Market Chain Analysis of Live Cattle in Borana Pastoral area:

The case of Moyalle District, Oromiya Regional State, Southern Ethiopia.

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DEDICATION

Dedicated to my beloved sister Martha Bassa, my late Mother Birhanesh Danddo, my love Meseret Wolde and lovely Daughter Tinbte Zekarias. They have and will support, loved, and lived for me all their life. They have had such creditworthy value in my life carrier in general and the graduate study in particular. Moreover, I have dedicated my work to My Darling, whose Banner over me is love. I would like to say my life word "We were one; we are one".

Zekarias Bassa Faku

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ACRONYMS

CC: Contingency Coefficient

CCAFS: Research Program on Climate Change, Agriculture and Food Security

CFC: Common Funds for Community

CGIAR: Consultative Group on International Agricultural Research

CILSS: Comitee Comité permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel or Permanent

                    InterstatesCom mittee for Drought Control in the Sahel.

CIAFS: Capacity to Improve Agriculture and Food Security

COMESA: Common Market for Eastern and Southern Africa

CR: Concentration Ratio

CSA: Central Statistical Agency

ECOSOC: United Nations Economic and Social Council

EEA: Ethiopian Economics Association

EEPRI: Ethiopian Economics Policy Research Institute

EIAR: Ethiopian Institute of Agricultural Research

ERASA: European Regional Science Association

ESAP: Ethiopia Society of Animal Production

ESSP: Ethiopia Strategy Support Program

FMC: Formal Market Channel

FAO: Food and Agricultural organization

FEWS NET: Famine Early Warning System Network

FIGM: FAO (Food and Agricultural Organization) Intergovernmental Group on Meat

GDP: Gross Domestic Product

HHI: The Herfindahl-Hirschman Index for estimating concentration ratio

IMC: Informal Market Channel

IFAD: International Fund for Agricultural Development

IIRR: International Institute of Rural Reconstruction

ILRI: International Livestock Research Institute

IMPS: Improving Productivity and Market Success

OLS: Ordinary Least Square

NAPCE: North American Professors of Christian Education Association

NMM: Net Market Margin

PFE: Pastoralist Forum Ethiopia

PLC: PRIVATE LIMITED COMPANY

PS: Producers Share

S-C-P: Structure Conduct performance

SNNPR: Southern Nations Nationalities Peoples Regional State

TGMM: Total Gross Market Margin

TOL: Tolerance

UNISA: University of South Africa

USAID: United States Agency for International Development VIF Variance Inflation Factor

VOCA: Volunteers in Overseas Cooperative Assistance

Market Chain Analysis of live Cattle in Borana Pastoral Area: the Case of Moyalle District, Oromyia Regional State Southern Ethiopia

Abstract

The Borana Pastoralists are known as the major cattle suppliers for domestic and international markets. Nevertheless, the benefits they get from the sector is said to be minimal. This study, therefore, was initiated to identify market chain actors, their functions and the determinants of cattle market of market participation decision and supply in Moyalle district of Borana Zone, Southern Ethiopia. The study was undertaken in three kebeles. Structured interviews were made in 223 sampled pastoralist, 25 traders and 14 brokers. The result shows that the market chain of live cattle in Moyalle district is comprised of different actors and diverse marketing channels. The study identified two marketing channels, formal and informal, which are equally important in market chain. It is only in few cases that the producers sell their products directly to consumers and exporters in the absence of brokers. About 81% of the producers sold their cattle by the intermediary process role of brokers and only 19 percent sold their cattle directly.

The live cattle traded in the chain are oxen, cows, bulls, heifers and calves and the market structure for all the cattle types is oligopoly. However, the degree of the oligopoly nature varies. This means that the market is tight oligopoly for oxen, heifers and claves and loose oligopoly for cows and bulls. As a result of the oligopoly market structure which reduces the competition and makes the entire market structure remain to be a few traders game and the market price of the cattle is more influenced by the traders. Regarding the marketing margins, the finding shows that the marketing performance measured by the marketing margin is different along different channels. The result shows that the final share of producers in the channel is not only vary among channels, but also among the types of cattle and whether the channel is formal or informal. The producers share, for example, is higher in formal market channel where producers sell to formal exporters, other producers, festival consumers and butchers though facilitation role of brokers and for cattle type (calve 92%, heifer 81%, ox 80%, bull 72.5% and cow 70.5%). The result from the econometric analysis shows that choice of the pastoralists to participate in cattle market and quantity supply is influenced by demographic and socioeconomic factors (gender of household head, cattle owned, camel owned, age and income). Major constraints of cattle market chain include lengthy market, brokers' interference, disease and parasite, clan conflict and unfriendly relation between market actors. As remedial measure, shortening the supply chain, linking to markets, cooperatives establishments and thereby changing the informal channel in to formal is crucial.

Keywords: Actors; Channel; Pastoralists; Market Chain; Market Margin and Structure Conduct Performance

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3. Introduction

3.1. Background and Justifications

Marketing is the answer to the underdevelopment of developing countries. When adopted and practiced, marketing will help to develop appropriate technologies as developing nations provide for the needs of the people and enhance their standard of living, create job opportunities, wealth for entrepreneurs, a means towards affording education and enjoyment of leisure Ewah and Ekeng [1]. By aggregating demand and supply across actors at different spatial and temporal scales, well-functioning markets underpin important opportunities at the micro level for welfare improvements that aggregate into sustainable macro-level growth Barrett and Reardon [2].

Market chain analysis is essential to an understanding of markets, actors' relationships and the critical constraints that limit the growth of cattle production IFAD [3]. Ethiopia is the largest livestock producer in Africa and one of the largest in the world Ritch et al. [4]. Ethiopia's estimated livestock population was approximately 53.99 million cattle, 25.5 million sheep, 24.06 million goats, 1.91 million horses, 6.75 million donkey, 0.35 million mules, 0.92 Camel, 50.38 million poultry and 5.21million bee hives (CSA, 2012/13).

Despite this huge potential of livestock population and its diversity, the benefits obtained from the sector are low compared to other African countries and the world standard. As cited in Asfaw et al. [5], Berhanu [6] and Pavanello [7] our country average beef yield per animal of 108. 4 kg is by far less than 119 kg for the Sudan, 146 kg for Kenya, 127 kg for eastern Africa, 146 kg for Africa, and 205 kg for the whole world. Livestock contribute 15 to17 percent of GDP and 35 to 49 percent of agricultural GDP, and 37 to 87 percent of the household incomes in Ethiopia Gebremariam et al. [8]. The livestock sector provides livelihood for 65% of the population and also accounts for 12–15% of total export earnings, the second in order of importance ESAP [9]. In recent years, however, official export has been reported to be declining while illegal export has been increasing Ayele et al. [10].

As one of its economic development objectives, the government of Ethiopia is pursuing a policy of maximizing revenues through meat and live animal exports. There is some progress in the volume of live animal and meat exports on a yearly basis, but not as much as anticipated given the huge livestock resources in the country Yacob [11]. Recently, several large scale meat processing abattoirs have been established in Ethiopia and other meat export abattoirs are under construction and planned to be established in the near future in different regions of the country in response to the emerging meat export opportunities to the Middle East and North African Countries Asfaw and Jabbor [12] .

In adequate market infrastructure, lack of market information system, inefficiencies in purchasing, poor animal handling and inadequate facilities at the abattoir and export level, absence of market oriented cattle production system, prevalence of various diseases, repeated bans, excessive cross-border illegal trade and stiff competitions etc are the major challenges that hinder the smooth cattle trade of Ethiopia ESAP [9]. Poor and inadequate knowledge on cattle market structure performance and prices for designing policies and institutions to overcome perceived problems in the domestic and export marketing systems are also the impediments in the sector ESAP [9]. In the domestic market, knowledge on how marketing routes and systems contribute to national and international trade in livestock is also highly insufficient to design any policy to improve domestic and export marketing for the benefit of the poor. A systematic and participatory interventionist research approach needed to increase the level of marketing efficiency requires current information on how markets operate Ayele et al. [10].

3.2. Statement of the Problem

Livestock trade is the main economic activity and critical source of livelihood for the pastoralists in Borana and an important link between the borderlands in Ethiopia and Kenya. Especially, cattle trades have existed across these borders for centuries. Complex market arrangements and channels involving a wide range of participants have created a web of cross-border relations based on trade and clan affiliations. Cross-border livestock trade is a significant integrating mechanism through which vital connections between communities have been maintained. Economically, the trade provides incomes for herders, traders, middlemen, transporters and local authorities in the two countries. However, pastoral livestock marketing in these border areas often faces risks associated with drought, diseases and unfavorable policies Mahmoud [13].

In the Borana Area of the Oromia Region, cattle predominantly flow in a South to North direction, regardless of their market channel. There are six main market channels for cattle in the district. Domestic cattle consumption, Domestic cattle restocking, slaughtering and packaging by private abattoir facilities, with sales to international hotels, Ethiopian Airlines, universities, supermarkets and shops, official live animal export through the central Ethiopian markets and unofficial live animal export Getachew et al. [14]. The average cattle off-take rate is found to be well below 10% for the sample Borana households of which only 11% of the household off-take decisions were made for the primary purpose of financing non-pastoral business. Cattle off-take decisions are largely determined by the actual conditions of life principally associated with the need to procure cereal grains and meeting other needs. Income diversity is a key determinant of the growing importance of "imported" items in pastoral household budgets Wassie and Bichaka [15], ECOSOC [16].

The distribution of the markets across the woredas in Borana zone does not conform to the size of cattle available in the area. The options for this woredas are either to use the Negelle market

in the woreda or trek to Dubuluq market, the largest market in the Borana Zone which is about 290 km from Negelle or alternatively transport the animal directly to Nazareth. Except the market at Moyalle which meets every day but Sunday, the rest of the markets meet 1 to 2 days per week Getachew et al. [14].

Moyalle is one of the largest cross-border terminal markets for livestock between Ethiopia and Kenya. Between 70-80 percent of live animals sold in these two markets originate in Ethiopia. The livestock trade is very important because it links prime cattle production areas of southern Ethiopia to the region's largest market in Nairobi, Kenya Awuor [17]. There are three livestock markets: Moyalle Somalia and Moyalle Oromiya on the Ethiopian side and Moyalle Kenya on the Kenyan side. All three operate every day except Sundays Pavanello [7].

Although, the Borana pastoralists are known as the major cattle suppliers for domestic consumption and international trade export, yet they could not able to be benefited from the sector. The lengthy marketing process, high transaction cost, brokers' interference, clan conflict and informal cattle trade has been one of major the obstacles that caused country to lose a lot of foreign currency. In addition to these, over exploitation of brokers, weak and unfriendly linkage in between the major marketing actors, lack of market oriented cattle production, lack of modern cattle marketing channels are some of the main challenges. Majority of cattle marketing information at the pastoralist level is outdated, unreliable and as a result it couldn't provide the real picture of the economic contribution of pastoralists sector for the country's economy and the community engaged in the sector. The critical problem in cattle marketing sector stands in the course of formulating appropriate policies and procedures for the purpose of increasing marketing efficiency. The market chain in pastoralist area is dominated by many brokers at primary, secondary and terminal markets Ayele et al. [10].

For the pastoral community that rears large proportion of cattle in the country, undertaking research on cattle market chain analysis is believed to enhance its productivity by providing update information and characterization of opportunities and challenges of cattle marketing. The study also believed to locating economical cattle marketing routes and identify relative determinant of cattle marketing participations and supply. Hence it is indispensable and timely to undertake the study on market chain analysis of live cattle trade in the area.

4. Objectives of the study

The general objective of the study was to examine market chain of live cattle and investigate the factors that influence market participation and supply in Moyalle district.

4.1. The specific Objectives of the study were

1) To identify the key cattle market actors and their function in the chain

2) To map marketing chain of cattle

3) To analyze the market structure, conduct and performance of cattle

4) To investigate the determinants of pastoralist market participation and supply of cattle and identify major constraints in cattle marketing chains

4.2. Research Questions

The following research questions were addressed in the study

1. Who are the major actors and what functions they play in the cattle marketing chain?

2. What are the major cattle marketing channels?

3. How is the cattle market structure, conduct and performance?

4. What are the major factors that influence the decision of pastoralists to participate in cattle marketing and the supply of cattle?

4.3. Significance of the Study

The study is believed to generate useful information for pastoralists, traders, brokers and service providers involved in the production and marketing of cattle in the area. It also helps development planners and policy makers in designing appropriate policies that enhance the efficiency of production and marketing of cattle subsector. Moreover, the information can be provided for potential investors and small and medium enterprises interested in the business so that medium and large scale cattle farms start to emerge. Researchers who want to undertake further investigation in the sector will also benefit from the findings.

4.4. Scope and Limitations of the Study

This study was conducted in Moyalle district of Oromiya Region, Southern Ethiopia. Hence, the investigation is limited spatially to one district among several districts in the zone and temporally to collect one season data (cross sectional). Moreover, the study is also limited to investigation of live cattle and it doesn't contain other livestock and livestock products.

5. Literature Review

In this chapter the basic concepts of market, market structure, conduct and performance, market demand for livestock and livestock products and livestock contribution to pastoralists is presented.

5.1 Definitions and Concepts

a. Market: A physical place or arrangement that brings buyers and sellers of ruminants together with a view of exchange the small stocks for cash Onyango [18], Kotler [19] also stated shortly marketing as the task of creating, promoting, and delivering goods and services to consumers and businesses.

Mankiw [20] defined market as a group of buyers and sellers of a particular good or service. Kohls and Uhl [21] defined marketing as the performance of all business activities involved in the flow of the product from the point of initial production until it reaches the hands of the consumers. According to Olukosi et al. [22] market is said to exist whenever a transaction is done between a buyer and seller, be it through physical contact, letter writing, telephone, telex or through other means of communication. Kotler [19] defined marketing as the social process by which individuals and group obtained what they need and want through creating and exchanging products and values with others.

b. Market Actors: means someone who is active in the market such as cattle traders, pastoralists, trekkers, truckers, transporters, brokers, consumers, etc. It is equivalent to market participant.

c. Marketing channel: Refers to the sequential arrangements of various marketing intermediaries involved in the movement of products from producers to consumers Adnan et al. [23].

d. Market Conduct: is referred as 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 is also defined as the way in which buyers and sellers behave, both amongst themselves, and amongst each other Johann [24].

e. Market Performance: is the ultimate result derived from the market and 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. [25].

f. Market structure: Structural characteristics like market concentration; industry maturity, government participation and barriers to entry are some of the basis considered. 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 and Timothy et al. [24,26].

g. Cattle marketing margin: is defined as the difference between the sales terminal price of the cattle and the costs incurred by the seller including the acquisition price of the animal. The major market costs considered in the study include, cost of transporting, brokering cost, marketing levies and taxes imposed by local and national authorities Misginaw [27].

Mankiw [20] 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 [18].

5.2 Marketing costs

As sited in Woldmiceal [28], because of 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 is calculated. Thus, the marketing margin in this study should be understood as gross marketing margin.

Marketing costs are composed of the total costs incurred on marketing of live cattle by each agent. It 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. [29].

5.3 Marketing and Marketing Systems of Livestock

Marketing is an evolving and dynamic discipline that cuts across every spectrum of life. This explains why contemporary societies are now involved in one form of marketing activity or the other. The recent advancement in technology, has aided the free flow of goods and services as well as information amongst businesses and institutions, thereby turning the marketing environment into a global village Ewah and Ekeng [1]. Marketing not only bridges the rural supply and demand with the urban demand and supply, but through this process it also plays determinant role in economic development. Price information helps producers to make production decisions in efficient and effective ways Getachew [30].

Livestock markets are dispersed with remote markets lacking price information and the number of animals offered in the local market is usually greater than the number demanded, so there is excess supply. Livestock are generally traded by 'eye-ball' pricing, and weighing livestock is uncommon. Prices are usually fixed by individual bargaining and depend mainly on supply and demand, which is heavily influenced by the season of the year and the occurrence of religious and cultural festivals Kefyalew [31].

5.4 Livestock Market Channel and the Main Actors

The livestock marketing structure follows a four-tier system, of which different actors involve in buying and selling of cattle. 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 and no feed and watering infrastructures. Yet buyers and sellers are subjected to various service charges by the local authority as well as other bodies Kefyalew [31], Yonad [32].

Traditional marketing channels with ad hoc sales are being gradually replaced by coordinated links among pastoralists, processors, retailers and others. The result, combining the strengths of market chain analysis with the needs of poor pastoralists, should be a market-based, commercially viable and sustainable solution that, in the long term, will equally benefit all the various actors of the chain IFAD [3].

5.5 Informal and Formal Market Channel in Pastoralist Area

The five major informal borders are Somaliland, Northeastern Kenya, Eastern Sudan, Southern Kenya and Northern Kenya. About 10% of this commerce passes through official trade channel COMESA [33]. Ethiopia is a major supplier of livestock to Somalia, Djibouti, Kenya, and Sudan. Different channels are employed for bringing livestock from production points to domestic terminal markets and to export points. There are speculations that unjustifiable costs are being incurred somewhere in the transaction. It is proved that there are too many intermediaries in the chain; or transport, taxation, and feed costs are high; or big livestock traders and butchers in big cities are operating as cartels; or the nascent export business is encouraging speculators to hike up livestock prices Yacob [11].

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 [34]. This being the potential for export, the actual performance has remained very low, leaving most (55 to 85%) of the projected livestock off take for the unofficial cross-border export and the domestic market Kefyalew [31].

5.6 Marketing Efficiency and Margin

Increased efficiency is in the best interests of pastoralists, farmers, traders, processors, wholesalers, retailers, consumers, brokers and society as a whole. The efficiency of a marketing system is measured in terms of the level and/or costs to the system of the inputs, to achieve a given level and/or quality of output. Such inputs are generally in the form of land, feeds, transaction facilitating, tax, time, manpower and materials. Hence resources are the costs and utilities are the benefits that comprise the marketing efficiency ratio. Efficient marketing optimizes the ratio between inputs and outputs. A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. The margin must cover the costs involved in transferring produce from one stage to the next and provide a reasonable return to those doing the marketing Mukasa et al. [35].

To improve the competitiveness of live cattle from Ethiopia, competent quality cattle type, cost-effective marketing channels and coordinated supply chains which reduce the transaction costs among different actors along the supply chain are crucial. This requires the competitiveness of individual firms and improving the efficiency of all its elements from production, to processing, handling, distribution, and marketing. However, there is little evidence for growing interests of strategic production of cattle for marketing Hailemariam et al. [29].

A marketing chain was used to describe the numerous links that connect actors and transactions involved in the movement of commodities from the farm to the consumer. It is the path goods follow from their source of original production to ultimate destination for final use Ayelech [36].

5.7 Structure Conduct and Performance model

As sited in [28] the structure conduct and performance model is used to examine the causal relationship between markets Structure, Conduct, and Performance, and is usually referred as the Structure Conduct and Performance (S-C-P) model. The model is used in the Structure-Conduct-Performance analysis for identifying factors that determine the competitiveness of cattle market, behavior of firms, and the success of cattle industry in meeting performance goals. Thus, this study used S-C-P model to evaluate the efficiency of cattle market in the study area.

According to Seanicaa et al. [37] the Structure, Conduct and Performance are differentiated terms yet interrelated. 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 [28]. According to Onyango [18] 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 [38].

5.8 Market concentration Ratio and Herfindahl index

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 the possibility of noncompetitive behavior, such as collusion would be. 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 enterprises in the industry Iveta [39].

Concentration ratio is used as an indicator of monopoly power. 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 [40]. As sited in Kumlachew [38] competition authorities examined the dynamics and the current concentration ratio of the industry and the reason how it achieved, either through efficiency or effort to monopolize, to take corrective measures and remedies.

As sited in [28], for an efficient market, there should be sufficient number of buyers and sellers. Firms of appropriate size are needed to fully capture economies of size; there should be no barriers to entry into, exit from markets, and should have full market information as sited in [41], a four enterprise concentration ratios of 50 percent or more is indicative of strongly oligopolistic industry, of 33-50 percent a weak oligopoly, and less than that, an un-concentrated industry. The greater the degree of concentration, the greater will be the possibility of non-competitive behavior, such as collusion, existing in the market [24].

A market with an HHI index less than 1,000 is regarded as competitive. HHI indices 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 [39]. 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 [42].

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 [43].

5.9 Market demand of livestock and products

The booming demand for livestock and livestock products is taking place almost exclusively in developing countries. Projections of food demand show per capita consumption growth rates for meat and milk differing greatly between developing and developed countries. To meet the growing demand, smallholders are playing different roles, largely depending on the stage of development of their countries McDermott et al. [44].

5.10 Pastoralism in Ethiopia

Cattle production plays an important role in the economies and livelihood of pastoralists Belete et.al. [45]. Pastoral areas support about 10 million people (12% of total population of the country) of which 56 % are pastorals, 32% are agro-pastoral and the remaining 22% are urban dwellers. Pastoralism also relies on the diverse livestock products including milk, hides, meat and draft power. Although pastoralism plays significant role in the Ethiopian economy, this sector with huge economic, social and environmental roles and benefits has been largely marginalized by the development policies and strategies in the past Pavanello [7].

Ethiopia's pastoralist community occupies 61% of the total land mass. The 29 nationalities and ethnic groups inhabit land with natural resources and a wealth of cultural and traditional heritage that remains largely untapped. Ethiopian pastoralists raise a large portion of the national herd, estimated at 42 % of the cattle, 7% of the goats, 25 % of the sheep, 20 % of the equines and all of the camels. But, pastoralist communities are often unable to utilize the immense resources of their land due to internal and external factors PFE [46].

5.11 Review of Empirical studies

According to Barrett et al. [47] greater cattle holdings results in greater cattle market participation and it also has an impact upon the numbers of cattle marketed. The key practical implication is that active livestock markets depend on pastoralists keeping of sufficiently large herd sizes that they become willing to liquidate animals through the market. Relatively wealthy pastoralists, with greater herd size, have considerably higher expenditure rates and thus use livestock markets more frequently to cash out animals. When livestock prices are rising in the post-drought period, the wealthier households are able to sell surplus animals and take advantage of favorable prices, while poorer households tend to hold on to their few animals remaining after the drought, unless forced to sell by consumption needs Onyango [18].

The cattle markets in most parts of the country are characterized by seasonality in flow and prices of animals. In pastoral lowland areas where it is considered as traditional source of animals for export, complex factors contribute to this phenomenon. Shifts in supply could occur as a result of factors including seasonality of consumption demand (fasting and other ceremonial period) in domestic and export markets, drought, disease outbreak, lack of information, availability of food aid, clan conflicts and others Getachew et al. [14]. The research finding of Misginaw and Ayalneh [48] showed Hadiya pastoralists are keeping large number of cattle like other pastoralists not as a security against risks but it is their cultural obligation to do so and attain the cultural titles. Therefore, economic factors have little effect in affecting cattle marketing in such areas and communities.

6. Methodology of the Study Area

6.1 The study area

The Borana administrative zone is situated in Ethiopia Oromiya regional state and located in Southern part at about 570 km from Addis Ababa. The capital of Borana zone is Yabello Niguse [49]. The Borana zone is made up of 13 districts, divided between two agro-ecological zones, the semi-arid lowlands to the south and the more humid lands at higher altitudes to the north Beyene and Yibeltal [50]. Moyalle is one of the Woredas in the Oromiya Regional State. It is located 770 km south of Addis Ababa. The Woreda has an area of 14,810 km2 and it is divided into 18 Kebeles of which 2 are located in Moyalle town Solomon et al. [51]. (Figure 1)
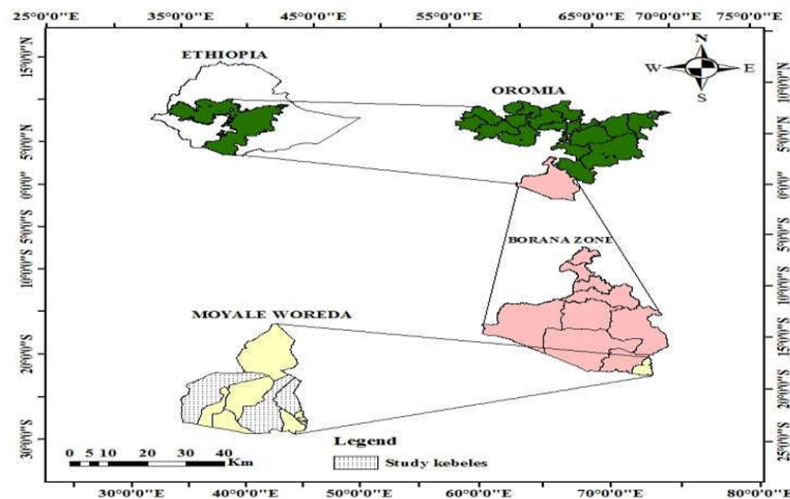
Figure 1: Map of the study area.

6.2 Livestock population of the study area

The population of livestock in Borana Zone, Oromiya Region was estimated to be 1,048,909 cattle, 396,819 sheep, 989,691 goats and 62,789 camels CSA [52]. The livestock population of Moyalle Woreda was estimated to be 52,280 cattle, 58,860 goat, 14,095 sheep, 17,185 camel, 4626 donkey, 21 mule, 3 horse and 17606 poultry (Moyalle Woreda Pastoralist Development office, 2014).

6.3 Methods of Data Collection

In this study both secondary and primary data were used. The secondary data sources were journals, books, proceedings, CSA and ESAP publications. The primary data sources were household survey and key informant of producers, traders and brokers.

A preliminary assessment was conducted to collect basic information about the woreda in order to select representative kebeles and households. First of all, major market chain actors operating at district level was identified in consultation with Moyale woreda Pastoralist Development Office, Moyale Woreda pastoralist Cooperatives office, reviewing literatures and undertaking key informant interview, field visit and assessments. The study developed flow diagrams of the market chains focusing on cattle marketing, showing how market channel operate, the strengths and weaknesses along the chains. The survey also assessed key cattle market chain constraints and possible solutions.

For this particular study a combination of probabilistic and non probabilistic sampling techniques were used. The study Zone and respective Woreda was selected purposively by sponsoring organization. The Kebele and pastoralist households selection was employed random and purposive sampling techniques based on number of cattle kept location of the Kebele and age of producers. In relation to availability, number and their willingness to participate in the study, the brokers and traders were selected purposively.

Three Kebeles from the pastoralist area were considered in the survey. Respondent sample size per Kebele was determined proportionally to the number of total household in the area. Before undertaking household survey, key informant interview was carried out on 10 producers, 5 traders and 3 brokers using checklist. The sample size was computed according to the following formula Kothari [65]:

Where: n= sample size, z= confidence interval (z-value, 1.96 at 95%),

$$N = Z^2 . p. \ q \div e^2$$

p= 0.5% (the expected proportion of the population of the cattle producers), q= 1-0.5, e=8% (the allowable margin of error), Therefore:

which is approximately 150. Therefore a sample size of pastoralist used in the study was more than 150 for accuracy improvement. Based on this technique the sample size of pastoralists household interviewed from respective kebeles, Maddo, Mado Miggo and Laga Sure were 100, 63 and 60 respectively.

The survey at Woreda level considered 167 male (74.9%) and 56 (25.1%) female household heads. The sample size of male and female household heads interviewed in Maddo kebele was 78 (78%) and 22 (22%). The male and female respondents number interviewed in Laga Sure kebele was 45(75%) and 15 (25%). From whole interviewed respondents in Maddo Miggo Kebele 69.8% (44) was male and 30.2% (19) female. The sample size of traders and brokers was 25 and 14.

The main cattle traders that considered in this study were small traders. Producers interviewed concerning cattle market dynamics, demographic characteristics, cattle ownership, marketing season, participation decision, constraints and opportunities of market chain, access to business support service, market actors and function in the market, market chain, price setting mechanism, market information source and other necessary related market variables. Traders were interviewed on major cattle market chain constraints, capital source, market level, market point, their function in the market chain, market chain and source of cattle and market information. The brokers in the area interviewed on their function in the market, amount of income from brokering activity, their relation with other market actors and major constraints.

6.4 Measure of Structure-Conduct-Performance of Cattle Marketing (S-C-P)

6.4.1 Measure of Market Structure

Market structure of live cattle trade was estimated by identifying market actors and their function, concentration ratio and HI index of live cattle type. The standard tools used to see competition and measure market concentration are the Herfindahl index (HI) and the concentration ratios (CR(n)).

6.4.2 Measures of Market Conduct

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 is evaluated. Terms of payment include payment inform of cash, credit and or both, Johan [24].

6.4.3 Measure of Market Performance

Marketing performance was evaluated by undertaking market margin analysis. Net marketing margins of a particular marketing agent (producers, traders and brokers) were defined as the residual of the gross marketing margin after paying marketing costs. Hence, gross and a net marketing margin is specified as: Gross marketing margin = Selling price - Buying price

Net marketing margin = Gross Margin - Marketing Costs

These costs include costs of procuring the live cattle, labor costs and non labor costs. 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. TGMM = End buyer price - First seller

price x 100/End buyer price Bosena et al. [53].

6.5 Method of Data Analysis

6.5.1 Descriptive Analysis

Descriptive statistical analysis like mean, minimum, maximum, percentage standard deviation and frequencies were used to examine and understand the socioeconomic characteristics of sampled respondents. In addition to this, descriptive statistical analysis was also used to carry out analysis of market structure, market conduct and market performance.

The main issues in market conduct considered include existence of formal and informal marketing groups that affect the bargaining power and the availability of price information as well as its impact on prevailing prices, buying and selling practices, the source of cattle, distribution channels used, pricing behavior: the chief determinants of price (one buyer or many buyers), price setting mechanisms (the degree of personal contact among market participants).

6.5.2 Econometric Analysis: Factors affecting Household's Choice of Cattle Market Participation and supply

The econometric analysis used in this study was binary logistic regressions for factors influencing household market participation decision and Multiple Linear regressions for factors affecting number of cattle supplied by pastoralists. The parameter estimate for the probability function of logistic regression model was converted to odds ratio. Because these

Coefficients are in log-odds units, they are not as such simple to interpret, so they are converted into odds ratios. The log odds units are converted in odds ratio by taking exponent of the coefficient. This is calculated by taking exponentiation of coefficients in excel sheet.

6.5.2.1 Factors affecting Household's Choice of Cattle Market Participation

The type of function used in household choice modeling is probabilistic function. Here, the factors influencing the household's discrete choice behavior was modeled using a Binary Logistic regression model. The logistic regression model allows the estimation of a set of probabilities of market participation regimes for households with a given characteristics.

To investigate factors embedded in deciding participation, the following variables were used as explanatory variables include gender, access to business support service, number of cattle owned, number of camel owned and market information source. The data collected was analyzed using Statistical software (STATA) version 10 and Excel 2007 after editing, leveling and defining the primary data collected from survey.

The model for market participation:

$P(Y=1/x) = P(Y=1/x_1, x_2, \text{--------} X_k)$ and this can be written as: $P(y=1/x) = f(B_o + B_1 x_1 + B_2 x_2 + B_3 X_3 + B_4 x_4 \text{----------} BkXk)$

where P is probability of explanatory variable to affect market participation decision and f is a function taking on values strictly between zero and one: $0 < f(z) < 1$, for all real numbers z. Yi=the dependant variable= probability of market participation and xi is explanatory variables, Y=1 when the household participated and Y =0 Otherwise (Not participated).

7. Explanatory Variables defined and included in Logistic Regression Model

7.1 Gender of the household head (gend_hh): This independent variable was one of variable that considered as determinants of cattle market participation decision of producers. It was a dummy variable and labeled zero if producer household head female and 1 if male. It was expected that male households considered as better market participants, as compared to female household heads. As a result, the probability of male household head to take part in cattle market was expected to be more than

that of female that supported institutionally.

7.2 Total size of cattle owned (catt_own): Total size of cattle a respondent owned, continuous variable, taken as another independent variable assumed to influence market participation decision. The expected sign was positive. The more cattle owned by a given households, the more would be the probability to decide and participate in marketing.

7.3 Camel owned (camel–owned): Total size of camel a respondent owned, continuous variable, taken as another independent variable assumed to influence participation decision. The expected sign was positive. The more camel owned by a given households, this assured the ownership of more cattle due to wealth influence, the more would be the probability to participate in cattle marketing.

7.4 Proximity to animal health center (helt_dis): this variable was one of continuous variable that assumed to affect positively the cattle market participation decision. Its expected sign was positive. This indicated that the more health center nearest to pastoralist, the more become the cattle market participation and that make better informed, owned market competent cattle, understood the cattle condition and hence have productive cattle.

7.5 Market information source (mkt_info): this is one predicator variable included in the model. The major market information sources considered in the model were broker, traders and neighbor pastoralist. These dummy variables defined as: brokers leveled 1, and 0 if otherwise. The brokers that were known as bad market information source for producers, considered as bench market for the model. The pastoralist households assumed to take part in cattle market when they obtained market information from market actors other than brokers.

7.6 Access to Business Support Service (Buss_serv): this was another predictor variable assumed to influence the probability of market participation decision by producers. The variable was categorical and labeled 0 for those pastoralists' households that did not accessed business support services; defined 1 for those obtained business support services. It was expected that the producer household that obtained business support services (credit and training) assumed to have a better likelihood of market participation (Table 1),(Table 39).

Table 1: Description of Hypothetical Variables in Logit Model.

Variable	Description	Type	Value
Gend-hh	Gender of household head	Dummy	if sex Male=1 and 0 otherwise
Catt-own	Number of cattle Owned	Continues	Number of cattle kept
Caml-own	Number of camel owned	Continues	Number of camel kept
Helt-dis	Proximity to animal health center	Continues	Distance from residence
Mkt-info	Market Information source	Dummy	If broker=1 and 0 otherwise
Buss-serv	Access to Business support services	Dummy	If accessed credit & training service =1 & 0 otherwise

Source: own survey 2014.

Table 39

Variable regressed	Measure	value	Approx. sig.
market info source by gender of HH head	contingency coefficient	0.192	.202
Business support service access by gender of HH head	contingency coefficient	0.082	0.454

Source: own computation

Cross tabulation result for multicollinarity test of limited dependant variable between gender, business service access and market information source

7.7 Factors affecting quantity supply of cattle to the market

In the second stage of estimation, OLS estimation procedure was used to identify determinants of market supply level (quantity of supply) of cattle by pastoralists'. The data collected was analyzed using Statistical Package for Social Science (SPSS version 20) and Excel 2007 after editing, labeling, and defining the raw data collected from survey. Here,the dependant variable was number of cattle supplied to the market and independent variables were the household head age, gender and education level, family size, cattle size, amount of other income earned, marketing season, camel size and market information source.

8. Explanatory Variables defined and included in Multiple Linear Regression Model

8.1 Age (age) - Age of the household, a continuous variable, was taken as one of the explanatory variables to influence quantity supply of cattle. The expected sign was positive as age one of the parameters of human capital. As an individual stayed long, he expected to have better probability of storing capital accumulation interims of cattle he better knowledge and decide to participate more and consequently supply more.

8.2 The education level of respondent (edu.): this was one of the variables that observed as continuous variable by requesting the year of schooling the household attended in formal education and it was expected to affect positively the supply. But, the education variable has no significant effect on number of cattle supplied. As majority of sampled pastoralists were not attended formal education and the production system followed of traditional type, the regression result confirmed that its role on cattle supply was insignificant.

8.3 The season of marketing (mkt_seas): This is one of discrete variable that was expected affect number of cattle supplied. Since these variables are categorical, they were defined and given value as 1 for dry season and 0 if otherwise. The major cattle marketing seasons considered were wet season and dry season. In this study, wet season was considered as bench mark, since the pastoral household reluctant to supply cattle to market at rainy season. Since there was no feed scarcity for cattle and producers market less number of cattle at rainy season. The level of supply of pastoralist during dry season was expected to be higher compared to wet seasons. Since the cattle reared by pastoralists accessed better quality and quantity range pasture, the health risk of cattle minimized and start producing milk during wet season the number of cattle supplied to the market assumed be decreased.

8.4 Family size (fam_siz): Family size of a respondent was one of independent variable (continuous Variable) supposed to influence number of cattle supplied to market. Its expected sign was positive because household with large number of families' size supply large number of cattle to the market for their numerous relative family demand (cash need for food, fear of cattle death, household investment). The regression results confirmed that family size has no significant effect in deciding number of cattle marketed in pastoralist area. It looked in to that family size was not as such influential factors linked with pastoraslism and cattle supply level, since the cattle was reared freely over freely accessed ranges with limited man power.

8.5 Market information source (mkt_info): this is one predicator variable included in the model. The major market information sources considered in the model were broker, trader, neighbor and their combinations. Market information sources were categorical and given value: 1 for broker and o if otherwise. The brokers that were known as bad market information source for producers, considered as bench mark for the model and given value 1. The pastoralist households assumed to supply more number of cattle to cattle market when they obtained market information from market actors other than brokers.

8.6 Gender of the houhold head (gend_hh): gender is other independent variable included in multiple linear regression models. A gender variable defined as 0 if female and 1 if male. It was expected that the male households were supposed to supply more than female household heads that supported institutionally.

8.7 Total size of cattle owned (catt_own): Total size of cattle a respondent owned, continuous variable, taken as another variable to influence number of cattle supplied to market. The expected sign was positive. If the given household owned more number of cattle, the number of cattle supplied to market was also become more.

8.8 Amount of other income earned from non cattle marketing (other-inc): this was continuous variable defined and included in multiple regression models. Its expected sign was negative. Since cattle marketing were known as one of

income earning activity experienced by producers, earning of more income from other activity supposed to decrease number of cattle supplied to market.

The quantity supply Model with k Independent Variables in supply of cattle in the study area can be written as: Y=f (age, number of cattle owned, and other income level and error term)

$$Y=f(bo+b1x1+b2x2+b3x3-----------bkxk+e$$

where y is the number of cattle supplied to market, bo is number of cattle supplied having all the explanatory variables equates zero that is meaningless in econometrics. Thus, the supply of cattle to market is determined by the explanatory variables: age, number of cattle owned, amount of other income earned and unobserved factors, which are contained in error term (Table 2).

Table 2: Description of Hypothetical Variables for Multiple Linear Regression Model Source: own survey 2014.

Variables	Description	Type	Value
Age	Age of household head	continuous	age in years
Mkt-seas	Season of cattle marketing	dummy	1 if dry season & 0 otherwise
fam-siz	Household family size	continuous	
other-inc	amount of non cattle market income	continuous	income earned in Birr
catt-own	number of cattle owned	continuous	number of cattle
caml-own	number of camel owned	continuous	number of camel
mkt-info	Market information source	dummy	1 if broker and 0 otherwise
edu	Education level of household head	continuous	years of schooling
gend-hh	Gender of household head	dummy	1 if male and 0 otherwise

Source: own survey 2014.

8.9 Factors affecting quantity supply of cattle to the market

In the second stage of estimation, OLS estimation procedure was used to identify determinants of market supply level (quantity of supply) of cattle by pastoralists'. The data collected was analyzed using Statistical Package for Social Science (SPSS version 20) and Excel 2007 after editing, labeling, and defining the raw data collected from survey. Here, the dependant variable was number of cattle supplied to the market and independent variables were the household head age, gender and education level, family size, cattle size, amount of other income earned, marketing season, camel size and market information source.

9 Explanatory Variables defined and included in Multiple Linear Regression Model

9.1   Age (age): Age of the household, a continuous variable, was taken as one of the explanatory variables to influence quantity supply of cattle. The expected sign was positive as age one of the parameters of human capital. As an individual stayed long, he expected to have better probability of storing capital

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9.2   The education level of respondent (edu.): This was one of the variables that observed as continuous variable by requesting the year of schooling the household attended in formal education and it was expected to affect positively the supply. But, the education variable has no significant effect on number of cattle supplied. As majority of sampled pastoralists were not attended formal education and the production system followed of traditional type, the regression result confirmed that its role on cattle supply was insignificant.

9.3   The season of marketing (mkt_seas): This is one of discrete variable that was expected affect number of cattle supplied. Since these variables are categorical, they were defined and given value as 1 for dry season and 0 if otherwise. The major cattle marketing seasons considered were wet season and dry season. In this study, wet season was considered as bench mark, since the pastoral household reluctant to supply cattle to market at rainy season. Since there was no feed scarcity for cattle and

producers market less number of cattle at rainy season. The level of supply of pastoralist during dry season was expected to be higher compared to wet seasons. Since the cattle reared by pastoralists accessed better quality and quantity range pasture, the health risk of cattle minimized and start producing milk during wet season the number of cattle supplied to the market assumed be decreased.

9.4   Family size (fam_siz): Family size of a respondent was one of independent variable (continuous Variable) supposed to influence number of cattle supplied to market. Its expected sign was positive because household with large number of families' size supply large number of cattle to the market for their numerous relative family demand (cash need for food, fear of cattle death, household investment). The regression results confirmed that family size has no significant effect in deciding number of cattle marketed in pastoralist area. It looked in to that family size was not as such influential factors linked with pastoraslism and cattle supply level, since the cattle was reared freely over freely accessed ranges with limited man power.

9.5   Market information source (mkt_info): this is one predicator variable included in the model. The major market information sources considered in the model were broker, trader, neighbor and their combinations. Market information sources were categorical and given value: 1 for broker and o if otherwise. The brokers that were known as bad market information source for producers, considered as bench mark for the model and given value 1. The pastoralist households assumed to supply more number of cattle to cattle market when they obtained market information from market actors other than brokers.

9.6   Gender of the houhold head (gend_hh): gender is other independent variable included in multiple linear regression models. A gender variable defined as 0 if female and 1 if male. It was expected that the male households were supposed to supply more than female household heads that supported institutionally.

9.7   Total size of cattle owned (catt_own): Total size of cattle a respondent owned, continuous variable, taken as another variable to influence number of cattle supplied to market. The expected sign was positive. If the given household owned more number of cattle, the number of cattle supplied to market was also become more.

9.8   Amount of other income earned from non cattle marketing (other-inc): this was continuous variable defined and included in multiple regression models. Its expected sign was negative. Since cattle marketing were known as one of income earning activity experienced by producers, earning of more income from other activity supposed to decrease number of cattle supplied to market.

The quantity supply Model with k Independent Variables in supply of cattle in the study area can be written as: Y=f (age, number of cattle owned, other income level and error term)

$Y=f(bo+b1x1+b2x2+b3x3------------bkxk+e$ where y is the number of cattle supplied to market, bo is number of cattle supplied having all the explanatory variables equates zero that is meaningless in econometrics. Thus, the supply of cattle to market is determined by the explanatory variables: age, number of cattle owned, amount of other income earned and unobserved factors, which are contained in error term.

10. Results and Discussion

This chapter presents the results of both the descriptive and econometric analysis. The first

section deals with the socio-economic characteristics of producers and traders. The 2ⁿᵈ section

looks into the Structure, Conduct and Performance of cattle marketing. In the 3ʳᵈ section of the chapter, the factors that determine supply of cattle and probability of market participation were examined in the area. The last portion of the chapter deals with market chain constraints.

10.1 Socio-Economic characteristics of pastoralists and Traders

This section presents the socioeconomic characteristics of sample households in the area. The socioeconomic characteristics include age, family size and years of schooling (Table 3).

Table 3: Summary of socioeconomic characteristics of producers (N=223).

Socioeconomic variables	Statistical parameters			
	Mean	Standard deviation	Minimum	Maximum
Age	42	12	20	81
Family size	7	3	2	25
Education level	1	2	0	10

Source: own survey 2014.

10.1.1 Age Distribution of pastoralist Households

The average age of the Pastoralists household head was 42. However, it ranges in between 20 and 81. The proportion of sampled producers whose age lies in the range between 20 and 65 was 96.9%. The remaining 3.1% sampled pastoralists were aged more than 65 years. This shows that majority of the cattle producers were in the age range of active labor force and only few known to be in dependant age category. Thus, this is very important with respect to cattle supply and household decision for participation and household market in low land area that is difficult to trek animals. The result is not in line with Desta et al. [54] result that undertaken in Yabello district, where access to education and infrastructural facilities well constructed that

states roughly three-quarters of pastoral households are of working age.

10.1.2 Family Size of Pastoral Households (Table 4)

Table 4: Family size of sampled producers.

Group	Frequency of producers (N=223)	Percent	Cumulative percent
Low family size (2-3)	21	9.4	9.4
Medium family size (4-6)	93	41.7	51.1
Large family size (7-10)	92	41.3	92.4
Very large family size (11-25)	17	7.6	100

Source: own survey 2014.

As it is described in (Table 3), the average family size of Moyale pastoralists is 7. However, the range of family size for sampled pastoralist is between 2 and 25. From whole sample households in the area, the proportion of households with family size of 2 to 3 family sizes are 9.4%, 4 to 6 are 41.7 %, and 7 to 10 are 41.3% and 11 to 25 are 7.6%. The survey result reveals that majority of households belong to medium and large family size. The proportion of households with low and very high family size is few. The survey result is not agree with Tollossa et al. [55] that undertaken in Yabello district ,which stated the mean family size for pastoralist in Borana area was 8.

10.1.3 Education level of pastoral household heads (N=223)

The data in the (Table 5) revealed that 81.2 percent of sampled households did not attend formal education. But, the proportions of pastoralist households who attended formal education were 18.8%. The distribution of pastoralist households with respect to formal education attendance shows that less than one fifth of them only attended formal education. The study is not in line with Tollossa et al [55] finding that carried out in Yabello district where the proportion of pastoralists attended formal education was 41.7 %.

Table 5: Education level of Pastoralist household heads.

Category of education level	Frequency	Percentage	Cumulative percentage of respondent
Not attended Formal education	181	81.2%	81.2%
Primary school(1-4)	18	8%	89.2%
Secondary school(5-8)	20	9%	98.2%
High school (9-10)	4	1.8%	100%

Source: household survey 2014.

10.1.4 Cattle Ownership

This table presents the average livestock ownership of pastoral households, minimum and maximum livestock ownership and standard deviation of the household ownership.

Table 6: Cattle ownership (N=223).

Cattle ownership	Statistical parameters				
	Minimum	maximum	Mean	Std. Error of mean	Sum
Oxen	0	66	2.43	5	448
Cows	0	35	5.36	5	980
Bulls	0	16	2.14	2	394
Heifers	0	15	2.21	2	407
Calves	0	25	2.88	3	529

Source: own survey 2014.

The result in (Table 6) shows that the mean pastoral house hold cattle ownership is 2.43, 5.36, 2.14, 2.21 and 2.88 for ox, cow, bull, heifer and calve respectively. The result implies that the numbers of cows and heifers kept by pastoralists are greater than oxen and bulls, consequently, cows and heifers are preferable.

10.1.5 Cattle ownership and Wealth Classification of Pastoralists

The following table presents wealth classification of pastoralists based on number of cattle owned (Table 7).

Table 7: Cattle ownership and Wealth Classification.

Cattle ownership		Wealth category	Frequency	Percent	Cumulative percent
Average owned	Range				
0	0	Very poor	3	1.35	1.35
2	1-3	Destitute	17	7.62	8.97
8	4-12	poor	101	45.29	54.26
28	13-43	Medium	96	43.05	97.31
50	44-56	Rich	2	0.90	98.21
>=85	62-109	Very Rich	4	1.79	100.00

Source: own survey 2014.

As cattle production system of pastoral area was concerned, from the total households interviewed, majority of households owned cattle in the range between 4 to 12 (45.29%) cattle per head closely followed by 13 up to 43 for 43.05 % respondents. The other producers rear cattle per household within the range between, 1 up to 3 (7.62%), more than or equates to 57 cattle (1.79%) and 44 up to 56 (0.9 %) respectively. The proportion of sampled pastoralists that did not rear cattle was 1.35%. As climate adaptation strategy, the pastoralist's has been changing production system from large ruminants to camel and small ruminants. This study results confirmed that more than half of pastoral households (54.26%) are in the wealth category of poor

followed by medium wealth category (43.05%). The proportion of sampled producers categorized in wealth category of rich is insignificant in quantity (2.69%). The result finding is not in line with Kejela et al. [56] that carried out in Dire District of Borana zone, in which proportion of the pastoralist that considered as rich, medium, poor and destitute is about 7 %, 10 %, 17 % and 66 % destitute respectively.

10.1.6 Socioeconomic characteristics of cattle traders

In this section socioeconomic characteristic of sampled traders is presented. Important socioeconomic characteristic characterized comprised of years of schooling, age, family size and trade experience. (Table 8)

Table 8: Summary of socioeconomic characteristics of traders (N=25).

Socioeconomic variables	Statistical parameters			
	Minimum	Maximum	Mean	Std. deviation
Education level	0	10	4	3
Age	23	60	39	9
Family size	4	14	8	3
Trading experience	2	20	8	5

Source: household survey 2014.

10.1.7 Age structure of cattle traders

The above (Table 8) revealed that the mean age for cattle traders was 39 years. However, the age of sampled cattle trader in pastoralist's area ranges in between 23 and 60. The study result confirmed that all the cattle traders are within the age bracket of active age category. This was an implication that almost all the traders are energetic enough to carry out cattle marketing activities.

10.1.8 Education level of traders (Table 9)

Table 9: Education level of traders.

Category of schooling years	Frequency	Percentage	Cumulative percent
Not attended formal education	9	36%	36%
Primary school(1-4)	5	20%	56%
Secondary school(5-8)	9	36%	92%
High school (9-10)	2	8%	100%

Source: own survey 2014.

The survey results in table 9 revealed that 36% cattle marketers were not attended formal education, 20% attended primary school (grade 1 to 4) and 36% attended junior school (grade 5 to 8) and 8% attended secondary high school (grade 9 up to 10) respectively. In cattle rearing, the importance of education cannot be over-emphasized. Indeed, education represents a predetermining factor in information dissemination and technology adoption among marketers in diverse socio-economic and biophysical environment.

10.1.9 Gender of Cattle Traders

The survey results revealed that all (100%) cattle marketers were males. The long period dry season, lengthy market point and beliefs of community that considered cattle marketing as the sole responsibility of male are reasons for gender imbalance. Since gender is one of the main criteria for determining entrance into cattle trade, it is advisable to adopt gender mainstreaming.

10.1.10 Family size of cattle traders (Table 10)

The result revealed that the average family sizes of cattle traders was 8 (table 8). Regarding the distribution of persons per household, the result in the table (10) shows that, the majority of households have 4-6 persons (48 percent) closely followed by those households with 7-10 persons (40 percent). But the proportion of households with very large family size (12-14 persons) is 12 percent.

Table 10: Family size of cattle traders.

Group	Frequency of traders(N=25)	Percent	Cumulative percent
Low family size (2-3)	0	0	0
Medium family size (4-6)	12	48%	48%
Large family size (7-10)	10	40%	88%
Very large family size (11-25)	3	12%	100%

Source: own survey 2014.

10.1.11 Trading experience of cattle Traders

The study results (Table 8) shows that the mean trading experience for sampled traders in the area was 8 years. The general trading experience of interviewed traders ranges between 2 to 20 years. The percent of cattle marketers that had marketing experience ranging from 2 to 5 years, 6 to 9 years and 10 to 13 were 52%, 12% and 16% respectively. The proportion of cattle marketers that had marketing experience of 14 to 17 years and 18 to 20 were 12% and 8% respectively. Hence, the study results revealed that majority of cattle traders in the area are highly experienced (Table 11).

Table 11: Experience of cattle traders.

Trading experience range	Frequency	Percent	Commutative percent
2 -5	13	52	52
6-9	3	12	64
10-13	4	16	80
14-17	3	12	92
18-20	2	8	100

Source: Own survey 2014.

10.2 Structure, Conduct and performance of Cattle Marketing

In this section, results from analysis of the structure, conduct and performance of cattle is presented and discussed. First the nature of cattle market structure is presented and discussed. This is followed by the market conduct of cattle market. The section ends with a subsection that deals with the market performance of cattle.

10.2.1 Market structure

In this subsection the nature of cattle market structure is presented and discussed with respect to the types of actors and their functions in the chain, marketing channel, degree of market transparency, the degree of market concentration and entry and exit barriers.

a. Marketing actors and their function in the Cattle Market

Cattle market in the area is characterized by diversity of actors. Notably, pastoralists are the first actors in the market chain of cattle and they have diverse functions. The other major market actors identified in the market chain are traders, brokers, hotels and restaurants.

b. Pastoralists and their functions

Pastoralists are peoples in dry land area whose livelihood is mainly dependent on livestock rearing. As one of major market actors in cattle market, they have diverse function in marketing processes. The main duties of them are supply of healthy and attractive cattle that is competent in the market. The result confirms that majority of pastoralists function is just supplying cattle but their roles related to price determination is insignificant.

c. Brokers and their functions

Brokers are market actors that are used as bridge between sellers and buyers. The major functions of brokers in cattle marketing include facilitation of market process, market information provision, bargaining price for traders, price setting and doing what is ordered by traders as their delegates. However, the aforementioned role of brokers is not appreciated by pastoralists. This means that pastoralists often blame brokers in the cattle marketing process for providing wrong market information, reducing price, blocking marketing process and purchasing cattle for traders to maximize their own benefits. Since they relatively obtain higher income from traders and get market information from trader, majority of brokers function is inclined to traders.

d. Small traders and their functions

Small traders are market actors that usually collect cattle from Bush market and give to medium and large traders. Small traders may or may not have their own capital for marketing process. Some of major functions of small trader include purchasing, price setting, giving final price, trekking, controlling marketing process and market information provision. Small traders usually purchase cattle from pastoralists at the bush and sell to butchers, medium traders and big traders.

e. Medium Traders and their functions

Medium traders are market actors that purchase cattle from small traders, brokers and pastoralists and sell to big traders that export formally and informally. In contrast to small traders, medium traders' purchasing capacity and price determination role is relatively higher than that of small traders and pastoralists. They have their as well as other big traders' capital for cattle marketing. Some of major functions of medium trader include purchasing, price setting and market information provision. In comparison, the price determination role of medium traders is higher than that of brokers, small traders and pastoralists, but lowers than that of big traders.

f. Big traders and their functions

Big traders are market actors that usually purchase cattle from small traders, brokers and medium traders for formal and informal market. Some of major functions of big trader's traders include purchasing, price setting, market searching, and controlling marketing process, market information provision, exporting formally and informally. Big traders' usually use trucks for transporting cattle and they are considered as the ultimate source market information for other actors.

g. Hotels and Restaurants and their functions

Hotels and restaurants are market actors that purchase oxen and bull for slaughtering and sell in form of meals. Hotels and restaurants are considered as newly developed market actors that are developed due to migration and resettlements of people from other location. The major function of hotels and restaurants in cattle trade include purchasing beef cattle, price setting and trekking. They usually purchase cattle from medium traders, small traders and brokers so as to slaughter and serve their customers in their hotels and restaurants.

h. Consumers and their functions

Consumers are individuals that purchase and slaughter beef cattle for festivals and other informal institutional cases. Consumers in the area are categorized in to festival consumers, religious consumers, and non religious and non festival

consumers. Major function of consumers in cattle market is purchasing and slaughtering cattle for holidays, religious based ceremonies and weeding

10.2.2 Cattle Market Channels

Marketing channel refers to the sequential arrangements of various marketing intermediaries involved in the movement of cattle from producers to formal and informal exporters. The cattle marketing channels identified in the area are formal and informal channel. Since the traders pay taxation fee for respective organization in the chain, they are referred the channel formal market channel. But, cattle traders that trek cattle from Ethiopia to Kenya do not paying tax and transport through informal (unknown) routes, the specific market chain defined as informal market channel. Market channel could be defined based on marketing points and market chain actors. The market channel that is defined based on destination indicates about the marketing points where the livestock or the specific commodity is travelled. The formal market channels identified based on marketing points include bush market to Moyalle, Dubuliq, Mega, Yabello, Harro Bakko, Hiddi, Dillo, Moyalle, Elewaye and Adama. The informal market channels include Bush Market to Moyalle, Gurmessa, Gambo, Minyata and Nairobi. The live cattle market channel that categorized based on major actors and their function is used to identify economical market chain and level of market share, competition, pricing strategies and market efficiency.

a. Formal Cattle marketing Channels (FMC)

Formal market channel: refers to market channel that passes the marketing routes from Moyale to Central Ethiopia towns and exports cattle officially. In addition to these formal marketing channels are marketing route that used by value addition actors with in the country in form of meat production, beef cattle fattening and transporting cattle from pastoralist area to other indoor vicinity destinations. Festival consumers, pastoralists and butchers are the major value addition actors in cattle marketing system in the specific area.

Channel I. Pastoralists -------->Brokers --------> Small traders -------->Formal exporters

This cattle market channel is one of the formal market channels and practiced by small number of pastoralists. Here, pastoralists sell their cattle to brokers and brokers sell to small traders. In this market channel the small traders purchase cattle from brokers and resale to formal exporters especially from central Ethiopia. It is known that this market channel is a newly developed due to infrastructural development and relatively better security in current years in the area. In this sort of cattle market channel about 5% of marketed cattle passed and it also referred as new opportunities. Traders in the channel purchase and collect cattle from different market points. In this channel bulls are the major cattle types exchanged.

Channel II: Pastoralists --------->Brokers --------->Formal Exporters

Here pastoralists sell their cattle to brokers and brokers resale to formal exporters. The proportion of cattle passes through this channel was 2%. Here the producers sell cattle to brokers and brokers sell cattle to formal exporters that come from central Ethiopia towns that could be Adama, Debrezeit, Modjo and Addis Ababa. Pastoralists in the study district also undertake cattle marketing through broker mediating process to other formal exporters and consumers. The cattle type marketed in this route are bulls. This cattle market chain was also identified as newly introduced channel to the area. This sort of market chain should be appreciated and it has to be given due attention to boost production and productivity of cattle.

Channel III: Pastoralists ---------> Other Pastoralists

This market channel is one of the channels that is used for restocking and it is usually undertaken around bush. In this cattle market channel, pastoralists sell cattle to other pastoralists. Cattle category marketed in this channel are comprised of calves, heifer and bulls. The proportion of cattle that passes in this sort of cattle market channel accounts to 12%. Here, pastoralists undertake marketing activity by friendship, kinship and neighborhood pattern. If a given pastoralist household is intimate and owns close relationship with other demanding producer, the probability of purchasing the cattle is high. The usual marketing point in this cattle marketing channel was bush market. The major aim of this market chain is replacing the aged cattle.

Channel IV: Pastoralists ---------> Broker ----------> Festival Consumer

This channel is one of oldest and informal institutional based channel. Here the producers sell cattle to other producers, consumer traders, urban dwellers and newcomers from surrounding highlands. The purpose of buyers of cattle is for festival consumption. The major festivals in the area were New Year celebrations, religious festivals and weeding ceremonies. This indicates that informal institutions have such a significant role in marketing system of cattle. The proportion of cattle passed through this market channel is 14%. The usual types of cattle used in the market channel include bulls and oxen.

Channel V: Pastoralists ------->Broker -------->Butchers

Here, producers sell cattle to brokers and brokers in their turn sell to butchers. This is also referred as newly adopted value addition channel that formed due to existence of smuggling activity and settlement of people from other areas. The proportion of cattle marketed in this market route was estimated 15%. Type cattle usually marketed in this route are bulls and oxen.

b. Informal Cattle Marketing Channels (IMC)

Informal Market Channel: defined as market channel that passes the market route without paying taxes to Ethiopian government. Since the cattle passes this route are unknown and unofficial market channel, this channel is also referred as illegal channel. In relation to proximity to Borana Pastoralists and long life history of adoption in the area, the proportion of cattle passes through this channel is greater than the formal one.

Channel I: Pastoralists ---------> Brokers ---------> Collectors ---------> Informal Exporters

In this cattle market channel pastoralists sell their cattle to brokers and brokers turn sell to collectors. Here, the collectors purchase cattle from brokers and bring to informal exporters. This sort of market channel has had long history in the district and used to be the only route of cattle market before five to ten years. The proportion of cattle marketed in this cattle market channel amounts to 46%. This is in line with Pavanello [7], which stated brokers purchase cattle from producers in pastoralist settlements and bush markets, and resells in primary markets or directly to traders. This result shows that majority of cattle travel through these sorts of informal routes. The types of cattle marketed through this channel are ox, cow, bull, heifer and calve.

Channel II: Pastoralist --------->Collectors ---------> Informal Exporter

This cattle market channel is one of the common market channels that found in the district. In this market channel, pastoralists sell to collectors and the collectors resale to informal exporters. The proportion of cattle accustomed to pass through this sort of market channel amounts to 4%. Here, as other type of cattle market channel in the area broker are not used as mediator in between collectors and producers. Collectors purchase from producers directly and resell to informal exporters. It is observed that almost all cattle category possessed through this channel.

Channel III: Pastoralists ----------> Brokers ----------> Informal Exporter

This market channel is one of channel identified as informal. Here, pastoralists sell cattle to brokers and brokers sell to informal exporters that come from Kenya. The proportion of cattle passed through this route amounts to 2%. Out of all categories of cattle that marketed through this channel, two thirds of cattle are heifers, cow and bulls and one thirds is ox and calves.

The pastoralists mentioned different sorts of reasons for availability of informal cattle trade in the area. Some of reasons for existence of informal cattle marketing in the area are currency and price difference, lengthy cattle marketing place in central Ethiopia route and proximity of Kenya route, broker's interference, recurrent tax and lack of control on border cattle trade. This implies that malfunction of market system in the area provoked pastoralists to participate in informal cattle trade.

The Principal factors contributing to informal trade existence identified by similar study Gebremariam [8] comprised of better price and more consistent market across the border, Poor market linkages (e.g. transportation costs, transaction costs, lack of relationships/trust),consumer goods (food, clothes, electronics) more readily available from across border, government restrictions, financial advantages to informality (e.g. taxation, formal vs. black market foreign exchange rate),non-financial advantages to informality (e.g. avoided regulation, health standards, bureaucratic delay and hassle).

To sum up, in the majority of cases the market chain of cattle in the district is highly influenced by the mediating process of brokers. From interviewed sampled producers, 81% of producers market their cattle by intermediating process through brokers. Out of total sampled respondents only 19% sold cattle directly to traders and other pastoralists. The study also shows that more than half respondents' cattle passed through informal channels that caused the country to loss foreign currency. The remaining cattle are used for restocking, informal institutions (festival, religious and weeding ceremonies) formal export and butchers meat productions. This finding tells about how the cattle market chain is influenced by brokers due to the complicated and the lengthy routes that hinder not to exploit the resource at pastoralists district by producers and tilted the market toward informal trade. This study finding calls for systematic intervention for minimizing unnecessary lengthy market channel and brokers' interferences.

10.2.3 Degree of market transparency

Degree of market transparency refers to the reliability and timeliness of market information that the actors have for their marketing decision. The study shows that the major sources of market information for producers include broker, neighbor and traders. The proportion of pastoralists that obtain market information from trader, brokers and neighbor was about, 20%, 41% and 39% respectively. The proportion of information collected from seller side amounts to 39% and the remaining 61% obtained from buyers angle. It is also acknowledged that the ultimate market information sources are traders. This implies that majority of producers' information source was from buyers' side. Even if the pastoralists obtain market information from two sides, its validity in term of determining market price inclined to buyers. Consequently, lack of reliable market information is raised as one of economically important market chain constraints. The study also points out that the producers have to be provided with the update and reliable market information to boost production and productivity of the sector.

The major market information sources for traders are brokers and other traders. From sampled traders 92% obtained market information from other traders and 8% from brokers. The study result assured that trader by their own act as information source for more than half sampled

where C=concentration ratio, si=percent share of top four traders. This means that traders by their own are the ultimate source of market information and producers hardly used as market information source for buyers. This research finding also magnified that how market power controlled by buyers that knocked out producers for market information source for traders.

10.2.4 Degree of market concentration

In this subsection the market concentration ratio of cattle is presented and discussed. As it was indicated in section above, concentration ratio for cattle market was calculated by taking the number of cattle purchased annually, number buyers and percent share in cattle marketing. The degree of market concentration for cattle market was estimated using the common measures of market concentration that is Concentration Ratio (CR4). In this section, market

Concentration ratio for oxen, cows, bulls, heifers and calves is presented. The market concentration ratio was calculated using two usual techniques. The two techniques employed for estimating market share of the in cattle market were Concentration ratio and Herfindahl Index. Market power of firms is estimated using Concentration ratio of top four traders and HI Index. Concentration ratio is estimated by summing total of Percent share of purchase of top four of cattle traders.

$$(c= \sum_{i=}^{r} si)$$

The HHI is expressed as: HHI = $(S_1)^2 + (S_2)^2 + (S_3)^2 + ... + (S_n)^2$ (where Sn is the market share of the ith firm).The value of HI index can also be calculated by the following formula:

HI=sum of 1^n (percent share) ^{2}.

a. Market Concentration Ratio for Oxen

The result in (Table 12) shows that the concentration ratio (CR4) for four top traders of oxen is 59.28%. This ratio is known to be in the ranges in between 50 % to 80%. This means that the top four oxen traders control 59.29 percent of oxen trade in the area. According to Scarborough and Kydd [42], the market structure in the area referred as tight oligopoly. The specific features of market structure imply that there was competition among few traders. The major oxen market fixtures summarized as trade was dominated by few number of large traders, high barrier to entry, non price competition and availability of abnormal profit. The implications of this market structure are existence of large market share by few oxen traders, market dominance and Collusion is possible. This also indicates that oxen traders have close market relation, information and benefits sharing experiences that helped them to exploit the benefits that belong to producers and dominate the marketing process. The result is also confirmed by Herfindahl-Hirschman Index where estimated HI value of oxen traders is 1522.18.This indicates that the oxen market structure is an oligopoly (Table 12).

Table 12: Market Concentration Ratio for oxen.

Number of traders	Cumulative frequency of traders	percent of traders C/A	Cumulative percentage traders	Quantity of ox purchased	Total quantity of ox purchased	Percent share of purchase	Herfindahl-Hirschman Index=Hi	C=sum of si
A	B	A/19*100	D	E	F=A*E	G=Si= F/894*100	G=Si=	I=C=sum of Si
1.0	1.0	5.26	5.26	150	150	16.78	281.52	16.78
1.0	2.0	5.26	10.53	140	140	15.66	245.23	32.44
2.0	4.0	10.53	21.05	120.0	240	26.85	720.69	59.28
2.0	6.0	10.53	31.58	50.0	100	11.19	125.12	70.47
1.0	7.0	5.26	36.84	38	38	4.25	18.07	74.72
1.0	8.0	5.26	42.11	36	36	4.03	16.22	78.75
1.0	9.0	5.26	47.37	35	35	3.91	15.33	82.66
4.0	13	21.05	68.42	20	80	8.95	80.08	91.61
1.0	14	5.26	73.68	18	18	2.01	4.05	93.62
1.0	15	5.26	78.95	15	15	1.68	2.82	95.30
1.0	16	5.26	84.21	12	12	1.34	1.80	96.64
3.0	19	15.79	100	10	30	3.36	11.26	100.00
		100.00			894	100.00	1522.18	

Source: Own computation 2014.

b. Market concentration Ratio for Cows

Table 13 presents concentration ratio of top four traders in cow market. The concentration ratio for cow was estimated using two techniques termed as C4 and HI. The result in (Table 12) below shows that the concentration ratio (CR4) for top four cow traders is 46.40%. Since the estimated market share ranges between 25% and 50%, cow market structure generally considered as lose oligopoly. This result indicates that top 4 traders account for 46.40% of market share. The HI index for cow marketers in the specific area estimated to be 1352.28. This HI index value also confirms the imperfection of the market. This shows that the competition in cow market is among few large traders, high degree of interdependence between traders, traders market a differentiated cattle category. It is also implied that traders undertake non price competitions. Traders' capital capacity, ability to speak local language, clan conflict and market experience has such a significant role in cow market. Traders are not as such free to enter and exit. The implications of this market structure are few potential traders' accounts for large market share, market dominance and Collusion is possible (Table 13).

Table 13: Market concentration Ratio for Cows.

Numbers of Traders	Cumulative frequency of traders	Percentage of trader	Cumulative percentage traders	Quantity of cow purchased by a trader	Total quantity of cow purchased	Percent share of purchase	The Herfindahl Hirschman Index	Cumulative purchase percent
A	B	C=A/22*100	D	E	F=A*E	G=Si=F/1194*100	H=(Si)^2	(c= $\sum_{i=}^{r}$ si)
1	1	4.55	4.55	180	180	15.08	227.27	15.08
1	2	4.55	9.09	144	144	12.06	145.45	27.14
1	3	4.55	13.64	120	120	10.05	101.01	37.19
1	4	4.55	18.18	110	110	9.21	84.87	46.40
3	7	13.64	31.82	100	300	25.13	631.30	71.52
1	8	4.55	36.36	60	60	5.03	25.25	76.55
2	10	9.09	45.45	50	100	8.38	70.14	84.92
1	11	4.55	50.00	35	35	2.93	8.59	87.86
4	15	18.18	68.18	20	80	6.70	44.89	94.56
1	16	4.55	72.73	15	15	1.26	1.58	95.81
4	20	18.18	90.91	10	40	3.35	11.22	99.16
2	22	9.09	100.00	5	10	0.84	0.70	100.00
		100.00		849	1194	100	1352.28	

Source: own computation 2014.

c. Market Concentration Ratio for Bulls

The following table describes about market concentration ratio for bull. The result in (Table 14) below shows that the concentration ratio (CR4) for bull traders is 43.03%. Since the estimated market share is in the ranges in between 25% to 50%, bull market structure generally considered as lose oligopoly. This result indicates that the top 4 traders account for 43.03% of market share. The HI index value of bull traders estimated to be 1013.39 that also indicated the existence of competition among few traders. The specific features fulfilled by market structure include the competition is among few large traders, high degree of interdependence between traders, market a differentiated cattle category. It was also understood that traders undertake non price competitions and compete on cattle type, trade experience, personality, security problem, financial capacity and language. Due to these reasons traders are not free to enter and exit. The implication of this market structure is market inefficiency. This calls for systematic government intervention through establishing pastoralist cooperative, credit service provisions, capacity building and there by linking producers to the market (Table 14).

Table 14: Market Concentration Ratio for Bulls.

Numbers of traders	Cumulative frequency of traders	Percent of traders	Cumulative percentage of traders	Quantity of bull purchased by a trader	Total quantity of bull purchased	Percent share of purchase	The Herfindahl-Hirschman Index	Cumulative purchase percent
A	B	C=A/22*100	D	E	F=A*E	G=si=F/1520*100	H=(Si)^2	(c= $\sum_{i=}^{r}$si)
1	1	4.76	4.76	200	200	13.16	173.13	13.16
1	2	4.76	9.52	160	160	10.53	110.80	23.68
1	3	4.76	14.29	150	150	9.87	97.39	33.55
1	4	4.76	19.05	144	144	9.47	89.75	43.03
1	5	4.76	23.81	140	140	9.21	84.83	52.24
2	7	9.52	33.33	130	260	17.11	292.59	69.34
1	8	4.76	38.10	120	120	7.89	62.33	77.24
1	9	4.76	42.86	80	80	5.26	27.70	82.50
1	10	4.76	47.62	50	50	3.29	10.82	85.79
3	13	14.29	61.90	30	90	5.92	35.06	91.71
3	16	14.29	76.19	25	75	4.93	24.35	96.64
2	18	9.52	85.71	15	30	1.97	3.90	98.62
1	19	4.76	90.48	10	10	0.66	0.43	99.28
1	20	4.76	95.24	8	8	0.53	0.28	99.80
1	21	4.76	100	3	3	0.20	0.04	100.00
		100			1520	100.00	1013.39	

Source: own computation 2014.

d. Market Concentration Ratio for Heifers

The following table presents, market concentration ration for heifer traders. The result in table (15) below shows that the concentration ratio (CR4) for heifer traders is 88.10%. Since the estimated market share ranges between 50% and 100%, heifer market structure generally considered as tight oligopoly. This result indicated that top 4 traders account for 88.10% of market share. The HI index value of heifer traders estimated to be 2702.31 that also justify heifer trader is tight oligopoly. The features of the market structure include the competition is among few large traders and high degree of interdependence between traders, traders market a differentiated

cattle category. It also points out that traders undertake non price competitions and compete on cattle type, price, trading experience and language. Traders are not free to enter and exit. As the result, the pastoralist's heifer market shows non competitive nature. The market concentration ratio was also assured by HI value that is above 1800 and, which is an indication of tight oligopoly. In addition to these since informal traders and pastoralists are the only major marketers of heifer, the competition is only among these market actors that illustrated inefficiency of market structure. The implications of this market structure are few potential traders' accounts for large market share, market dominance and collusion is possible (Table 15).

Table 15: Market Concentration Ratio for Heifers.

Numbers of traders	Cumulative frequency of traders	Percent of traders	Cumulative percentage of traders	Quantity of heifer purchased by a trader	Total quantity of heifer purchased	Percent share of purchase	The Herfindahl-Hirschman Index	Cumulative purchase percent
A	B	C=C/A	D	E	F	G=si	H=(Si)²	(c= $\sum_{i=}^{r}$ si)
1	1	12.5	12.5	292	292	43.45	1888.11	43.45
1	2	12.5	25	150	150	22.32	498.25	65.77
1	3	12.5	37.5	100	100	14.88	221.44	80.65
1	4	12.5	50	50	50	7.44	55.36	88.10
1	5	12.5	62.5	30	30	4.46	19.93	92.56
1	6	12.5	75	20	20	2.98	8.86	95.54
1	7	12.5	87.5	18	18	2.68	7.17	98.21
1	8	12.5	100	12	12	1.79	3.19	100.00
		100		672	672	100	2702.31	

Source: own computation 2014.

e. Market Concentration ratio for calves

The tables below describes about market concentration ratio for calve traders in pastoralist's area. The result in table 16 below shows that the concentration ratio (CR4) for calves is 95.62%. This market share ranges in between 50% to 100% are categorized tight oligopoly. When we come to market category, since it is higher than 50%, it is termed tight oligopoly. The result also assured by HI index (2675.04) that is higher than 1800 and calve market structure is tight oligopoly. In addition to these, calves are marketed mainly by pastoralists and marketing system of the specific cattle is based on kinship and neighborhood pattern, the market structure is not competitive. The implications of this market structure are large market share for few marketers, market dominance and Collusion is possible (Tables 16 & 17).

Table 16: Market Concentration Ratio of calve trade.

Number of traders	Cumulative frequency of traders	percent of traders	Cumulative percentage traders	Quantity of calves purchased	Total quantity of calves purchased	Percent share of purchase	The Herfindahl-Hirschman Index	Cumulative purchase percent
A	B	C= C/A*100	D	E	F=A*F	G=si	H=(si)²	(c= $\sum_{i=}^{r}$ si)
1	1	20	20	350	350	40.32	1625.91	40.32
1	2	20	40	180	180	20.74	430.04	61.06
1	3	20	60	160	160	18.43	339.78	79.49
1	4	20	80	140	140	16.13	260.15	95.62
1	5	20	100	38	38	4.38	19.17	100.00
		100		868	868	100.00	2675.04	

Source: own computation 2014.

Table 17: Summary of Market structure for Cattle Trading.

Cattle type	CR4	Sum of HI index	Market structure
Oxen	59.28	1522.18	Tight oligopoly
Cows	46.40	1352.28	Loose oligopoly
Bulls	43.03	1013.39	Loose oligopoly
Heifers	88.10	2702.31	Tight oligopoly
Calves	95.62	2675.04	Tight oligopoly

Source: own computation 2014.

As indicated in the above (Table 17) the market structure shows distinctive features according to cattle type marketed. Market structure for oxen, heifers and calves trade is tight oligopoly but it is a loose oligopoly for cows and bulls trade. Since heifers and calves are often marketed among pastoralists and rarely by informal traders and not by formal traders, the market structure is tight oligopoly. In addition to these, calves are unable to trek long distance in the marketing route, they are not preferred by market actors. The market structure for oxen trade tight oligopoly, because pastoralists supply at bull and oxen are usually demanded only in limited festivals. The implication of this is that market actors want ox at bull stage in order to exploit value added in the market chain and easily trek/truck the bulls. Consequently, traders in the area undertake marketing activity having been closely creating market relation so as to exploit benefits that belongs to producers.

In addition to these, bulls trade encompass various market actors such as informal traders, formal traders, hotels and restaurants and festival. Consumers, the market structure are relatively loose oligopoly. The cow trade is also including various market actors such as pastoralists and informal exporters; its market structure is loose oligopoly. This point out that tight oligopoly reduces competition and the entire market remains a "few traders game" where created wealth does not flow to all the beneficiaries in equitable ratio. Arguably, it should again be noted that failure to enjoy such benefits may distort market operations and eventually lead to collapse of the cattle production system. This calls for systematic government intervention in the sectors that could mitigate imbalance of trade benefits and help to optimize productivity through market linkage formation, adoption of value addition and development, update market information provision and cooperative formation.

10.2.5 Entry and exit conditions in the cattle market

The long market distance from pastoral areas to central towns of Ethiopia and the related high trucking cost, high capital demand, institution based marketing and information asymmetries are some of the major entrance and exit barriers in cattle trade in the area. The number of cattle supplied to market in holidays, religious festivals and weeding occasions are also higher than that of others seasons. Therefore, informal institutions, market distance, high transaction cost and high capital need are some of major barriers for entry and exit of cattle market in the area. In order to undertake marketing activity directly; it is must to speak local language. So as to take part in cattle trade, it is also must secure large amount capital for purchasing cattle, trucking and trekking.

10.2.6 Market Conduct

Market Conduct refers to the strategies adopted by a player as a way of adjusting to the market conditions in order to fully enjoy the market benefits. Notably, it includes mechanisms such as price setting and terms of payment.

a. Price Setting Mechanisms

The price setting activity of cattle in pastoralist area is known to be accomplished by various actors in the market. About 62% of pastoralists confirmed that price of cattle is set by brokers based on initial price given by sellers and final price from buyers. The proportion of pastoralists recognized determination of price by buyers based on central market information, by brokers based on central area information and sellers by their own respectively is 22%, 10% and 6%. This shows that market actors had different level of influence in the role they played for setting price. It is observed that every aspect of price setting mechanisms majorly is controlled by traders. This means that price setting in cattle market is often skewed toward traders and brokers. The result indicates that traders undertake non price competitions including cattle type, trade experience, personality, financial capacity and language. The implications of this market structure are few potential traders' accounts for large market share, market dominance by these top four traders, interdependency and collusion possible.

b. Terms of payment for producers

Both the household survey and key informant interview reveals that the cattle marketing by pastoral households has been undertaken in inform of cash or hand by hand currency. The proportion of producers who indicated cattle marketing carried out in the form of direct cash payment is 96%. The remaining 4% of the pastoralists marketed both in credit and hand in hand cash payment before three to five years. This justified that almost all producers market their cattle inform of direct cash transfer in current years. The main reason for ceasing of cattle trade in form of credit from previous years to current is loss of certain capital due to credit. This means that market actors in the area assured that before five year certain informal traders had purchased cattle in form of credit did not repay the credit back. This phenomenon had ceased credit marketing system in the district.

10.2.7 Market Performance

Market performance refers to the impact of structure and conduct as measured in terms of variables such as prices, costs, and volume of output. Analysis of the level of marketing margins

and their cost components could help to evaluate the impact of the structure and conduct characteristics on cattle market performance.

The marketing margin of cattle is the difference between the revenue from the sales of cattle and the costs incurred in running the market operation. The net marketing margin of cattle (NMM) is also the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted and is one of the best tools to analyze performance of cattle market. Marketing margin was calculated taking the difference between producers and formal exporter or informal exporter or trader prices. Producers' share can be expressed as: the ratio of Producers share of the Price to traders share. Mathematically, $PS = Pp/Pt = 1-MM/Pt$ where PS=producers share, Pt=price of traders, and MM= market margin. It is possible to calculate the total or gross marketing margin of cattle trade=Traders Price-less--pastoralists price/traders price*100.

a. Market Margin for oxen

Table 18: Market margin of oxen trade.

Market margin of ox	Market measures	Marketing channel oxen							
Market actors cattle per head	Cattle per head	$_I$FMC	$_{II}$MC	$_{III}$MC	$_{II}$FMC	III^{IMC}	III^{FMC}	$_{IV}$FMC	$_V$FMC
Producers' Price per head	price per head		6272	6272		6272		6272	6850
Traders	price per head		10350	10350		10350			
Gross margin per head/head			4078	4078		4078			
Marketing cost/head			1868.33	1798.33		1698.33			
Net market margin/head			2209.67	2039.67		2376.67			
Producer's share of final price of ox (%)			61%	61%		61%			
Brokers	price per head		10470	10470		10470		7889	8465
Gross margin per head/head			4198	4198		4198		917	1015
Marketing cost/head			1718.33	1718.33		1643.33		150	130
Net market margin/head			2479.67	2479.67		2554.67		767	885
Producer's share of final price of ox (%)			60%	60%		60%		80%	81%

Source: own computation 2014 (note: *FMC*=Formal Market channel & *IMC*=Informal Market Channel).

The analysis of the marketing costs and margin in the below (Table 18) indicates that marketing margin of the participants was different along different channels; traders get their higher margin in the 3rd, 1st and 2nd informal channels in descending order. The level of cost incurred by brokers is lower than that of traders in oxen marketing. Brokers collected the higher gross market margin at 1st, 2nd and 3rd informal than 4th and 5th formal channel.

As it is shown below, the producers' share of final ox price is higher in 5th formal channel where pastoralists sell oxen to butchers and 4th formal channel in which producers sell to festival consumer through facilitation of brokers. The amount of producers' share from final market price of oxen trade in formal and informal channel is 61% and 80.5% respectively. By summing up, the producer's share of oxen trade is higher in formal channel than formal. The study indicates that it is better for producers to sale their ox at 5th and 4th formal channel through facilitation process of brokers, where butchers and festival consumers purchase for meat production (Table 18).

b. Market Margin of Cows

Marketing margin of the participants is different along different channels. The marketing cost of traders raise when they pass from 2nd informal channel to first formal and 1st formal to 1st informal channel, because they could not able to purchase directly from producers in the 1st formal channel where traders purchase from small traders that purchase from broker through facilitation of brokers and 1st channel. Brokers collected relatively better gross market margin at 1st informal and 2nd formal channel than they obtained at 1st and 5th channel. The producers' share of final cow price is higher in first formal market channel with traders in comparison to 2nd and 1st informal channels. The producers also obtained higher final cow price share at 3rd informal, 1st formal and 2nd formal market channel with brokers in descending order. The final price share of producer at 1st channel (formal route) is estimated to be 71%, which is higher than at 1st formal and 2nd informal channel that is estimated to be 63% and 65% with traders. The analysis of the marketing costs and margin in table bellow (19) revealed that brokers incurred the lower and traders incurred relatively the

higher marketing cost. Cow traders get higher profits in informal channel than formal; it is the reason that makes the traders to participate in greater proportion the informal trade. Since producers' share of final cows prices is higher in formal channel than informal, it is advisable for producers to sell cattle through formal market channel (Table 19).

Table 19: Market Margin of cow's trader.

Cow	Market Measures	Marketing channels for Cow							
Market actors Cattle per head	Cattle per head				$_{II}$FMC	$_{III}$IMC	$_{III}$FMC	$_{IV}$FMC	$_{V}$FMC
Producers' Price per head	price per head	4429	4429	4429	4429	4429			
Traders	price per head	6250	6870	6750					
Gross margin per head/head		1821	2441	2321					
Marketing cost/head		1012	1050	962					
Net market margin/head		809	1391	1359					
Producer's share of final price of cow (%)		71%	64%	65%					
Brokers	price per head	6250	7025		6350	6850			
Gross margin per head/head		1821	2596		1921	2421			
Marketing cost/head		962	985		972	980			
Net market margin/head		859	1611		949	1441			
Producer's share of final price of cow (%)		71%	63%		70%	65%			

Source: own computation 2014 (note: *FMC*=Formal Market Channel & *IMC*=Informal Market Channel).

c. Market Margin of Bulls

Gross marketing margin of the participants is different along different channels. Bull traders get their higher gross margin at 1st and 2nd informal channels and lower at 1st formal channel. The marketing cost of traders was higher at 1st and 2nd informal market channel and lower at 1st formal channel. Brokers collected the higher gross market margin at 1st informal and 3rd informal market channel and obtain the lower market margin at 1st and 2nd formal channel. The producers' share of final bull price was higher in first formal market channel with both traders and brokers. The producer's share of final price is also higher at 2nd formal channel with brokers. The lower share bull final price earned by producers was in 1st and 2nd informal market channel with traders and 3rd and 1st channel with brokers. The analysis of the marketing costs and margin (Table 20) revealed that direct purchase of bull by trader from producers lowers the cost of marketing at least by the amount paid to intermediaries. The analysis also justified that market cost of trader in bull trade is lower in formal market than informal ones. The producers share of bull final price in formal channel is higher that of formal. This implies that it is advisable for producer to sell in formal channel than informal channel where they earned relatively better final price share (Table 20).

Table 20: Market Margin of bull's trade.

Bull Market Margin	Market measures	Marketing channels for bulls							
Market actors Cattle per head	Cattle per head	$_I$FMC	$_I$IMC	$_{II}$IMC	$_{II}$FMC	$_V$IMC	$_{III}$FMC	$_{VI}$FMC	$_V$FMC
Producers' Price per head	price per head	4160	4160	4160	4160	4160			
Traders	price per head	5750	7150	7100					
Gross margin per head/head		1590	2990	2940					
Marketing cost/head		906	1474	1450					
Net market margin/head		684	1516	1490					
Producer's share of bull final price (%)		72%	58%	59%					
Brokers	price per head	5800	7190		5700	7060			
Gross margin per head/head		1640	3030		1540	2900			
Marketing cost/head		856	1450		806	1390			
Net market margin/head		784	1580		734	1510			
Producer's share of final price of bull (%)		72%	58%		73%	59%			

Source: own computation 2014 (note: *FMC*=Formal Market Channel & *IMC*=Informal Market Channel).

d. Market Margin of heifers

Marketing margin of the participants of heifer trade is different along different channels; heifer traders get higher gross market margin in 1st informal channel where traders purchase from collectors that purchase by facilitation process of brokers from producers and 2nd informal channel in which traders purchase from collectors that collected from producers. The marketing cost of traders was higher at 1st and 2nd informal market channel, because these are identified as informal route. Brokers collected the higher gross market margin at 1st and 3rd informal channel and lower gross market margin at 2nd formal channel. The producers' share of final heifer price is higher at 2nd formal channel with brokers. The lower share of producer's heifer final price is earned at 1st and 2nd formal channel with traders and 1st and 3rd market channel with brokers. The analysis of the marketing costs and margin in the below Table (21) shows that brokers incurred the lower marketing cost than traders. In general, the proportion of final price share for producers is higher in formal channel than informal channel. Therefore, it is advisable for producers to market their heifer through formal route, where they could optimize their profits by reducing transaction costs and linked to market through cooperative formation (Table 21).

Table 21: Market Margin of heifer traders.

Heifer Market margin	Market measures	Marketing channels for heifer							
Market actors cattle per head	Cattle per head	$_I$FMC	$_I$IMC	$_{II}$IMC	$_{II}$FMC	III^{I}MC	$_{III}$FMC	$_{IV}$FMC	$_V$FMC
Producers' Price per head	price per head		3640	3640	3640	3640	3640		
Traders	price per head		5750	5680					
Gross margin per head/head			2110	2040					
Marketing cost/head			1470	1420					
Net market margin/head			640	620					
Producer's share of final price of heifer (%)			63%	64%					
Brokers	price per head		5850		4850	5800	4175		
Gross margin per head/head			2210		1210	2160	535		
Marketing cost/head			1405		800	1355	50		
Net market margin/head			805		410	805	485		
Producer's share of final price of heifer (%)			62%		75%	63%	87%		

Source: own computation 2014 (note: *FMC*=Formal Market Channel & *IMC*=Informal Market Channel).

e. Market Margin of Calve

Marketing margin of the participants is different along different channels. Calves traders get their highest gross market margin at 1st formal and 2nd formal channels. The marketing cost of traders is higher at 1st and 2nd informal market channel. Brokers collected the higher gross market margin at 1st and 3rd formal market channel and obtain the lower market margin at 2nd formal channel. The producers' share of final calve price is higher in 3rd formal channel with brokers. The analysis of the marketing costs and margin revealed that brokers incurred the lower marketing cost and traders the higher marketing cost. The total final price share producer from formal route is higher than that of informal. The proportion final price share from calves' trade in 1st, 2nd and 3rd informal channel is 56%, 56 and 65% respectively, while it is 92% in 3rd formal channel. By summing up, the informal trade route is preferable to traders and brokers to earn better gross market margin. It is advisable for producers to sell their calves at formal market channel, where they earn relatively higher final market share (Table 22).

Table 22: Market Margin of calves' trade.

Calve market margin Market Marketing channels for Calve measures									
Market actors cattle per head	Cattle per head	$_I$FMC	$_I$IMC	$_{II}$IMC	$_{II}$FMC	$_{III}$IMC	$_{III}$FMC	$_{IV}$FMC	$_V$FMC
Producers' Price per head	price per head		1973	1973		1973	1973		
Traders	price per head		3600	3530					
Gross margin per head/head			1677	1557					
Marketing cost/head			1299	1299					
Net market margin/head			378	258					
Producer's share of final price of calve (%)			55%	56%					
Brokers	price per head		3450	3520		3050	2150		
Gross margin per head/head			1477	1547		1077	177		
Marketing cost/head			85	75		65	0		
Net market margin/head			212	452		122	177		
Producer's share of final price of calve (%)			57%	56%		65%	92%		

Source: own computation 2014 (note: *FMC*=Formal Market Channel & *IMC*=Informal Market Channel).

In general, producer's share of final price in formal channel higher than that of informal, which points out that formal route is preferable for them. Since traders and brokers obtain relatively better market margin in informal route, it is difficult to compete for formal traders with informal traders in the district.

In contrary to free market economy, market concentration ration and market margin estimated for cattle market shows oligopolistic nature. It therefore means that the formal or informal market cattle traders do not bare full cost involved in the market thereby leading relatively low marginal costs. This is to mean that the cattle market are disintegrated in such a manner that price levels does not relay from the cattle keepers to the terminal market traders.

Indeed, it is observed that the principle of free market through bargaining is distorted once a new market entrant is discovered. For example, buying at a relatively fair price requires one to have known the local language at the farm gate market, security and cattle type marketed (non price competition). This means that without close relation with the market brokers; one is subjected to price discrimination. Since the market is flooded by brokers at all the chain terminals; it is very difficult to assess the efficient market price and general information. It was observed that there exists larger number of market brokers both for different live cattle and in many cases; the brokers hold much needed information so as maximize on the commissions. Monopoly market structure violates the principle of equity between the traders and the pastoralists. This is because the larger share of the market gains remains with end of chain traders thereby denying pastoralists a chance to realize the economic gains in cattle production.

10.2.8 Comparison of Market Margin Across cattle type and marketing channels

The market performance of cattle marketed varies across cattle type marketed and the type of channel used. The empirical result in (Table 23) indicates that the cow traders earn highest net market margin but, calve traders earn lowest net market margin in formal channel. The level of net market margin earned in informal channel is highest for ox traders, while it is lowest for calves. The proportion of producer share of final cattle price

from informal market channel is 18% lower than that of formal. This indicates that it is advisable for producers to market cattle though formal channel, while it is good for trader to use informal channel that is well developed in value addition practices and linked to the largest east Africa market point, Nairobi, which by its own make difficult to compete for formal traders with informal channel that has higher market margin (Table 23).

Table 23: Comparison of Market Margin across cattle type and marketing channels.

Cattle type	Marketing Cost		Net-Market Margin		producers Share	
	Formal	Informal	Formal	Informal	Formal	Informal
Oxen	140	1999.47	826	2100	80%	60.5%
Cows	987	989	834	1453.67	70.5%	64.25%
Bulls	856	1441	734	1524	72.5 %	58.5%
Heifers	425	1412.5	447.5	717.50	81 %	63%
Calves	0	564.60	177	284	92 %	57.8%
Mean	481.60	1281.31	603.7	1215.83	79.2	60.82

Source: own computation 2014.

10.2.9 Determinants of Household's Choice to participate in Cattle market and supply

a. Tests for Multicollinearity

Tests for Multicollinearity is used to denote the presence of linear relationship among explanatory variables. If explanatory variables are perfectly linearly correlated, that is, if the correlation coefficient for these variables is equal to unity, the parameters become indeterminate: it is impossible to obtain numerical values for each parameter separately and the method of least square breaks down and their standard errors are infinite koutsouiannis [57].At the other extreme if the explanatory are not inter-correlated at all (that is if the correlation coefficient for these variable is equal to zero), the variables are called, orthogonal and there is no problems concerning the estimates of coefficients Gujarati [58].

It is important to check multicollinearity problem for continuous and dummy variables before running the model. There are two measures that are often suggested to test the existence of multicollinearity. These are Variance Inflation Factor (VIF) for association among the continuous explanatory variables and Contingency Coefficient (CC) for limited dependant or dummy variables. Variance Inflation Factor is used to test the existence of multicollinearity for association among the continuous variables. As Rj2 increase towards unity, that is, as the co linearity of Xj with the other regressors increase, VIF increases. As a rule of thumb, if the VIF greater than 10, which will happen if Rj2 is greater than 0.90, that variable is said to be highly collinear. As correlation coefficient of explanatory variables approaches 1, the VIF approaches infinity. That is, as the extent of co linearity increases, the variance of an estimator increases, and in the limit it can become infinite. Multicollinearity of continuous variables can also be checked using Tolerance. Tolerance is one if Xj is not correlated with the other explanatory variable, where as it is zero if it is perfectly correlated with other explanatory variables Gujarati [58] (Table 38).

$VIF (X) = (1- R_j^2)^{-1}$ --------------------------- Equation 1

$TOL=$ ------------------------------------ Equation 2

Where, R_j^2 refers to coefficient of determination between explanatory variables

VIF refers to variance inflation factor TOL refers to tolerance. In this result the minimum and maximum VIF value observed is in the range between 1.041 and 1.341 that is lower than 10 and imply absence of multi-collinarity between continuous explanatory variables. Of course, it is also possible to use TOL*j* as a measure of multicollinearity in view of its intimate connection with VIF*j*. The closer is TOL*j* to zero, the greater the degree of collinearity of that variable with the other regressors. On the other hand,

the closer TOL*j* is to 1, the greater the evidence that X*j* is not collinear with the other regressors.

The other justification made is that the regression result value of tolerance. Contingency coefficient is used to check multicollinearity between discrete explanatory variables. The value ranges between 0 and 1, with 0 indicating no association between the variables and value close to 1 indicating a high degree of association between the variables. Since the value of contingency coefficient for limited independent variable ranges between 0.08 (for gender and business support service access) to 0.192(gender with market information source), there is no multicollinarity between discrete explanatory variables in the model.

b. Test for Heteroscedasticity

Test for Heteroscedasticity: The primary result for least squares estimation is that it retains its consistency and asymptotic normality, but some correction to the estimated asymptotic covariance matrix may be needed for appropriate inference Greene [59]. One of the assumptions of the classical linear regression analysis is that for given X's, the variance of ei (error

term) is constant or homoscedasticity among the explanatory variables. That means, the variance of the unobservable error term, conditional on the ''X's,'' is constant, i.e.Var(ei/x)=δ2. The Violation of homoscedasticity assumption is known as heteroscedasticity. It is important to check heteroscedasticity problem before presenting, interpreting and discussion of the result of regression. There are different methods to check existence of heteroscedasticity problem in the model. But in this study Breusch-Pagan Test approach was used. Heteroscedasticity was tested using Breusch-Pagan test by applying the following procedure.The original equation was estimated by using OLS method and the least square residuals were obtained .i.e. y = β0 + $\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e_i$, --------------------------------Equation 3

Then the least square residuals were regressed on all the independent variables. i.e.

ei^2 = δ0+ $\delta_1 X_1 + ... \delta_{11} X_{11} + u$ where, δi=parameters --------------------------Equation 4

e^2 is independent variable The R-square of this regression was obtained.

The null of no heteroscedasticity is then:

$H_0 = \delta_1 = \delta_2 = \delta_k$

H1: = δ1# δ2 # δk

F= (1-R2 ε2)/(n-k-1) Gujarati [58].

If F-calculated is less than F-tabulated, the null hypothesis is accepted which says there is homoscedasticity in the model. In this study regression result of error term square over explanatory variable, the F calculated value=2.209 and F tabulated value at 95% and 99% significance level is 2.425 and 3.65 respectively. Since the F calculated value (2.209) is lower than F Tabulated values (95%=2.425 and at 99% =3.65) the statistical parameter result in the regression analysis indicates that there is no heteroscedaciticity in explanatory variables Gujarati [58].

10.2.10 Determinates of Household choice to participate in Cattle Market

In order to examine the market participation decision of pastoralists in the area, Logistic regression Model was employed. Here, the factors influencing the household's choice to participate in cattle market was estimated using logistic model.

The estimates described in table below (24) points out the relationship between the dependent variable termed cattle market participation decision and the independent variables, where the dependent variable is on the logit scale. This regression analysis used six variables for model specification. From these variables, gender, cattle owned and camel owned significantly affect probability of market participation by pastoralists (Table 24).

Table 24: Determinants of household choice to participate in cattle market.

Explanatory variables	Coefficient	Std. Err.	z	P value	Odds ratio
constant	-2.87	.67	-4.30	0.000	0.06
gend-hh	1.07	.41	2.64	0.008**	2.92
catt-own	.19	.04	5.41	0.000**	1.21
Caml-own	.20	.09	2.16	0.031*	1.22
mkt-info	-.19	.17	-1.17	0.242	0.83
helt-dis	.15	.10	1.54	0.124	1.16
Buss-serv	.30	.38	0.80	0.422	1.35
Summary	Observation =221	LR chi2 = 92.44		Pseudo R2	= 0.3250

Source: own computation 2014 (STATA: **,* statistically significant at 1% and 5% respectively).

Gender – The odds ratio of the parameter estimate for the variable gender is 2.92. The regression result confirmed that being male by itself promotes cattle market participation. This is the proportional odds ratio of comparing male to females on cattle market participation given the other variables in the model are held constant. For males, the probability of market participation decision is 2.92 times higher than that of female, given the other variables are held constant. This is to mean that being male increase likelihood of decision to take part in cattle market by the estimates about 2.92 units higher as compared to females households. The result is in line with Mamo and Degnet [60] finding, which confirms gender has statistically significant effect on whether or not a farmer participates in the livestock market.

a. Number of cattle owned: The coefficient for the parameter estimate cattle owned is 0.19 (Table 24). The odds ratio of cattle owned parameter estimate is 1.21. The sign of parameter estimate is positive, which shows number of cattle kept by pastoralists increase the probability of cattle market participation decision. This implies that one unit increase in cattle owned results in increment of the probability of cattle market by 1.21 times, holding all other explanatory variables constant. As the herd size increases, the probability of pastoral household to take part in cattle market increases while the probability of non-participation in cattle market decreases.

This finding is also agrees with Asfaw and Jabbar [61] and Barrett [47] that states the households with larger herd size has higher ability to generate surplus animals and are therefore more likely to sell. The implication is that active cattle markets depend on pastoralists attaining and maintaining sufficiently large herd sizes that they become willing to liquidate animals through the market. It is generally believed that pastoralists sell their animals at least partly in response to demand for cash to

meet expenditure needs. Relatively wealthy pastoralists, with greater herd size, have considerably higher expenditure rates and thus use cattle markets more frequently to cash out animals. When cattle prices are raising in the post-drought period, the wealthier households are able to sell surplus animals and take advantage of favorable prices, while poorer households tend to hold on to their few animals remaining after the drought, unless forced to sell by specific family needs.

b. Number of camel owned: Total size of camel the respondent owned, is continuous variable, taken as another explanatory variable influence cattle participation decision. The coefficient for the parameter estimate cattle owned is 0.20. The odds ratio of parameter estimate for camel kept is 1.22 (Table 24). The sign of parameter estimate is positive that indicates number of camel kept by producers increase the likelihood of cattle supply to the market. The result indicates that for one unit increase in number of camel kept, the probability of cattle market participation increase by 1.22 times, holding all other explanatory variables constant. Due to wealth effect, the household that had more camel have also more cattle, the probability of market precipitation increased. As the result households that owned one more camel have more likelihood

of cattle participation. In addition to this, as climate adaptation strategy, pastoralists in the study districts has been changing production from cattle to camel there by increasing the camel herd and decrease cattle size by liquidating the cattle in the market. This result is also supported by Kelemework [62] that states pastoralists have long developed adaptive strategies against environmental shocks through effective management of their resources. Adaptive strategies include the establishment of strong economic and social support networks, herd splitting, and herd diversification.

10.2.11 Determinants of live cattle supply

In Table 25, the results of the parameter estimate of the model for the relationship between supply of cattle and explanatory variables is presented and discussed. The result indicates that among the nine hypothesized determinants of market supply of cattle, age of household head, number of cattle owned and amount of non cattle market income were significantly affected the supply. These were. The coefficient of multiple determinations (R^2) was estimated 0.845 and adjusted R^2 value was 0.833. This means that 85% of the variation in the dependent variable is explained by the explanatory variables included in the model (Table 25).

Table 25: Determinants of live cattle supply.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	-.032	1.268		-.025	.980
age	-.031	.015	-.082	-2.148	.033*
fam-size	.043	.056	.029	.759	.449
edu.	.077	.077	.038	.996	.321
gend-hh	.101	.395	.009	.255	.799
catt-own	.221	.009	.950	24.510	.000**
camel-own	-.001	.056	.000	-.012	.991
Other-inc	-.002	.001	-.172	-4.686	.000**
mkt-seas	.066	.115	.020	.578	.564
Mkt-info	.034	.060	.020	.558	.578
Model Summary	R =0.920	R Square=0.846	Adjusted R Square=0.833	Std. Error of the Estimate =1.88.06	

Source: own computation 2014 (SPSS: **, * statistically significant at 1 % and 5% significance level respectively).

Furthermore, the adjusted R^2 (83%), which is significant has further consolidated the goodness of the model; hence, it is econometric significance and reliable. To estimate determinants of cattle supply by pastoralist households, OLS estimation procedure was used. The supply Model with specific Independent Variables in supply of cattle in the study area can be written as:

Y=f (age, number of cattle owned, amount of non cattle market income earned and error term)

Thus, the supply of cattle to market is determined by the explanatory variables: number of cattle owned, age of respondent pastoralist, amount of other monthly income obtained and other unobserved factors, which are contained in error term e.

a. Age (AGE) - Age of the household is one of the explanatory variables that influence number of cattle supplied to market. Its sign is negative and the negative sign of the coefficients indicates that one year age increment have the negative influences over

cattle supply. This means that increase in age of pastoralists in one more year, decrease number of cattle supplied in about 0.031 units, holding other independent variables constant. As one of the factor for human capital development, the old aged pastoralist was not educated and was not able to obtain update market information, as result they supply less number of cattle as compared to young age pastoralists. The old age pastoralists are also more indebted to institutional matter of just holding large number of cattle for self-respect and to be counted as rich person, they often supply less number of cattle to market as compared to young age pastoralists.

b. Total number of cattle owned - Total size of cattle owned by pastoralists, continuous variable, is taken as another variable that affect number of cattle supplied to the market. Its sign is positive. This means that the number of cattle owned by household is directly related with the amount of cattle supplied to the market. This indicates that as a number of cattle owned increased by ten more units, the pastoral household supplies more than two cattle to the market. This result shows that a pastoralist household that owned one more cattle as compared to other pastoralists supplies 0.22 more cattle to market, holding other explanatory variables constant. This finding agrees with Barrett et al. [47] that states that greater cattle holdings results in greater number of cattle market supply. The key practical

implication is that active cattle markets depend on pastoralists rearing and maintaining sufficiently large herd sizes that enable them to supply more number of cattle to the market.

c. Amount of income obtained from non cattle marketing: The amount of income obtained other than a cattle marketing by pastoralists is one of explanatory variable that influence the number of cattle supplied to the market. Its sign is negative this implies that the more other income earned by pastoralists, they supply less number of cattle to the market. Since the main targets of supplying cattle to market is income earning, earning other income make the pastoralist's households to minimize the extent of cattle supply to the market. Since the area is known in smuggling activities, when the households engaged and secured income from these tasks, the number of cattle supplied to market decrease. The result indicates that for a pastoralist household who could earn one more thousand Ethiopia Birr from non cattle market source, holding other explanatory variables constant, the number of cattle supplied to market is reduced by 1 unit.

This finding is in line with Bellemare and Barrett [63] that states Pastoralists used livestock market to meet immediate cash needs when cash is not otherwise available but that livestock are the preferred form in which to hold assets when cash is available to meet immediate expenditure needs.

10.3 Major Cattle Market constraints and enabling environments (Figure 2)
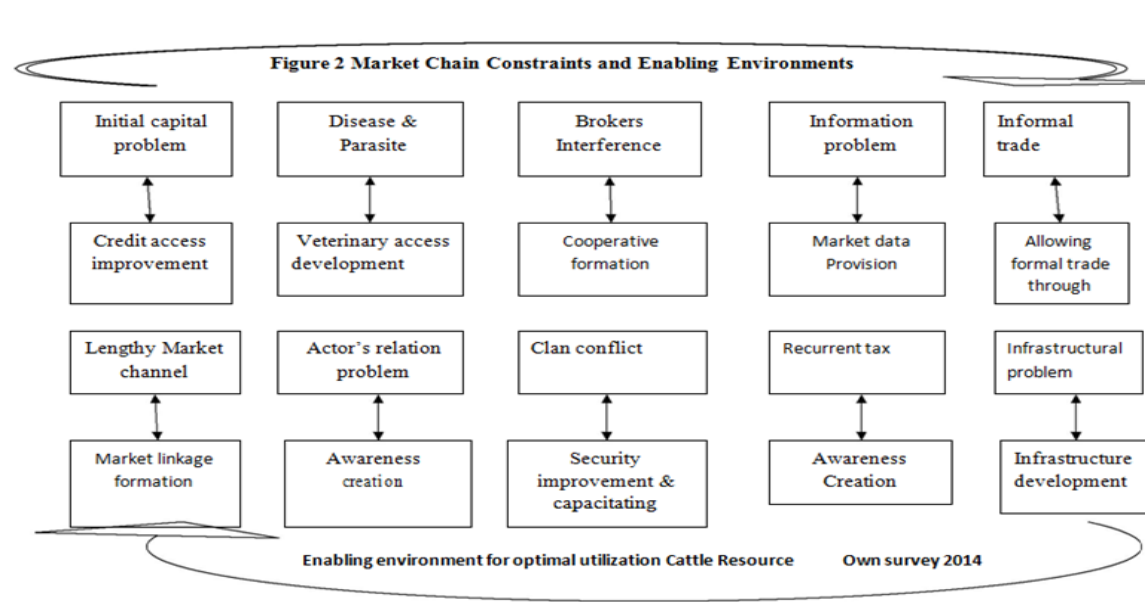
Figure 2

10.3.1 Lack of initial capital

The pastoralist households in the area identified initial capital problem as one of the major constraints in cattle marketing. The initial capital problem was given 1st to 5th rank by 30.9% sampled households and 6th to 10th rank by 69.1%

interviewed pastoralists. Therefore, the overall rank of initial capital problem is 10th out of ten most important market chain constraints. The following table presents about initial capital problem and pair wise Comparison (Table 26).

Table 26: Lack of Initial capital problem.

Score out of ten	Frequency	Percen-tage	Rank	Frequency	Percentage
.00	11	4.9	1st	22	9.9
1.00	62	27.8	2nd	13	5.8
2.00	34	15.2	3rd	14	6.3
3.00	33	14.8	4th	13	5.8
4.00	20	9.0	5th	7	3.1
5.00	13	5.8	6th	18	8.1
6.00	15	6.7	7th	32	14.3
7.00	17	7.6	8th	23	10.3
8.00	11	4.9	9th	45	20.2
9.00	6	2.7	10th	36	16.1
10.00	1	.4			

Source: own computation 2014.

10.3.2 Unfriendly Relation between Market Actors

Unfriendly relation between market actors was one of the major constraints of cattle market in the area. The major market actors that have unfriendly relation with producers are brokers, traders and tax collectors. From below (Table 27) it is understood that unfriendly relation between market actors is one of the major market chain constraints that found at around at mid of ten ranked constraints by pastoralists. Unfriendly relation between market chain actors has given 1st to 5th rank by 60.9% pastoralists and the remaining 39.1% sampled households give 6th to 9th rank. Hence, the overall rank of unfriendly relation between market chain actors is 4th.The table bellows points out about pair wise comparison of unfriendly relation between actors with other constraints of cattle market (Table 27).

Table 27: Unfriendly relation between market actors.

Score out of ten	Frequency	Percentage	Rank	Frequency	Percentage
2.00	17	7.6	1st	6	2.7
3.00	38	17.0	2nd	16	7.2
4.00	59	26.5	3rd	23	12.1
5.00	51	22.9	4th	45	20.1
6.00	37	16.6	5th	42	18.8
7.00	17	7.6	6th	44	19.7
8.00	4	1.8	7th	10	4.5
			8th	27	12.1
			9th	6	2.7

Source: own computation 2014.

10.3.3 Cattle Diseases and Parasite

Disease and parasite constraints is sorted as one of most important cattle market and production constraints and it is found around the top five ranked constraints. From total sampled pastoralists around 59.2 % give 1st to 5th rank for disease and parasite constraint and the remaining 40.8 % given sixth to ninth rank, out of top ten market chain constraints. Therefore, the overall rank of disease and parasite problem is 5th.

This study result calls for investment in animal health services that are required to improve the productivities of pastoralists. From the supply side, the large numbers of non-participants need to enter the market for which improvement in fertility rate and significant reduction in mortality rate will be required so that herd/flocks sizes increase sufficiently to allow pastoralists to sell more cattle. This requires increased private and public investment in animal health services. This finding is also

supported by other study Asfaw and Jabbar [61]. The following table elaborates about disease and parasite importance ranks and pair wise comparison score given by sampled pastoralists (Table 28).

Table 28: Cattle disease and parasite.

Score out of ten	Frequency	Percentage	Rank	Frequency	Percentage
.00	9	4.0	1st	38	17.0
1.00	23	10.3	2nd	33	14.8
2.00	23	10.3	3rd	30	13.5
3.00	22	9.9	4th	13	5.8
4.00	24	10.8	5th	18	8.1
5.00	21	9.4	6th	24	10.8
6.00	15	6.7	7th	14	6.3
7.00	52	23.3	8th	7	3.1
8.00	28	12.6	9th	25	11.2
9.00	6	2.7	10th	21	9.4

Source: own computation 2014.

10.3.4 Lengthy Market Channel

Lengthy market chain problem is ranked as top five out of ten most important market chain constraints and it is confirmed by about 82.9% sampled pastoralists and the remaining 17.1% household give sixth to ninth rank. Therefore, overall rank of lengthy market channel in comparison with other constraints is first. This indicates that the distant market in pastoralists' area is one of most important market chain constraints for producers. This finding agrees with Awol [64] that states market places in rural areas are often characterized by long distance and considerably long time interval between two market days. These characteristics of rural marketing system obviously adversely affect the transaction of goods and services by rural households. This in turn affects the farmers' production and marketing decision of goods and services. The table bellow discusses about importance rank of long distant problem and pair wise comparison rank of cattle market chain in pastoralists area (Table 29).

Table 29: Lengthy market.

Score out of ten	Frequency	Percentage	Rank	Frequency	Percent
2.00	10	4.5	1st	42	18.8
3.00	23	10.3	2nd	50	22.4
4.00	15	6.7	3rd	29	13.0
5.00	27	12.1	4th	50	22.4
6.00	55	24.7	5th	14	6.3
7.00	46	20.6	6th	9	4.0
8.00	30	13.5	7th	12	5.4
9.00	17	7.6	8th	14	6.3
			9th	3	1.3

Source: own computation 2014.

10.3.5 Broker's interference

In the Table 30 below broker's interference problem listed as highly appreciated constraints that found around top five out of ten problems. From interviewed pastoralists 75.7% households give 1st up to 5th top rank out of ten market chain constraints and 14.3% give 6th to 9th rank. Therefore, overall rank of broker's interference problem is 2nd. The result is in line with other study Yacob [11], Berhanu et al. [6] also found that the brokers eliminate the direct contact between producers and buyers. The table bellows points out about brokers' interference problem importance rank and Pair wise comparison score (Table 30).

Table 30: Brokers' interference.

Score	Frequency	Percent	Rank	Frequency	Percent
1.00	4	1.8	1st	21	9.4
2.00	9	4.0	2nd	38	17.0
3.00	20	9.0	3rd	42	18.8
4.00	29	13.0	4th	43	19.3
5.00	49	22.0	5th	25	11.2
6.00	30	13.5	6th	31	13.9
7.00	60	26.9	7th	12	5.4
8.00	10	4.5	8th	7	3.1
9.00	12	5.4	9th	4	1.8

Source: own computation 2014.

10.3.6 Recurrent taxes

Recurrent taxation levied up on cattle marketed listed as one of the lower five important constraints ranked by sampled pastoralists in the area. From interviewed households 40.8% respondents give one to five ranks and the remaining 59.2 % ranked sixth up to tenth. Hence, overall rank of recurrent tax problem is 9th in comparison with other ten most important market constraints. The table bellow justifies about recurrent taxation problem pair wise comparison with other market chain constraints and its importance rank (Table 31).

Table 31: Recurrent tax.

Score out of ten	Frequency	Percent	Rank	Frequency	Percent
1.00	64	28.7	1st	8	3.6
2.00	25	11.2	2nd	5	2.2
3.00	24	10.8	3rd	14	6.3
4.00	57	25.6	4th	35	15.7
5.00	31	13.9	5th	29	13.0
6.00	8	3.6	6th	32	14.3
7.00	7	3.1	7th	20	9.0
8.00	1	.4	8th	20	9.0
9.00	1	.4	9th	37	16.6
10.00	5	2.2	10th	23	10.3

Source: own computation 2014.

10.3.7 Clan conflict

The sampled pastoralist identify clan conflict as important constraints in the market chain and undertake pair wise comparison with others problems. The main causes for the conflicts in the district include competition for range land, water and land. Out of interviewed households 63.6% households give 1st up to 5th rank for clan conflict and 36.4% give 6th up to 10th ranks. Therefore, overall rank of clan conflict problem is 3rd in comparison to other important market chain constraints. The (Table 32) here points out about clan conflict pair wise comparison with other economically important market chain constraints and its rank (Table 32).

Table 32: Clan conflicts.

Score	Frequency	Percent	Rank	Frequency	Percent
1.00	12	5.4	1st	38	17.0
2.00	21	9.4	2nd	50	22.4
3.00	26	11.7	3rd	20	9.0
4.00	36	16.1	4th	19	8.5
5.00	17	7.6	5th	15	6.7
6.00	23	10.3	6th	26	11.7
7.00	31	13.9	7th	27	12.1
8.00	27	12.1	8th	18	8.1
9.00	29	13.0	9th	8	3.6
10.00	1	.4	10th	2	.9

Source: own computation 2014.

10.3.8 Undeveloped Infrastructure

From the result it is confirmed that pastoralist households listed infrastructural problem as one of important problems in the area. From interviewed pastoral households 48.8 % respondents give 1st to 5th rank for infrastructural problem and 51.2 % give 6th to 10th rank in comparison with other market chain constraints. Hence, overall rank of infrastructure problem is 7th. The infrastructure constraints identified in similar fashion by other research finding Pavanello [7] (Table 33).

Table 33: Undeveloped infrastructure.

Score	Frequency	Percent	rank	Frequency	Percent
.00	7	3.1	1st	60	26.9
1.00	53	23.8	2nd	5	2.2
2.00	26	11.7	3rd	5	2.2
3.00	20	9.0-	4th	16	7.2
4.00	34	15.2	5th	23	10.3
5.00	7	3.1	6th	13	5.8
6.00	10	4.5	7th	16	7.2
7.00	9	4.0	8th	28	12.6
8.00	5	2.2	9th	41	18.4
9.00	40	17.9	10th	16	7.2
10.00	7	3.1			

Source: own computation 2014.

10.3.9 Lack of reliable market information

From interviewed households 40.9% give 1st to 5th rank for market information constraints and 59.1% give 6th to 10th rank. Therefore, overall rank of reliable market information problem is 8th. Livestock market information problem supported by other research finding in the area Pavanello [7] that states poor and uneven access to market information remains a major constraint for cattle market actors in general and producers in particular (Table 34).

Table 34: Lack of reliable market information.

Score	Frequency	Percent	Rank	Frequency	Percent
1.00	34	15.2	1st	14	6.3
2.00	40	17.9	2nd	20	9.0
3.00	47	21.1	3rd	14	6.3
4.00	36	16.1	4th	14	6.3
5.00	17	7.6	5th	29	13.0
6.00	14	6.3	6th	28	12.6
7.00	12	5.4	7th	20	9.0
8.00	11	4.9	8th	56	25.1
9.00	8	3.6	9th	21	9.4
10.00	4	1.8	10th	7	3.1

Source: own computation 2014.

10.3.10 Informal trade

From interviewed households 47.8% households give 1st to 5th rank for availability of informal trade and the remaining 52.2% respondents give 6th to 10th rank in comparison to other market chain constraints. Therefore, overall rank of informal trade problem is 6th out of ten important market chain constraints (Table 35).

Table 35: Informal trade.

Score	Frequency	Percent	Rank	Frequency	Percent
.00	3	1.3	1st	29	13.0
1.00	45	20.2	2nd	35	15.7
2.00	37	16.6	3rd	20	9.0
3.00	25	11.2	4th	23	10.3
4.00	17	7.6	5th	4	1.8
5.00	7	3.1	6th	11	4.9
6.00	22	9.9	7th	18	8.1
7.00	28	12.6	8th	25	11.2
8.00	18	8.1	9th	46	20.6
9.00	17	7.6	10th	12	5.4
10.00	4	1.8			

Source: own computation 2014.

11 Conclusions and Recommendations

11.1 Summary of Findings

The Borana Pastoralists are known as the major cattle supplier for domestic and international markets. Nevertheless, the benefits they get from the sector is said to be negligible. This study therefore initiated to identify market chain actors, their functions, constraints and the determinants of cattle market participation decision and supply in Moyalle district of Borana Zone, Southern Ethiopia.

The result indicates that more than three fourth of producers market their cattle by intermediating process of brokers. Out of total sampled respondents only 19% sold cattle directly to traders and other pastoralists. The remaining cattle are used for restocking, festival, religious and weeding ceremonies, formal export and butchers meat productions. It is concluded that the cattle market chain is highly influenced by brokers and the informal market chain in the district overrides the formal channel (i.e, 48% formal and 52% informal).

Market structure for oxen, heifers and calves trade is tight oligopoly but it is a loose oligopoly for cows and bulls. Since heifers and calves are often marketed by pastoralists themselves for replacement and rarely by informal traders, the market structure shows non competitive behavior. Since pastoralists mostly supply oxen at bull stage for informal and formal traders, the market structure for ox trade is tight oligopoly. The bulls' trade encompasses various market actors such as informal traders, formal traders, hotels and restaurants and festival consumers, the market structure is relatively loose oligopoly. Cows are also marketed between informal traders and pastoralists. The market concentration ratio for top four traders for oxen, cows, bulls, heifers and calve is summarized as 59.28, 46.40, 43.03, 88.10 and 95.62 respectively. The HI value for oxen, cows, bulls, heifers and calves is estimated to be 1522.18, 1352.28, 1013.39, 2702.31 and 2675.04 respectively. This indicates that the oligopoly market structure reduces competition and the entire market remains a "few traders game" where created wealth does not flow to all the actors in equitable ratio. Failure to enjoy such benefits may distort market operations and eventually lead to collapse of the cattle production system.

11.2 Conclusions

It is concluded from market structure measures that the market competition strategies vary across cattle type, the competition is among the few traders and this few large traders share majority of market. For each cattle types there are formal and informal market channels. Among the channels the formal channel where producers sell to formal exporters, butchers, festival consumers and other pastoralists was identified as the preferable marketing channel that has better total final price share for producers. The monopoly nature of the terminal cattle market denies the efficient market principles that could forces out the producers from market benefits and productivity.

Marketing margin of traders and brokers is different along different channels. Producer's share of final price in formal channel is higher than that of informal, which points out that formal route is preferable for pastoralists. Since traders and brokers obtain relatively better market margin in informal route, it is difficult to compete for formal traders with informal traders in the district. It is the reason for most traders and pastoralists to participate in informal channel. The study indicated that it is better for producers to sale cattle at formal channel, where they could optimize their benefits through cooperative and reduced transaction costs.

Regression analysis confirms that greater cattle holdings results in both better probability of cattle market participation and large numbers of cattle supply. The practical implication is that active cattle markets depend on pastoralists attaining and keeping sufficiently large herd sizes that make them willing to sell animals. Relatively wealthy pastoralists, with greater herd size, have considerably higher expenditure rates and thus use cattle markets more frequently to cash out animals.

The age of respondents have negative influence over number of cattle supplied. In association with informal institution and market information constraint the aged household supply lesser quantity of cattle in comparison with young ones. The implication is that the young aged pastoralists are less subjected to informal institutions of just holding more number of cattle. The negative influence of amount of other non cattle market income earned by pastoralists to number of cattle supply indicates that the households that earn more other non cattle market income supply lesser quantity of cattle to market. Since supplying cattle to market is one of income earning activity, securing more income from other source make the pastoralists to supply less to the market.

The study indicates that the pastoralist's households that have one more cattle than other have better probability of market participation. Due to wealth effect, the pastoralists' households that have more camel are subjected to keep more cattle and these households demand and capacity to keep large size of cattle provokes the probability of cattle market participation. The major market chain constraints identified in the area include lengthy market channel, brokers' interference, disease and parasite, clan conflicts and unfriendly relation between market actors.

11.3 Recommendations

Based on the findings of this study, the following points were recommended to improve marketing efficiency of live cattle in pastoralist area and thereby to enhance its productivity:

i. Since keeping large size of cattle promotes market participation and supply, it is important to give due attention for promotion of restocking and Boran breed Conservation

ii. As the cattle market structures is a non competitive one in

the study area, promoting market oriented cattle production, linking producers to markets, value chain development and Establishment in Cooperative could optimize the productivity of the sector

iii. The study identified that cattle market is influenced by the middle men and the traders due to the long channel that characterize the market. As remedial measure, infrastructural development, shortening the supply chain and thereby changing the informal channel in to formal is crucial. In this regard, institutional arrangements, policy support and adopting legalized channel against illegal rout could play a key role for low proportion of final price share of producers in informal route, brokers' interference, lengthy channels, high ransaction costs and traders' market power and dominance.

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