable household characteristics determining likelihood to participate in live goat market and thereby affecting the number of live goat supplied to the market. The wald chi2 (11) = 352.11 which is significant at 1% significant level, indicated the overall goodness of fit of the Heckman selection model. This shows that jointly the independent variables included in the selection model explain the level of participation. Therefore, Heckman two step sample selection model was relevant model for this study.

Among the hypothesized variables, five of them influenced number of goat supplied to the market significantly. Sex of household head, number of goat owned and credit use affected the live goat supplied to market positively and significantly whereas distance to the nearest livestock market and other livestock owned negatively and significantly affected the level of live goat sales.

Sex of household head: As hypothesized this variable influenced the live goat market supply positively and significantly at 1% level of significance. Holding other explanatory variables

constant, as compared to female headed household, male headed household's goat market supply increases by 0.54TLU of goats. The reason behind might be that those households who are female headed household are busy with house work and as well in taking care of their children. This result is in line with Habtamu (2015) who found that being male headed household had positively and significantly affected the level of supply.

Distance to market (dstmkt): This variable influenced number of goat market supplied negatively and significantly at 10% significance level. Holding other explanatory variables constant, the result shows that as the distance from the nearest livestock market increased by one kilometer, the number of goat supplied to market decreased by 0.06TLU of goat. This might be due to the fact that the far the market place the higher would be the trekking time, marketing costs, less access to market information and facilities. This is in line with Zemeda (2016) who indicated that distance to market caused the quantity of small ruminants supplied to market decrease in Tahtay adyabo district.

Number of goats owned (goatown): As expected, this variable influenced households' number of goats supplied to market positively and significantly at 1% significance level. As number of goat owned increase by one TLU the number of goat supplied to the market increases by 0.16TLU. This is mainly due to the fact that pastoralists with more number of goats tend to favor the supply of goat and generate cash from goat sale. This result agrees with the finding of Zekerias (2017) who found that number of cattle owned by pastoralists increase the number of live cattle supplied to market.

Livestock owned other than goats (othrtlu): This variable determined number of goats supplied to market negatively and significantly at 1% significant level. As other livestock owned increased by one TLU the number of goat supplied to market reduced by 0.07TLU. The intuition behind this might be that those households with more number of livestock other than goat tend to mainly disregard the benefits to be generated from supplying of goat to the market. Shambel (2013) also reported the same result.

Credit use (credit): This variable affected goat market supply positively and significantly at 1% significance level. Holding other explanatory variables constant, as compared to credit non-users, the level of goat supplied for those households with credit use increased by 0.41TLU. This suggests that credit use would enhance the financial capacity of the farmer to cover possible marketing costs to supply more goats to market. This is in line with Gebremedhin *et al.* (2015) who found that credit use increases the number of small ruminants supplied to the market.

Table 16: Results from Heckman second-step of determinants of number of live goat supplied

Variables	Coef.	Std. Err.	Z	P>z
Age of household head	0.011	0.0100081	1.11	0.265
Sex of household head	0.541***	0.1926553	2.81	0.005
Education	0.019	0.0341511	0.54	0.586
Family size	0.025	0.0400434	0.63	0.527
Distance to market	-0.062*	0.0323673	-1.9	0.057
Number of goat owned	0.155***	0.0578158	2.68	0.007
Other livestock owned	-0.070***	0.0139646	-5.02	0.000
Extension contact frequency	0.020	0.0319894	0.62	0.537
Credit	0.410**	0.1596608	2.57	0.010
Veterinary service use	0.077	0.146436	0.53	0.599
Off/non goat income	-0.00003	0.0000222	-1.4	0.161
Constant	0.887	0.5903267	1.5	0.133
mills lambda	0.498**	0.2240523	2.22	0.026
rho	0.780			
sigma	0.639			
Wald chi2(11) = 352.11		Prob > chi2 = 0.0000		

Note: ***, ** and * are statistically significant at 1%, 5% and 10% significance levels respectively.

Source: Own computation from survey result, 2017

Inverse mills ratio (LAMBDA): According to the model output, the inverse Mill's Ratio or selectivity bias correction factor affected the number of goat supplied positively and significantly at 5% significance level and this result suggests that there appears to be unobserved factors that might affect both probability of households goat market participation decision and number of goat supplied, justifying the suitability of the Heckman two stage model for identifying the determinants of number of goats supplied to market.

4.4.3. Determinants of Goat Market Outlet Choices

Goat producers in the study area have five major market alternatives to sell their goat. Multivariate probit model was used to analyze the determinants of households decision on market outlet choices as households are more likely chooses different outlets simultaneously. The model estimated jointly for five categorical dependent variables namely; (1) large-scale traders, (2) small-scale traders, (3) cooperatives, (4) collectors and (5) ultimate consumers market outlets. The correlation coefficients of the error terms in MVP model had positive as well as negative signs, indicating that there is interdependency between different market outlets chosen by households. The signs of correlation coefficients indicate the complementary and competitive nature of different market outlets.

*The wald $\chi^2(50) = 177.68, prob > \chi^2 = 0.0000$ is significant at 1% significance level, this implies that the coefficients are jointly significant and the explanatory power of the factors included in the model is satisfactory. The likelihood ratio test of the null hypothesis of independency between market outlet choice decision ($\rho_{21} = \rho_{31} = \rho_{41} = \rho_{51} = \rho_{32} = \rho_{42} = \rho_{52} = \rho_{43} = \rho_{53} = \rho_{54} = 0$) is rejected at 1% level of significance ($\chi^2(10)=124.82^{***}$). This indicated that there are significant joint correlations for all estimated coefficients across the equations in the model except for large-scale traders and small-scale traders which is negative and insignificant.*

The likelihood ratio test for correlation between outlets showed that there are negative and significant interdependency between large-scale traders and cooperatives outlets, large-scale

traders and collectors outlets, and large-scale traders and ultimate consumers' outlets. On the other hand small-scale traders' outlet had a positive and significant relationship with cooperatives, collectors and ultimate consumers market outlets, and cooperatives outlet had positive and significant relationships with both collectors and ultimate consumers' outlets. While there were positive and significant interdependency between collectors and ultimate consumers outlets. The model result also shows that the probability that goat producers choose large-scale traders, small-scale traders, cooperatives, collectors and consumers market outlets were 35.36%, 58.63%, 57.68%, 62.48% and 34.12%, respectively. The joint probability of choosing all market outlets was 3.04% and the joint probability of failure to choose all market outlets was 0.05%.

The multivariate probit model analysis indicated that out of ten explanatory variables included in the model two variables significantly affected the choice of entire outlets at different magnitude and probability level.

Distance to market (dstmkt): Distance to livestock market negatively and significantly affected large scale traders, small-scale traders and consumers' market outlets choice at 5%, 5% and 10% level of significance respectively. While it is positively and significantly affect cooperatives and collectors outlets at 5% and 10% significance level. This result showed that as the distance from the livestock market increases the households tend to sell their goat at farm gate and use outlets other than large and small-scale traders' market outlets. This is due to high trekking and other marketing costs to supply goat to the market. This is coincided with Nuri (2016) who found that increase in distance to the market center would decrease the probability of choosing wholesalers outlet, but increase the likelihood of choosing collectors outlet. The result is again supported by the findings of Addisu (2016) and Bezabih *et al.* (2015) who reported that distance to the nearest market positively influenced the likelihood of choosing retailer outlet.

Selling price (price): Selling price of goat positively and significantly affected the large-scale traders, small-scale traders and consumer market outlets choices at 1%, 5% and 1% significance level respectively. In contrary, the variable affected the choice of cooperatives and collectors market outlets negatively and significantly at 5% and 1% significance level respectively. The

result indicated that the households receive a better selling price from large-scale traders, small-scale traders and consumers as compared to cooperatives and collectors. Therefore households prefer to choose large-scale traders, small-scale traders and consumer market outlets than choosing cooperatives and collector market outlets as they pay less. This result is in line with Melkamu (2016) who found that selling price affected wholesalers and consumer outlets positively and significantly and negatively affected collector outlet choice. Sultan (2017) found that price offered by market outlets significantly and negatively affected accessing cooperative market outlet.

Table 17: Multivariate probit estimation results for determinants of goat market outlet choice

Variables	Large-scale traders		Small-scale traders		Cooperatives		Collectors		Consumers	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Age of household head	0.083	0.031	-0.051	0.022	0.016**	0.028	0.023***	0.033	0.021	0.020
Sex of household head	0.095	0.608	0.076	0.452	0.218	0.223	0.207	0.119	-0.176	0.473
Education level	0.159	0.149	-0.056	0.084	-0.081	0.102	-0.195	0.125	0.129	0.082
Family size	0.182**	0.133	0.116**	0.106	-0.146	0.112	-0.143	0.045	0.059	0.096
Distance to market	-0.318**	0.109	-0.128**	0.079	0.259**	0.118	0.121*	0.132	-0.107*	0.082
Number of goat owned	1.156***	0.476	0.019	0.141	-0.135	0.175	-0.382*	0.227	-0.399***	0.146
Other livestock owned	-0.191	0.053	-0.057	0.035	-0.049	0.050	0.186	0.063	0.054	0.033
Extension contact	0.105	0.094	0.023	0.076	-0.041	0.096	-0.369	0.140	-0.038	0.075
Credit use	0.238	0.469	-0.281	0.423	0.523	0.482	-0.152	0.159	0.240	0.401
Selling price	0.0031***	0.0066	0.0013**	0.0005	-0.002**	0.001	-0.0022***	0.0008	0.002***	0.0005
Constant	-5.135**	2.320	1.143	1.513	-0.965	1.373	-1.634	1.518	-3.075	1.452
Predicted probability	0.353		0.586		0.577		0.624		0.341	
Joint probability (success)		0.0304								
Joint probability (failure)		0.0005								
Number of draws (#)= 5		Number of obs. = 123				Log likelihood = -294.46				
Wald chi2(50)=177.68***		Prob > chi2 = 0.0000								
(-)rho31*,(-) rho41***, (-) rho51**, (+) rho32**, (+) rho42**, (+) rho52**, (+) rho43**, (+) rho53***, (+) rho54***										
Likelihood ratio test of rho21 = rho31 = rho41 = rho51 = rho32 = rho42 = rho52 = rho43 = rho53 = rho54 = 0								chi2(10)=124.82***		

Dependent variable is goat market outlet choice where Y1=Large scale traders, Y2=Small scale traders, Y3=Cooperatives, Y4=Collectors and Y5= Consumers.

Note: ***, ** and *are statistically significant at 1%, 5% and 10% significance levels respectively.

Source: Own computation from survey result, 2017

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary and Conclusion

Ethiopia is one of the African countries with the largest small-ruminants population in the continent. This sub-sector is the main economic activity and critical source of livelihood for the pastoralists in Moyale district. It plays significant role in improving income and livelihood of large portion of rural households in Moyale district. Goats are important to the socioeconomic wellbeing of pastoralist in the district in terms of nutrition, income and intangible benefits (savings, insurance against emergencies, cultural and ceremonial purposes). However, the subsector faces various marketing challenges in the district.

The study was aimed at analyzing goat market chain analysis in Moyale district, Borena zone, Oromia region. The specific objectives of the study include identifying goat market chain actors and their roles; analyzing structure, conduct and performance of goat marketing; analyzing the determinants of goat market participation decision and level of participation; and analyzing the determinants of goat producers' market outlet choice.

To meet the objectives of the study primary data were collected from 196 goat producers and 32 traders using pre-tested structured questionnaires and secondary data from different district offices, CSA, published and non-published sources. Descriptive statistics and econometric models were used to analyze the data collected from sample goat producer households. Determinants of goat producers' participation decision and level of participation in goat marketing has been analyzed using Heckman two-stage selection model simultaneously. Factors affecting market outlet choice of goat producers was analyzed using Multivariate probit model (MVP).

The study revealed that the main goat market chain actors are producers/pastoralists, collectors, cooperatives, small-scale traders, large-scale traders, hotels and restaurants, and ultimate consumers. Cooperatives collect goat from member and non-member producers to resale it to

large-scale traders, hotels and restaurants, and also to trade out of district. Collectors purchase goat from village and resale to small-scale traders, large-scale traders and ultimate consumers. Small-scale traders are responsible in supplying goat to large-scale traders, hotels and restaurants, and ultimate consumers. Large-scale traders mainly buy goat from collectors, cooperatives, small-scale traders and pastoral producers. They supply goat to hotels and restaurants, and again on the other hand they are permanent transporters of goat out of the district. Hotels and restaurants mainly purchase goat from cooperatives, small and large-scale traders and they resale to consumers in meat/meal form.

SCP approach was used to analyze the structure, conduct and performance of goat market. The structure of goat market in Moyale district is weak oligopoly in nature with concentration ratio for top four goat traders were found to be 44.72%. According to traders' survey result 43.8% of goat traders stated that there is absence of barriers to entry in to goat marketing and 31.2% of the total goat traders reported lack of working capital as barriers to entry in goat trading mainly for large-scale traders and collectors.

Negotiation is the main price setting mode for traders in the district and the cash on hand is the mode of payment traders are mainly using. The majority of sample goat traders depend up on the body condition of goats and goat quality to set the purchasing price. The strategies used by traders to attract their buyers were by giving quality goat and offering better price.

Performance of the market was analyzed using marketing margin, and margin determination is accompanied with market. Eight main alternative channels were identified for live goat marketing. From the goat supplied to the district market the largest amount has passed through channel III (34.09TLU) while the smallest number is through channel II (9.37TLU). Total gross marketing margin (TGMM) was highest in channel III (43.1%) and low in channel II (16.8%).

Generally, high market concentration causes traders to collide which causes larger share of the market margins remain with the traders, giving them more control than goat producer households

which in turn made poor market performance. Therefore, goats market in Moyale district can be characterized by weak oligopoly market nature, with higher margins for traders and inefficient.

Heckman two stage model was used to identify the determinants of participation decision and level of participations and the result showed that family size, credit use and lagged price were positively and significantly determine participation decision, while distance to market and other income negatively and significantly determine participation decision. Moreover the result indicated that the number of goat supplied was affected positively and significantly by sex of household head, number of goat owned and credit use. While on the other hand it is negatively and significantly affected by distance to market, other livestock owned and other income.

The Multivariate probit (MVP) model was used to identify factors affecting goat producers' market outlet choice. The model result showed that distance to livestock market negatively and significantly affected large scale traders, small-scale traders and consumer market outlets choice, while it affects cooperatives and collectors market outlets positively. Selling price of goat positively and significantly affected the large-scale traders, small-scale traders and ultimate consumers' market outlets choices, while the variable affected the choice of cooperatives and collectors market outlets negatively and significantly.

In general, the study concluded that the structure, conduct and performance of goats market in the study area were found to be inefficient. The study also conclude that demographic, socio-economic and institutional factors play a vital role in determining goats market participation decision, number of goats supplied and producers market outlet choice decision. However in the study area, the overall situation of live goat market has not been to the expected levels. Hence, solid efforts should be made to promote the goat market chain in the district.

5.2. Recommendations

Depending up on the findings of the study the following recommendations are made to be considered by responsible bodies for the promotion of goat production and marketing for generation of fair and equal benefit among the goat market chain actors.

Governmental and non-governmental institutions/organizations and other stakeholders who are concerned to support those goat producer farmers must strengthen training, follow up and other supports to goat producers in the district to reduce pastoralists' exploitation by traders. Well-established marketing institutions are needed to promote and enhance goat market competitiveness that helps in reducing concentration and collusion of existing traders. Increasing the dimension of access to formal financial institutions is critical to overcome the problem of capital barrier in participating in the goat trade business. Developing the skills of pastoralists through training can develop effective marketing strategies and to negotiate more effectively with traders to increase the price they receive while marketing their animal.

Distance to market negatively and significantly affected the participation decision and number of goats supplied to the market. Therefore, developing market infrastructure such as building market places, repairing roads and improving road networks to production areas reduce trekking time, minimize transportation and other marketing costs which in turn improve goat market participation and increase goat supply to the market. The development of transport infrastructures also enables households (particularly aged households) to supply their animal to better offering outlet rather than being exploited by nearby collectors for whom distance to market is an asset.

Family size (active labor force) positively and significantly influenced participation of households to the market. The variable again affected the choice of large and small-scale traders' market outlets positively and significantly. It is important for raring and also trekking the animals to the market. Lack of such labor force has a great impact on households' decision to participate and supply their animal to a better offering market outlets. Therefore, improving the

capacity of available productive labor of the households is important to increase goat production, market participation and supply to the well-paying market outlets such as large-scale traders.

Credit use by producers positively and significantly affected goat market participation and number of goat supplied. Therefore, increasing and facilitating more financial institutions are critical in helping goat producer households' capacity to cover the marketing costs it takes to participate in the market and in turn supply more to the market. Therefore Credit providing institutions need to attract goat producers to the institution by linking them with the main urban and nearby supply of the service providing institutions.

Other livestock holding have negative and significant effect on the number of goat supplied to the market and the other income generated from non-goat business activity was negatively and significantly affected households decision to participate on goat market. This is mainly due to an inadequate recognition of the contributions goats make to the livelihoods of the poor. Therefore, market oriented training focused on awareness creation about the advantage of having alternative income sources and the real benefit to be obtained from goat marketing should be given.

Number of goats owned positively and significantly determines number of goats supplied to the market. Similarly it affected the choice of large-scale traders' market outlet positively and significantly and in contrary, it negatively and significantly affected the choice of collectors and ultimate consumer market outlets. Therefore, the concerned body needs to focus on increasing goat production which could be achieved through providing improved feed and other agricultural technologies. This in turn will enhance the choice of large-scale traders' outlet which buys large number of animal at once.

One year lagged price positively and significantly influenced goat market participation decision of households. High price in the previous production season results in improvement in the goat market participation by goat producer households. Therefore, information about previous year price can improve market participation decision of producer households.

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7. APPENDICES

Appendix I: Tables

Appendix Table 1: Conversion factors used to estimate man equivalent

Age group	Male	Female
<10	0	0
10-13	0.2	0.2
14-16	0.5	0.4
17-60	1	0.8
>60	0.7	0.5

Source: Storck, *et al.* (1991)

Appendix Table 2: Conversion factor of Tropical Livestock Units (TLU)

Livestock category	TLU
Oxen and cow	1
Bull/heifer	0.75
Calf	0.25
Donkey (adult)	0.70
Donkey (Young)	0.35
Horse and mule	1.1
Sheep and goat (adult)	0.13
Sheep and goat (young)	0.06
Chicken	0.013
Camel	1.25

Source: Storck, *et al.*, 1991

Appendix Table 3: Results from Heckman two stage estimation model

```

Heckman selection model -- two-step estimates      Number of obs      =      196
(regression model with sample selection)          Censored obs       =       73
                                                Uncensored obs     =      123

                                                Wald chi2(11)      =     352.11
                                                Prob > chi2        =     0.0000

```

		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
<hr/>							
gtlusply							
	age	.0111468	.0100081	1.11	0.265	-.0084686	.0307623
	sex	.5410701	.1926553	2.81	0.005	.1634726	.9186676
	edu	.0185795	.0341511	0.54	0.586	-.0483554	.0855144
	maneui	.0253009	.0400434	0.63	0.527	-.0531826	.1037845
	dstmkt	-.0615822	.0323673	-1.90	0.057	-.125021	.0018566
	goatlu	.1550287	.0578158	2.68	0.007	.0417119	.2683454
	othrtlu	-.0701043	.0139646	-5.02	0.000	-.0974744	-.0427342
	extfrq	.0197373	.0319894	0.62	0.537	-.0429607	.0824354
	credit	.4101379	.1596608	2.57	0.010	.0972084	.7230673
	vetservc	.0770444	.146436	0.53	0.599	-.2099649	.3640536
	othrinc	-.0000312	.0000222	-1.40	0.161	-.0000747	.0000124
	_cons	.8872175	.5903267	1.50	0.133	-.2698016	2.044237
<hr/>							
mktprt							
	age	.0126109	.025974	0.49	0.627	-.0382972	.063519
	sex	.4022657	.3412694	1.18	0.239	-.26661	1.071141
	edu	.1200226	.1145337	1.05	0.295	-.1044594	.3445046
	maneui	.3495448	.1470698	2.38	0.017	.0612933	.6377964
	dstmkt	-.158619	.0743441	-2.13	0.033	-.3043307	-.0129072
	goatlu	.261251	.1854026	1.41	0.159	-.1021314	.6246335
	othrtlu	-.031192	.0278824	-1.12	0.263	-.0858405	.0234566
	extfrq	.010469	.0750313	0.14	0.889	-.1365896	.1575276
	credit	.7728053	.425632	1.82	0.069	-.0614182	1.607029
	vetservc	.3389854	.3470961	0.98	0.329	-.3413105	1.019281
	lgprice	.0010304	.000472	2.18	0.029	.0001053	.0019555
	othrinc	-.0001997	.0000436	-4.58	0.000	-.0002852	-.0001142
	_cons	-.4439487	1.506305	-0.29	0.768	-3.396251	2.508354
<hr/>							
mills							
	lambda	.4983165	.2240523	2.22	0.026	.059182	.9374509
<hr/>							
	rho	0.77976					
	sigma	.63906055					
<hr/>							

Source: own computation (2017)

Appendix Table 4: Results from Multivariate probit model

Multivariate probit (MSL, # draws = 5) Number of obs = 123
 Wald chi2(50) = 177.68
 Log likelihood = -294.46281 Prob > chi2 = 0.0000

		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	

largtrad							
	age	.0834789	.0308843	0.67	0.243	-.0675606	.0514894
	sex	.0948155	.608485	0.14	0.186	-1.28557	1.096202
	edu	.1586003	.1490915	0.81	0.375	-.4524043	.1331534
	manequi	.1816852	.133382	2.33	0.023	.442862	.792653
	dstmkt	-.3177401	.1093256	-2.46	0.011	-.5336877	-.103502
	goatlu	1.15592	.4759852	3.42	0.000	.1893808	1.501319
	othrtlu	-.1911742	.0531856	-1.57	0.122	-.2953226	-.0866087
	extfrq	.1053581	.0935716	0.29	0.164	-.0790221	.2900012
	credit	.2377660	.4693549	0.85	0.304	.157204	.6816174
	price	.0031498	.0066045	3.16	0.002	.0015959	.0099325
	_cons	-5.134975	2.320228	-2.08	0.044	- 9.68226	.5880226

Smaltrad							
	age	-.0514958	.0218459	-1.49	0.108	-.0944654	-.0065855
	sex	.0762586	.4523689	0.06	0.583	-1.647436	.1252055
	edu	-.0559321	.0841523	-0.28	0.485	-.1102817	.2221289
	manequi	.116025	.1062584	2.74	0.028	.0955398	.5126467
	dstmkt	-.1283845	.0789308	-2.04	0.043	-.1290333	.1844175
	goatlu	.0.0194	.1413684	0.92	0.293	-.2947671	.259151
	othrtlu	.0567205	.025475	-0.30	0.558	-.1271385	.0117107
	extfrq	-.0228862	.0760048	0.29	0.691	-.126747	.1717622
	credit	-.280654	.4221865	-0.81	0.368	-1.510378	.1485877
	price	.001333	.0005	2.56	0.035	.0003311	.002275
	_cons	1.1434258	1.51285	0.78	0.567	-1.823903	4.110257

coops							
	age	.0155902	.0279324	2.24	0.023	.0039678	.0713277
	sex	.2183527	.2227253	0.81	0.378	-2.615279	2.179952
	edu	-.0810862	.102468	-0.36	0.780	-.1189745	.2814324
	manequi	-.1459854	.1120059	-1.47	0.157	-.3652087	.0737482
	dstmkt	.259426	.1175627	2.02	0.041	.0281491	.4912579
	goatlu	-.1352641	.1750935	-1.29	0.223	-.4785729	.2082089
	othrtlu	-.0493555	.050368	-1.19	0.238	-.1482351	.049129
	extfrq	-.041085	.0962543	-0.56	0.574	-.229069	.1487492
	credit	.5218369	.4819356	1.11	0.253	-.4668981	.9213832
	price	-.0022	.001122	-3.06	0.019	-.0025533	-.0003538
	_cons	-.9652358	1.373458	-0.23	0.814	-2.687382	2.617511

collectr							
	age	.023005	.0330895	3.89	0.000	-.0868321	.0416001
	sex	.2074689	.1192631	1.14	0.263	-.4395192	.7004563
	edu	-.1946237	.1253679	-0.51	0.541	-.2499041	.4409875
	manequi	-.1425601	.0445526	-1.06	0.235	-.4275386	.1424081
	dstmkt	.1210085	.1322204	1.63	0.095	-.3788357	.1358851
	goatlu	-.382229	.2266382	-1.58	0.073	-.6624263	.8273374
	othrtlu	-.1856384	.063008	-1.32	0.191	-.3620908	.3091476
	extfrq	-.369138	.1404462	-0.42	0.714	-.6442108	-.093853
	credit	-.1519909	.1589537	-0.50	0.523	-1.712503	.4819762
	price	-.002223	.0008456	-2.65	0.007	-.0036845	-.0007048
	_cons	-1.633947	1.518454	-1.39	0.143	-3.616901	.2428956

consumr							
	age	.0214982	.0204863	0.76	0.439	.0090136	.0619582
	sex	-.1758967	.4729547	-0.38	0.651	-1.104088	.7526339
	edu	.1290435	.0824462	0.78	0.430	-.0321939	.2918266
	manequi	.0586813	.0956551	0.60	0.542	-.1287414	.2481778
	dstmkt	-.107495	.0820546	-1.67	0.091	-.2537224	.2680361

Continues

goatlu		-.3990697	.1458674	-3.03	0.000	-.6860245	-.1121111
othrtlu		.0542841	.0327425	0.18	0.861	-.0102664	.1190614
extfrq		-.0375103	.0750008	-1.19	0.232	-.1871027	.1097587
credit		.2404066	.4014449	1.61	0.102	-.5445919	1.025209
price		.002223	.0005501	2.65	0.006	.0006757	.0026858
_cons		-3.075202	1.452364	-1.37	0.158	-5.922473	-.2295015

Source: Own completion (2017)

Appendix Table 5: Error covariance matrix and correlations of the market outlets

/atrho21		-.0538899	.1471186	-0.37	0.714	-.342237	.2344573
/atrho31		-.1878512	.1107296	-1.70	0.090	-.4048771	.0291748
/atrho41		-.3043252	.1063118	-2.86	0.004	-.5126925	-.0959579
/atrho51		-.2493451	.1054105	-2.37	0.018	-.4559458	-.0427444
/atrho32		.2864216	.1216583	2.35	0.019	.0479758	.5248675
/atrho42		.2958868	.1177	2.51	0.012	.0651991	.5265745
/atrho52		.2384763	.1087223	2.19	0.028	.0253845	.4515681
/atrho43		1.208282	.1366726	8.84	0.011	.9404086	1.476156
/atrho53		.6404459	.1055744	6.07	0.000	.4335239	.8473678
/atrho54		.6371632	.1092052	5.83	0.000	.423125	.8512014
rho21		-.0538378	.1466922	-0.37	0.714	-.3294731	.2302536
rho31		-.1856723	.1069122	-1.74	0.082	-.3841143	.0291665
rho41		-.2952657	.0970433	-3.04	0.002	-.4720404	-.0956644
rho51		-.244303	.0991191	-2.46	0.014	-.4267742	-.0427184
rho32		.278838	.1121993	2.49	0.013	.047939	.481448
rho42		.2875439	.1079684	2.50	0.011	.0651068	.4827582
rho52		.2340561	.1027662	2.28	0.023	.0253791	.4231871
rho43		.8361634	.0411153	2.34	0.010	.7354099	.9007452
rho53		.5652031	.0718482	7.87	0.000	.4082621	.6896919
rho54		.5629649	.0745948	7.55	0.000	.3995598	.6916966

Likelihood ratio test of rho21 = rho31 = rho41 = rho51 = rho32 = rho42 = rho52 = rho43 = rho53 = rho54 = 0: chi2(10) = 124.82 Prob > chi2 = 0.0000

Appendix Table 6: The predicted probability that goat producers choose each outlet

```
. mvppred Y, pmarg
    (pmarg will be stored in variables Yi, i = 1,...,#eqs)
. summarize Y1 Y2 Y3 Y4 Y5
```

Variable	Obs	Mean	Std. Dev.	Min	Max
-----+-----					
Y1	123	.353571	.3383186	.0000815	.9999952
Y2	123	.5863678	.3128335	.0378642	.9978813
Y3	123	.5768079	.4052018	.0195873	.99997
Y4	123	.624816	.4231768	.0002858	1
Y5	123	.3411951	.2898076	.0011055	.994819

Appendix Table 7: Joint probability of success/failure to choose all markets outlets

```
. mvppred outjpr, pa
    (Pr(all zeros), Pr(all ones) will be stored in variables outjpr0s, outjpr1s)
. summarize outjpr1s outjpr0s
```

Variable	Obs	Mean	Std. Dev.	Min	Max
-----+-----					
outjpr1s	123	.0304345	.0638791	1.01e-13	.4504709
outjpr0s	123	.0005215	.0014228	6.75e-34	.0129554

Appendix II: Survey Questionnaire

A. Questionnaires: To be filled by goat producer households

I. General information

1. Zone: Borena Woreda: Moyale Kebele: _____
2. Name/code of respondent: _____
3. Age of respondent: _____
4. Sex of respondent: _____
5. Marital status (✓): 1. ☐ Single 2. ☐ Married 3. ☐ Divorce 4. ☐ Widowed
6. Religion (✓): 1. ☐ Muslim 2. ☐ Orthodox 3. ☐ Protestant 4. ☐ Waqefata 5. ☐ Others
7. Formal education level of household head: _____ years
8. Age and sex of family members (Except household head)

16. Who sets selling price for goat in 2017? (✓) 1. ☐ Yourself 2. ☐ Buyers
3. ☐ Determined by market 4. ☐ Negotiations 5. Others (specify) _____
17. When did you get the money after your sale? (✓) 1. ☐ As soon as you sold
2. ☐ After some hours 3. ☐ Other days after sale 4. Other (specify) _____
18. How did you sale your goat in 2017? (✓) 1. ☐ Direct to the purchaser
2. ☐ Through commission man 3. ☐ Through broker 4. Others _____
19. If you use brokers, what problem/s did brokers create? (Multiple answer possible)
1. ☐ Took to limited client 2. ☐ high brokerage fee 3. ☐ Weighing cheating
4. ☐ Wrong price (market) information 5. Others (specify) _____
20. To which market outlet(s) did you sell your goat? (✓) 1. ☐ Large scale traders
2. ☐ Small scale traders 3. ☐ Cooperatives 4. ☐ Collectors 5. ☐ Consumers
21. What was the market price paid by these different outlets?

Collectors		Cooperatives		Small-scale traders		Large-scale traders		Consumers	
Number (No.)	Av. Price	Number (No.)	Av. Price	Number (No.)	Av. Price	Number (No.)	Av. Price	Number (No.)	Av. Price

22. In choosing outlets, what factors do you consider? 1. ☐ Price 2. ☐ Business link
3. ☐ Secured demand 4. ☐ Transport availability 5. Others _____
23. Was there a difference in the marketing cost of goat for 2017? (✓) 1. ☐ Yes 2. ☐ No.
24. If **Yes** to Q 23, how much is your cost to sell to different actors?

Collectors		Cooperatives		Small-scale traders		Large-scale traders		Consumers	
Number (No.)	Cost/ No.	Number (No.)	Cost/ No.	Number (No.)	Cost/ No.	Number (No.)	Cost/ No.	Number (No.)	Cost/ No.

25. What is the estimated amount of income you obtain from goat sale in 2017? _____ Birr

III. Credit Use

1. Did you borrow money for 2017 livestock production purpose? 1. ☐ Yes 2. ☐ No
2. If No for **Q1**, what are your reason(s)? 1. ☐ Warranty problems 2. ☐ No credit service
3. ☐ No need at all 4. ☐ High interest rate 5. ☐ Other (specify) _____
3. From whom did you get credit for goat production? 1. ☐ Banks 2. ☐ Cooperatives
3. ☐ Neighbors and relatives 4. ☐ Micro finance institutes 5. Other _____

4. What will u do with credit in relation to goat production? 1. ☐ To purchase fattening chemicals 2. ☐ To hire transportation vehicle 3. ☐ To purchase goat 4. Others _____
5. Did you faced with any problem in using credit? (✓) 1. ☐ Yes 2. ☐ No
6. If your answer for Q.5 is **Yes**, what was the problem? (✓) 1. ☐ Limited supply of credit 2. ☐ High interest rate 3. ☐ Complicated procedure. 4. Others _____
7. Did you have used veterinary service for your goat in 2017? 1. ☐ Yes 2. ☐ No
8. If yes in **Q7**. How many time u have used it? _____

IV. Extension contact frequency

1. Is there farmers training center in your *kebele*? 1. ☐ Yes 2. ☐ No
2. If **Yes** for Q1, how far farmer training center is from your residence? [_____] km
3. Did you have extension contact in relation to goat in 2017? 1. ☐ Yes 2. ☐ No
4. If yes, how often on average did the extension agent contact you per month? ____times.
5. Have you gain training on goat production and marketing in 2017? 1. ☐ Yes 2. ☐ No
6. If **Yes** for Q5, who provides the training? 1. ☐ Development agents 2. ☐ NGOs (specify) _____ 3. ☐ District experts 4. ☐ Research centers (specify)_____ 5. Others_____
7. Did you know the market prices before you sold your goat? (✓) 1. ☐ Yes 2. ☐ No
8. If **Yes** for Q.7, from whom did you get market information? 1. ☐ DAs 2. ☐ *kebele* 3. ☐ Woreda experts 4. ☐ Brokers 5. ☐ From market 6. Others _____
9. What type of information did you get? (✓) (Multiple answer possible) 1. ☐ Price information 2. ☐ Market place information 3. ☐ Buyers' information 4. Other_____
10. Did you face difficulty in finding buyers while selling goats? (✓) 1. ☐ Yes 2. ☐ No
11. If **Yes** for Q.10, it is due to: (✓) 1. ☐ Inaccessibility of market 2. ☐ Lack of market information 3. ☐ Low price offered 4. Others (specify)_____
12. Have you used veterinary service in 2017 production year? (✓) 1. ☐ Yes 2. ☐ No.

V. Other livestock owned and other income earned excluding income from goats

1. Did you own other livestock rather than goats? 1) Yes 2) No

2. If yes, what is the total number of livestock you owned and annual income generated from livestock other than goats including their products in 2017?

Other livestock	Total number	Total sold	Selling price	Total income	Purpose
Oxen/cows					
Bull/Heifer					
Camel					
Donkey young					
Donkey adult					
Sheep young					
Sheep adult					
Calves					
Chicken					
Horse/mule					
Total					

*Purpose: 1) for purchasing food grains 2) for settling debts 3) for buying clothes 4) others ____

3. Have you involved in off/non-farm activities in 2017 production season? 1. ☐ Yes 2. ☐ No

4. If your answer for Q3 is **Yes**, what were these sources and amount of income?

No.	Off-farm income source	Amount of income in Birr per year
1		

5. What is total income you obtained from off/non-farm activities annually? _____ Birr.

6. What is total income you obtained from all sources rather than goats in 2017? _____ Birr

V. Membership to organizations

1. Are you a member of any social organizations? 1. ☐ Yes 2. ☐ No

2. If yes, what do you get from the organizations? 1. Loans/credit 2. Labour 3. Others ____

3. In which of the following social organization do you participate? 1. Cooperatives

2. Credit and saving 3. Ikub and idir 4. Others (specify) _____

B. Questionnaires: To be filled by traders

I. General household characteristics

I. General household characteristics

1. Name/code of trader _____ Sex _____ Age _____

2. Marital status of trader: 1. ☐ Single 2. ☐ Married 3. ☐ Divorced 4. ☐ Widowed

3. Religion: 1. ☐ Muslim 2. ☐ Orthodox 3. ☐ Protestant 4. ☐ *Waqefata* 5. Others ____

4. Family size _____ 1. ☐ Male _____ 2. ☐ Female _____ 3. ☐ Total _____

5. Year of formal education of household head: [_____] years.

II. Business aspect

1. Which type of trader are you in goat market: 1. ☐ Large-scale traders
2. ☐ Small-scale trader 3. ☐ Collector 4. ☐ Other (specify) _____
2. What is your reason for engaging in this business? 1. ☐ Profitable alternative
2. ☐ No experience in other business 3. ☐ Business granted from family 4. Others_____
3. How long have you been in goat trading? [_____] years
4. At what period of the year do you participate in the goat trade? 1. ☐ Year-round
2. ☐ When purchase prices are low 3. ☐ When supply is high 4. Others_____
5. If you participate in goat trading year round at what period of the year do you participate? (✓) 1. ☐ During high supply 2. ☐ When selling price increase
3. ☐ Holiday 4. Other (specify) _____
6. Do you practice trading other than goat? (✓) 1. ☐ Yes 2. ☐ No
7. If your answer to Q.7 is Yes, what? 1. ☐ Dairy trade 2. ☐ Poultry and eggs trade
3. ☐ Other livestock trade 4. ☐ Honey trade 5. Other (specify) _____
8. How much was your initial working capital in the live goat trade? _____birr.
9. What was your working capital (current working capital) in 2017? _____birr.
10. What was the source of your working capital? 1. ☐ Own 2. ☐ Loan 3. ☐ Gift
4. ☐ Share 5. others (specify) _____
11. If it was loan, from whom did you borrow? 1. ☐ Relative/family 2. ☐ Private money lender
3. ☐ NGO 4. ☐ Friends 5. ☐ Other traders 6. ☐ Microfinance institution
7. ☐ Bank 8. Others (specify) _____
12. Why did you take out the loan? 1. ☐ To extend goat trading. 2. ☐ To buy goat transporting vehicles
3. Others (specify) _____
13. What was the repayment schedule? 1. ☐ Quarterly 2. ☐ Semi-annually 3. ☐ yearly
4. ☐ 3 to 5 year 5. ☐ When you can 6. Others (specify) _____
14. Has there been change in your ability to access finance for the goat trade?
1. ☐ Improved 2. ☐ Deteriorated 3. ☐ No change
15. Are there entry barriers in goat trading? (✓) 1. ☐ Yes 2. ☐ No

16. If your answer to Q.15 is Yes, what are the barriers? (✓) (Multiple response expected)

1. ☐ lack of Capital 2. ☐ Education 3. ☐ licensing procedure 4. ☐ Business experience 5. ☐ High monopoly with prior control of farmers 6. Other _____

17. Number of market days in a week? ☐ days

18. How many days you work per week? ☐ days

III. Purchase Practice

1. From whom did you buy goats in 2017? 1. ☐ Pastoralists 2. ☐ Collectors
3. ☐ Cooperative 4. ☐ Small-scale traders 5. ☐ Large-scale traders 6. Others _____
2. How do you measure your purchase? 1. ☐ By number 2. ☐ By weight (kg)
3. ☐ Body size 4. Other (specify) _____
3. How much and from which supplier did you buy goat 2017 G.C?

Producer/Pastoralist		Collector		Cooperatives		Small-scale traders		Large-scale traders	
Amount	Av.Price / No.	Amount	Av.Price / No.	Amount	Av.Price / No.	Amount	Av.Price / No.	Amount	Av.Price / No.

4. Which are the season when prices are lowest? _____.
5. Which are the season when prices are highest? _____.
6. Was your purchasing price higher than your competitors' prices? 1. ☐ Yes 2. ☐ No
7. If **yes** for Q.6, why? 1. ☐ To attract suppliers 2. ☐ To buy more 3. ☐ To kick out competitors 4. ☐ To get better quality 5. Other (specify) _____
8. How many regular suppliers did you have in 2017? 1. Pastoralists ____ 2. Collectors ____
3. Cooperative ____ 4. Small-scale traders ____ 5. Large-scale traders ____ 6. Others ____
9. How you set purchase price in 2017? (✓) 1. ☐ By negotiation 2. ☐ By the market
3. ☐ The buyer 4. ☐ The seller 5. Other (specify) _____
10. If you decide on the purchasing price, how did you set it? (✓) 1. ☐ Agreeing with other traders 2. ☐ Based on last year price 3. ☐ Considering market forces 4. Other _____
11. What criteria do you use in determining purchasing price? 1. ☐ Quality 2. ☐ Body size 3. ☐ Color of goat 4. ☐ Other traders offer 5. ☐ Supply forces 6. Other _____
12. 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) _____
13. Who purchase goats for you? (✓) 1. ☐ Myself 2. ☐ Friends 3. ☐ Broker
 4. ☐ Commission agent 5. ☐ Family members 6. Others _____
14. If you use brokers, what was the advantage(s)? 1. ☐ To get buyers and sellers easily
 2. ☐ Reduce transaction costs 3. ☐ Save your time 5. Other _____
15. What problems did brokers create? 1. ☐ Cheating quality 2. ☐ Wrong price information
 3. ☐ Charging high brokerage fee 4. Other _____
16. Low prices in 2017 were due to: 1. ☐ Excess supply due to favorable conditions
 2. ☐ Excess supply due to drought 3. ☐ Trade regulations 4. ☐ Clan conflict
 5. ☐ Increase in other substitution such as sheep 6. Other (specify) _____

IV. Selling practices

1. To whom and how much goat did you sell in 2017?

Collectors		Cooperatives		Small scale traders		Large scale traders		Consumers	
Amount	Avg. Price/ No.	Amount	Avg. Price/ No.	Amount	Avg. Price/ No.	Amount	Avg. Price/ No.	Amount	Avg. Price/ No.

2. How do you attract your buyers? (✓) 1. ☐ By giving better price
 2. ☐ By goat quality 3. Other (specify) _____
3. When did you get the money after sale? 1. ☐ On cash 2. ☐ On credit
4. How many regular buyers did you have in 2017? 1. Rural collector ___ 2. Cooperative ___
 3. Small-scale traders ___ 4. Large-scale traders ___ 5. Consumer ___ 6. Others ___
5. What is your source of information? _____
6. How do you qualify the reliability, timeliness and adequacy of the information you got?
 1. ☐ It was reliable 2. ☐ It was timely 3. ☐ It was adequate 4. Other _____
7. Are you willing to pay for market information if it is available? 1. ☐ Yes 2. ☐ No
8. Accessibility to market roads in rainy seasons for vehicles is: 1. ☐ Difficult 2. ☐ Easy
9. If difficult, for how long? _____ months/weeks in _____ season.

V. Marketing Costs

1. What is your average cost incurred per goat in the trading process of goats in 2017:

Cost of marketing	Birr
purchase price per goat	
Labor employed to keep one goat	
Transport cost per goat, if you use vehicles	
Brokerage cost per goat	
License and taxes	
Telephone expenses	
Watching and warding	
Personal travel and other expenses	
Others (specify)	
Total costs	
Average Selling price (per goat)	

V. Marketing services

- Did you pay tax on the goats you purchased in 2017? 1. ☐ Yes 2. ☐ No
- Did you pay tax on the goats you sold in 2017? 1. ☐ Yes 2. ☐ No
- On what basis did you pay tax on the goats you purchased in 2017? 1. ☐ Per goat____ birr
2. ☐ Per kg ____ birr 3. ☐ Fixed payment ____ birr 4. Other (specify) _____
- On what basis did you pay tax for the goats you sold in 2017? 1. ☐ per goat____ birr
2. ☐ per kg ____ birr 3. ☐ Fixed payment ____ birr 4. Other (specify) _____
- What do you think of the marketing fee you paid, compared to your transaction?
1. ☐ Low 2. ☐ High 3. ☐ Average 4. ☐ Don't know
- Do you need a license to trade goats in your locality? 1. ☐ Yes 2. ☐ No
- If yes, how do you see the procedure to get the license? 1. ☐ Complicated 2. ☐ Easy
- Do you have a goat trade license? 1. ☐ Yes 2. ☐ No
- How much did you pay for your license initially? _____birr
- How much is the annual renewal payment? _____birr