ST.MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF LIVE ANIMAL EXPORT IN ETHIOPIA:
THE CASE IN ETHIOPIAN SOMALI REGIONAL STATE

BY

IBRAHIM FARAH

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DETERMINANTS OF LIVE ANIMAL EXPORT IN ETHIOPIA:

THE CASE IN ETHIOPIAN SOMALI REGIONAL STATE

A Thesis Submitted to the School of Graduate Studies of St. Mary's University in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Agricultural Economics

BY: - IBRAHIM FARAH.

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Approval Board of Examiners

This is to certify that the Thesis Prepared by Ibrahim Farah Titled "Determinants of Live Animal Export in Ethiopia: The Case of Ethiopian Somali Regional State." And Submitted In Partial Fulfillment Of The Requirements For The Degree Of Masters Of Science In Agricultural Economics Complies With The Regulation Of St. Mary's University And Meets The Accepted Standards With Respect To Originality And Quality.

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DECLARATION

I declare that this MSc. Thesis is my original work, has never been presented for a degree in this or any other university and that all sources of materials used for the thesis have been duly acknowledged.

IBRAHIM FARAH

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Date of Submission: January, 2015.

ENDORSEMENT

This Thesis has Been Submitted to St. Mary's University School of Graduate Studies For Examination With My Approval As A University Advisor.

Milkesa Wakjira (PhD),   _____

   Advisor   Signature and Date

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Holy is Allah for making it all happen
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ACRONYMS

ADF	Augmented Dickey-Fuller
APHRD	Animal and Plant Health Regulatory Directorate
CSA	Central Statistical Agency
CBLT	Cross Border Livestock Trade
Dp	Domestic Price
ELTA	Ethiopian Livestock Traders Association
EMPE	Ethiopian Meat Producers and Exporters Association.
ETB	Ethiopian Birr
EXR	Exchange Rate
ECA	Ethiopian Custom Authority
ERCA	Ethiopia Revenue and Customs Authority
FSNWG	Food, Security, Nutrition Working Group
GDP	Gross Domestic Product
GDP	Gross Domestic Price
HoA	Horn of Africa
IMB	Import Ban
ICBLT	Informal Cross Border Livestock Trade
IMF	International Monetary Fund
J.J	Jigjiga
JB	Jacque Bar
KSA	Kingdom of Saudi Arabia
LC	Letter of Credit
MEDaC	Ministry of Economic Development and Cooperation
MoFED	Ministry of Finance and Economic Development
M.E	Middle East
Moa	Minister of Agriculture
NBE	National Bank of Ethiopia.
NBE	National Bank of Ethiopia
NEER	Nominal Effective Exchange Rate

ONLF	Ogaden National Liberation Front
RVF	Rift Valley Fever
SRS	Somali Regional State.
SMEs	Small and Medium Enterprises
SPS	Sanitary and Phytosanitary
SNNPS	Southern Nation's Nationalities and Peoples State.
WB	World Bank

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ABSTRACT

Despite the critical importance in the live animal export in the Somali Regional state, there are a number of impacts behind between, and beyond the border that directly and indirectly affects the live animal export and food security of a region and performance of this country.

This paper attempts to explain and assess empirically the demand and the supply side factors affecting live animal export. It also investigates the official and unofficial cross border Trade that has practiced in the Region since Long. Specifically the study focuses on analyzing the relative importance of the live animal export in economic growth and positive advantage in social and the relationship between the region and other relative region in Somali, Somaliland and Djibouti. The determinants of live animal export in factors that current there is a highly affect in export like infrastructure and drought, famine, lack of nutrition and other things. The methodology I make in this thesis is for description in statistical and secondary data, econometric for analyses and etc. The informal cross border livestock trade advantage of traders not for the society the income of traders and also the seasonality change for affect in the export animal therefore, the overall result reiterates that both supply side and demand side factors are equally important in determining live animal export performance in Somali regional state. The discussion or result part the current export in Ethiopian Somali regional state make a growth time to time and make profit for population or society as well us in infrastructure in market make change but slow the market infrastructure but the informal export is large and make the region unprofitable society only is profitable for exports so the society is need for formal part and also the governmental part is low to take part in market for live animal export

CHAPTER ONE: INTRODUCTION

1.1   Background

The backbone of the economy in Ethiopian Somali National Regional State is the livestock sub sector. The Bureau of Agriculture in Jigjiga" estimated that the livestock resources in the region comprises of 11.5 million sheep and goats, 6 million cattle and 1.5 million camels" (Thornton, and others, 2002).

While this remote, underdeveloped region covers a vast area of the Ethiopian territory, its population is relatively small (nearly 3.5 million), of which only some 15 per cent live in the so called "urban" centers.   The population is predominantly nomadic with up to an estimated 90 per cent who are deriving their livelihood from pastorals and animal related activities. The Ethiopian Somali Region (Region 5) is still experiencing the traditional way of life such as the clan- and sub-clan affiliation that plays a very important role in their social and economic life. The clan-kinship is strongly maintained across international boundaries and accordingly the economy and trade routes are also related to the age-old links of the clan-system.

Livestock trade is the main economic activity and a critical source of livelihood for the pastoral Somali populations and it has already created an important link between the borderlands in Somalia, Ethiopia and Kenya. Such trade, mainly in cattle, has existed across these border areas for centuries, but in the past couple of decades, particularly since the collapse of the Somalia state in 1991, it has experienced phenomenal growth, along with changing trading directions and clan relationships.(Thornton, and others, 2002).

 Livestock procurement begins in southern Somalia and southeastern Ethiopia. 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. While livestock are usually trekked from village markets to primary and secondary markets, traders truck their animals to the terminal markets of Nairobi and Mombasa. In particular, the bulk of livestock exports from Ethiopia occur as informal trade and come from the eastern and south-eastern lowlands, mainly from the

Somali Region, a vast and underdeveloped region with ethnic and economic links with neighboring Somalia.

The eastern Ethiopia border region has been more linked with Djibouti and Somalia. Djibouti and Somalia import livestock, coffee, chat, vegetables, and food grain officially and unofficially from the eastern Ethiopia region. Livestock is imported primarily for re-export to the Middle East. Traders also unofficially import new and used clothes, electronics, cigarettes, manufactured food items, vegetable oil, and pharmaceuticals from these countries. Not all these items are products of Djibouti and Somalia. They are imported illegally across the border through these two countries from Asian and European countries. This trade is conducted beyond the control of official institutions. On the other hand, government regards the cross-border trade as illegal and it is commonly referred to as "contraband". Control mechanisms such as border patrols and searches at various checkpoints are- employed to curb this illegal trade. However, success in this area seems very limited. The cross-border trade rather showed expansion in terms of the items traded, areas covered and number of people involved. Rather Cross-border trading has now become a major economic activity in the area.

The problem is that, little is known about the structure and performance of external trade networks in pastoral areas of Ethiopia. Until quite recently, only some attempts have been made to investigate livestock trade in relation to specific issues such as regional integration (Maruye, 1992; Belay 1996). Other studies where cross-border trade issues are marginally incorporated (Sentayehu, 1996) indicated that there are important cross-border livestock markets in neighboring countries for livestock originating from the adjacent borderlands of Ethiopia. Generally, not all these studies adequately addressed the cross-border trade issue and its relationship with food security in the area to enable policy makers and planners to deal with these issues at regional and national levels. This issue is important particularly among the pastoral groups who inhabit the borderlands of this region and whose food security is highly exchange dependent.

This study is initiated to fill this information gap. That is to investigate the relationship between cross- border trade and food security in the region along with the impact of illegal cross border livestock trade on the national and regional economies. (FOA ICBLT).

1.2 Statement of the Problem

This illicit cross-border trade has been there for a long time between countries in the Horn of Africa where Ethiopia is found. Consequently, the recent recorded data show that Ethiopia's trade with its neighboring countries is very little and is limited to some manufactured imports from Kenya and vegetable and chat exports to Djibouti and to Somaliland (Northern Somalia). On the other hand, hundreds of thousands of all types of livestock and bulk of coffee, vegetables and chat originating from Ethiopia are smuggled to neighboring countries. In return, a wide range of manufactured goods is imported illegally. All these trade activities are largely unofficial and unrecorded.

Several interrelated factors have facilitated the existence of the unofficial trade in the area. In the case of Ethiopia, the borderlands are poorly integrated with the central regions. Therefore, official channels hardly provide adequate outlets for livestock and other products of the lowland pastoral areas found in the borderlands.

This weak link is also a constraint on the smooth flow of food crops from the central highlands to the peripheral lowlands. Other factors such as government trade policies had also discouraged trade along official lines. Thus, the unofficial cross-border trade has been filling the gaps by creating outlets for the products of the border region and by providing goods that could not be supplied by the official channels. Therefore, the eastern Ethiopian border region has been more linked with Djibouti and Somalia.

 Indeed, Djibouti and Somalia import livestock, coffee, chat, vegetables, and food grain officially and unofficially from the eastern Ethiopia region. Livestock is imported primarily for re-export to the Middle East. Traders also unofficially import new and used clothes, electronics, cigarettes, manufactured food items, vegetable oil, and pharmaceuticals from these countries. Not all these items are products of Djibouti and Somalia. They are imported illegally across the border through these two countries from Asian and European countries. This trade is conducted beyond the control of official institutions.

The government regards the cross-border trade as illegal and it is commonly referred to as "contraband". Control mechanisms such as border patrols and searches at various checkpoints are- employed to curb this illegal trade. However, success in this area seems very limited. The cross-border trade rather showed expansion in terms of the items traded, areas covered and

number of people involved. Cross-border trading has now become a major economic bottleneck in the area.

Despite of the existence of the problem in the area since time immemorial to the present time, little is known about the structure and performance of external trade networks in pastoral areas of Ethiopia. Some attempts have been made in relation to specific issues such as regional integration (Maruye 1992; Belay 1996). Other studies where cross-border trade issues are marginally incorporated also include Sentayehu (1996) whose study indicates that there are important cross-border livestock markets in neighboring countries for livestock originating from the adjacent borderlands of Ethiopia.

Generally, not all these studies investigate adequately the cross-border trade issue and its relationship with food security relations in the area. This issue is important particularly among the pastoral groups who inhabit the borderlands of this region and whose food security is highly exchange dependent. The present study has attempted try to explore the determining factors that has been contributing to the development of this illegal cross- border trade between Ethiopia and the neighboring nations. The current structure and performance is low and no government to take part in these problems, the major policy for take part in export and other things are not match also the influence in cross border trade for formal or informal and also for food security. There a little formal cross border trade and no advantage for people who live in this region.

1.3 Research Questions

1. What is the current structure and performance of the livestock trade in the Somali Regional State, Djibouti and Somalia borders?
2. What are the major policy and other factors influencing cross-border trade and food security in the region?
3. What are advantages in live animal export that the societies live in Somali Regional State?

1.4 Objectives of the study

The study aimed to assess the following general and specific objectives.

1.4.1 General objective

The general objective of the study is to examine the determinants of live animal export in Ethiopia- Somali Regional State.

1.4.2. Specific objectives

The specific objectives of this study are:

1. To investigate determinants of the live animal export in Somali Regional State
2. To identify how livestock trade is important in the region economic activity
3. To identify the impact of unofficial trades in regional and national economies.
4. To determine the current structure and performance of the livestock trade in the Somali Regional State, Djibouti and Somalia borders.
5. To identify the major policy and other factors influencing cross-border trade and food security in the region.

1.5 Significant of the study

The findings of this study have discovered:

1. The positive as well as the negative impact of trade among Somali regional state through export of their live animal.
2. The study discovers the reason behind the segmentation among Somali animal marketing or price.
3. The study explored various means in which Somali pastoralists could eliminate border – cross illicit livestock trade.

Understanding factors that cause illicit cross-border export for live animal would help the actors and the country to fully exploit the benefits of the sector that is essential for sustainable economic growth in the region. It is also important to understand how volume of animal export,

exchange rate policy, domestic price, GDP, major animal importing countries and other variables could affect live animal export. The results can be used as an input towards designing appropriate policy intervention to maximize the foreign currency earnings from live animal export. Furthermore, actors along the cattle supply value chain including animal export operators, professionals and producers are expected to be benefited from the results of this study.

1.6 Limitations of the Study

There were few limitations that were encountered while conducting this research. The unavailability of secondary data was the major ones. There were time and money constraints and because of the nature of the topic which is sensitive, some respondents were also suspicious and sometimes hesitant to answer some questions.

1.7 The Scope of the Study

The coverage of the study is limited and bounded only inside the boundaries of Somali Regional State particularly with in **Jigjiga**, targeting Somali traders in animal export and focusing on it is challenges among the Somali traders as well as the integrity of the local people in the study area.

1.8 Organization of the Thesis

The paper is structured into five chapters. Chapter one deals with introductory part that briefly highlight about the study background, statement of the problem, objectives of the study, etc. Chapter two reviews the pertinent theoretical and empirical literature relevant to the study. The third chapter looks at research methodology. Chapter four deal with estimation of the model and analysis of the results. Chapter five presents conclusion and recommendation.

CHAPTER TWO: REVIEW OF RELATEDLITERATURE.

2.1 Brief historical Background of livestock Trade in the Region.

2.1. 1.An Overview

The economy of Somali regional state mainly depends on livestock production, which has historically and culturally been the mainstay of livelihood for the majority of the people. Livestock is the main source of livelihood for pastoralists, contributes to the Government revenues, and provides employment to a wide range of professionals and other service providers. Somali regional has a long history of live animal export to the Arab Gulf states through the Berbera port and Djibouti In the past several decades, however, these exports have been disrupted by a series of trade bans for years in part because of diseases like Rift Valley Fever, and Rinderpest. The bans have adversely affected the incomes and livelihoods of pastoralist families and the national economy in general.

In spite of these setbacks, Somali livestock continues to be a major repository of individual and national wealth. The main livestock end markets are concentrated in the oil-rich countries of the Arabian Peninsula, with Saudi Arabia relatively absorbing the largest quantities. Sheep and goats were exported in the largest numbers before the livestock ban of 2000. However Livestock export activities and associated economic benefits all dried-up during the ban. Fortunately since the end of the ban in 2009, livestock exports have recovered in a very short time to become a flourishing economic activity once again.(Rich & Perry, 2009; Thomson et al., 2004; Scoones & Wollmer, 2008).

There are several factors which influence the livestock export trade in Somali regional includes:

a. Production systems and environmental effects;

b. Policies supporting livestock development and export conditions;

c. SPS issues, diseases, transport, logistics, supporting institutions.

d. Livestock export infrastructure,

2.1.2 Livestock Trade Value Chain.

The livestock value chain comprises all the activities involved in the production, and consumption of livestock including auxiliary activities. These include production inputs, transport, processing, utilization, and domestic and export trades as well as the institutions that serve and regulate the smooth functioning of the livestock value chain. More specifically. (Cross-border Livestock Trade Assessment Report, Famine Early Warning System Network, and Oct, 2010.)

The Somali livestock value chain includes:

- producers (pastoralists and agro-pastoralists)
- Jeeble (traders)
- agents
- brokers
- transporters
- escorts
- exporters

Jeeble are traders who buy livestock in rural villages, keep for specific periods usually three months or longer, and sell livestock later at secondary markets. Jeeble traders provide ready cash for producers saving for the costly trip to main markets and often pay the producer even before collecting the animals. Brokers facilitate livestock sales among sellers and buyers and are present in almost all markets. The services provided by brokers who efficiently operate along clan lines, includes securing animals against theft, which gives the seller some confidence that he/she will receive the cash value of his/her livestock.(Cross- border Livestock Trade Assessment Report, Famine Early Warning System Network, and Oct, 2010.)

2.2. Major Challenges Facing Livestock Sector in the Ethiopian Somali Regional state.

❖ **Weak National infrastructure**: The livestock markets in many towns in Somali regional state are in poor condition. Some donors have started upgrading some markets by providing basic infrastructure such as loading/unloading ramps, but there is still a need to address issues such as: water provision, fencing, road networks, feedlots, transport vehicles, holding grounds, resting stations, ramps for loading livestock onto ships, and veterinary inspection stations. Animals at regional markets often wait several days before being sold or transported, and hence higher-quality holding grounds may need to be a priority infrastructure investment.

❖ **Informal grading:** Compared to international livestock producing countries, Somali regional state continues not to implement much formal grading standards. As a result, some potential competitive advantages (i.e. proximity to end markets; demand for Somali species; long history of trade relations with Middle East), that should be accessible to value chain stakeholders are limited in Somali state. Grades of cattle used by Somali state exporters, for example, are subject to interpretation and do not consistently conform to a specific and clear grades.

❖ **Range degradation and other pastoralist challenges:** There is considerable range degradation in all Somali regions, which is affecting the species diversity, with a decrease or slow growth rate in grazers like cattle and sheep. Climate change has increased the frequency of droughts, and increased borehole/berkad construction is adversely affecting traditional grazing areas. In addition, pastoralists are facing a multiple problems such as lack of market information, price instability/price setting by exporters/importers/dealers/brokers and long distances to markets. More productive and organized pastoral livestock producers will lead to a more competitive Somali livestock export sector.

❖ **Need for improved veterinary drug quality:** Animal health is extremely important for the animal production sector. Economic losses can occur due to mortality and morbidity,

which result in a loss of export volume. Due to poor enforcement of the Somaliland Veterinary Code, for example, much of the imported drugs are of poor quality and there is poor control of their use. Counterfeit, expired, and fraudulent veterinary products in the Somali marketplace present a serious issue that prevents producers from receiving quality animal health services. Throughout the Somali regions, there are weak veterinary service systems as well as weak veterinary medicinal product import and distribution systems, which increase vulnerability to animal disease outbreaks. The overall system of veterinary drugs and medicines importation, distribution and administration needs updating. The existing regulatory mechanisms for quality control, distribution and proper use need to be better enforced, and all livestock players have a stake in ensuring this system is upgraded.. (Holleman, 2002).

❖ **Limited access to financial services including trade finance:** Somali regional state have underdeveloped financial sectors with no formal commercial banking established yet. The lack of access to finance (including letters of credit for importing and exporting businesses), lack of access to insurance and lack of access to capital remain key constraints across value chains and across geographic regions, and are particular challenges for small and medium enterprises (SMEs) without strong foreign networks. Solving this larger than livestock sector problem is important for the long-term growth of the livestock industry and other business sectors in the Somali regions.

In addition, many aspects of trade-related finance are lacking for Somali exporters. Trade finance facilitates trade by helping overcome the information asymmetry between buyers and sellers, whereby sellers will be paid under certain conditions and buyers will be assured the products they purchase. Important trade finance instruments missing in Somali state include letters of credit, import bills for collection, import financing, shipping guarantees, L/C confirmation, pre-shipment export financing, invoice financing, and receivables purchase. For example, livestock dealers exporting to Arab countries without a letter of credit (L/C) often experience difficulties in receiving their money. (Holleman, 2002).

2.3 Channels
2.3.1 Market Route

The following map shows the marketing channels for Somali livestock exports. The market organization and practices of the livestock trade has evolved from the long tradition of livestock export trading in the country. In broad terms, three stages can be observed on this map; the first stage involves livestock from producers to primary and secondary markets; the second stage takes place in secondary markets where export traders are able to purchase suitable quantities of livestock; and the final stage is the preparation & shipping of livestock for export, this includes placement of animals in quarantines, health certification, transportation, etc.(Desta et al. 2011),

EXPORT MARKETS

SHIPPING _SEA AND AIR

EXPORT TRADERS

Domestic markets
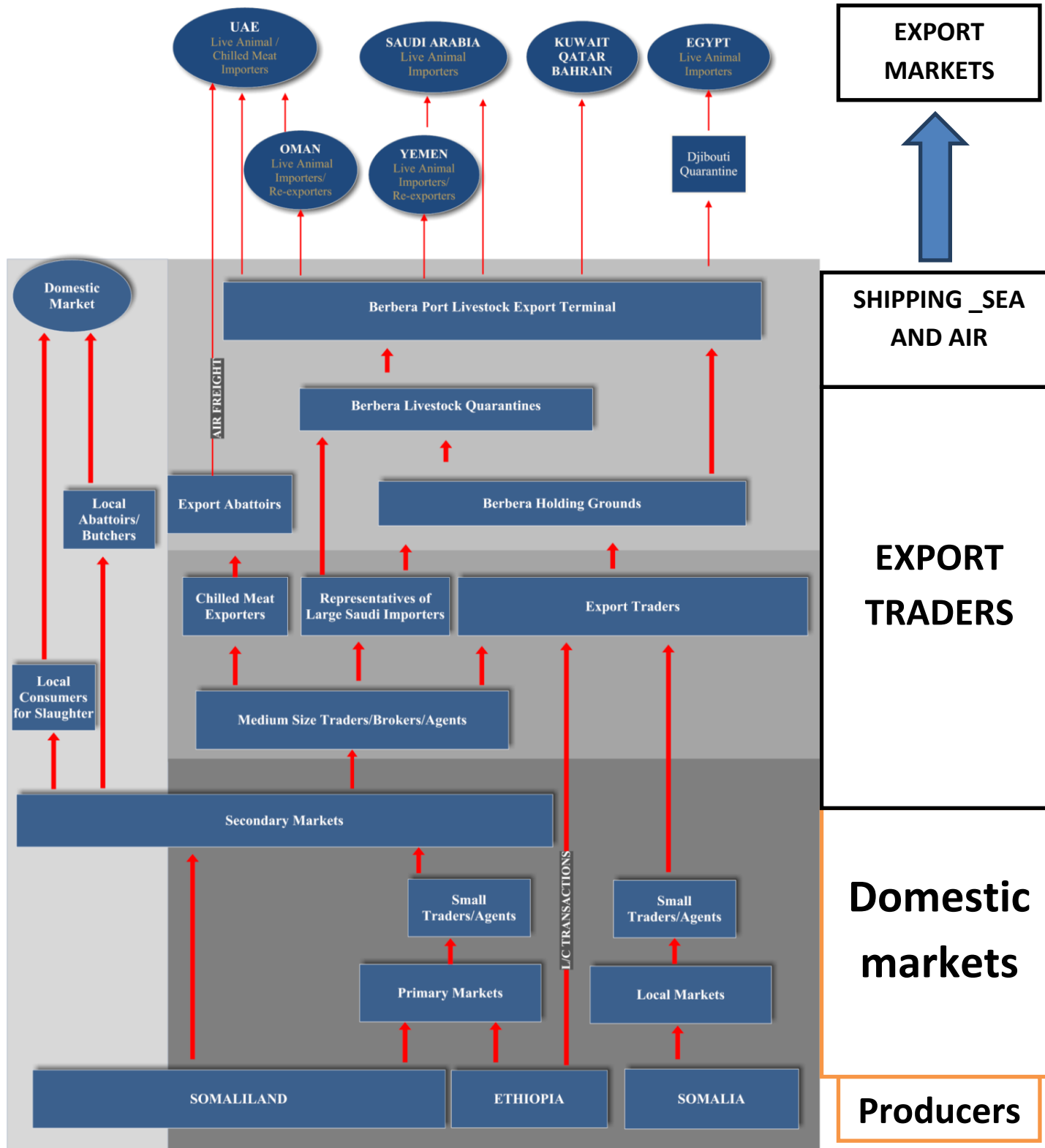
Producers

Figure 1: The market route

2.4 Types and Volumes of Animals

The main species of livestock produced and traded in Somali region are cattle (comprising oxen, bulls and cows), small stock (sheep and goats) and camels. Animals are graded using a more or less uniform system across all market centers.

Livestock has both a monetary and social worth to pastoralists and it has been suggested that there is reluctance among pastoralists to sell their livestock. However for Somali region at least, the volume available for sale is much higher than official records would indicate and there is excess supply in the market. (Mason, 2008).

2.4.1. Species Grades

This section describes pertinent production characteristics of livestock species and the grading system.

2.4.2. Value and use of Pastoral Stock.

The social significance of livestock holdings in Somali pastoral life, and the culturally exalted role of animal rearing, cannot be captured merely by quantitative data and analysis. Apart from the large volumes of animals traded in cash markets, the non-monetary exchange of livestock in a social barter system is significant, in which both material and non-material goods are traded. Livestock transfers maintain the social fabric of the pastoral people, where animals are used to contribute towards clan re-stocking schemes, dowries, interfamily gifts (inheritances), customary fines and compensation. Camels are traditionally the most prestigious livestock species a Somali family can own. Although the lack of a market for camels limits the livelihood options for pastoral families in the dry areas, clans still aspire to camel ownership for its pre-eminence as social capital. However, in areas where market penetration has been higher, like the plains of Jigjiga Zone, there has been a shift towards keeping cattle and sheep which are more easily marketable. Pastoralists in cattle and small-stock rearing areas can keep smaller herds because the livestock-grain terms of trade and engagements in markets allow them to sustain their family with fewer animals by trading, than by subsisting directly from their animals. However, expansion of cattle and sheep rearing into drier lands generates environmental stress due to the greater grazing pressure exerted by sheep and cattle; it also leads to heavier animal mortalities

during periods of drought, as cattle and sheep have lower resistance than browsing camels and goats.(Little, Peter D. 2007)

2.4.3. Cattle

Cattle include mature and young bulls and cows. Although they are adapted to the dry conditions of their homelands, pastoralist cattle are more susceptible to droughts and diseases than all other species of domestic livestock. Pastoralists refer to cattle as daif (weak) or nugul (soft). Available records and estimates of drought-induced livestock mortality rates by emergency invariably show highest rates among cattle populations. Despite the greater risk of rearing cattle, they are an attractive asset for pastoralist households to include in their species mix, wherever it is marginally possible to raise them. The major consumer demand in the urban centers for red meat is for beef. The price offered for full-grown bulls is very attractive, and young immature bulls can gain body weight at favorable speeds making it attractive to buy and fatten young bulls. Bulls grow to optimum body size after four to five years. However, in many pastoral rangelands resources are too limited to support animal growth beyond three years. The holder of immature stock will calculate the relative benefits of selling stock against the gains to be made by holding on to them and rearing them for sale as mature bulls. (Mariam et al. 1999).

2.4.4. Small Remnants

The demand for small stock by the Middle Eastern markets has benefited the sheep and goat rearing areas of Somali Region. Only male animals are sold, and as females can give birth every year (gestation period is about six months) and first parturition is at one and half years, small stock herds grow fast. Keeping a herd with a high proportion of female animals gives the herder the potential for rapid growth. Annual turnover from small stock can be high, due to the short periods needed for breeding and maturing to marketable size. The pastoralist with a reasonable herd of sheep and goats can present animals for sale every year from the natural herd growth. Small stock is jokingly referred to as "petty change", as the odd sheep can be sold without endangering family herd size. Traders buy young sheep and goats aged between six months and a year, and sell them after a year or year and a half. The same sheep and goat varieties that are found in Somali Region have been the base stock for breeding and upgrading programmers in

various parts of the globe21. The Berbera Blackhead sheep is bred in Somali Region (known locally as the Wanka breed). With a lower fat content than the highland sheep, it is considered a delicacy in the Middle East. Through selective husbandry through the centuries by herders, this sub-species type conforms to the same narrow characteristics over most of the region. The large white goat breeds that are kept by Somalis are sometimes called Galla goats. They are hardy animals that can survive in very tough conditions. Somalis consider their meat the best tasting of any species. Export-oriented livestock trading has impacted on the species composition of Somali herds, and herding systems have changed to accommodate the need to produce large numbers of animals for the market. Elements of a "futures" trading in sheep can be discerned in the sheep exporting belt along the border with Somaliland. Traders (mainly jeble) place contract agreements with the client pastoral families for delivery of stock at specific periods, for which advance cash payments are made. The size of the order and cash paid to the producer depends upon herd size and the number of breeding stock owned by the producer. Traders also buy rights to ownership of unborn animals (uurjiif) from pastoralists with pregnant sheep22. The effect of receiving money to grow stock may turn indebted pastoralists into paid labour, while the system also assures traders competing for stock of supplies. Before the Arab ban, breeding patterns purposively coordinated parturition timing and seasonal spikes in demand. (Mariam et al. 1999).

2.4.5. Camel.

The cash market in camels is quite limited, given the large populations of camels in the region. Camels are valued for their hardiness and as social capital; customary exchanges, like bride price and compensation payments for injury or death, are casted in numbers of camels. In driest bush land with scarce water resources, camels and goats usually provide the optimal species mix. Lactating camels give milk several times a day, providing an important source of sustenance and sales for pastoral families. The milk of camels has found new markets in the major urban areas, as more and more Somali move to an urban livelihood. Camel milk can last for three days, and is thus transportable over considerable distances. Camel milk is transported to Somaliland from Jigjiga and the north parts of the Somali Region, as well as to the large towns within the region. (Mariam et al. 1999).

2.5. Sources of Demand for Pastoral Livestock.

Consumers in the oil-rich countries of Saudi Arabia and the Arabian Gulf create demand for large male sheep and goats as well as bulls. Breeds of Somali lowland sheep and goats are the preferred source of mutton in the Middle East. A new niche demand has been found by the Addis Ababa abattoirs which airfreight chilled meat from young goats and sheep to the Middle East. Local demand is driven by consumers of meat, mainly in the growing urban centers of the region and also by pastoralists, who buy to restock, to change species mix, or to build herds by acquiring breeding stock. However, the central Ethiopian highlands prefer mutton from the highland long-tailed sheep and goats, which have higher fat content. As a result almost no lowland small stocks are sold in the high demand Addis Ababa-DebreZeit-Nazareth area. Livestock traders themselves buy young and medium age animals to fatten for later resale at a profit. Such traders are most prominent in the assembly market areas like jigjiga. Local sales make up a significant proportion of all market activities. (Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.5.1. Grading of Traded Animals into Categories

Traded livestock should not be viewed as a uniform and standard product. Within each species, individual animals range from the completely immature to the young, mature, fully grown and old animal. A standard measure used to compare animals and differentiate price is live weight. If a reliable measure of an animal's live weight is known, its carcass weight (which is the useful measure for the butcher) can be estimated. If not, local traders make use of a number of criteria, including the animal species, size, estimated age and weight, condition of skin and body and general well-being. Animals are then graded into a number of categories. The system allows traders to engage in discussions of price trends across whole categories of animals.

In the price monitoring survey, the categories used were those defined by local traders at the markets. (Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

Type	Category	Description
Bull	Grade I	Large mature bulls; Lambar (usually >4 years old; traded to Yemen.
	Grade II	Medium sized bulls (usually 3-5 years old); traded to Yemen.
	Ujusha/dhaqmad	Young bulls (<2 years old); traded to Yemen or bought by traders for fattening.
Cow	Grade I	Large mature cows; sold for local meat consumption
	Grade II	Medium sized cows; sold for local meat consumption
	Dhaqmad (breeding)	Heifers, breeding stock (<2 years old); bought by pastoralists.
Goat	Grade I (orgi)	Fully mature large male goats; exported to Middle East
	Grade II (orgi)	Medium sized male goats; preferred locally; also exported
	Dabaxaad (slaughter)	Female mature goats; usually sold to local market
	Dhaqmad (breeding)	Immature female goats (<1 year old); used for breeding. Males are eaten locally as veal and bought by abattoirs in Somali/Somaliland
Sheep	Grade I	Export quality large mature male sheep
	Grade II	Export quality medium sized male sheep
	Grade III	Small sheep; usually bought in local market
	Dabaxaad (slaughter)	Female mature sheep; sold exclusively for local market
	Dhaqmad (breeding)	Immature and breeding stock (<1 year old)
Camel	Grade I	Large male pack camels; bought by pastoralists
	Grade II	Medium-sized medium-aged camels
	Grade III	Small camels; used for veal and bought by pastoralists
	Dhaqmad (breeding)	Young camels; used for breeding

Table 1:- Categories of marketed livestock.

2.6. Volumes of Animal Sales and Exports.

1,800 animals were sold each day in the four markets of Jigjiga, HartiShekh, Gode and Tog Wachale which equates to more than 600,000 animals traded every year24. The volumes of animals of different species traded show considerable specialization across markets.

2.6.1. Export Animals.

The Ethiopian Customs Authority reports that a total of live animal (cattle, sheep, goat and camel) 41,565 live animals were officially exported from all f Ethiopia in 2003/4 (Ethiopian Customs Authority, 2005:16-17)26. It is acknowledged that many more animals are exported out of Ethiopia via the illegal cross-border trade27.However, of the animals sold each day in the large four markets, we estimate that at a minimum, between 400-800 out of 1800 are destined for export. This translates into a minimum of about 140,000 animals being exported over the year from the two markets of HartiShekh and Tog Wachale, and a maximum of about300, 000 animals being exported per year from these two markets and Gode28. The estimates of animals exported from HartiShekh and Tog Wachale alone are 3.2 to 6.5 times the number reported by the Ethiopian Customs Authority. This is a significant trade that is being missed by the central Ethiopian statistical bodies. Over the year, the actual volume of animals dispatched for export will be influenced by the effect of seasonality and weather patterns on producer and consumer behavior, as well as the impact of shocks. Incidences of these are examined below. (Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.6.2. Bull.

By far the most important market for bulls is Tog Wachale, on the border with Somaliland, Export quality cattle from the plains of Jigjiga and from East Hararghe (including the major cattle markets of Chinahasen, Dawe, Haramaya, LafeIssa, Gursum, Babile, Jigjiga, Harar, Woter, Qulubi, and Kersa) ends up in the Tog Wachale livestock market. The lesser markets where cattle are sourced include: EjersaGoro, Kombolcha and Dawe in East Hararghe. The Tog Wachale market is a regional terminal market for bulls being exported out of Ethiopia. The big bulls aged seven to eight years are sent to Yemen. Younger bulls between three and six years old are sent to Dubai. Some ujusha, which are between two and four years old, are sent to both Dubai and Yemen, while the smallest immature, also known as marmar (one), are sent to Yemen. Some of the bulls sold in Jigjigaare likely to end up in Tog Wachale market, while a significant number of the bulls sold in Gode are resold in HartiShekh or Tog Wachale. Some ujusha are sold for fattening locally. Some plough oxen are sold before the rainy season in Jigjiga. Farmers sell older bulls that are then slaughtered by the local butcheries or sent abroad. Pastoralists sell young

bulls for use as plough oxen. (Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.6.3. Cow.

Cows, like all female animals, are not exported to the Gulf, but supply the Somali beef market. Cow sales are roughly five times less than sales of bulls. Local demand is also driven by the urban market of Jigjiga, An average of 40-50 cattle per day are sent to Hargeisa, Borama and Gebiley for local slaughter. In Dire Dawa short and small cattle are offered, which are purchased by the El-Fora food manufacturing complex. An important steady source of demand for cattle is the local institutions like hotels, colleges and the army barracks around Jigjiga. (Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.6.4. Goat.

Gode is the leading market for goats, followed closely by HartiShekh, 50-66% of the goats sold in these markets were of export quality (Grades I and II). Very few goats of export quality are bought in Jigjiga market, where 70% of the mature goats sold were the dabaxaad(slaughter) grade destined for local slaughter for Gode and HartiShekh are 25% and 32% respectively. Tog-Wachale is a relatively unimportant market for goats.(Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.6.5. Sheep.

The leading sheep markets are HartiShekh and Gode, which sold an average of 245 and 213 animals daily respectively for every day. Between them these two markets accounted for more than 83% of all sheep sold in the four markets. 55% of the sheep traded were of export grades (Grades I to III), while 22% were immature breeding stock. 65% of the mature sheep sold in Jigjiga were female dabaxaad destined for local slaughter. Larger quantities of dabaxaad are sold in HartiShekh and Gode, but unlike Jigjiga, it is likely that these sheep are destined for re-sale in markets further to the north.(Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.6.6. Camel.

Just 65 camels were traded per day across the four markets, mainly in more pastoral HartiShekh and Gode markets. Although camels are highly valued by pastoralists (as they can resist drought and waterless conditions) lack of demand means that it is difficult to exchange them for cash.(Source of book Title: Risk taking for a living: Trade and Marketing in the Somali Region of Ethiopia. P.41-44).

2.7. Livestock Exports

2.7.1. Official Export

The Horn of Africa including Ethiopia. A study in the early 1970s (Assefa et al. 1972) highlighted the export potential of Ethiopian livestock to the Middle East. The potential and the problems of exporting livestock from Ethiopia and surrounding countries to the Middle East was discussed at a workshop attended by 14 participating countries and 6 international organizations (FAO 1985a). To increase export, the conference made the following recommendations:

- ✓ Take actions for achieving improvements in livestock and meat trading systems as well as marketing, market knowledge and commercial infrastructures.

- ✓ Take actions for achieving improvements in animal health and sanitary regulations.

- ✓ Take actions for achieving improvements in transportation of livestock and meat.

Africa countries used to export up to 3 million sheep and goats, 100 thousand cattle and 50 thousand camels per year to the Arabian Peninsula (Stockton 2001).In recent years, however, increasingly stringent health and quality control regulations in the importing countries restricted exports to these countries. In September 2000, Middle East countries banned imports of live animals from six countries in the Horn of Africa and Nigeria due to an outbreak of Rift Valley fever. Although the outbreak of Rift Valley fever triggered the recent ban on imports of animals from Ethiopia (and other Horn of Africa countries), most likely the ban has been prompted by a number of other factors. First, the rapid economic growth in the importing countries has enabled

their consumers to look for high quality products with adequate guarantees of food safety. The governments of these countries have also most likely responded by formulating and implementing the necessary regulations in line with global sanitary and phytosanitary (SPS) requirements in food trade. On the other hand, supply conditions in Ethiopia remained virtually unchanged to meet the rapidly changing market conditions in the importing countries. A major problem for exporters from Ethiopia, as elsewhere in the region, is that they have little knowledge about the market structure, rules and regulations, as well as consumer tastes and preferences in importing countries. Apart from diseases, the apparent poor state of health of the animals caused by long rough journeys may also reduce their marketability. Second, alternative suppliers who were better prepared and able to meet the market demand and conditions entered the market gradually replacing Ethiopia as a supplier. The recent outbreak of foot-and-mouth disease in Europe hampered Europe's exports of processed meat to the Middle Eastern countries. This indicates the importance of disease-free export products from Ethiopia. However, adequate understanding of these changing market conditions are not available among the export market stakeholders in Ethiopia and, without such an understanding, it may be difficult to develop proper strategies to re-enter the lost market.

Pastoral areas, which supply most of the exporting animals, are likely to be severely negative on several fronts. There will be increased pressure on feed resources due to increased population. Unsold animals will depress domestic prices of animals and meat, thereby reducing the income and purchasing power of livestock owners. This will further reduce domestic trade for other commodities, creating a downward spiral in several directions (The Daily Monitor, 19 October 2000). Nearly half of the animals were exported from Ethiopia, so the negative effects have been more seriously felt there (Ethiopian Network on Food Security Newsletter, December 2001). The Republic of Yemen lifted its ban in December 2001, but the more lucrative Saudi market is still apparently closed. Although live animals make a considerable contribution to the economy in terms of export earnings, a large number of the country's ruminants have been traditionally smuggled to neighboring countries. The ban on import by Middle Eastern countries has led to increased illegal sale of livestock through Somalia and Kenya, and to a lesser extent, through Sudan and Djibouti. This is another reason for the decline in official exports.

2.7.2. Unofficial Export

A number of studies have tried to estimate losses from illegal export and generated widely variable estimates. In a 1976 World Bank development loan application, the Ethiopian Government estimated that ETB 50–250 million equivalents in foreign exchange was lost due to contraband trade in cattle, sheep, goat and camels. In 1983, an estimate by 'concerned ministries' indicated losses of 1.1 million animals excluding camels valued at US$ 136 million (CIF) or US$ 120 million (FOB). Similarly, AACMC (1984a) estimated 225,450 cattle and 758,200 sheep and/or goats were illegally exported in 1983/84 causing the country to lose ETB 94,959,540 (US$ 51 million CIF or US$ 44 million FOB) in revenue. Table 3 shows some of the more recent estimates of the extent of unofficial exports. The basis of these estimates is not very clear.

Table 2:Estimate of Number of unofficial livestock Exports. (1981-2002)

Source of data	Reference period	Cattle (head)	Sheep and/or goat (head)	Camel (head)
Concerned ministries 1983a.	1981/82	225,450	758,200	-
AACMC 1984	1983/84	55,000	330,000	-
Ministry of Foreign Trade 1987b.	1985/86	260,000	1,200,000	-
FAO 1993	1987/88	150,000	300,000	-
World Bank 1987	1987	225,000	750,000	100,000
MEDaC 1998	1998	260,000	1,200,000	-
Belachew and Jemberu 2002	2001	325,000	1,150,000	16,000

A). Ethiopian Government Committee of Concerned Ministries, unpublished data, 1983.
b). Ministry of Foreign Trade, unpublished data.

A recent study (Tegegne et al. 2005), jointly undertaken by the Organization forSocial Science Research in Eastern and Southern Africa (OSSREA) and BASIS–CRSP5 covered areas between the Omo to Wabi Shebelle rivers in the Borana zone of Oromiya region, Liben and Afder zones in the Somali region and Konsoworeda and lower Omo in the Southern Nations, Nationalities and Peoples State (SNNPS). The study created a typology of the players involved in cross-border

livestock trade, examined the role of brokers and market information, studied diversification by traders and constraints to cross-border trade. Data was collected on volume and price of livestock traded, and input costs such as marketing, feed, water, veterinary and service costs. The main findings of the study are as follows:

- ✓ Illegal Ethiopian exports are agricultural products mainly livestock (on-the hoof)while illegal imports are a wide range of manufactured consumer items mainly foodstuffs and clothing items.
- ✓ The Borana and Somali inhabitants of southern and South-East Ethiopia are the main players in the illegal trade of livestock, implying that entry barriers to 'outsiders' are high.
- ✓ The average trader sells below 200 heads of cattle per annum and is engaged in farming and retailing of manufactured items.
- ✓ Market information is private and non-standardized; thus, brokers facilitate the market transactions for a fixed fee.
- ✓ Seasonal production and consumption patterns, the availability of inputs (i.e. feed, water, transportation and veterinary service), market fees and market information determine livestock prices.

2.8. STRUCTURE OF ETHIOPIA TRADE WITHSOMALIA.

2.8.1. Official Trade.

Official trade as used in this study is trade that is recorded, known by the concerned institutions, and conducted in accordance with the country's required procedures. Currently there are two types of official trade in eastern Ethiopia: large-scale trade and cross-border petty trade. Large-scale trade involves convertible currencies and bank procedures such as opening of letters of credit by an importing country. It is run by business firms with large capital and formal organizational set-ups. Cross-border petty trade does not involve convertible currencies and bank formalities. Rather it is checked by the barter balance, i.e., an equivalent amount of import for export. The petty trade business is a self-employment scheme that currently employs poor women living in the area.

2.8.2. Large-Scale Trade between Ethiopia and Somalia

Ethiopia's direction of external trade is characterized by geographical concentration in both export and import. Its trading partners are few Western European countries, USA, Japan and Saudi Arabia. More than 80% of its import and export trade is with these countries. Ethiopia exports unprocessed agricultural products and imports manufactured consumer and capital goods. Available data shows that this structure has been there for the last four decades and has showed only little diversification particularly on the composition of export commodities. In every year the Somali border to have in Ethiopia there is a number of live animal exports for ports in Somalia like bosasso and Mogadishu the numbers of last decade state in unofficial trade between 8million up to 15million. (Source Mohammad, 2005,.).

2.8.3. Ethiopia's Trade with Somalia and Somaliland

The relationship between Ethiopia and Somalia has been dominated by conflict since Somalia's independence in the 1960s. The Siyad Barre regime's claim of the Ogaden region of Ethiopia led the two countries to conflicts in the 1960s and to a full-fledged war in the 1970s. The war resulted in the displacement of people in the area and the damage of infrastructure, among other things. The continued hostility after the end of the war also hampered free movement of livestock and people in the area The Siyad Barre's expansionist policy failed to be successful; rather it led to the disintegration of Somalia and the downfall of the regime in 1991 (Belay 1995). Since then, however, the political relationship between Ethiopia and the self-declared state of Somaliland Republic (Northern Somalia) started to improve. Currently, the relationship is improving arid there exists some official trade relation between the two countries. Ethiopia is now expanding trade infrastructure such as road construction leading to Somaliland.

Although it failed to be operational due to some implementation problems, Ethiopia has also recognized official, small-scale cross-border trading, for people living on both sides of the border without bank procedures. In terms of large-scale official trade, Somaliland is now the largest importer of Ethiopia's second largest export, chat. According to the records of the National Bank of Ethiopia, Dire Dawa Branch, the official export of this item started in the second half of 1998. In 1998, Ethiopia exported more than half a million kg of chat per month to Somaliland. The

amount increased to about one million kg of chat per month in 1999. This is almost 200 percent higher than the export to Djibouti during the same period. The National Bank records also show that Ethiopia had exported some cement and haricot beans in 1996 to Somaliland. Generally, all these developments are important to enhance Ethiopia's integration with its neighbors. Ethiopia would improve its potential to use Somali ports such as Berbera and Bossasso as well as sell some of its products in Somali markets. Similarly, the service industry in Somalia would be invigorated. T. Hagmann and Mohamud H. Khalif, 'State and Politics in Ethiopia's Somali Region since 1991', Bildhaan: An International Journal of Somali Studies 6,2006: 25–49. See also S. Devereux, Vulnerable Livelihoods in Somali Region, Ethiopia (Brighton, Sussex: Institute of Development Studies, 2006), p. 196.

2.8.4. Unofficial Trade

The official trade has been unattractive especially to small-scale traders found in the border areas due to structural and policy related problems. The requirements of this type of trade such as the use of convertible currencies, licenses, bank procedures for money transfer, and transit service providers are beyond the reach of small-scale livestock traders in the border areas. Moreover, total foreign currency surrender requirement on the one hand and the overvaluation of the domestic currency on the other, that were in place at different times, discouraged other traders from expanding their coverage and incorporating markets in the peripheral areas. Inadequate infrastructure in the area worsened the problem. All these factors led the people in the area to stick to alternative markets, i.e., unofficial cross-border trade that is undertaken beyond the government's control. Some studies estimate the volume of this trade to be far greater than the recorded trade (Maruye 1992;Belay 1996).

2.8.5. Traders' Profile and Goods Traded in the Unofficial Channel

The unofficial trade in eastern Ethiopia borderlands involves a diversified group of people living in Ethiopia, Djibouti and Somalia as well as some manufacturing and trading firms in Asia and the Middle East. However, the principal actors are people found in the eastern region of Ethiopia bordering Djibouti and Somalia and the people in the two countries bordering Ethiopia these are the Afar and the Isa

Somali groups from the Djibouti side and different clans on the Somalia Somaliland side of the border. They supply the imported commodities to people in adjacent central regions of Ethiopia and for onward resale. The same people also supply exportable items to the traders for resale in Djibouti and Somalia. The unofficial trade is in general young men's domain. This is due to the difficulties associated with this risky business, including long distance travels on foot during nighttime and armed confrontation with customs patrollers. 11 The difficulty is particularly severe in the case of unofficial import than export. The involvement of women is limited to those places accessed by motorized transport.(Maruye 1992;Belay 1996).

2.9. Cross-border livestock Trade in the Horn of Africa

Livestock marketing is a key element in the livelihood system of pastoral and agro-pastoral communities in the Horn of Africa. Livestock trade beyond the region to the Arabian Peninsula has long been a significant outlet for livestock owners in Ethiopia's Somali Region. This trade has expanded greatly in recent years (Mahmoud 2011; Aklilu and Catley 2010; Majid 2010). Export trade is sustained through intricate social networks that cross geo-political boundaries, whereby the interior rangelands are linked to the ports through a series of clan based corridors. The regional cross-border network supports about seventeen million people in the HoA, including livestock producers and traders, trekkers, fodder traders, brokers and middlemen who directly or indirectly derive their entitlements from livestock production and trade (FEWSNET 2010).

Livestock trade between countries in the HoA is largely unofficial and unrecorded by government bodies. Over a long period, this elaborate and lucrative informal livestock trade has established itself largely beyond the reach of official regulation and taxation. Several factors have facilitated the expansion of this trade. The pastoral and agro-pastoral communities of Somali Region are poorly integrated into Ethiopia's central economy. Although official channels for exporting livestock have grown exponentially in recent years, most livestock trade continues through informal channels. Other factors such as government trade policies have also discouraged trade along official lines. Thus, the unofficial cross-border trade is filling the gap by creating outlets for the products of Somali Region pastoralists and by providing goods that could not be supplied through the official channels (Tegenen and Alemayehu 2002).

In the north-eastern part of HoA the cross-border trade connects Somaliland with Somali Region of Ethiopia. As stated earlier, pastoralists and traders in Somali Region market their livestock through Somaliland, destined for Arabian markets. The bulk of livestock exported from Berbera and Bossaso originate from Somali Region. In the 1990s it was estimated that the annual value of livestock going through the Somali Ports of Berbera and Bossaso amounted to more than US$120m, 80 percent of which was estimated to be sourced from Somali Region (Shank 1997). The recent estimate is that 50-65 percent of the livestock exported from Berbera port originates from Somali Region (Oxfam-GB 2011), and the value of this trade has now surpassed US$400m annually.

2.9.1. Clan Dynamics and Cross- border Livestock Trade

In pastoral Somali communities, the clan acts as a social and political unit of organization and system of government. Each clan has its own leader (called Sultan, Ugaas or Garad) and group of elders who are mostly assembled after an incident, except in the Somali clan of Isa, where the council of elders is permanent. The traditional governance system has been weakened after the introduction of the modern state system. Both in Somaliland and Somali Region of Ethiopia attempts were made to integrate the clan elders and leaders into the government system. This failed in Somali Region, but elders are important in Somaliland's government. In Somali Region the elders are however integrated at the woreda (district) level, where each woreda keeps three elders on its payroll as advisors. This has created confusion within pastoral communities as to whether these elders are serving the interests of government or local communities. Still, despite all the problems in the customary institutions, Somalis both in urban and rural areas settle many of their issues through the clan system.

The cross-border livestock trade between Somali Region of Ethiopia and Somaliland passes through two major clan areas, and has long been influenced by them. The CBLT between the two goes through the Berbera corridor, coming through different trade routes. Currently the main trade routes feeding the Berbera/
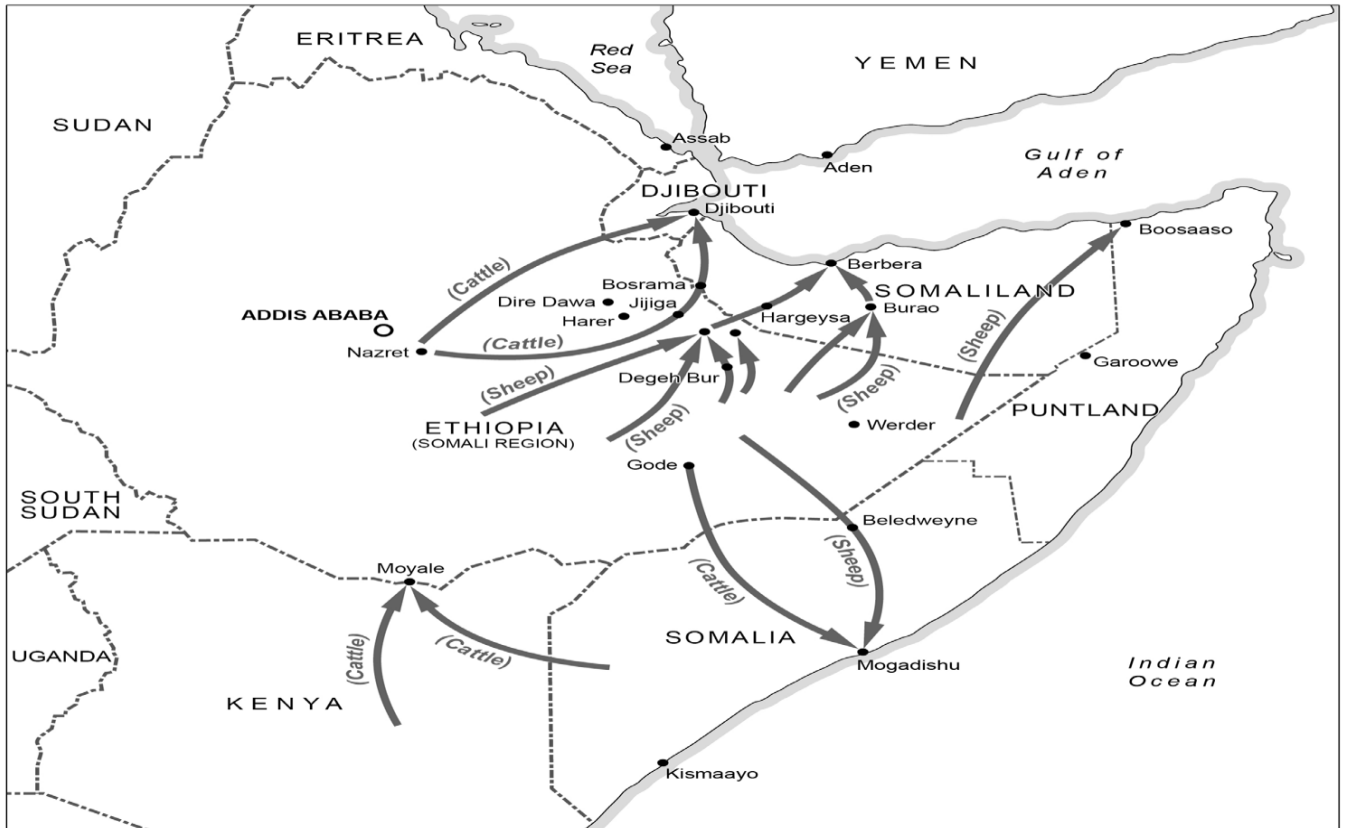
Figure 3:- cross border trade.

- **Togwajalle Route:** this is a route that assembles livestock coming as far as Nazret and the northern parts of Somali region. It is also through this route that the little formal trade takes place.

- **Hartashiekh Route:** this is a market that assembles livestock from Fik, Qoraxay and Degeh Bur areas of Somali region.

- **Gashamo Route:** This route serves mostly livestock coming from Gode, Afdher and Dh/Bur zones of Somali Region. The livestock that goes through this route passes through Burco town, in eastern Somaliland before it reaches the port city of Berbera.

- The other route that operated in this area was the Daror/Rabaso Route which is not functional now due to traders changing routes.

2.10. Informal Cross Border Livestock Trade in the Somali Region.
(General Features of the ICBLT along the Berbera and Bossaso Corridors).

The cross border livestock marketing chains and trade routes that feed into the Berbera and Bossaso corridor involve a long distance operation of a large number of different types of actors such as herders, traders, brokers, financiers and a variety of numerous actors in the physical market place. As the marketed animals move through the value chain across vast areas to reach their destinations, they change hands through both the formal and informal systems.

The Somali regional state, east and west Hararghe zones of Oromia Regional State, Harari Regional State, and Borana zone in Oromia region (Desta et al. 2011), are the major sources of informal cross-border live animal outflows from Ethiopia, through the Barbara and Bossaso Corridors. Recently, cattle are brought all the way from Jimma and Bale zones to be traded to Somaliland (through Togowachale and other outlets); and to Punt land (through Werder, Geladin, and Boh). Price, proximity to export market, conveniences and clan based trust and regularity of demand is some of factors that move traders in the region and beyond to supply the corridors.

An important feature of the informal cross-border livestock trading system lies in its crucial interconnection with food and other basic commodity imports. The cross-border livestock trading operation is an integral part of a system which Omar (2007) describes as "a set of parallel conveyor belts that take out livestock exports and bring in consumer goods."

The cross border pastoral trading system is characterized by spatially integrated clan-based networks, where market participants throughout the region obtain their "fair share" of total income generated from the trading system. Clan-based trading networks are defined within the broad indigenous institutional framework that governs the conduct of operations of the entire supply chain. Business trust and smooth operations of the informal cross-border pastoral trading system are highly dependent on the clan-based networks. These networks ensure security of individual operators in this significantly complex and uncertain environment characterized by risks of failure to pay, violent attacks, confiscation, and harassment.

There are nine zones in Somali region and each zone uses different cross border exit ports, depending on proximity and clan composition along the trading routes. The major export traders

along the Barbara corridor are the Isaac clan, whereas the Majertin operate along the Bossaso corridor.

2.11. Theoretical Reviews

The theory of supply is the base for this study. According to David Otien et al.,(2008), the export supply of a commodity is a function of the price of exports, domestic price, domestic production capacity, income, taxes, subsides, supply shocks(e.g. disease and droughts), exchange rate and nontrade barriers(NTBs) such as SPS or health and quality issues in this study, it was explained that the volume of cattle export depend on domestic production, macroeconomics variables(such as prices, development expenditures in livestock) and disease outbreaks. Improvements in the domestic production capacity would contribute to increase output for the export market. Increased expenditure in livestock development (especially in market infrastructure, research, and extension) is expected to contribute to higher live animal export supply.

Disease incidences discourage export supply. The magnitude of export decline from a disease incidence depends on the nature and severity of the disease. The assumption in the estimation is that long –run supply exhibits a lagged response to changes in the explanatory variables (Otieno.et al (2008)).

Importing countries such as Middle East impose import ban immediately as soon as an outbreak of Trans boundary diseases such as Rift Valley fever (RVF) reported or suspected not in Ethiopia but in any countries neighboring Ethiopia such as Kenya, Somalia and Sudan. The occurrence of such incidence affects export supply from the affected country. Therefore, import ban imposed during study period by major buying countries will be considered.

2.12. Empirical Reviews

Given that the overall success of the agricultural export promotion strategy will depend among other things on what factors constrain export growth and other responsiveness of producers to changes in price and non-price incentive structures, a better understanding of key variables affecting export performance and the direction and magnitude of the relevant elasticity is desirable (Daniel Gbetnkom and Sunday A. khan, 2002).

Entering in international market in livestock trade is a big challenge for the developing countries such as Ethiopia. While Ethiopia is Africa's largest livestock producers, sanitary and phytosanitary standards (SPS) barriers and animal diseases have traditionally constrained market access (Brain perryet al.2010).

According to Albert Makochekanawa (2010), regional trade agreements and exchange rate (currency devolution) contributed positively to the Botswana's export of the three sectors (meat and meat products, textile and diamond).

The same source indicated that it is crucial for U.S. livestock exporters to create an excellent external product image such as brand name, packaging, cooking convenience and shopping environment. Marketing strategies to consider include building a brand name for livestock products, designing attractive packaging with suitable size, making products easy to cook and creating a comfortable shopping environment. These indicate that the buyers have diverse requirements and interest.

Albert Makochekanawa (2010) indicated none tariff barriers (NTBs) such as SPS which are arbitrary, difficult and costly to meet especially for the developed countries are one of the critical factors inhibiting export especially to the developed world.

Another factor that is global issue and affecting export of live animals and meat export is occurrence of animal diseases. This is not challenges only to Ethiopia, but a big impediment for countries such as Botswana. According to Albert Makochekanawa(2010), with the outbreak of foot and mouth disease in Botswana, all animal exports are abruptly brought to a halt until health officials are fully satisfied that the disease has come under control or been eradicated. Owing to the lengthy procedure involved in arriving at the conclusion that the diseases has been brought under control, the county ended up exporting less that is potential animal export in the years where such disease has occurred

On the other hand, Jeremy et al (2001) indicated that the result of study conducted on Canadian exports of livestock and meat to the United States, the major factors affecting exports of animal, pork, cattle, and hogs from Canada to the united states includes the exchange rate, increased Canadian exports, U.S. Canada price differentials, and trade liberalization under the Canada-united States free Trade agreement (CUSTA) of 1989

The above brief reviews of empirical studies indicate that volume (quantity) of export (supply) affected by parameters such price, production, exchange rate, NTBs (disease, SPS), etc.

Once the analytical procedures and their requirements are known, it is necessary to identify the potential explanatory variables and describe their measurements. Identifying and defining dependent and explanatory variables for the study will be done based on theoretical frameworks and empirical findings.

2.13. Working Framework

Ethiopia is endowed with diverse agro climatic zones that are favorable to produce different species of animals. Animals are among agricultural products that play vital role in economic performance of the country. Ethiopia is earring foreign currency by exporting live animal. Exploiting these resources require transformation of production, transporting and marketing (value chain) of the animal export. In line with this paper attempted to identify factors (volume of export, export price, volume of live animal export, domestic live animal price, ban imposed by importing countries and government expenditure to the livestock development) influencing live animal export using 10years quarter based export data (2004-2013). These data analyzed using EViews and stat11.

CHAPTER THREE: RESEARCH METHODOLOGY

The study area, type and method of data collection and analysis are discussed below. Based on the theoretical and empirical evidence, pertinent variables were selected to study what influences live animal export performance in Somali Regional State.

3.1 Description of the Study Area.

Ethiopian Somali Regional State is one of the ninth regional states of Ethiopia, occupying the south-east and easternmost parts of the country. The region occupies an area of 350,000km^2, which is almost one-third of the country's landmass. The last census conducted in 2007 put the population of the region at 4,439,147, of which 86 percent (3,817,937) live in rural areas and the remaining 14 percent (621,210) were urban populations. Out of the rural population, 60 percent (2,290,762) were pure pastoralists and 25 percent were agro-pastoralists, while the remaining 15 percent are sedentary farmers (SC-UK/DPPB, 2008).

This gives an indication of the importance of livestock and livestock products for the majority of people in Somali Region. The region borders Djibouti, Somaliland, Somalia and Kenya. Most of the people have strong social and economic ties with Somalis living in neighboring territories. The pastoralists of the region depend on the ports of Berbera and Bossaso to market their livestock. The region also highly depends on informal trade, not only for marketing its products but also for all imported commodities to the region.

This has made the region a battleground between traders trying to informally export and import goods and Federal Police Forces trying to stop them from doing so. The details of the livestock population of the region are shown in Table3.

Table 3. Livestock Population Estimates for Somali Region.

	CSA 2011	**LDMPS 2006**	**IGAD 2009**	**Mariam et al. 1999**
Cattle	610,514	1,386,903	1,271,980	3,796,000
Sheep	1,054,287	8,028,693	7,445,234	9,053,000
Goat	1,411,481	7,102,281	6,616,337	8,547,000
Camel	301,323	1,417,080	1,268,694	2,032,000
Donkey	100,367			231,000
Total	**3,477,972**	**17,934,957**	**16,602,305**	**23,641,000**

Source: CSA

The region is rich in livestock resources, composed mainly of small ruminants and camels. It is difficult to get reliable livestock population figures in Somali Region, as the Central Statistical Agency (CSA) is yet to conduct a comprehensive livestock census in the region. The most widely used livestock sample survey was conducted in 1999 by the Investment Agency of the Region through a consulting firm (Mariam et al. 1999). The livestock population of the region was estimated to be around 23 million head. From that time on no survey or census was conducted on the region's livestock population, and this has led to different estimates given by different organizations. Table 1 shows the available estimates that we have for the Somali Region's livestock population. This shows how difficult it is to know the size of the livestock resources that are involved in the Cross Border Livestock Trade (CBLT), but what has been agreed on is the fact that most of the livestock brought to ports like Berbera are sourced from Somali Region of Ethiopia.

3.2 Sampling Design and Sample Size

The study was carried out using time series (secondary) data and as time series data had used, it was found not relevant to apply the sampling procedures.

3.3 Data Type and Variable Identification

The study attempted to identify major factors influencing live animal export using quarter based time series data of 14 years (2000-2013). The empirical data covered key variables such as Value of live animal export(Y), the volume (Number) of live animal export (X_1), live animal export (X_2), live animal domestic price (X_3), exchange rate (X_4), livestock annual population or production(X_5), ratio of government expenditure of livestock development (X_6), import ban imposed by the major importing countries (X_7)live animal export value is measured in \$ Dollar. The disease variable is explained in terms of import ban considered using dummy variable (Di). Di is unitary (1) in the year when there was no ban imposed by major importing countries and zero (0) otherwise. It is important to note that the disease impose import ban whenever there is fear (threat) of live animal disease(s) either in exporting country or in countries that are neighborhood to exporting country. Since it is subjective and difficult to consider quality variables and as there is no export tax imposed by Ethiopian government on export items, quality and tax variables were excluded from the analysis. Issue is associated to import ban by importing countries as major importing countries

3.4 Data Collection

To conduct the study secondary data were used. The time series (secondary data) used for this study were the quarterly time series live animal export data for 14years (2000-2013) that comprise value of live animal export, volume of animal export, exchange rate, domestic live animal export price, etc. It was collected through document review like articles, records etc. and other literature such as print articles. The researcher used secondary data to investigate **the determinants of live animal export in Ethiopia. For the current study,** the main sources of the data were governmental organizations like Central Statistical Agency (CSA), National Bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MoFED), and Ethiopia Revenue and Customs Authority (ERCA) and publications of

national and international organizations. Moreover, websites of different local and international organizations such as FAO, World Bank and others such as IMF, World Economic Outlook Websites and UNCTADSTAT were consulted to collect all relevant data and information.

3.5 Data Analysis

Both descriptive and econometric techniques were applied to study the relationship between the dependent and independent variables. Using descriptive statistics the mean, median, standard deviation, minimum as well as maximum values of variables were identified. The result obtained used as an indicator of the relationship between independent variables and the dependent variables.

In addition to this, econometric model has been employed to study the relationship between variables empirically. Thus, the OLS analysis **was applied to analyze factors that influence live animal export. Moreover, the unit roots test, gi**nger causality test and integration test applied to check stationary of the time series data.

3.5.1. Econometric Analysis

Trends in live animal export value, export volume, export price, domestic animal export price, live animal population (production), exchange rate, ratio of government expenditure for the livestock development to GDP and import ban imposed by major importing countries were used in the econometric model .

Value of Live animal export value (Y) in US Dollar is a dependent variables whereas the live animal export volume(X1), the live animal export price (X2), live animal domestic price (X3), exchange rate(X4), live animal population/production(X5),ratio of government expenditure of livestock development (X6), import ban imposed by major importing countries (X7), are independent (explained) variables.

This study of live animal export follows the structure of export supply model derived by Goldstein and Khan (as quoted in Mulualem, 2002 and David Otieno et al, 2008) where export value in log linear form is defined as a function of live animal export volume, export price,

volume of animal export, domestic live animal price, exchange rate, live animal production (population), government expenditure to develop the livestock sub-sector, import ban imposed by the major importing countries and GDP.

An econometric model was employed to study the relationship between variables empirically thus, the multiple regression analysis has been used to analyze factors that determine live animal export.

The study applied a single equation approach to analyze factors affecting value of live animal export the function for the value of live animal export can be in the form of:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, x_7)$……………………………… (1)

Where

Y is value of live animal export,

X_1 is volume of live animal export

X_2 is live animal export price

X_3 is live animal domestic price

X_4 is exchange rate

X_5 is live animal production (population).

X_6 is ratio of government expenditure of livestock development.

X_7 import ban imposed by major importing countries and

The export value specification consider the importance of domestic live animal demand (absorption) expected to be captured including domestic price, volume of live animal export, live animal production (population) and import ban imposed by the major buying countries as a major phenomenon inhibiting rapid export growth over long period. A country's ability to increase value of cattle export also depends on infrastructure and total factor productivity that will lead on an increase in export supply at any given level of export price. Therefore GDP is included to capture the impact of infrastructure and total factor productivity.

This study follows the structure of export value (supply) model derived by Goldstein and Khan (1978) where export value equation is in log linear form. Therefore, substituting the variable names in Table 1 into equation 2, the live animal export model is specified as in an equation 2.

$$LnYt = \beta_0 + \beta_i \, LnX_i + \mathcal{E}_i\ldots\ldots\ldots(2)$$

Where

In= denotes natural logarithm

X_i = (i = 1, 2, 3,4,5,6 and 7) are independent variables

$\beta_o = constantterm$

$\beta_i = (i = 1,2,3,4,5, \ 6 \ and \ 7) are$ Parameters to be estimated for i's variable

$\mathcal{E}$= error term

Estimation is through the ordinary least Square approach and apriority expectations are that $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 < 0$, $\beta_4 < 0$, $\beta_5 > 0$, $\beta_6 > 0$, $\beta_7 > 0$.

For the secondary data, various diagnostic tests will be undertaken to determine the data properties in terms of stationary, granger causality and existence of cointergration.

The dependent variables for the OLS analysis is export value while the independent variables which are expected (hypothesized) to affect the export decision of exporters and this expected to be proved during this study. Diagnostic tests are undertaken to determine the data properties in terms of stationary, granger causality and existence of co integration.

3.5.2.Variable Definition and Hypothesis.

Value of live animal export (Y) being dependent variable is assumed be affected by independent variables such as volume of live animal export (X_1), live animal export price (X_2), live animal domestic price (X_3), exchange rate (X_4), annual live animal population $(X5)$, ratio of government expenditure of livestock development (X_6), import ban imposed by major importing countries (X_7)

Identifying the optional explained and explanatory variables, describing their measurement and representing them in symbols will be important in explaining a model and used to hypothesize the study of live animal export as shown in Table 3.

Table 4 : Variables and Definition of Hypothesis.

Variable	Symbol	Types of Variable	Expected sign	Unit	Data source
Live animal value	Y	Continuous	+	Dollar	CSA
Live animal export volume	X_1	Continuous	+	Dollar/kg	CSA
Live animal export price	X_2	Continuous	+	Dollar/Kg	CSA
Live animal domestic price	X_3	Continuous	-	ETB/Kg	CSA
Exchange rate	X_4	Continuous	+	1 USD to ETB	NBE
Live animal production (population)	X_5	Continuous	+	Number (head) of live animal produced	CSA
Livestock development expenditure	X_6	continuous	+	Ratio budget to GDP	MoFED
Import ban	X_7	Dummy	-:	= 1 if no ban and 0 otherwise	Publications

Source: Tabulated by the researcher.

Based on these variables the hypothesis of the study is set as under.

Null hypothesis (H₀): the null hypothesis reflects that there will be on observed effect for our experiment. The null hypothesis is what we are attempting to overturn by our hypothesis tests. We hope to obtain a small enough p-value that we are justified in rejecting the null hypothesis. If the null hypothesis is not rejected, then we must be careful to say what this means. The thinking on this is similar to a legal verdict. The impact of joint independent variables is hypothesized as $\beta^1 = \beta^2 = \cdots = \beta_6$ are jointly or simultaneously equal to zero. A test or such

a hypothesis is called a test of the overall significance of the observed or estimated regression line (N. Gujarati, 2007) that is, whether Y is linearly related to $X1$ $, X_2 \dots X_7$

Alternative hypothesis (H_1) the alternative or experimental hypothesis reflects that there will be an observed effect for our experiment. In a mathematical formulation of the alternative hypothesis there will typically be in inequality or not equal to symbol. The impact of joint independent variables $\beta^1 \neq \beta^2 \neq \dots \neq \beta_5$. ($\beta_i \neq 0$) I = 1, 2, 3…7

The dependent variables for the OLS analysis is export value while the independent variables which are expected (hypothesized) to affect the export decision of exporters and this is expected to be proved during this study.

3.5 Definitions of Variables

Terms of Trade

The terms of trade will be favorable to a country when the export prices are high relatively to import prices. The terms of trade are of economic significance to a country. If they are favorable to a country, it will be gaining more from international trade and if they are unfavorable, the loss will be occurring to it. When the country's goods are in high demand from abroad, that is when its terms of trade are favorable, the level of money income increases. Conversely, when the terms of trade are unfavorable, the level of money income falls. We therefore expect the coefficient of terms of trade to be positive.

Nominal Effective Exchange Rate (NEER)

An increase in the NEER means appreciation and obligation makes Ethiopia's livestock export less competitiveness in the world market and thus decreases total livestock exports of the country. On the other hand depreciation or the decrease in NEER increases livestock exports of the country by making Ethiopia's livestock exports more competitive in the world market in general. Finally, therefore, we expect the sign of the coefficient of NEER to be negative.

Infrastructure

Of the factors that boost production as well as export supply of commodities, infrastructural facilities come at the forefront. Its development is a key element of countries ability to produce and move goods. Weak infrastructure is a major impediment to trade, competitiveness and sustainable development in most African countries, particularly land-locked and small island countries. It reduces the return to trade and economic activity and hinders growth prospects of a given country.

In this study the impact of infrastructure is captured by kilometers of total paved roads. Since the availability of road creates marketing opportunities in the international market and also the absence of such facilities does not bring the desired agricultural export performance of the country, therefore, we expect the sign of this variable to be positive.

Gross Domestic Product (GDP)

Higher GDP values in the exporting country imply increased capacities for export. It is expected to have a positive impact on exports. For instance, Kumar (1998) in his study on the determinants of export growth in developing countries confirmed that GDP has a significant positive impact export volumes. He also underlined that higher level of production is the main cause of export expansion. So, a higher GDP implies a higher production and hence larger volume of exports. Therefore, we expect a positive relationship between the dependent variable and GDP.

World Price

The price of exports on the international market is one of the major determinants of export growth and especially for countries which depend on exportation of livestock whose prices fluctuate from time to time (Agasha, 2006). When foreign price level increases, the domestic exporters will get incentive to maximize or increase their export. So, we expect positive relationship between the livestock export and foreign price level.

CHAPTER FOUR: RESULTS AND DISCUSSION

Before going more into time series econometric procedures, a simple descriptive statistics was used to highlight the relationship between the variables and factors that influence value of live animal export. The period of study 2000-2013 of live animal export in Somali Regional State who depends on livestock rearing as well as the export of live animals, .

4.1 Summary of Descriptive Statistics

Table 4 below shows the mean, median, maximum, minimum, standard deviation, Skewness, kurtosis, jarque-bar, probability, sum, sum of square deviations of the study.

Table 5: Summary of Descriptive Statistics.

	value Y	Volume X1	Export price X2	Dp X3	ER X4	P X5	Exp X6	Imp X7
Mean	77139592	1574403.	57.42857	25.14503	10.92676	45.24286	0.000593	0.500000
Median	42022314	1325994.	40.00000	16.94000	8.758100	45.35000	0.000600	0.500000
Maximum	2.10E+08	3505050.	145.0000	66.52000	19.56410	64.40000	0.000900	1.000000
Minimum	2290835.	134755.0	15.00000	8.648300	5.765200	25.70000	0.000200	0.000000
Std. Dev.	77712215	1135060.	41.59089	18.54568	4.183176	10.92764	0.000234	0.518875
Skewness	0.746742	0.448240	0.826985	1.196576	1.000047	-0.121683	-0.211688	0.000000
Kurtosis	1.922003	1.889050	2.433201	3.051510	2.637884	2.410745	1.767572	1.000000
Jarque-Bera	1.979000	1.188767	1.783177	3.342403	2.410046	0.237095	0.990573	2.333333
Probability	0.371763	0.551903	0.410004	0.188021	0.299685	0.888210	0.609396	0.311403
Sum	1.08E+09	22041645	804.0000	352.0304	152.9747	633.4000	0.008300	7.000000
Sum Sq. Dev.	7.85E+16	1.67E+13	22487.43	4471.247	227.4864	1552.374	7.09E-07	3.500000
Observations in	14	14	14	14	14	14	14	14

The analysis indicates that X3 (domestic price) is almost three fold of X4 (live animal export price). This is an indication that export price is higher than the domestic price. An increase of domestic price encourages the domestic market and discourages the performance of export market. As the domestic live animal export market transaction (price determination) carried out based on eye evaluation and not on weight bases, domestic price used to present domestic price rather than live animal per kilogram. Among the variables provided in the table volume of live animal export, live animal export price, exchange rate, live animal production for population, government expenditure to the livestock development assumed to have positive relation with the increase of live animal export value and the export price, domestic price and import ban imposed by the major buying countries have negative impact on export performance of value of export. The live animal export during the study period is shown in Table5.

Table 6. Live Animal Export and Value during the Study Period (2000-2013)

Year	Export Volume(Numbers)	Export value (ETB)
2000	1,609,972	24,149,580
2001	134,755	2,290,835
2002	410,539	8,210,780
2003	638,719	14,690,537
2004	1,002,343	26,060,913
2005	1,172,089	35,162,670
2006	1,321,134	48,881,958
2007	218,665	8,746,600
2008	1,330,853	66,542,650
2009	1,662,699	91,448,445
2010	2,810,482	157,386,992
2011	3,083,850	181,947,150
2012	3,505,050	210,303,000
2013	3,140,495	204,132,175

Table 5 shows that live animal export performance over thirteen years (2000-2013) had increased except in 2001,2002,2003,2007. The decline of live animal export in these years was due to droughts, famine and other natural impact. The other thing most challenging is seasonal fluctuation. For instance in the months of April, May and June the live animal export price is high and make sense in markets because of these months are rainy seasons and make the people who are pastoral ready to make their animal to husbandry. In the other months like November,, December and January the price of live animal is low and the people like to sell their animals even at lower price because of shortage of rain and subsequent feed resources .

On the other hand the increase of live animal export was linked to increase of live animal price and an increase of number of countries to which live animal is exported. The time of Muslims go the hajj the Saudi Arabia is exporting a lot of animal because many people come and need what they feed and make slaughter

For the normally distributed variables, Skewness, kurtosis, and jarque-bar (JB) are zero, three and zero respectively. However, for the variables shown in Table 5, skewness test values are different from zero, that of kurtosis are different from 3 and that of JB are different from zero. Therefore we can easily conclude that the variables indicated in the above table are normally distributed.

4.2 Root/Stationary Variables.

4.2.1 Unit Root Test

Testing the existence of unit roots in the variables is very essential before any meaningful regression is performed with the time series variables, either through graphical inspection or by conducting formal unit root tests. However it is always advisable to first plot the time series under study to get an initial clue about the likely nature of the time series before perusing a formal unit root test. (Gujarati, 2004).
Despite its unreliability, it is difficult to make inferences about the presence of unit root based on graphical evidence only. So, all variables are detected through graphical inspection of their time series plots. The plots of the variables at their level and first difference are presented in Table 6 and also in appendixes. From the plot, it is easily observed that each variable seems to have a

non-constant mean which explicitly stipulates that the series are not stationary in levels. In contrast the plots of the variables in the first difference are at least, visually revolve around their

The graphical representations of the variables are provided below in figures. Inspection of the plots suggests that all the variables seem non stationary at their level while the respective first differences look like stationary.
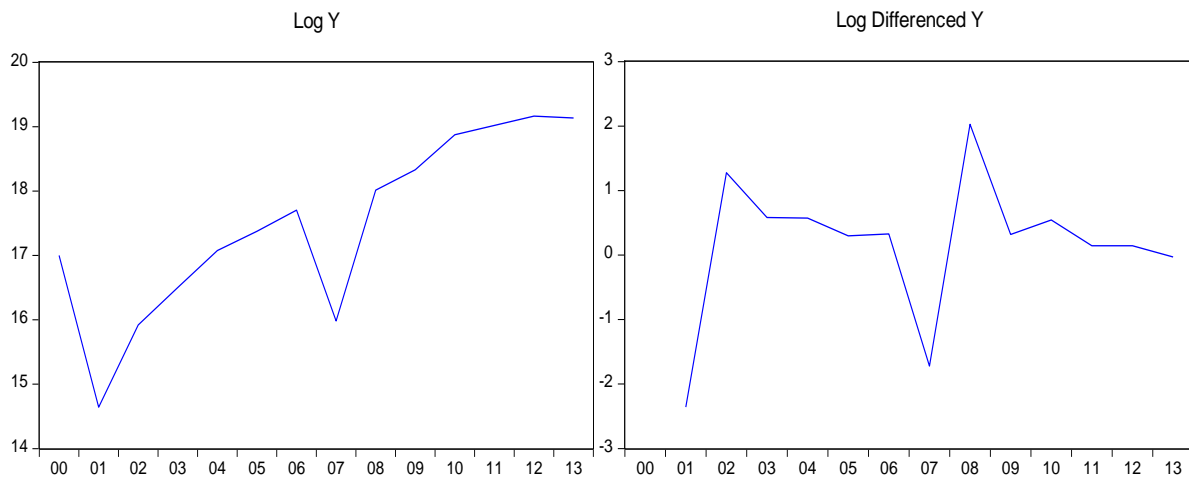
Figure 1: Log Y and Difference of Log Y

The Log Differences in Y

A graph of In and In of first difference is value of live animals. This figure looks more or less stable and steadily increasing except the years in we defined above - 2001, 2002, 2003 and 2007. The graph shows that it has advantage for value in live animal export and related for price fluctuates in period to period.

The number of live animals exported every year between 2000-2013 X1 and log difference in x1 is shown in Figure 2.
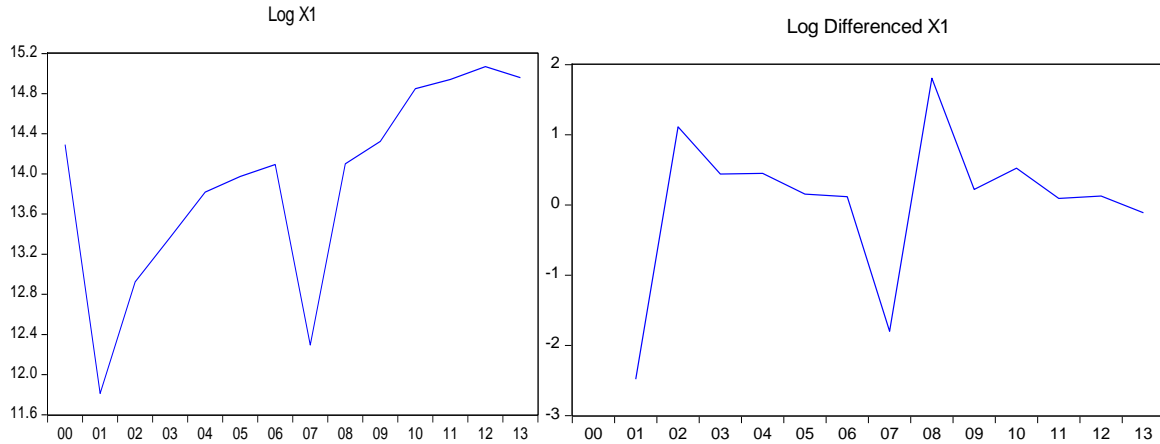
Figure 2. The number of live animals exported between (2000-2013) X_1 and log difference

Similarly the trend of volume of live animal export has shown up and downs due to the decline or no export of live animal and.In the graph showing volume of live animal the series is stationary (unit root) and the difference is stationary.

The price of live animal in log X2 and difference log X2 is shown in the graph below.
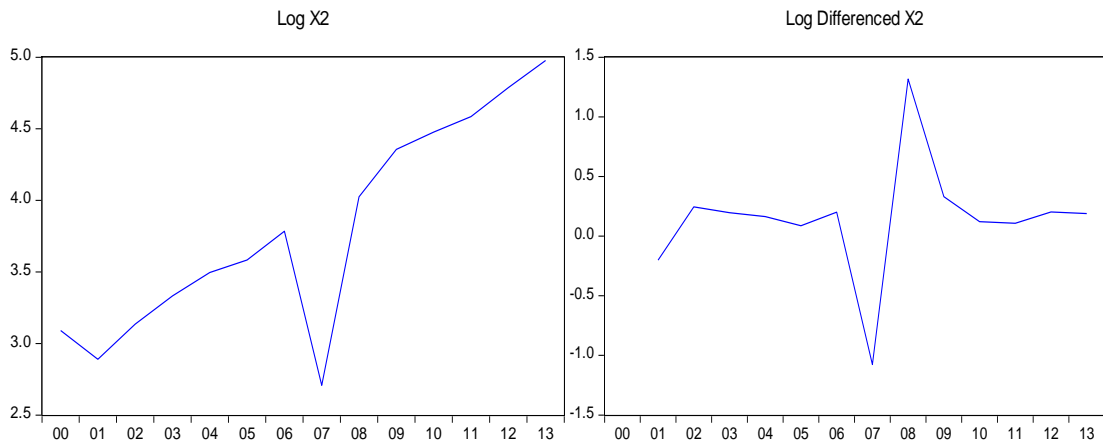
Figure 3.Graphs of ln and ln of first difference of live animal export price (international price).

Non stationary is also observed in price of live animal export and its log difference transformed to stationary. Volume of live animal export is an important variable assumed competing live animal export volume and value. The assumption is that when export volume increase the live

animal export expected to decrease. Figure (3 indicates the price of animal export and the graph is irregular and this type of "random walk" behavior is non-stationary.

Figure 4.1.1 (d) the graphs of Ln and Ln of first difference of live anima export volume (local price).
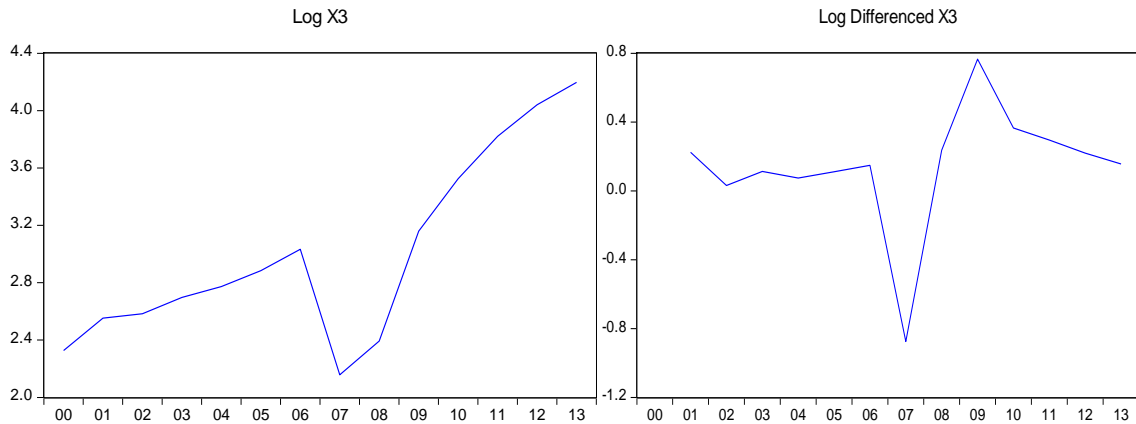
Figure (d) graphs of ln and ln of first difference of live animal export price in local domestic price.

The graphs of ln and ln first difference of exchange rate is shown in Figure 4.
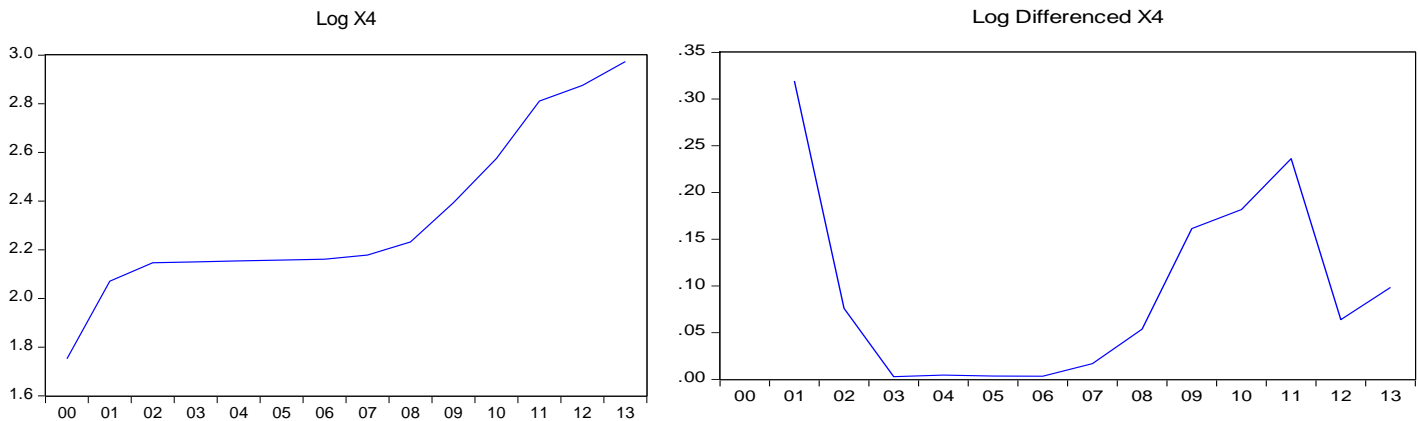
Figure 4: Ln **and Ln first difference of exchange rate**

The figure indicates that the exchange rate between the local and international price fluctuates from time to time and it is at all non-stationary in ETB and . Given that the variables that appear to have a non –constant mean it implies that they are not stationary in levels. But the time high price exchange the advantage between imports and people who sell their animal earn high

income and many markets establish good opportunities like Somali and get in high income and buy food like sugar and tea, rice and clothes.

The ln and ln difference in X_5 for live animal production population is shown in Figure 5.
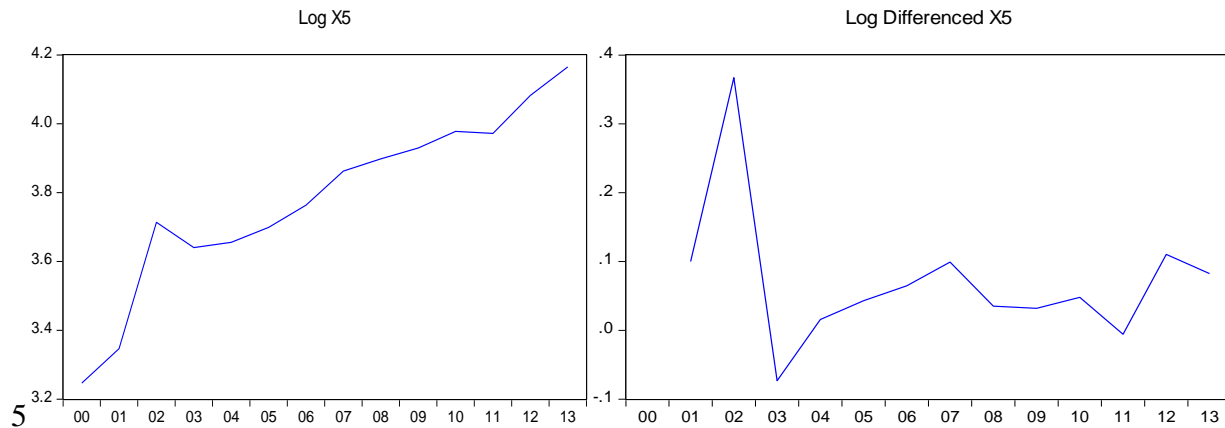
Figure 5.Ln and Ln Difference of Volume of Live Animal Export

Given that variables that appear to have a non-constant mean it implies that they are not stationary in levels. Plots of the first differences (a-f), in contrast, show no evidence of changing means or changing variance. Thus the use of graphical evidence is unreliable in making inference about the presence of unit roots, and it is better to turn to the formal testing strategies that examine each of the series for the unit root.

The study of time series data uses the Augment Dickey Fuller (ADF) test for stationary (Guajarati, 2007). This involves the search for the data generating process from pure random walk or random walk without drift or random walk with drift and time trend.

As to the formal tests, the well-known Augmented Dickey- Fuller (1981) is applied to test the existence of unit root and ascertain their order of integration. The primary interest is to determine whether the variables are stationary or not. The null hypothesis for the test states that, the series has unit root. Whereas, the alternative hypothesis says the series is stationary (i.e., no unit root). These unit root tests suggest that, the variables under examination are a unit root process at levels; and hence, integrated of order one, I (1).The unit root test is undertaken both at the

intercept and intercept plus trend regression forms, and the results of Augmented Dickey- Fuller (ADF) .Figures below indicates (ADF) for the unit root test and first and at different (Table 6)

Table6. ADF Unit Root Test at Level for Y

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.306781	0.9684
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y(-1)	0.036927	0.120370	0.306781	0.7647
C	11356983	11571883	0.981429	0.3475
R-squared	0.008483	Mean dependent var		13844815
Adjusted R-squared	-0.081655	S.D. dependent var		28618342
S.E. of regression	29763827	Akaike info criterion		37.39612
Sum squared resid	9.74E+15	Schwarz criterion		37.48304
Log likelihood	-241.0748	Hannan-Quinn criter.		37.37826
F-statistic	0.094115	Durbin-Watson stat		2.024874
Prob(F-statistic)	0.764739			

ADF Unit Root Test for **First Difference for Y**

Null Hypothesis: D(Y) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.543595	0.0260
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(Y,2)
Method: Least Squares
Sample (adjusted): 2002 2013
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Y(-1))	-1.060443	0.299256	-3.543595	0.0053
C	17757748	9573806.	1.854826	0.0933

R-squared	0.556680	Mean dependent var	1307327.
Adjusted R-squared	0.512348	S.D. dependent var	41535150
S.E. of regression	29004864	Akaike info criterion	37.35484
Sum squared resid	8.41E+15	Schwarz criterion	37.43565
Log likelihood	-222.1290	Hannan-Quinn criter.	37.32492
F-statistic	12.55706	Durbin-Watson stat	2.000536

Where * indicates rejection of null hypothesis both at 1% and 5% level of significance.
Source: Own estimation using E Views 7.0.2.

The other ADF in X6 up to X7 see in (Appendix back letters).

4.3 Granger causality

Granger causality occurs when X changes and changes in Y follow thereafter and the most popular version of the granger test for causality involves an F-test (D. Halcoussis, 2005). Pair wise, granger causality has been performed to establish the direction of causality between the dependent variable and the non-dummy independent variables. The causality tests also carried out between pairs of independent variables to determine if any of the independent variables could be used as the dependent variable in estimation.

Conducted pair-wise granger causality tests confirmed that X1, X2 and X4 granger cause Y and similarly Y granger cause X_5 the test confirmed that X1 granger cause X2 (Appendix in back papers).

4.4 Cointgration.

Cointegration occurs when the variables in a model are non-stationary, but the trends of the variables are related in a way so that the error term observation are stationary; Dickey- fuller can be adapted to test it.(D.Halcousis,2005). The long run equilibrium relationship among the

variables is determined through the Johnson co-integration test, assuming a linear deterministic trend (David. Otieno et al, 2008).

Economically speaking two variables will be cointegrated if they have a long term, or equilibrium, relationship between them (Guajarati, 2007).The null and alternative hypotheses in the test for co integration are:-

Ho: The series are not integrated or residuals are non-stationary

H$_1$: The series are not cointegrated or residuals are stationary.

Similar to the one tail unit root tests, the null hypothesis is rejected of no co integration if tau $(\tau) \leq \tau^c$, and the null hypothesis is rejected and the alternative hypothesis is accepted if

$$\tau \leq \tau^c$$

The tau (τ) statistics for X_1 (37.28), X_2 (395049.) X_3 (-1231636) X_4 (10564349), X_5 (11691), X_6 (-1.99) X_7 (-3015778) and Y (-3.75). Table value is less than the critical value -2.76 at the 5% level of significance. Thus, we reject the null hypothesis that the least square residuals are nonstationary and conclude that they are stationary. This implies that the value of live animal export, live animal export volume, live animal export price, volume of animal export domestic price, exchange rate and import ban imposed by major buying countries are cointegration. The result that the variables were cointegrated has major economic implications. It means that any policy implemented to enhance live animal export value ensures that its effect transmitted to the rest of the variables (economy). In contrast, the effectives of policy on value of cattle export would be severely hampered if the variables were spuriously related as this implies that their movements, fundamentally, have little to do with each other. The r**esult of integration test is shown in Table 7.**

Table7: Result of Integration Test

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
Y	-3.754692	0.7294	-14.39160	0.6354
X1	-4.128094	0.6056	-14.90036	0.4838
X2	-4.257525	0.5786	25.20488	0.0011
X3	-4.246818	0.5741	-44.55691	0.0000
X4	-4.850133	0.3899	-53.83799	0.0000
X5	-3.422777	0.8277	-12.90036	0.8112
X6	-6.601547	0.0929	-186.6991	0.0000
X7	-4.249362	0.5734	-50.88566	0.0000

*MacKinnon (1996) p-values.

Intermediate Results:

	Y	X1	X2	X3	X4	X5	X6	X7
Rho - 1	-1.107046	-1.146182	-2.550982	-1.752128	-1.896026	-0.992335	-2.356333	-2.093625
Rho S.E.	0.294843	0.277654	0.599170	0.412574	0.390922	0.289921	0.356936	0.492692
Residual variance	2.93E+13	1.77E+10	23.69704	4.633260	0.092560	9.054303	4.45E-09	0.128898
Long-run residual variance	2.93E+13	1.77E+10	19.11891	20.80761	0.518262	9.054303	1.94E-07	0.528781
Number of lags	0	0	2	1	1	0	1	1
Number of observations	13	13	11	12	12	13	12	12
Number of stochastic trends**	8	8	8	8	8	8	8	8

**Number of stochastic trends in asymptotic distribution

The Coefficient in Variables That Define in Different Variables.

Dependent Variable: Y
Date: 01/09/15   Time: 20:55
Sample: 2000 2013
Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	37.27797	5.408553	6.892411	0.0005
X2	395049.5	354077.5	1.115715	0.3072
X3	-1231636.	805961.9	-1.528157	0.1773
X4	10564349	4597290.	2.297952	0.0613
X5	11691.28	738552.8	0.015830	0.9879
X6	-1.99E+08	2.25E+10	-0.008828	0.9932
X7	-3015778.	5335794.	-0.565198	0.5924
C	-87606019	20298671	-4.315850	0.0050

R-squared	0.995393	Mean dependent var	77139592
Adjusted R-squared	0.990018	S.D. dependent var	77712215
S.E. of regression	7764271.	Akaike info criterion	34.86352
Sum squared resid	3.62E+14	Schwarz criterion	35.22870
Log likelihood	-236.0447	Hannan-Quinn criter.	34.82972
F-statistic	185.1898	Durbin-Watson stat	2.115236
Prob(F-statistic)	0.000001		

CHAPTER FIVE: CONCLUSION, SUMMARY AND RECOMMENDATIONS

5.1 Conclusion and Summary

The major challenge for the livestock traders of Somali region is the overall need for economic growth; that include growth in infrastructure, demand and an increase in the volume of animals being traded and on the side of the government improving infrastructure, provision of adequate security and putting in place enabling policy and that require concerted work by the various arms of the administration. In addition, achieving required levels of growth also call for exertion by traders and entrepreneurs in the pastoralist areas

The cross-border livestock trade between Ethiopia and Somaliland supports many pastoralists and other actors in the trade, who are mainly from Somali Region of Ethiopia. The trade has been going on for centuries, and strong links persist between traders on both sides of the border. Strong social and economic ties between communities living on both sides of the border also facilitate the existence of the trade. This reality makes the government's effort to control the trade ineffective. It necessitates the adoption of a new strategy on the government's side which maintains benefits for those involved and allows the government to collect the required revenues. The CBLT is crucial for the food security of pastoral and agro-pastoral communities in Somali Region.

The increased restrictions limit market options for pastoralists and consequently the income they generate from the sale of their livestock. It has been reported (Little 2009, cited in FEWSNET 2010) that the loss of livestock assets due to cross-border trade restrictions reaches more than 60 percent of the herd size. This figure alone suggests the extent of the impact of increased restrictions on pastoral and agro-pastoral communities. The restrictions also favor large traders, as they have extended connections and can create their own routes to move animals across the border. This happens at the cost of small traders and pastoralists, who are forced to settle for the prices offered by the larger traders.

This study attempted to investigate the relationship between the explanatory variables considered in the present model and the export value of live animal export in Somali regional state by using Eview and stata 11. A time series econometric approach has been applied for estimating the

contribution of these variables in export response of the value earned from the live animal export.

The value of live animal export influenced by live animal export volume, animal export price and volume of live animal export. The values of animal export are positively responds to the change in volume of animal export and export price, exchange rate and negatively respond to the volume of animal export. This implies an appropriate level of export volume of animal and export price could support production and generate export surplus uses. However live animal export growths would inevitably require increase supply of production inputs and investable resources of the rest variables the live animal production (population), The ratio of government t expenditure for live animal development to be excluded from the analysis due to the problem of multi linearity. The other variables (i.e. Domestic price and import ban imposed by the major buying countries) are found to have in significance contribution to affect the animal export value. The live animal export value responds reasonably significant to volume of animal export and the animal export price both in the short and in the long run particularly the export price result fits the conventional wisdom in the sense that the export value with respect to export price suggests some important aspect of the behaviors of the live animal export of the Somali regional state. The responsiveness to price stimuli could be less important in the presence of high domestic price (demand) which draws the products away from export market.

One of the most important determinants of animal export value is domestic consumption in this case denoted by domestic price. Both the short run and long run analysis entails by the non-significance of this variable in affecting the value of live animal export, the elasticity of the value of live animal export with respect the domestic animal price (consumption) is elastically in significant, this implies in Ethiopian context the type of animals used for export completely different form that are required for the domestic use or market the researcher practical experience indicate that the animal used for export are intact, young male animals whereas that used for the domestic market are usually older male that conditioned after serving for longtime for traction and female animal will high fat accumulation. Therefore, the existence of preference difference between the domestic and export market expected to contribute for non-responsiveness value of live animal export to the domestic animal price. The non-significance of exchange rate (x4) and ban imposed by major animal buying in Somali regional state (X7) have no impact on the

performance of live animal export. This is completely to the contrary of the researcher's expectation and need conducting further detail investigation.

However as noted by Ajit (1992, cited in Mulumalem 2002) in the absence of any restriction on external trade, an increase in domestic demand relative to output would either spill over into imports or decrease the availability of exports for the world market or both, the continues decrease of value ETB in terms of USD are tariff rate imposed on imported the export animals and make low sense in consumers.

The insignificance of Dummy variables (DI), representing import ban imposed by the major buying countries implies that import ban imposed by the major buyers does not completely stop or decline export. Though it was expected that the ban has negative impact on live animal export performance to analysis did not confirm this fact, the question why is open for future investigation.

On top of the above issues, the policy reform has paramount importance to change live animal export to value added product such as meet of shoats. However it is important to note that policy reform by itself may not generate immediate positive response in increasing either export of animal in live further requires improvement of animal breed the application of better technology trained man power, active participation of private sector, etc. as the international market works under advanced as well as highly competitive environment.

5.2 Recommendations

According to the empirical results, Ethiopia is endowed with great resource of livestock and the following recommendation required to be addressed to improve the overall performance of the live animal export and there by maximize the export earnings expected from this sub-sector.

❖ Increasing volume of export has significant impact on value earned from the live animal export. Therefore, it is imperative to increase volume of animal export with quality meat for consumption. The overall animal production system, conditioning and transport and animal handling along supply chain of the country require to be geared to fulfill the international standard or requirements of the buying countries. In addition to fulfill quality requirements of buying countries, producing at lower cost and be able to

price competitive in the international market and thereby increase to sub-sector share in the international market and boosting foreign currency earring of the country has of paramount importance. This inevitably require revitalizing the animal production system, feeding, disease prevention, fettering (conditioning) practices, upgrading and expansion of marketing facilities including marketing center, transport, and creating reliable market information.

❖ Export price has great impact on value, earned from the live animal export. The actors along live animal export supply chain required to work identifying factors influencing live animal export price and work hard alleviate them. The exporters should enhance their bargaining position by producing and supplying quality animals. Currently, the Somali regional livestock exporter's in particulars and live animal exporters in general are price takers and not price makers. This must be reserved if the country future economy policy direction is favoring live animal export. If the country's future policy direction is to undertake export after value addition, focusing on live animal export might not be relevant. None the less, whether the export commodity is live animal or value added product (meat), developing strong price bargaining position in the market has of paramount importance for the effort being made to get attractive price for the product and increase the country's foreign currency earning.

❖ Live animal export is playing vital role in generating foreign currency to the country on the one hand, beef export of live animals brings loss to the Somali regional state as it makes the region to loss large number of cattle that is another big source of foreign currency. Therefore involving value addition (beef export) by transforming the sector to the fully-fledged stage enable the country to create employment for the citizen. Moreover, at the same time process of beef by- products such as hide locally and then export leather would generate additional foreign currency. The value added commodity export also minimize risk associated to health as for it is prepared maintaining the international standard and delivered to the end consumer without breaking of cold of chain.

❖ Getting good price one way or the other linked to whether live animal production system is market oriented or not. Majority of the animal producers in the region have less concern and understanding about linked their animal production system to market as producing targeting either the domestic or export market is not common practice in the country. Majority of the animal producers worry about the price at which they are going to sell their animal market when they are in need of cash emanating from various cash stimuli factors. Thus the way animal production practiced in the country needs transformation. Producers required realizing and decide from the early beginning of their animal production. For what purpose they are producing the animal decide to grow live animal to sell and get good income .They are targeting for having clear idea to which market the producers are targeting to supply has a paramount importance to materialize market oriented animal production system in the country.

❖ The formal and informal live animal export in Somali region state carried out from the region simultaneously and destined to the same end market, usually the Middle East countries. The severe consequence of such trade is that the animal reach the same end market through informal channel are relatively with inferior quality sold with less price as compared to animals supplied through the formal channel are uncompetitive in price as animals supplied through formal channel. This has big impact for the effort being made to increase volume and price of live animal export. To overcome the price in competitiveness of formal live animal export ,it is recommended that both market channels supply to the same end markets should follow the same processes and procedures,

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APPENDIXIES.

Appendices A: Raw data of the study

year	Y	X1	X2	X3	X4	X5	X6	X7
2000	24,149,580	1,609,972	22	10.25	5.7652	25.7	0.0003	1
2001	2,290,835	134,755	18	12.84	7.9342	28.4	0.0003	0
2002	8,210,780	410,539	23	13.25	8.5605	41	0.0004	1
2003	14,690,537	638,719	28	14.84	8.5845	38.1	0.0005	0
2004	26,060,918	1,002,343	33	16	8.6244	38.7	0.0005	0
2005	35,162,670	1,172,089	36	17.88	8.6554	40.4	0.0006	1
2006	48,881,958	1,321,134	44	20.76	8.6847	43.1	0.0008	0
2007	8,746,600	218,665	15	8.6483	8.8315	47.6	0.0002	1
2008	66,542,650	1,330,853	56	10.9521	9.3192	49.3	0.0009	0
2009	91,448,445	1,662,699	78	23.56	10.9521	50.9	0.0008	1
2010	157,386,992	2,810,482	88	33.98	13.1342	53.4	0.0007	0
2011	181,947,150	3,083,850	98	45.66	16.6342	53.1	0.0006	0
2012	210,303,000	3,505,050	120	56.89	17.7305	59.3	0.0009	1
2013	204,132,175	3,140,495	145	66.52	19.5641	64.4	0.0008	1

Appendixes B for Augmented Dickey- Fuller (ADF) at level at difference.

Y

			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.543595	0.0260
Test critical values:	1% level		-4.121990	
	5% level		-3.144920	
	10% level		-2.713751	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Y(-1))	-1.060443	0.299256	-3.543595	0.0053
C	17757748	9573806.	1.854826	0.0933

R-squared	0.556680	Mean dependent var	1307327.
Adjusted R-squared	0.512348	S.D. dependent var	41535150
S.E. of regression	29004864	Akaike info criterion	37.35484
Sum squared resid	8.41E+15	Schwarz criterion	37.43565
Log likelihood	-222.1290	Hannan-Quinn criter.	37.32492

		t-Statistic	
F-statistic	12.55706	Durbin-Watson stat	2.000536

X1

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.691822	0.8154
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1(-1)	-0.139376	0.201463	-0.691822	0.5034
C	320376.5	360337.1	0.889102	0.3930

R-squared	0.041696	Mean dependent var	117732.5
Adjusted R-squared	-0.045422	S.D. dependent var	740068.3
S.E. of regression	756689.4	Akaike info criterion	30.05193
Sum squared resid	6.30E+12	Schwarz criterion	30.13885
Log likelihood	-193.3376	Hannan-Quinn criter.	30.03407
F-statistic	0.478618	Durbin-Watson stat	1.652372
Prob(F-statistic)	0.503390		

At difference x1

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.821537	0.0033
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X1(-1))	-1.160391	0.240668	-4.821537	0.0007
C	275807.8	178750.7	1.542975	0.1539

R-squared	0.699223	Mean dependent var	92555.17
Adjusted R-squared	0.669145	S.D. dependent var	1051898.
S.E. of regression	605051.5	Akaike info criterion	29.61503
Sum squared resid	3.66E+12	Schwarz criterion	29.69584
Log likelihood	-175.6902	Hannan-Quinn criter.	29.58510
F-statistic	23.24721	Durbin-Watson stat	2.055547
Prob(F-statistic)	0.000701		

X2

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.898469	0.9915
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X2(-1)	0.126212	0.140475	0.898469	0.3882
C	3.063544	8.503355	0.360275	0.7255

R-squared	0.068369	Mean dependent var	9.461538
Adjusted R-squared	-0.016325	S.D. dependent var	16.62135
S.E. of regression	16.75647	Akaike info criterion	8.616084
Sum squared resid	3088.573	Schwarz criterion	8.703000
Log likelihood	-54.00455	Hannan-Quinn criter.	8.598219
		Durbin-Watson stat	2.560952

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.565643	0.0251
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

At difference

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X2(-1))	-1.130062	0.316931	-3.565643	0.0051
C	11.64551	5.679757	2.050353	0.0675

R-squared	0.559739	Mean dependent var	2.416667
Adjusted R-squared	0.515713	S.D. dependent var	25.16657
S.E. of regression	17.51360	Akaike info criterion	8.714844
Sum squared resid	3067.260	Schwarz criterion	8.795662
Log likelihood	-50.28906	Hannan-Quinn criter.	8.684922
F-statistic	12.71381	Durbin-Watson stat	1.979991
Prob(F-statistic)	0.005133		

X3

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.604714	0.9984
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

At difference of x3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X3(-1)	0.199952	0.124603	1.604714	0.1369
C	-0.062957	3.259920	-0.019312	0.9849

R-squared	0.189693	Mean dependent var	4.328462
Adjusted R-squared	0.116029	S.D. dependent var	6.793531
S.E. of regression	6.387259	Akaike info criterion	6.687126
Sum squared resid	448.7679	Schwarz criterion	6.774041
Log likelihood	-41.46632	Hannan-Quinn criter.	6.669261
F-statistic	2.575106	Durbin-Watson stat	1.510369
Prob(F-statistic)	0.136859		

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.768055	0.3763
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

*MacKinnon (1996) one-sided p-values.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X3(-1))	-0.500990	0.283357	-1.768055	0.1075
C	2.533849	2.171350	1.166946	0.2703

R-squared	0.238154	Mean dependent var	0.586667
Adjusted R-squared	0.161970	S.D. dependent var	7.081263
S.E. of regression	6.482471	Akaike info criterion	6.727092
Sum squared resid	420.2243	Schwarz criterion	6.807910
Log likelihood	-38.36255	Hannan-Quinn criter.	6.697171
F-statistic	3.126017	Durbin-Watson stat	1.901060

X4

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.409521	0.9974
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X4(-1)	0.124694	0.088466	1.409521	0.1863
C	-0.218201	0.955406	-0.228385	0.8235
R-squared	0.152983	Mean dependent var		1.061454
Adjusted R-squared	0.075981	S.D. dependent var		1.116363
S.E. of regression	1.073114	Akaike info criterion		3.119644
Sum squared resid	12.66730	Schwarz criterion		3.206560
Log likelihood	-18.27769	Hannan-Quinn criter.		3.101779
F-statistic	1.986749	Durbin-Watson stat		1.159204
Prob(F-statistic)	0.186321			

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.794174	0.3651
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

At difference of x4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X4(-1))	-0.461868	0.257426	-1.794174	0.1030
C	0.432582	0.380666	1.136382	0.2823
R-squared	0.243517	Mean dependent var		-0.027950
Adjusted R-squared	0.167868	S.D. dependent var		1.067496
S.E. of regression	0.973783	Akaike info criterion		2.935755
Sum squared resid	9.482533	Schwarz criterion		3.016573
Log likelihood	-15.61453	Hannan-Quinn criter.		2.905834
F-statistic	3.219060	Durbin-Watson stat		1.692376
Prob(F-statistic)	0.103025			

X5

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.770897	0.7905
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

*MacKinnon (1996) one-sided p-values.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X5(-1)	-0.109553	0.142111	-0.770897	0.4605
D(X5(-1))	-0.248701	0.317070	-0.784374	0.4530
C	8.656391	6.513912	1.328908	0.2166

R-squared	0.129397	Mean dependent var	3.000000
Adjusted R-squared	-0.064070	S.D. dependent var	3.887041
S.E. of regression	4.009630	Akaike info criterion	5.827593
Sum squared resid	144.6942	Schwarz criterion	5.948820
Log likelihood	-31.96556	Hannan-Quinn criter.	5.782710
F-statistic	0.668833	Durbin-Watson stat	1.334456

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.114992	0.0101
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

At difference of x5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X5(-1))	-1.272119	0.309143	-4.114992	0.0021
C	3.761933	1.426417	2.637330	0.0248

R-squared	0.628710	Mean dependent var	0.200000
Adjusted R-squared	0.591581	S.D. dependent var	6.145508
S.E. of regression	3.927449	Akaike info criterion	5.724869
Sum squared resid	154.2485	Schwarz criterion	5.805687
Log likelihood	-32.34921	Hannan-Quinn criter.	5.694947
F-statistic	16.93316	Durbin-Watson stat	1.435648
Prob(F-statistic)	0.002094		

X6

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.846803	0.0788
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X6(-1)	-0.812065	0.285255	-2.846803	0.0159
C	0.000507	0.000177	2.868549	0.0153

R-squared	0.424213	Mean dependent var	3.85E-05
Adjusted R-squared	0.371869	S.D. dependent var	0.000293
S.E. of regression	0.000232	Akaike info criterion	-13.75660
Sum squared resid	5.94E-07	Schwarz criterion	-13.66969
Log likelihood	91.41792	Hannan-Quinn criter.	-13.77447
F-statistic	8.104288	Durbin-Watson stat	2.223697
Prob(F-statistic)	0.015887		

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.223244	0.0111
Test critical values:	1% level	-4.297073	
	5% level	-3.212696	
	10% level	-2.747676	

At difference of x6

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X6(-1))	-4.077508	0.965492	-4.223244	0.0055
D(X6(-1),2)	1.766862	0.708772	2.492850	0.0470
D(X6(-2),2)	0.615120	0.334153	1.840833	0.1152
C	0.000155	7.67E-05	2.015550	0.0905

R-squared	0.918798	Mean dependent var	-2.00E-05
Adjusted R-squared	0.878198	S.D. dependent var	0.000607
S.E. of regression	0.000212	Akaike info criterion	-13.79228
Sum squared resid	2.69E-07	Schwarz criterion	-13.67125
Log likelihood	72.96140	Hannan-Quinn criter.	-13.92505
F-statistic	22.63008	Durbin-Watson stat	2.298118
Prob(F-statistic)	0.001135		

X7

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.134458	0.0003
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X7(-1)	-1.547619	0.252283	-6.134458	0.0001
C	0.714286	0.171392	4.167544	0.0016

R-squared	0.773810	Mean dependent var	0.000000
Adjusted R-squared	0.753247	S.D. dependent var	0.912871
S.E. of regression	0.453462	Akaike info criterion	1.396827
Sum squared resid	2.261905	Schwarz criterion	1.483743
Log likelihood	-7.079377	Hannan-Quinn criter.	1.378962
F-statistic	37.63158	Durbin-Watson stat	1.915288
Prob(F-statistic)	0.000074		

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.959252	0.0146
Test critical values:	1% level	-4.200056	
	5% level	-3.175352	
	10% level	-2.728985	

At difference of x7

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X7(-1))	-2.500000	0.631432	-3.959252	0.0042
D(X7(-1),2)	0.465517	0.335081	1.389266	0.2022
C	0.051724	0.191475	0.270135	0.7939

R-squared	0.889666	Mean dependent var	-0.090909
Adjusted R-squared	0.862083	S.D. dependent var	1.700267
S.E. of regression	0.631432	Akaike info criterion	2.145349
Sum squared resid	3.189655	Schwarz criterion	2.253866
Log likelihood	-8.799420	Hannan-Quinn criter.	2.076944
F-statistic	32.25356	Durbin-Watson stat	1.680429

Appendixes C: Granger Causality.

Pairwise Granger Causality Tests
Date: 01/08/15   Time: 22:08
Sample: 2000 2013
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
X1 does not Granger Cause Y	12	1.64805	0.2591
Y does not Granger Cause X1		1.96935	0.2096
X2 does not Granger Cause Y	12	0.62498	0.5627
Y does not Granger Cause X2		0.33646	0.7252
X3 does not Granger Cause Y	12	5.98434	0.0305
Y does not Granger Cause X3		3.35012	0.0953
X4 does not Granger Cause Y	12	0.32858	0.7305
Y does not Granger Cause X4		4.48532	0.0557
X5 does not Granger Cause Y	12	1.54706	0.2777
Y does not Granger Cause X5		4.98680	0.0450
X6 does not Granger Cause Y	12	1.77213	0.2384
Y does not Granger Cause X6		0.70169	0.5275
X7 does not Granger Cause Y	12	0.59672	0.5764
Y does not Granger Cause X7		0.49605	0.6288
X2 does not Granger Cause X1	12	3.09129	0.1091
X1 does not Granger Cause X2		0.50539	0.6237
X3 does not Granger Cause X1	12	0.49639	0.6286
X1 does not Granger Cause X3		0.93054	0.4382
X4 does not Granger Cause X1	12	1.55494	0.2762
X1 does not Granger Cause X4		1.43085	0.3013
X5 does not Granger Cause X1	12	1.66590	0.2560
X1 does not Granger Cause X5		9.71472	0.0096
X6 does not Granger Cause X1	12	1.44780	0.2977
X1 does not Granger Cause X6		0.58495	0.5822
X7 does not Granger Cause X1	12	0.57139	0.5890
X1 does not Granger Cause X7		0.70725	0.5251
X3 does not Granger Cause X2	12	2.30050	0.1707
X2 does not Granger Cause X3		2.38813	0.1619
X4 does not Granger Cause X2	12	0.72524	0.5173

X2 does not Granger Cause X4		4.11627	0.0658
X5 does not Granger Cause X2	12	1.09861	0.3846
X2 does not Granger Cause X5		2.46920	0.1544
X6 does not Granger Cause X2	12	1.08952	0.3873
X2 does not Granger Cause X6		0.91471	0.4437
X7 does not Granger Cause X2	12	0.49376	0.6301
X2 does not Granger Cause X7		0.49574	0.6290
X4 does not Granger Cause X3	12	10.6915	0.0074
X3 does not Granger Cause X4		1.33244	0.3233
X5 does not Granger Cause X3	12	1.58805	0.2700
X3 does not Granger Cause X5		1.82581	0.2301
X6 does not Granger Cause X3	12	0.00577	0.9943
X3 does not Granger Cause X6		0.54466	0.6028
X7 does not Granger Cause X3	12	0.19176	0.8297
X3 does not Granger Cause X7		0.51649	0.6177
X5 does not Granger Cause X4	12	3.03909	0.1122
X4 does not Granger Cause X5		2.60699	0.1425
X6 does not Granger Cause X4	12	2.06066	0.1978
X4 does not Granger Cause X6		1.06060	0.3960
X7 does not Granger Cause X4	12	1.54360	0.2784
X4 does not Granger Cause X7		0.44645	0.6569
X6 does not Granger Cause X5	12	0.02978	0.9708
X5 does not Granger Cause X6		4.98444	0.0451
X7 does not Granger Cause X5	12	0.02760	0.9729
X5 does not Granger Cause X7		0.36783	0.7049
X7 does not Granger Cause X6	12	1.53205	0.2806
X6 does not Granger Cause X7		1.38579	0.3111

Appendixes D for Cointergration.

Date: 01/08/15   Time: 22:05
Series: Y X1 X2 X3 X4 X5 X6 X7
Sample: 2000 2013
Included observations: 14
Null hypothesis: Series are not cointegrated
Cointegrating equation deterministics: C
Automatic lags specification based on Schwarz criterion (maxlag=2)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
Y	-3.754692	0.7294	-14.39160	0.6354
X1	-4.128094	0.6056	-14.90036	0.4838
X2	-4.257525	0.5786	25.20488	0.0011
X3	-4.246818	0.5741	-44.55691	0.0000
X4	-4.850133	0.3899	-53.83799	0.0000
X5	-3.422777	0.8277	-12.90036	0.8112
X6	-6.601547	0.0929	-186.6991	0.0000
X7	-4.249362	0.5734	-50.88566	0.0000

*MacKinnon (1996) p-values.
Warning: p-values may not be accurate for fewer than 35 observations.

Intermediate Results:

	Y	X1	X2	X3	X4	X5	X6	X7
Rho - 1	-1.107046	-1.146182	-2.550982	-1.752128	-1.896026	-0.992335	-2.356333	-2.093625
Rho S.E.	0.294843	0.277654	0.599170	0.412574	0.390922	0.289921	0.356936	0.492692
Residual variance	2.93E+13	1.77E+10	23.69704	4.633260	0.092560	9.054303	4.45E-09	0.128898
Long-run residual variance	2.93E+13	1.77E+10	19.11891	20.80761	0.518262	9.054303	1.94E-07	0.528781
Number of lags	0	0	2	1	1	0	1	1
Number of observations	13	13	11	12	12	13	12	12
Number of stochastic trends**	8	8	8	8	8	8	8	8

**Number of stochastic trends in asymptotic distribution