

**THE IMPACT OF THE EXPORT OF LIVE
ANIMALS ON THE MEAT PROCESSING FIRMS AND
FOREIGN EXCHANGE EARNINGS TO THE
ECONOMY OF ETHIOPIA.**

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Acronyms and Abbreviations

GDP =Gross Domestic Products
FAO=Food and Agricultural Organization
IMF=International Monetary Fund
LMA =Livestock Marketing Authority
ETB=Ethiopian Birr
ECuA=Ethiopian Customs Authority
NBE=National Bank of Ethiopia
OLS =ordinary least squares
WB=World Bank
TLU =Tropical Livestock Unit
USD=United States Dollar
MOFED=Ministry of Finance and Economic Development
PLI-LM =Pastoralist Livelihoods Initiative – Livestock Marketing
SSA=Sub-Saharan Africa
USA=United States of America
CSA=Central Statistical Authority
COMESA=Common Market for Eastern and Southern Africa
UNIDO=United Nations Industrial Development Organization
mla =Meat and Livestock of Australia
DAGRIS =Domestic Animal Genetic Resource Information System
GNP=Gross National Product
ILRI=International Livestock Research Institute
LDCs= Less Developed Countries
H-O-S= Heckscher-Ohlin-Samuelson
DF= Dickey–Fuller
ADF= Augmented Dickey–Fuller
ADL= autoregressive distributed lag
ECM=Error Correction method
BLUE=Best Linear Unbiased Estimator

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Abstract

Agro-processing sector should have to grow in order to match the growing supply of agricultural products and increasing demand for processed agricultural products. Agro-processing designed for accelerating growth and poverty reduction, and the ultimate achievement of structural transformation, is the critical policy challenges in present day Ethiopia. This paper examines the impact of the Export of Live Animals on the Meat processing Firms and Foreign Exchange Earnings in terms of the value of meat processed and exported and assess the gain/loss/ against the value of the export of live animals particularly cattle, sheep and goat if processed in domestic firms. The study was originated from the hypothesis that meat processing firms operate far below their installed capacity due to supply shortage; meanwhile the country exports live animals. To this end the study data was collected from meat processing firms and the ECuA (from 1997-2007; though transactions were not regular) and NBE, and compiled on monthly bases for econometric analysis and yearly bases for descriptive analysis. Because of the time series nature of economic data, Error Correction econometric Model was used for analyses. The analyses results revealed that processing livestock (cattle, sheep, and goat) fetches more benefits as compared to exporting live animals. The analyses of the model, that is, the econometric result showed that the export of live animals significantly affected the performance of meat processing firms. Accordingly, the same amount of processed meat of heads of livestock generates more benefits over the export of the same amount of live animals and the estimated minimum net gain obtained per head is 23.21, 8.33 and 23.09 ETB for cattle, sheep and goat respectively. Despite the fact that it requires detailed examination, with the current capacity utilization alone, this preliminary study shows that the unutilized gap of meat processing firms in terms of the value is estimated to 192 million ETB per year while on average firm operate the value of about 32 million ETB per year. Thus, in addition to the low supply to which domestic firms are confronted, these results validate that the export of live animals has an impact on the meat processing firms.

CHAPTER I

1. INTRODUCTION

1.1 Background of the study

Ethiopia's economy mainly depends on agriculture and its contribution to the country's economy is quite large, though largely characterized by subsistence production. The bulk of the populations (about 85%) depend on agricultural sector live in rural areas. Out of the estimated 66% of the suitable land for agriculture only 16.5 % is under cultivation. At country level, its economic contribution accounts for about 50 % of the GDP, it provides employment for about 85% of the population, generates about 90% of the export earnings and it supplies about 70% of the raw material requirements of agro-based domestic industries (Amin Abdella, 2002).

The Ethiopian agricultural sector, among others, has two main sub-sectors, crop and animal sub-sectors, which are the major livelihood of the Ethiopian people and it is a common knowledge that these are the major contributing sub-sectors to the country's economy. The livestock sub-sector plays a key role in the daily life of the Ethiopian people by providing food, cloth, income, etc., and in generating foreign exchange to the national economy. Next to coffee, livestock and livestock products exports were/are an important source of foreign exchange to the country.

Manufacturing sector, especially Agro-processing in general engrosses a series of value addition that the Ethiopian economy lacks, and in the past and present economic systems though there is a slight improvements currently, Ethiopia experienced a low level of contribution from manufacturing to the country's economy. With respect to animal sub-sector, when the contribution to foreign exchange earnings is examined, the export of live animals and animal products never exceeded 21 percent (1991/92) from the total export (NBE, March 2008). Recent study made by Asfaw, et al, 2008, states that one of the major challenges facing the meat export abattoirs has been that the competitiveness of these firms in the domestic and export markets has been limited by the underutilization of their meat

processing capacities and the existing meat processing facilities operate at less than 50% of their operational capacities.

Given the existing stock in animal sub-sector, not to mention its substantial forward and backward linkages at all levels of the economy, the scope for developing livestock resources is considerable, as there are multiplier effects that can be expected. Since the country has high livestock potential, proximity to markets (the Middle East and Europe) and related better situation, the need for improving the underutilized meat and hides and skins processing firms to operate at full (or near full) capacity has many advantages. First, the production of the value added export products that fetch better prices may significantly reduce the high transportation cost and associated problems as compared to the export of live animals; second, the hides and skins obtained from slaughter houses/meat processing firms serve as an inputs for hides and skins firms; thirdly, it creates employment and economies of scale to transport large mass of processed and packed products, as compared to the standard requirements of exporting the bulk of live animals that could have cumbersome tribulations and higher costs, are among many advantages.

Moreover, processing the primary agricultural products, including livestock pass a series of value addition stages to produce livestock products (like packed meat, chilled lamb and mutton carcass; chilled goat carcass; chilled veal carcass and beef; chilled boneless veal and beef; frozen lamb, mutton, veal and beef). In addition, employment, animal byproducts (for instance bone meal, blood meal, etc., that are used as organic fertilizer, animal feeds, etc.) are other advantages of processing locally than exporting live animals. Consequently, the export of live animals affects meat processing industries, and obviously the country loses the foreign exchange earnings from hides and skins and other advantages obtained after processing.

Agricultural sector is the major livelihood of the Ethiopian people as well the backbone of the national economy. The real situation of Ethiopian agriculture indicates that it consists of a mixture of farming systems ranging from entirely pastoralism to a subsistence small scale producers and a few specialized plantation enterprises. However, the major agricultural composition with a large number of smallholder productions of peasant farms cultivate traditionally using draught animal power to produce various combinations of staple and cash crops and animal production activities.

The livestock sub-sector plays a key role in the daily life of the Ethiopian people by providing food, cloth, income, etc., and in generating foreign exchange to the national economy. For a long period, next to coffee livestock and livestock products exports were/are an important source of foreign exchange to the country. Ethiopian livestock, with its comparative advantage in production, proximity to the Middle–East and Europe, and preferred products, is expected to have high potential to expand its export markets.

On the other hand, a high livestock potential and, proximity to markets, the operation of the meat processing industries at their full capacity has many advantages. First, the production that have better prices and export these value added products significantly reduces the transportation costs compared to the cumbersome challenges in the export of live animals and second the hides and skins obtained from slaughter houses/meat processing firms serve as the inputs for tannery industry; thirdly, it creates employment and economies of scale to transport the processed and packed products related to exporting the bulk of live animals that could incur higher cost are among many advantages.

In Ethiopia cattle, goats, sheep, camel and poultry, in order of magnitude, are used as resource base for meat production; however, the first three species are the most common. The annual growth of livestock is estimated at 1.2 percent for cattle, 1 percent for sheep, 0.5 percent for goats and 1.14 percent for camels while annual off take is estimated at 10 percent for cattle, 35 percent for sheep, 38 percent for goats and 6.5 percent for camels (Belachew and Jemberu, 2003).

Another study made by Ayele et al, (2003); revealed that livestock and livestock products are among the major foreign exchange earners, only second to coffee, with hides and skins contributing the most. For example, in 1995/1996 livestock exports accounted for close to 14% of the value of agricultural exports, of which 96% came from hides and skins. Exports dropped from 5% of the total value of exports in 1987/88 to 0.02% in 1995/96 due to decreased live animal exports, and an overall increase in the value of all exports. The share of live animal exports in total livestock and livestock products export earnings reveal fluctuating trend overtime. Skins and hides exports increased during this period while meat exports remained relatively constant.

It was also found that Ethiopia produces about 2.4 million hides, 8.3 million sheepskins and 7 million goat skins annually from its livestock resources. . Now fully processed leather that can directly be used to produce shoes and other leather products are being exported; Another opportunity that the country can benefit from is the possibility to use hides and skins for further processing to establish the finished products processing firms and leather garment factories. Various sources of information show that the hides and skins previously being exporting underwent only a first phase processing (<http://www.indo-african-society.org>, accessed Feb 2008: Investment Opportunities in Ethiopia)

According to COMESA (<http://www.comesa.int>, accessed Feb 2008), Ethiopia has the best-developed leather and leather products industry in Sub-Saharan Africa, with the possible exception of South Africa. Ethiopian highland sheepskin is internationally recognized as high quality, and has a significant demand. The Ethiopian industry has considerable scale, breadth of product lines, experience, capacity and extensive forward integration. There are a number of inclinations in Ethiopia that support the development of this industry, such as privatization of the large public sector firms and the current encouraging conditions to establish new firms. In addition, UNIDO provides support for effluent treatment plant design and installation.

It should be clear that the value added products are based on the concept of customer-oriented and producers only add value to their products only if their customers actually perceive these products as having more quality, utility or value (Samuel, 2007). A supporting suggestion to this point is described by Grunert (2005) that agribusiness sector in these days compete not only on efficiency and quality, but also on adding value. Grunert (2005) further strengthened this suggestion and asserted that in modern marketing system producers compete to catch large share of consumers by producing standardized, processed, packaged and quality products having an implication on the export of volume of processed commodities that have higher value as compared to the export of the bulk of primary agricultural commodities.

Considering Grunert's suggestion and assuming that customers actually perceive these products having more quality, utility or value, processing the primary agricultural products, in particular livestock, has many advantages, that is, the production of value added animal

products (packed meat, chilled lamb and mutton carcass; chilled goat carcass; chilled veal carcass and beef; chilled boneless veal and beef; Frozen lamb, mutton, veal and beef) bring better benefits. In addition, employment, animal by-products (for instance bone meal, blood meal, etc., that are used as organic fertilizer, animal feeds, etc.) are other advantages of processing locally than exporting live animals.

Regarding Meat Production, as explained by Improving Productivity and Market Success (IPMS) (<http://www.ipms-ethiopia.org>), although the country is endowed with a very high potential of livestock resources, the contribution of the sector to the national economy is much below the potential. In view of the traditional methods of animal husbandry, the current output per unit of domestic breed of livestock is low. Therefore, investment opportunities are potentially attractive in the areas of modern commercial livestock breeding, production and processing of meat, milk and eggs. The resource base for meat production includes cattle, goats, sheep, camel, and poultry. Cattle provide 76.8% of the meat produced nationally. Hides and skins are important by-products of meat production and are used for export and as input for the local leather industries.

In most country of East and Central Africa, agricultural products are not graded and this constitutes a barrier to profitable agricultural products marketing and value addition by various intermediaries. This is most apparent in case of livestock products. With regard to live cattle, sheep and goats markets are based on visual assessment rather than established grades. These results in unpredictable quality of meat destined for different interval and export markets and less remunerative prices for producers (Ayele, et al, 2005, Jabbar et al, 2004,). As a result of lack of quality and safety standards, the sector is open for intense competition to imports.

Many scholars who has been studying about livestock underlines that pastoralism, the larger source of livestock supply, is a cultural and economic system that incorporates and defines social structure, resource management, productivity, trade, and social and welfare mechanisms in communities founded on livestock rearing as the primary economic activity. Pastoralist communities hold the intangible resource of strong local knowledge of livestock rearing, which has helped these communities subsist largely from their animal wealth for

generations. However, this livelihood is highly vulnerable to drought, animal disease outbreaks or other shocks.

Livestock exporters pointed out that the export of live animals is more complicated, cumbersome and its business undertakings are very challenging for a land locked country like Ethiopia. In addition to these challenges, the country faces the standard requirements the world need. There are about 31 specified ‘List of International Standards of Codex Alimentarius Commission, General Standards; General Guide Lines; and Recommended code of practices’. These are adopted and modified by Ethiopian Standard Authority which is required to be satisfied. Besides, there are requirements that the World standards need to be fulfilled to export live animals; in the world Standards in “The Meat and Livestock of Australia (mla), 2006,” as indicated in: “World Livestock Export Standards” the special challenges that confront livestock exporting are:

i. Transportation of live animals: Most animal products that are traded between nations are denatured and therefore issues of live health and welfare are not relevant considerations. With live animals, however, the transportation function must satisfy various welfare standards depending on the parties involved and how they empathise with basic animal needs. The Farm Animal Welfare Council in the United Kingdom has formulated ‘Five Freedoms’ for assessing the welfare of animals that are relevant to livestock transportation and these provide an insight into the conditions that might be required to achieve acceptable welfare:

- Freedom from hunger and thirst – by ready access to fresh water and a diet to maintain health and vigour
- Freedom from discomfort – by providing an appropriate environment including shelter
- Freedom from pain, injury and disease – by rapid diagnosis and treatment of disease or injury
- Freedom to express normal behaviour – by providing sufficient space, proper facilities and company of the animal’s own kind
- Freedom from fear and distress – by ensuring conditions and treatments that avoid mental suffering.

Long distance transportation has the potential to be hazardous by virtue of the time it takes, changing climatic conditions, air quality on the carrier itself and the limited space that might be available for each animal. Logically, these challenges to animal welfare act as challenges to livestock exporting.

- ii. **Economic considerations:** Livestock exporting is a commercial activity with profitability largely tied to the operator's capacity to contain costs. From this standpoint, animal welfare standards are a 'problem' where they are perceived by operators to add more to costs than they return through saleable product.

Therefore, this study attempted to utilize the value of the exports of the Ethiopian livestock, and assess the impact on the livestock products processing firms in terms of the value of meat and hides and skins and the loss of foreign exchange earnings from the export of hides and skins due to the export of live animals.

1.2 Statement of the Problem

Comparing the export of live animals and animal products, as pointed out in the above discussions, the export of live animals is more complicated, cumbersome and its business undertakings are very challenging with a higher transaction costs. Moreover, the incapability of processing the primary agricultural products, in particular livestock, could have many disadvantages. This is based on the evidences from the past studies and this study also confirmed that the meat and hides and skins processing firms operate below their capacity mainly due to supply shortage. Hence, the export of live animals affects the meat and hides and skins processing firms due to the fact that there is a loss in revenue from better price of value added products and from hides and skins due to the exported live animals.

With this regard, so far there is no study that assesses the effects of the export of live animals on the meat and hides and skins processing firms and the lose of foreign exchange earnings from the export of hides and skins due to the export of live animals.

Therefore, the export of live animals affects meat and tannery industries with regard to supply and foreign exchange earnings from hides and skins.

1.3 Objective of the Study

Ethiopia exports live animals; nevertheless, animal products processing firms (meat and hides and skins) operate below their capacity due to supply shortage.

Hence, this study uses the information based on the data to be generated from relevant institutions and estimate the loss in foreign exchange earnings and assess the level of impact on processing firms (meat and hides and skins), and estimate the existing gap between demand and supply of these processing and exporting firms due to the export of live animals.

Therefore, the main objectives of this study are:-

1. Examine the value of the export of live animals and compare and contrast with the value of processed animal products obtained from the export.
2. Assess and quantify the loss in revenue to be obtained from the export of meat and hides and skins due to the export of live animals.
3. Assess the gap between the capacity of meat and hides and skins processing firms and supply constraints and relate with the meat and hides and skin exported as live animals.

1.4 Hypothesis

The hypotheses to be tested are the following:

1. Exports of the live animals affects the meat processing firms and,
2. There is a loss of foreign exchange earnings from the export of hides and skins due to the export of live animals.

1.5 Limitations and Scope of the Study

To carry out time series analysis it is normally accepted to utilize the long period data. The longer time data at country level we have is in an aggregated type. There is a lack of longer period disaggregated (not explicitly recoded on bases of livestock category ,that is, meat and hides and skins from cattle, sheep and goats) data both in governmental and private sector that this study requires, and the problem is critical in private sector. Besides, the disaggregated data obtained has a lot of irregularities that needs corrections and removing the outliers at the expense of the observations. Beside, getting primary information is becoming a challenging task since private firms' willingness to provide information is very minimal and some firms never provide data. In any case, to get the critically required information indirect questions were designed by diverting from discerning questions that were seemed never responded by firms. Therefore, to overcome these problems and make the required estimations and attain the stated objectives, the researcher used the combination of secondary data (meat and hides and skins export and foreign exchange earnings) as well as responses from meat exporting firms. Moreover, to make a detailed investigation for further research there was also a lack of sufficient time and the shortage of cooperation from all concerned stakeholders.

1.6 Significance of the Study

It is already indicated that agricultural production in general and livestock with respect to the comparative advantage of meat and hides and skins in particular and their contribution to GDP and foreign exchange earnings plaid/play significant role to the national economy.

Being the first of its kind, this study attempts to fill the gap in providing information regarding the estimate and indicate the effects of the export of live animals on the meat and hides and skins and/or leather processing firms and the loss of foreign exchange earnings from the export of hides and skins due to the export of live animals.

1.7 Organization of the Study

This study is organized in five chapters. Chapter one discusses on the Introduction with background, overview, marketing, potential, etc, of livestock and its contribution to the country' economy. Chapter two mainly looks at Literature Review (theoretical and empirical literatures, and model specifications). Chapter Three deals with Methodology and chapter Four describes Summary of Results and Discussion (Descriptive and Econometric) and Chapter Five provides Conclusion and recommendation/s.

CHAPTER II

2. LITERATURE REVIEW

2.1 Theoretical literature

Development policies that human beings experienced so far have their root on one or many theoretical considerations, although not exclusively. These theoretical considerations are based on the principal situations together with resources attributes. Therefore, the success of a development policy depends on the methods in which the resources are allocated and how strategies and the policies are designed and implemented. Here under, different trade theories with countries export and empirical findings on the responsiveness of the export of livestock, meat and processed livestock products to price incentives will be reviewed.

The level of development of the economy, resource endowments, policies and development strategies pursued are some of the determining factors of the export structure of a country. Being underdeveloped economy that heavily depends on agriculture, the structure of Ethiopian export is dominated by agricultural products which used to account for more than 90% over a long period except the last two years when the export share of the industrial sector showed relative increases. The share of export earnings generated by the industrial sector was 15.2% in 1999/2000 and 26.5% in 2000/01. This is attributed from improved industrial activities, besides the decline of world prices for primary commodities, specifically coffee. Coffee has been the dominant export commodity for the last five decades making-up on average 55-60% of total exports. Recent export structure and performance is indicated Table 5 as follows.

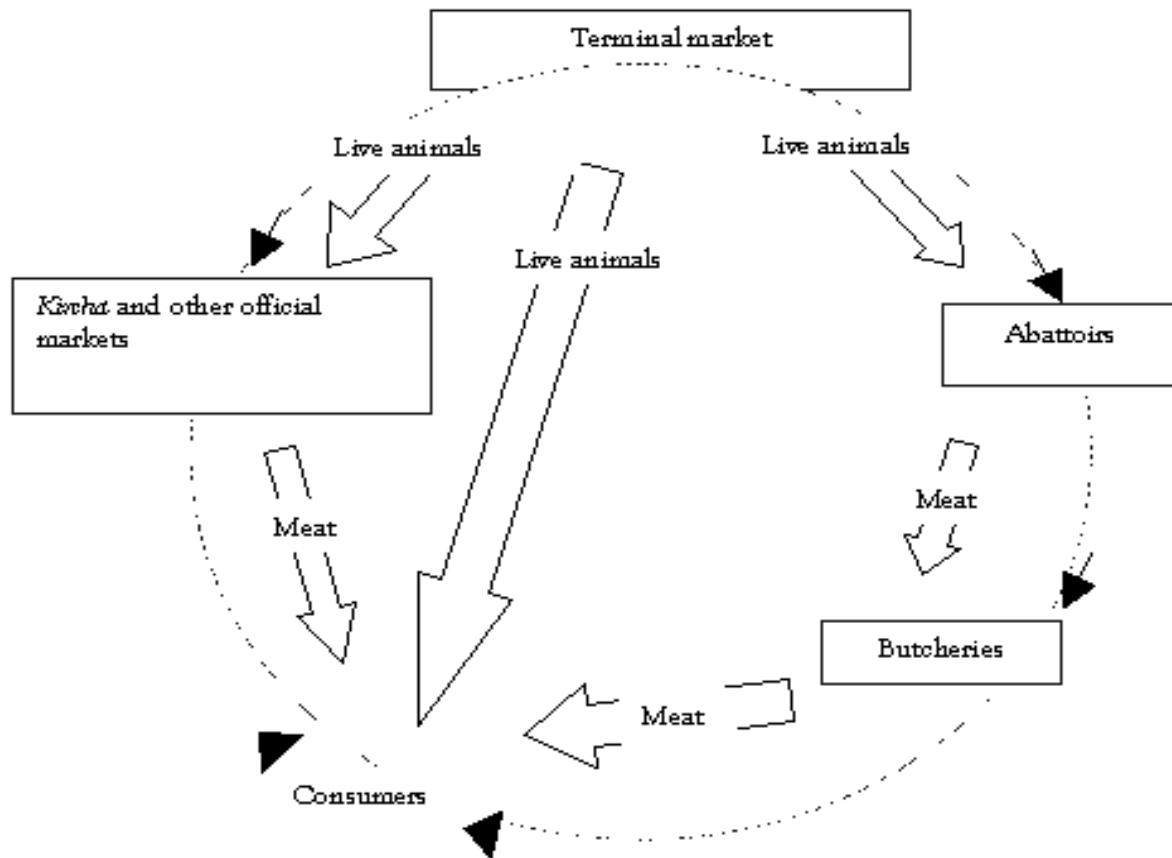
World Bank (WWW. Worldbank.org, accessed in March 2008) asserts that globally, animal products – meat, milk, eggs and fiber – constitute about 40 percent of the total value of agricultural output. The proportional contribution is about 50 percent in developed regions and 25 percent in developing regions. In developing regions, livestock provide major additional contributions to agriculture through draft power and manure for fuel and fertilizer.

The report further mentioned that the growth of markets for livestock products is in the developing regions. Improvements in livestock productivity are necessary to meet the

substantial increase in demand for livestock products – especially in developing regions. According to FAO (2001), field studies in different parts of the highland of Ethiopia show that livestock account for 37–87% of total farm cash income of farmers, indicating the importance of livestock in rural livelihood. Despite the contribution of livestock to the economy and to smallholders' livelihood, the production system is not adequately market-oriented. There is little evidence of strategic production of livestock for marketing except some sales targeted to traditional Ethiopian festivals. The primary reason for selling livestock is to generate income to meet unforeseen expenses. Sales of live animals are taken as a last resort and large ruminants are generally sold when they are old, culled, or barren. In the highlands, large numbers of cattle are kept to supply draft power for crop production whereas prestige and social security are the predominant factors in the lowland pastoral areas.

Based on FAO (2007), traders that participate in livestock trade are composed of several actors. Some traders may specialize in either small or large animals. Those small traders from different corners bring their livestock to the local market (2nd tier). Traders purchase a few large animals or a fairly large number of small animals for selling to the secondary markets. In the secondary market (3rd tier), both smaller and larger traders operate and traders and butchers from terminal markets come to buy animals. In the terminal market (4th tier), big traders and butchers transact larger number of mainly slaughter type animals. From the terminal markets and slaughterhouses and slabs, meat reaches consumers through a different channel and a different set of traders/businesses (see **Figure 1.**)

Figure 1.1. *Typical Ethiopian livestock market structure.*



Source: FAO (2007).

In the case of Ethiopian animals marketing, starting from local markets to major terminal markets trekking remains the main transport mode for most of livestock marketing in which there are a lot of risks (weight loss, theft, death of livestock) on the trek routes. According to the World Bank (2004), regarding the live animal input side, there is a very high gap with respect to the shortage /non existence/ of essential infrastructure (roads and livestock transporting tracks) needed; instead the livestock are transported by the trekking. Similarly, these activities are traditional and costly, managing problems such as poor watering and holding facilities along the trek routes that would reduce weight and mortality losses during the trek are among the major problems of the market.

Moreover, markets are dispersed with remote market areas lacking price information. Generally, at local/primary markets the number of animals offered in a market is usually greater than the number demanded, so there is excess supply. This effectively suppresses

producer prices since the more mobile trader is better informed on market prices, while better information combined with excess supply place the trader in a better position during price negotiation. On the other hand, however, meat and hides and skins processing firms operate below their capacity mainly due to the shortage of supply.

Prices are usually fixed by individual bargaining. Prices depend mainly on supply and demand, which is heavily influenced by the season of the year and the occurrence of religious and cultural festivals. Northern Ethiopia's livestock supply is heavily influenced by the severity of the dry season; supply peaks after the October– January rainy season then drops rapidly. In the South, low sales volume characterizes the July–September main rainy season, and the fasting period (February–April), but trade peaks immediately following these periods (FAO, 2001).

As Tessema (2001) stated, Ethiopia is better known for exporting raw materials such as oilseeds, pulses and fresh vegetables, besides coffee, meat, hides, skins and leather. It should not be forgotten that Ethiopia had a track record of successful exports of especially canned meat products in the past, and it has the potential to make a come back into the processed foods export market in the export of meat and meat products. This is based on the existing solid facts. Because it is a common knowledge that Ethiopia has a very large livestock reserve, which very few countries are fortunate to be endowed with and given that there are proper off-take rates of live stock and the existence of meat and hides and skins processing firms operating at full capacity (Table 2.1).

Table 2. 1. Livestock population for cattle, sheep and goats in millions of heads

Livestock category	Year			
	1995/96	2004/05	2005/06	2006/07
Cattle	31.76	38.75	40.38	43.12
Sheep	12.80	18.07	20.73	23.63
Goats	9.96	14.86	16.36	18.56
Others(horses, donkeys, mule)	3.45	5.92	6.25	6.78

Source: CSA, 1996, 2005, 2006, 2007. Annual Statistical Bulletin

Regarding the value of Major Exports of live animals and animal products hides and skins export is relatively stable and shows an increasing trend yearly. However, Exports of live animals and meat experienced a fluctuating trend (Table 2.2)

Table 2.2. Value of Major Exports of live animals and animal products (in Thousands of ETB)

Year	Live animals	Meat products	Hides & skins
1996/97	11,201	24,175	372,253
1997/98	10,562	29,340	347,699
1998/99	5,724	31,644	243,052
1999/00	14,137	32,708	286,459
2000/01	1,506	14,366	633,752
2001/02	7,132	9,423	474,426
2002/03	4,129	20,781	448,003
2003/04	16,454	66,676	375,844
2004/05	110,875	126,152	585,185
2005/06	239,240	160,842	651,333
2006/07	323,066	135,518	789,162

Source: Computed from National Bank of Ethiopia (NBE) data, April 2008.

Another study carried out by Befekadu and Berhanu (2000) confirmed that the supply side potential of the country has an estimated livestock population ranging between 30-35 million Tropical Livestock Unit (TLU) [see Annex III for TLU conversion). Berhanu et al, 2002, also noted that Ethiopia held about 15.75 percent of the cattle and 9 percent of the sheep and goat herd of Africa in 1996, which confirms the claim that Ethiopia has the largest livestock population in the continent. Despite the fact that the off-take or actual utilization rate is comparably low in contrast to the pack or the potential, the country provides about 2 million pieces of hides and 13.6 million skins annually (Berhanu et al,2002). Had this amount been properly utilized, leave alone the potential; it could have been a great opportunity for those currently operating and potential investors in the sub-sector in particular and the country in general.

Befekadu, et al (2002), also indicated that the supply shortage of processed hides and skins has not only led many footwear industries to slow down their operation but also forced them to close down not less than 20 medium and able to large-scale foot wear industries. Similarly, survey result of Central Statistical Authority (2000 & 2001) revealed that there were about 63 medium and large-scale leather industries in the 1998/99 fiscal year but this figure declined to 53 in 1999/00. As a result of this, the sector was obliged to reduce about 13 percent of workers within 1996/97 to 1999/00. The average rate of capacity utilization of those industries, which were able to survive in the sub sector, was only 49 percent in 1999/00.

Moreover, from another source, with respect to the meat supply as indicated by Belachew Hurissa, Ethiopia has more than 41 million oxen and cows, over 50 million sheep and goats, and more than 2.6 million camels, which could potentially supply over 500, 000 tons of meat annually (<http://harowo.com/ethiopia>, accessed in Feb, 2008).

2.1.2 Potential and Contribution of Livestock in the Export of Meat, Hides and Skins and foreign exchange earnings.

In Ethiopia, it is traditionally accepted that livestock is the preferred tool that serve as savings and insurance, as financial services are remote and unreliable, livestock also fulfill social functions in ceremonies and exchanges. For pastoralists and semi-pastoralists livestock provide the majority of the cash income of rural households, and, as the most important marketable commodity.

There is an agreement among researchers that Ethiopia has a comparative advantage in exporting processed meat, particularly in the export of chilled meat to the Middle East because of its geographical proximity to the region and a well established air transportation from Addis Ababa to this region; since air transportation is faster compared to other means of transportation and lower transportation cost as compared other countries like India and Australia. The major export destinations of the Ethiopian live animal and meat through the formal channel, among many, include Saudi Arabia, Yemen (cattle, camel and sheep), Egypt (camel), and Jordan. Meat is exported mainly to the Middle East countries (sheep's meat) and Congo Brazzaville (beef) (Data collected from ECA, March 2008).

Many scholarly studies and statistical figures reveal that the country has enormous potential of livestock population nonetheless it is underutilized. Though this figure of livestock population varies from literature to literature the latest study which was made by Asfaw et al, (2008) indicates that the total estimated cattle, sheep, and goat populations in 2001/2002 including the pastoral areas are 51.9, 24.4, and 22.7 million, respectively and in 2005/2006 these figures were 50.1, 34.6, and 27.2 million, respectively. Thus, between the two periods cattle population decreased by 1.8 million (3%), and sheep and goat populations increased by 10.2 million (42%) and 4.5 million (20%), respectively.

People in the pastoral areas entirely or almost fully rely on livestock for subsistence due to the fact that most of the pastoral areas are rain fed and crop production is limited by low and erratic rainfall; hence in these arid and semi-arid zones, livestock production is the most important means of livelihood. In these communities livestock products are consumed as milk and meat as part of the normal diet. Equally and importantly pastoralists depend on the sales of livestock for their cash incomes to purchase cereals and satisfy cash needs. This strongly suggests that livestock is an important form of savings and serve as a security for pastoralists and agro-pastoralists and as well serve as a commodity ready to be sold. Pastoral, agro-pastoral and mixed farming areas, the sources of livestock to both domestic and export market, are where animal husbandry is carried out varying in proportions of stock kept and degree of seasonal movement according to location and year.

The main sources of these livestock, millions of pastoralists, are located in the extensive grazing areas of the eastern, western and southern lowlands (Mottram et al, 2005) that is these animals are more concentrated in pastoralist areas of the country. Some available estimate reveals that the pastoral areas account for about 20% of cattle, 40% of sheep, and 40% of goat populations in the country (Asfaw et al, 2008). This indicates that pastoral areas have a better comparative advantage for specialization as compared to mixed farming and with regard areas; to this community livestock serve as a source of cash income of rural households and in generating foreign exchange, as the most important marketable commodity. The Pastoralist Livelihoods Initiative – Livestock Marketing (PLI-LM) component which aims to increase pastoralists' food security by strengthening Pastoralist resiliency against drought and other economic hardship indicated that the 8 to 9 million pastoralists in Ethiopia subsist on an annual income of around \$92, of which approximately

85 percent is derived from the sale of livestock and livestock products (ACDI/VOCA, 2006). Moreover, it was understood that pastoralism is inherently not market oriented—that is, pastoralists focus on minimizing risk and vulnerability rather than maximizing profits. This is based on the premise that strengthening the competitiveness of the Ethiopian livestock industry is instrumental to sustainably improving pastoralist livelihoods and increasing their economic strength.

2.1.3. Production and Livestock marketing

In this sub-sector the country has a potential for export competitiveness and comparative advantage in livestock products (making the meat and meat products) obtained from Ethiopia, because livestock husbandry is mostly carried out under natural grazing which are very tasty and nutritionally healthy for human consumption. Ethiopia's main exports of live animals and meat products include: Steers and yearlings; sheep and goats; Fresh and chilled lamb and mutton carcass; Fresh and chilled goat carcass; Fresh and chilled veal carcass and beef; Fresh and chilled boneless veal and beef; Frozen lamb, mutton, goat carcass, veal and beef special cuts; and finished and semi-finished hides and skins (<http://www.Telecom.net.et>).

According to Asfaw et al, 2008, the total market supply of cattle, sheep, and goats from the highland and sedentary areas of Ethiopia in 2001/2002 are estimated to be 3.3, 3.2, and 2.5 million, respectively. On the other hand, the total supply side potential for both domestic and export (live animals), that is, the computation of net commercial off-take information from this same study is indicated as follows:

The off-takes can be estimated for cattle and shoats produced under smallholder mixed farming and under pastoral systems. First, the gross commercial off-take rate which is given as the total sales as a percentage of the average stock of a household is computed as:

$$\text{Gross Commercial Offtake Rate} = \left(\frac{\text{Sales}}{0.5(\text{Opening Stock} + \text{Ending Stock})} \right) * 100$$

The denominator is the average stock which is computed as a half of the sum of opening stock and ending stock over one year period. The gross commercial off-take

involves animal sales and excludes other outgoings and incomings such as transfers, exchanges, gifts, and purchases. Slaughters, gifts, and exchanges are on-farm while the sale of animals could be to others or just among livestock owners. Some transactions like buying and selling of animals for herd replacement, breeding, draft use do not lead to a net transfer of animals from the farming community though for an individual household these constitute net transfer. When the interest is in the number of livestock that actually leaves the livestock owners and enter the market for slaughter, other exchanges such as on-farm transfers, on-farm exchanges, on-farm slaughters need to be netted out for off-take computations. Thus, from the point of view of assessing the supply of live animals by the households to the market, net commercial off-take rather than gross commercial off-take is a more relevant parameter to be estimated. As a result we have also estimated the net commercial off-take rate which is given as the sales minus purchases made by the households as a percentage of the average stock. Thus, the net commercial off-take rate is given as follows:

$$\text{Net Commercial Offtake Rate} = \left(\frac{\text{Sales} - \text{Purchases}}{0.5(\text{Opening Stock} + \text{Ending Stock})} \right) * 100$$

When both the sedentary and pastoral areas are combined, the total market supplies of cattle, sheep, and goats in 2001/2002 are estimated at 4.2, 3.8, and 3.1 million, respectively and for 2005/2006 they are estimated at 4.1, 5.4, and 3.7 million, respectively.

Market supply for cattle, sheep, and goats from the pastoral areas of Ethiopia for the same year are estimated at 0.9, 0.6, and 0.6 million, respectively. When both the sedentary and pastoral areas are combined, the total market supplies of cattle, sheep, and goats in 2001/2002 are estimated at 4.2, 3.8, and 3.1 million, respectively and for 2005/2006 they are estimated at 4.1, 5.4, and 3.7 million, respectively.

Finally, the residual total supply of live animals for export markets (live and meat) is obtained by subtracting the total live animal equivalents for domestic consumption from the total live animals supply to the market. Three main steps are involved in

estimating the off-take rates of cattle, sheep, and goats for domestic consumption. First, the human population projections for Ethiopia for different years based on the human population census data for 1994 are obtained. Based on this, the total human population of Ethiopia is estimated at 62.583 for 1999/2000, 66.282 for 2001/2002 and 74.056 million for 2005/2006.

Second, the total quantities of beef, mutton, and goat meat consumed in 1999/2000 are obtained by multiplying the average per capita consumption of beef, mutton, and goat meat for 1999/2000 by the human population for 1999/2000.

Third, the estimates of total cattle, sheep, and goat equivalents of different classes of meat consumed in the rural and urban areas for different years are obtained by converting the estimated total quantity of beef, mutton, and goat meat consumed in a given year into live animal equivalents using appropriate conversion factors. The conversion factors used are based on dressing weights obtained from Domestic Animal Genetic Resource Information System (DAGRIS) given in Table 5. For example, based on this the total live animal equivalents (heads) consumed for cattle, sheep, and goats in 2001/2002 are 1.3, 4.0, and 2.3 million heads, respectively. Similarly, the total cattle, sheep, and goats equivalents consumed in 2005/2006 are 1.5, 4.6, and 2.7 million, respectively.

The domestic live animal consumption off-take rate is obtained by dividing the total live animal equivalents consumed by the total live animal population estimated for that year. Thus, for example, the estimated national off-take of cattle, sheep, and goat for domestic consumption in 2001/2002 is 2.5%, 16% and 10%, respectively and in 2005/2006 is 3%, 13%, and 10%, respectively. The consumption of cattle and sheep is almost equally split between rural and urban areas. On the other hand, significantly higher proportion of domestic consumption of goat occurs in the rural areas. Thus, when these consumption off-take rates are compared with the estimated off-take rates from production systems, it appears that domestic consumption absorbs a large share of the overall low net commercial off-take rates or market supply from smallholder farmers and pastoralists leaving a small share for the live animal and meat export activities, especially for shoats.

Once the estimates for the total live animals supply to the market and the demand for live animals for domestic consumptions are obtained, the total supply of live animals for export markets is obtained by subtracting the total live animal equivalents for domestic consumption from the total live animals supply to the market. For example, in 2005/2006 the total supply of cattle, sheep, and goats to the export markets after meeting domestic consumption demand are 2.6, 0.8, and 1.0 million, respectively. For these quantities, the meat export abattoirs have to compete with formal and informal live animal exports. However, these figures are only rough estimates based on available secondary data. If the assumptions on the population and income growth, per capita domestic consumption and off-take rates change, then different set of supply estimates could be obtained.

It is observed that there are significant off-take of cattle and shoats for domestic consumption given the observed low net commercial off-take rates. For example, the domestic consumption off-take rate for cattle, sheep, and goats in 2005/2006 for Ethiopia was 3%, 13%, and 10%, respectively. In the short run, there might be some degree of market segmentation regarding the demand for live animals due to different quality requirements for the domestic consumption and export markets. However, in the long run, with growing supermarkets and increased demand for high quality meat as a result of the increase in the income of consumers, the demand for high quality live animals for domestic consumption is expected to increase which increases the competitive pressure on export abattoirs.

The study made by Getachew et.al (2007), regarding the livestock production and marketing in Ethiopia is summarized and presented briefly as follows:

The diverse agro-climatic conditions of Ethiopia make very suitable for the production of different kinds of livestock. Most of the livestock are produced by pastoralists, agro pastoralists, and smallholder mixed crop–livestock farmers and sold to private entrepreneurs operating in a marketing chain involving collection, fattening and transportation up to terminal markets.

Livestock are kept for multiple purposes as sources of draft power, milk, meat, skin and hides. They are also the main sources of income and are closely linked to the social and cultural lives of the community.

In general, the Ethiopian export market for live animals and meat exhibited non-uniform pattern showing both ups and downs. Increased domestic demand due to population growth and stagnant or declining production in the early 1990s might have led to major decrease in exports. As of 1994/95, the share of meat export was exceeding earnings from live animal export. Earnings from meat export that reached the highest level (Birr 32.71 million or USD 3.94 million), which is about 4 percent of the annual export potential of the country in 1999/2000, has encountered a sharp fall during 2000/01, as a result of the ban on import by the Middle Eastern countries following incidence of RVF. Annual potential for export is estimated at 72,000 metric tons of meat, valued at USD 136 million. The four export abattoirs currently functional have annual slaughter capacity of 2.45 million shoats with a possibility of expansion to attain a maximum capacity of 4.5 million shoats.

Similar study made by Aklilu (2002) reveals that the livestock markets in Ethiopia function at three levels consisting of primary, secondary; and terminal markets. Some also include a nominal forth tier at the farm gate level, which could hardly be considered to function as a market.

- Primary markets have been identified as village level markets with a supply of less than 500 head of cattle/week where primary producers (farmers and pastoralists) sell small number of animals to small traders, other farmers (replacement animals), farmer or pastoralist traders and in some cases to consumers and local butchers. Such markets are not fenced, have no scales, and no feeds and watering facilities. Purchasing is done through 'eye ball' negotiations.
- Secondary markets are trader and to some extent butcher dominated markets, with an average volume of 500 – 1,000 head per week consisting of finished, breeding and draught stocks and located mainly in regional capitals. Secondary markets serve the local consumers to some extent but mainly feed the terminal markets. These markets also supply live animal exporters and meat processors.

- The terminal markets are located in large urban centers consisting of Addis Ababa, Dire Dawa, Dessie, Adama and the coffee growing regions of Sidama and Gideo. Medium to large-scale traders and butchers dominate these markets. Average volume of cattle brought to these markets may exceed over 1,000 head/week.
- Supply of livestock to the primary and secondary markets including to the terminal markets is mostly done through trekking. Traders/producers use traditional stock routes to trek their animals to the markets. In Ethiopia, there is no requirement for livestock movement permits as in Kenya (though this is being discussed in the parliament now) and producers or traders are free to take their livestock wherever they want to. Cattle are walked about 35-40 kms and shoats 15-25 kms/ a day on average. Staging points are chosen on customary practice but may change depending on the season and security. A 1995 study showed that a 100 km trekking costs Birr 1.15 per cattle and Birr 0.16 per shoat. Though trekking could be inexpensive relative to trucking, whether the costs saved from trucking would outweigh the weight loss incurred through trekking at the eventual point of sale would be an interesting point to look at. For example, an average weight loss of 8.9% (18-40 kg/head/trip) was reported over a 7-8 days trek from the highlands of Gasera (Bale) to Dera (Arsi) of cattle weighing between 200 and 450 Kgs according to a study conducted by Arsi Rural Development Project over a period of 12 months. The loss could be higher for animals originating from lowland areas.

Some studies suggest that livestock disease such as Rift Valley Fever (RVF), Foot and Mouth Diseases (FMD), etc. are other major factors that reduce or totally affect the market. In addition, the study made by World Bank (2004) outlined several factors that affect the Ethiopian meat and live animal exports. Among these, the most important causes for under-performance in meat and live animals exports are: Regulatory constraint, Banking sector constraints, Sanitary constraints, Administrative Arrangements and Infrastructure facilities, shortage of capital and cold storage, lack of standard materials (such as packaging), information on export markets, trained manpower, high internal service charges, fees and taxes.

The marketing of hides and skins starts at the producer/consumer level and passes through a chain of many middlemen and reaches the tanneries. The marketing chain is principal from primary producer (rural farmer and pastoralist) to rural markets; to small dealers and agents/collectors; to town traders and shed owners (where the hides and skins are frame-

dried and/or wet-salted); to the big traders in Addis Ababa and finally to tanneries (Getachew et.al 2007). The tanneries can be supplied directly from the slaughter premises, regional big traders or Addis Ababa big traders as well. The tanneries processes the skin received from their suppliers either in the green (fresh), air-dried or wet salted states to semi-finished or finished stages for both local and exports markets (Getachew et.al 2007).

Livestock Research conducted for 25 years by World Bank (<http://www.worldbank.org/html/□batt/25years>) with respect to “The Economic Role of Livestock, Global strategies for developing animal agriculture”, Livestock research, Socioeconomic issues, Contribution of Livestock to other sectors, socioeconomic constraints, etc are presented as follows:

2.1.3.1 The Economic Role of Livestock:

Livestock and poultry production, including milk and eggs, is the second most important sector (\$123 billion) of agriculture in developing countries, after grain production (\$147 billion). The gross value of milk production alone (\$45 billion) exceeds that of wheat (\$31 billion), beef and buffalo meat (\$24 billion) that of the developing world maize harvests (\$20 billion).

- Livestock and their products contribute about 19 percent to the total value of agriculture, forestry and fisheries production in developing countries, or about 25 percent to the value of agricultural production. This calculation only includes the output of priced commodities such as milk and meat; it ignores other benefits livestock is providing, such as capital formation, risk insurance, draft power, manures and weeding. Including the estimated value of these benefits would increase the livestock sector’s contribution to the agriculture product of developing countries to well over 30 percent. This ratio is bound to increase with rising incomes, continuing urbanization, and correspondingly changing food consumption and agricultural production patterns.
- In recent years, livestock production in developing regions has been viewed rather critically. Livestock overgrazing was seen as a major cause of desertification, exacerbating periodic droughts in Africa and their related extraordinary food aid requirements. Livestock production has been associated with the economic force behind expansion of grazing lands into closed forests in Latin America, the

Caribbean, and sub-Saharan Africa, with negative consequences for climate, agriculture and biological diversity, though in fact the primary cause of deforestation has been land policies that favor granting of land rights to cleared rather than forested land.

- This perspective has somewhat obscured public perception of the essential role of livestock for agricultural and economic development, as well as for nutrition. Livestock allows millions of small farmers to transit from subsistence to a market economy. In India and many other places, dairy development based on small farms provides fresh milk supplies to cities and offers cash income to the farmers. In Africa, cattle on the hoof is the traditional form of capital formation; hides and meat are cash commodities, and taxes are often based on numbers of livestock and paid in heads of cattle. Introducing animal traction in some parts of African agriculture has had a stimulating effect on crop production similar to mechanization.
- For the millions of landless poor and small farmers whose numbers are rapidly increasing due to population growth and limited land availability, small-scale livestock and poultry production often offer the only way of ensuring viability of the household and economic survival. Small ruminants and poultry provide gainful work to women and children.

2.1.3.2 Global strategies for developing animal agriculture: Livestock play a vital role in economic development – particularly as societies evolve from subsistence agriculture into cash-based economies.

- Increasingly, global strategies for livestock development must consider the environmental impact and the inter-regional economics of production and marketing. Improved livestock productivity supporting economic development and sustainable natural resource management are not incompatible goals. Inter-regional trade and market development must consider differences in comparative and competitive advantage, which often do not coincide. Subsidies, price controls, trade barriers and other factors can neutralize comparative advantage of developing countries for low-cost livestock production.

- Animal agriculture can be a positive factor in long-term, sustainable agriculture by incorporating adequate economic returns to livestock farmers; through maintenance of natural resources and productivity; minimal adverse environmental effects; optimal production with minimal external inputs; and satisfaction of food, income and social needs.

2.1.3.3 Animal production empowers smallholders by providing:

- Improved nutrition for the farm family
- Inputs for crop production (draft, manure)
- Regular cash income (particularly from milk) for the purchase of food, farm inputs, medical expenses and other family obligations
- Surplus cash for cropping activities, improved resource management and new enterprises that will increase the opportunities for gainful employment in rural areas

All these benefits contribute to social security at the farm level and to sustainable economic development at the national level.

2.1.4 LIVESTOCK PRODUCTION

2.1.4.1 Share of livestock in agricultural GDP:

Livestock commodity outputs contribute about 25 percent (or \$11.8 billion in 1979-81 dollars) to the agricultural GDP of sub-Saharan Africa, or about 8 percent of the total GDP. When the values of draft power and manure are included, livestock's share of agricultural GDP rises to 35 percent. The agricultural GDP share of livestock and its contribution to food supply and food security will increase with economic development and population growth. The relatively high income elasticity of livestock products indicates that an income increase of 1 percent will result in a demand of equal or higher magnitude of livestock products. Livestock contribute to household food security by simultaneously increasing food production and consumption through the acquisition of greater benefits from complementary crop and livestock enterprises. Retention of family labour on farms with livestock enterprises positively affects farm output.

2.1.4.2 Contribution to other sectors:

- To *cropping*: power, value added to crop residues, manure and soil improvements (e.g. increased carbon content and moisture retention and lower surface temperature). Crop-livestock interactions enable better use of resources, thus contributing to higher output. Also, farmers with animals can start planting earlier after drought.
- To *nutrition and food*: milk and meat production augments food supplies; milk and meat improve human diets by supplying high-quality animal proteins and micronutrients; sale of surplus milk provides cash for the purchase of other foods. (Nutrition CRSP results have shown that children provided with animal foods have improved learning and motor skills.)
- To *agro-industries*: hides and fibre; milk for dairy processing; meat for processing; cash flow for investment; employment in production, processing and trade.

2.1.4.3 The Conversion of Livestock to Meat

- Statistics on meat production and consumption vary quite significantly depending on the source, and need to be used with some degree of caution. This is partly due to the rapidly changing production levels, and partly due to the conversion of animal population data into meat production data at optimistic yields. In most cases it is not clear if meat production statistics refer to boned-out meat or bone-in carcasses.
- Comparison with international meat yields is not wise, since the meat market in most of countries utilizes animal components that would not be used in some other countries. In Less Developed Countries (LDCs), farming methods are not automated to the same degree as advanced industrialized countries; Cattle tend to be smaller and variable in weight, poultry are frequently harvested early to relieve local cash shortages, and official data is based on best achieved (or theoretical) results rather than actual average results. These and other operational differences, cause errors when using conventional «Western» yields to convert livestock populations into meat production data.

Project analysts should allow at least 10% reduction for large livestock and 15% for small livestock and poultry, against the estimated live-weight to meat conversion calculations – unless the livestock production and processing is with very sure yields. The conversion of livestock production to meat yield is demonstrated in the table 2.3.

Table 2. 3 The conversion of livestock production to meat yield

Type of animal	Live-weight at slaughter (kg)	Slaughter yield (dressing)	Retail yield as % dressing	Fat content (%)
Beef and Dairy cattle	475	61%	74%	32
Sheep	50	50%	89%	36
Pigs	100	73%	92%	32
Broilers	2	63%	100%	13
Rabbits	3.2	60%	100%	6.8

Source: (WWW. Worldbank.org, accessed on March 2008)

2.2 Export and Trade theories

Before discussing what Trade and Export are, it is worthwhile to briefly look at what Competitiveness and Globalization are. In a contemporary world trade, Competitiveness and Globalization are the most important central points to be considered. To generate benefits from comparative advantage (business with more efficient production of higher relative efficiency in the production of a particular good in one country or company as opposed to another) in trade and to sustain in the intense competition of the world a brief knowledge about Competitiveness and Globalization is crucial. Therefore, it is better to see what “Competitiveness” and “Globalization” are before discussing what Trade and Export theories are.

Competitiveness can be defined in many ways. The one used here was adopted by the European Commission (1999):

“{ “[Competitiveness is defined as] the ability to produce goods and services which meet the test of international markets, while at the same time maintaining high and sustainable levels of income or, more generally, the ability to generate, while being exposed to external competition, relatively high income and employment levels’.” And “In other words, for a country to be competitive, it is important to ensure both quality and quantity of jobs.” Economic theory suggests several factors that distinguish the concepts of competitiveness. Foremost amongst these are the issues of localization and specialization that come from the field of New Economic Geography. A number of studies (eg Audretsch and Feldman, 1998) link spillover effects, in particular knowledge spillovers, with productivity gains providing a bridge to the ideas of new growth theory where such effects are regarded as important sources of externalities.}”

Next, with longer experiences and cumulative knowledge on livestock research, among many, the one used here is explained by ILRI. Globalization as defined and used by ILRI in general and with the context of livestock exports in particular stated as follows:

“Globalization is transforming domestic and international agricultural markets in developing and high-income countries through increasing trade and enhanced exchange of technology and capital. Trade liberalization, as one of the key drivers of the globalization process, affects supply and consumer prices, triggering changes in production, specialization patterns and generating second-round effects through consumption, income, investment, factor prices and employment. Other events that shape the globalization process, like urbanization and rising incomes, are rapidly strengthening domestic demand for livestock products and are expected to dramatically affect agricultural production, agro-industries and food consumption, bringing increasingly stringent food safety and quality standards. These events are likely to lead to profound changes in the structure and performance of livestock industries in developing countries, not only by providing opportunities for accelerated economic growth and poverty alleviation but also by introducing risks for the poor and smallholder producers (*ILRI: Socio-economics and Policy Research, Version I.*)”

Therefore, the above two paragraphs justifies that the presence of challenges and opportunities in globalization and the need to overcome the challenges with exhaustively

using all opportunities by allocating the meager resources properly; utilizing these resources efficiently and effectively to sustain and attain the competitiveness in a global world.

Now, let us see the two terms, export and trade, what export is in a paragraph and what trade means in detail from its early evolution to present and its contribution to the world development in general.

In broad, “Export” is defined not only as a physical transfer/disclosure of an item outside the country, but also as a transfer/disclosure in any form of a controlled item or information within the country to anyone who is a foreign national (not that particular country citizen or permanent resident) or in short export is sell or send of goods or services to another country. Therefore, export is the provision of goods, services or knowledge across national and international boundaries. Exporting of goods is controlled by laws and government policies. Goods may not be exported unless all the necessary export permits have been obtained from the relevant agency. In all cases an export license is obligatory except in some cases where a license may not be available at all (<http://www.research.fsu.edu>, accessed in Feb 2008).

Trade, a means of getting goods in exchange for other goods, had started in a barter time. Export is to send goods for sale or exchange to other countries or the selling of goods to other countries or a product sold and transported to another country. In the earlier time it requires the simultaneous existence of the two goods to be exchanged. The development of commodity money and latter fiat money has facilitated the trading process. In trade theories there are distinct ideas that have explained how trade benefits the trading partners.

During the mercantilist period trade was viewed beneficial only if it leads to surplus (excess of export over import). This enables the country to get more precious metals, such as gold, that will help them to build power by employing more soldiers to expand their occupation. The mercantilists thus advocate economic nationalism, believing as they did that national interest were basically in conflict (Salvatore, 1995).

Unlike the mercantilists periods, nowadays, it is generally agreed that trade enables at least one of trading countries to consume beyond their autarky that shows an increase in welfare of the societies. But what is the source of trade had become the central question for trade theorists. In explaining the source of trade Adam Smith’s absolute advantage is a pioneer

work. Later Ricardo explained that countries need not have absolute advantage over the production of a good in order to trade. He says comparative advantage is sufficient. The similarity of these trade theories is both Smith's and Ricardo's trade theories are one-factor two good and two-country analysis. Moreover, these theories were not able to explore the source of that comparative advantage.

The Heckscher-Ohlin trade theory explains the source of comparative advantage. In its proposition it says a country will produce and export that commodity that uses its abundant resources intensively. Therefore, according to Heckscher-Ohlin trade theory the source of comparative advantage is factor abundance. This is to mean that labor abundant countries, most LDCs, produces and export goods that uses labor force intensively while capital abundant countries produces and export goods that uses capital intensively that is resource abundance is the source of trade.

The factor price equalization theorem of the H-O-S extends the theory to claim that through trade factor prices will be equalized. In other words trade will converge income of peoples.

In contrast to the above income convergence theory there is also a claim that income of the South and North will go further apart. The unequal exchange of Prebisch, in Yotopoulos (1996), argues that the secular terms of trade tended to turn against agricultural products of the South in favor of the Northern industrial trade. This claim is based on the inelastic demand for primary commodities and highly elastic demand for manufactured goods. Improving productivity in the agricultural export goods will increase the supply of the same. Given the inelastic demand for these products the price of them will decrease. As a result of this the developed countries appropriate part of the productivity gain in LDCs, most of whom are primary commodity exporters. On the other hand an improvement in income of LDCs induce them to demand more manufactured goods whose demand is income elastic. In general the terms of trade deteriorate for countries that export primary commodities. The implication is LDCs remain to be poor and dependent so long as they continue to produce primary commodities for their export earnings.

Yotopoulos (1996) further elaborated the effect of sectoral policies on terms of trade using an extended Lewis-type model and came up with the following four conclusions;

- improvement in productivity in the non-tradable sector in the South improves factorial terms of trade in the South.
- improvements in productivity in the tradable sector in the South imply factorial terms trade don't change.
- improvements in productivity in the North imply factorial terms of trade deteriorate for the South.
- increase in the power of unions in the North imply factor terms of trade deteriorate for the South.

Despite some pessimistic view about trade currently there is a widely held view that it is beneficial for trading partners and the benefit from it is sustainably balanced if countries are able and willing to address the deteriorating terms of trade against LDCs. Moreover, there is an understanding that there is bi-directional and long run relationship between export and growth. Therefore, increasing export is expected to improve the well being of the society through its positive impact on economic growth.

2.3 MODEL SPECIFICATION

2.3.1 General Model Description

Economic data analyzing to predict or forecast the values of economic variables is based on the past and present data. A number of possible models should be carefully examined for the suitability to analyze this economic data with the aim to achieve the specified objectives of the study.

One approach to do this is to build a more or less structural econometric model, describing the relationship between the variables of interest with the economic quantities and to use as the basis for forecasting or inference. In any time series model, the current values of economic variables are related to past values (either directly or indirectly). The approach is making use of information in the past values of variables for forecasting its future. In this particular time series approach, the study used the data of the export of the value of live animal as a base of a time series data to analyze the export of economic data.

An important issue in time series data is whether a time series process is stationary, which implies that the distribution of the variable of interest does not depend upon time. Non-stationarity can arise from different sources but an important one is the presence of so-called unit roots.

In order the estimators are Best Linear Unbiased Estimator (BLUE) Classical Linear Regression Method needs to satisfy a number of assumptions, among which non-stationarity of the error term is one. However, as discussed in William E.G. (1993), in such data (time-series data) the assumption that the error terms from successive observations are uncorrelated is frequently invalid; that is investigation will find the residuals to be auto correlated.

Time series economic data rarely behave as a set of randomly selected data without any connection between successive observations. In most time series data it is believed/observed that the constant mean around which the data fluctuates (mean reverting behavior), constant variance (finite and time invariant), and the covariance of two observations at a K distance apart is not affected by the length K (lag or lead) then the data is said to be

stationary. A data with such characteristics has temporary memory that is any shock to such data does not stay long period; hence the autocorrelation dies out quickly. In other words they have no long run mean that fluctuates around; their variance is time dependent on the lag or lead length between them (see Griffith et al, 1993).

Any regression analysis which is using non-stationary data fail to provide reliable forecast; because the data used may be spurious and further test would prove that the result is 'nonsense'. Variables of such kind frequently confirm that there is additional relationship; they may be following a deterministic trend or random walk. Therefore, to manage this problem it is better to understand the properties of "stationary" series.

A "stationary" series has several statistical properties, but as its name implies its central property is that the data points "aren't going anywhere", but instead fluctuate randomly about a constant mean which does not change from the beginning of the series to its end. It is as if this constant mean has a magnetic effect on the series, pulling it back whenever it strays too far off in either direction. This magnetic effect may be either strong or weak; a random walk is the simplest case of a series in which the magnetic effect has vanished completely (<http://www.>).

Stationarity of a time series is achieved through *differencing*, which is subtracting the previous value from the current value. First-order differencing subtracts once and removes linear trends. Second-order differencing subtracts twice and removes exponential trends. However, not all time series can be rendered stationary by differencing.

Non-stationarity of data is implied if the data has no constant mean and constant variance, and if the covariance between two observations depends on the number of lead or lags between them.

Stationarity test can be made using graphs or algebra. As described by Mukherjee and et.al.(1998), the ordering of time series can matter since it contains the history of the variables. That is, the value of the variable in one period is an important factor in determining the variable's value in the following period. This facet of time series may be expressed in a number of time series models, the simplest of which is autoregressive model with a single lag called AR(1).

$$X_t = \beta_1 + \beta_2 X_{t-1} + e_t \text{ -----(2.1)}$$

The autoregressive distributed lag (ADL) model, from which the ECM is derived, is described as follows.

Granger and Newbold, further explained that the out come of regressing one non-stationary variable on the other are, the usual t-tests of statistical significance can be very misleading because they reject the null hypothesis of “on relationship” much too frequently and, thus accept as significant relationships that are spurious far too often.

Granger and Newbold in William et.al., 1993, suggested the relationship should be estimated in first differences of the variables that the levels. However, if we wish to study the longrun relationship between variable then it is important to consider their levels rather than difference (William E.G. and et.al., 1993). In such kind of relationships we are required to test for co integration. If two time series Y_t and X_t are say $I(1)$ then, in general, the linear combination of $Y_t - \alpha - \beta X_t = \varepsilon_t$ is also $I(1)$. However, it is possible that ε_t is stationary, or $I(0)$. In order for this to happen the “trends” in Y_t and X_t must be cancelled out when $\varepsilon_t = Y_t - \alpha - \beta X_t$ is formed. In this case Y_t and X_t are said to be co integrated, and β is called by co integrating parameter (William E.G. and et.al., 1993).

2. 3.2 Model Specification

Most of the time, there are no economic reasons to choose a particular specification of the model. Consequently, to a large extent the data will determine which time series model is appropriate. Before arriving at a particular model it is common to estimate the suitability to analyze the economic data by utilizing all available estimating models.

In time series economic data usually means, variances and covariances of the series are considered, and it is sufficient to impose that these moments are independent of time, rather than the entire distribution. This is referred to as weak stationary or covariance stationary. A stochastic process is said to be strictly stationary if its properties are unaffected by a change of time origin; in other words, the joint probability distribution at any set of times is not affected by an arbitrary shift along the time axis (Verbeek, 2002).

In this particular study, the analyzing model is carried out to estimate the variables in this case the exports of Live animals, Meat processing firms' products (Meat and Hides and Skins obtained from exported live animals) in terms of the Value of Exports (at FOB prices) and the gap between supply and demand of firms.

To examine and make necessary estimations, the level of the impact of the live animal export on the meat processing firms and foreign exchange earnings, the export of the livestock (cattle, sheep and goat), the largest foreign exchange contributing sub-sector among live animal and animal products, was considered. To accomplish the outlined study, the Ethiopian Customs Authority (ECuA) and National Bank of Ethiopia (NBE) were selected because their direct and day to day involvement in export. Quantifying the loss occurred due to the export of live animals was estimated using the data collected from meat processing firms (mainly used as a conversion coefficient for the daily recorded data obtained from Customs Authority) and time series econometric model used for estimation was as follows:

General regression model:

$$f(X)=\alpha + \beta X + U \text{ ----- (Maddala, 1992)-----}(2.7)$$

Where, $f(x)$ is dependent variable

X = Observed variable

β is parameters of the model that is

α is constant/intercept,

U is error terms

Based on the nature of the data specifically, this study used the Error Correction Model (ECM), which is often used in a time series data analysis and as shown in (2.2) the ECM used was:

$$\Delta y = \alpha_0 + \alpha_{1t-i} \sum_{i=0} \Delta x_{t-i} + \alpha_{2t-i} \sum_{i=0} \Delta z_{t-i} + \alpha_{3t-i} \sum_{i=0} \Delta w_{t-i} + R_{t-i} + \varepsilon_t \dots (2.8)$$

This model is preferred due to its desirable and superior property to estimate relationships between dependent and independent variables and because of its Unbiasdness, Efficiency and Consistency to estimate (Verbeek, 2002, Gujarati 1995, Maddala, 1992,).

The models/equations were estimated by appropriate econometric tools using the data of the value of the export of live animals, meat, hides and skins and foreign exchange earned on monthly (for econometric) and annual (for descriptive analysis) bases. Then in the case of econometric analysis, it was carried out to see the stability tests to check whether the estimations are correctly specified, or whether the regression parameters are constant. Stationarity of a time series is achieved through *differencing*, which is subtracting the previous value from the current value. First-order differencing subtracts once and removes linear trends. Second-order differencing subtracts twice and removes exponential trends. However, not all time series can be rendering stationary by differencing.

As most time series economic variables have different stationarity, it is necessary to first test for stationarity of the variables to avoid spurious regression problems. Stationarity of the time series economic variables is tested by Dickey–Fuller (DF) and Augmented Dickey–Fuller (ADF) tests.

The general error correction model, which has lags of the explanatory variables, to be used in this study is;

$$\Delta y = \alpha_0 + \alpha_{1t-i} \sum \Delta x_{t-i} + \alpha_{2t-i} \sum \Delta z_{t-i} + \alpha_{3t-i} \sum \Delta w_{t-i} + R_{t-i} + \varepsilon_t \dots (2.10)$$

$$i=0$$

$$i=0$$

$$i=0$$

where, Δy = difference value of meat if livestock products are domestically processed

Δx = difference value of exported livestock

Δz = difference value of meat processed and exported

Δw = difference value of hides and skins variables are used.

CHAPTER III

3.0 Methodology of the Study

The approach to address the outlined objectives was using Time Series Data (from 1997 – 2007) obtained from National Bank of Ethiopia, Ethiopian Customs Authority, Ethiopian Export Promotion Agency, and Central Statistical Authority (CSA) and meat processing firms.

The data was collected mainly from two sources:

1. From the government institutions directly or indirectly participating in export
 - the daily exported number of heads from each livestock category (cattle, sheep and goat)
 - the value earned (at FOB price in ETB) from each livestock category (cattle, sheep and goat) exported
 - the value earned (at CIF price in ETB) from processed livestock (cattle, sheep and goat) products
2. From meat processing and exporting firms

Based on the questionnaire and other subsequent questions, information (data) was generated from meat processing firms (ELFORA Agro-processing p.l.c, Luna Slaughter house export, Modjo modern abattoir, Kolba abattoir) to develop the conversion factor; the obtained data are mainly from the first two. The data obtained includes,

- the number of heads used for processing from each livestock category (cattle, sheep and goat), the average weight of each before and after processing,
- the price of live weight of heads from each livestock category (cattle, sheep and goat) used for processing, the average price of each before and after processing
- the number of heads from each livestock category (cattle, sheep and goat) of exported live animals and the respective value obtained

- using the developed conversion factors the value of processed animal products (Meat and hides and skins) and foreign exchange earnings from these exports are estimated provided that the livestock exported are processed in domestic firms,
- the value of the export of processed meat (which was used as a proxy indicator for the performance of meat processing firms) was considered as a dependent variable and the value earned (at FOB price in ETB) from live animals (in this case cattle, sheep and goat) exported, the export of the value of hides and skins of livestock and other important variables from each category were considered.
- the amount of heads of live animals and the amount of processed meat in each firm and exported

The data was obtained from firms that have relatively higher share in production and marketing and engaged in exporting of their products. The data obtained from these firms is for a few years. It should be clear that some of processing firms are not willing to provide information, though this study is useful to them, and it was attempted to get the information indirectly. The main sources of export time series data are Ethiopian Customs Authority, National Bank of Ethiopia, Ethiopian Export Promotion Agency, and Central Statistical Authority (CSA) and others. Whenever necessary additional data was obtained from respective/related institutions (like The Ministry of Trade & Industry, relevant organizations and individuals) and other dependable source of information.

CHAPTER IV

4.0 Estimation of Results and Discussion

4.1 *Results of the Descriptive Analysis*

We have seen that with the largest livestock population in Africa, the country has an abundant supply base for the export of live animals and domestic meat processing firms. However, the marketing of livestock and livestock products performance remained lower. The live animal export and processed animal products (ETB) price and the respective estimated value of processed meat and the hide and skins in the same currency are presented in the subsequently detailed sections, tables, figures and graphs.

An assessment made by compiling and analyzing the survey data obtained from meat processing firms, the average dressing yield (that shows the out put per head) obtained in all measured variable indicators compared to the world standard depicted that the slaughter dressing yield of Ethiopian livestock is lower than the world standard (see Table 2.3 and Table 4.1 for comparison), as described by many researchers indicating that the need for further improvement particularly with respect to quality (genetic and health) and management.

Table 4.1. Average (weighted) Price of Livestock, processed meat and hides and skins from 1997- 2007.

Description	measuring Unit	Livestock Category			Remark
		Cattle	Sheep	Goat	
A=Live Weight (in kg) of livestock at slaughter houses	Kg	337.50	26.00	21.00	Computed from the processing firms data
B=Price per live head	ETB	2650.00	148	140.00	Computed from the processing firms data
C=(B/A)=Live Price per kg	ETB	7.85	5.69	6.67	Computed from the processing firms data
D=Live Price per kg	ETB	7.85	7.40	7.40	Computed from the processing firms data
E=Processed weight of Meat (carcass/lamb) per head	Kg	172	10	8	Computed from the processing firms data
Price of Meat (carcass/lamb) per kg	ETB	7.00-50.59 ≈ 14.00	11.36-20.60 ≈ 15.98	11.36-20.60 ≈ 15.98	Computed from the processing firms data
Weight of hides/skins/	Kg	18-22 ≈ 20	3.50	3.50	Computed from the processing firms data
Price per kg of hides/skins/	ETB	2.50	3.37	3.37	Computed from the processing firms data
Slaughter yield of dressing (E/A*100)	Percent	50.96	38.46	38.09	

Source: Computed based on data collected by the researcher from the survey of meat processing firms

Regarding the contribution of each livestock category, as shown on Figures, in all measured indicators the estimated average quantity of processed stock, the exported value of processed meat and the value of processed hides and skins that are exported are indicated in the pie charts from one to three (see Figure-1, Figure-2 and Figure-3). It can be seen from the Charts, estimated with the three measures, that is, the number heads processed, the value of meat processed and the value of hides and skins, the highest proportion is obtained from goat followed by sheep except in hides where next to goat, cattle generates the second

amount of value and then sheep takes the third place. This is an indication that goat meat is required more than others in the foreign markets. Next sheep follows goat and cattle takes the last rank (see Figur-1 to Fiture-3 and Appendix II).

Chart indicating the proportion of the export of meat and hides and skins from the three livestock categories

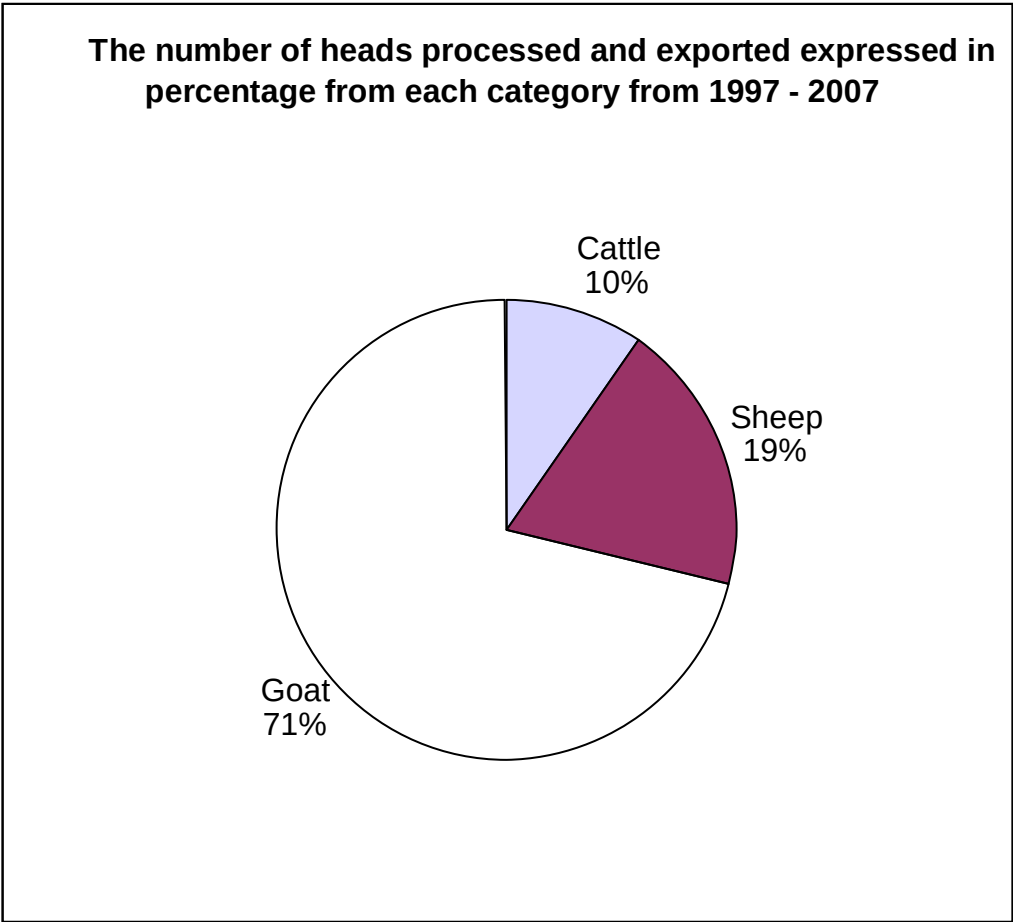


Figure 4. 1

Source: Computed, based on data collected by the researcher

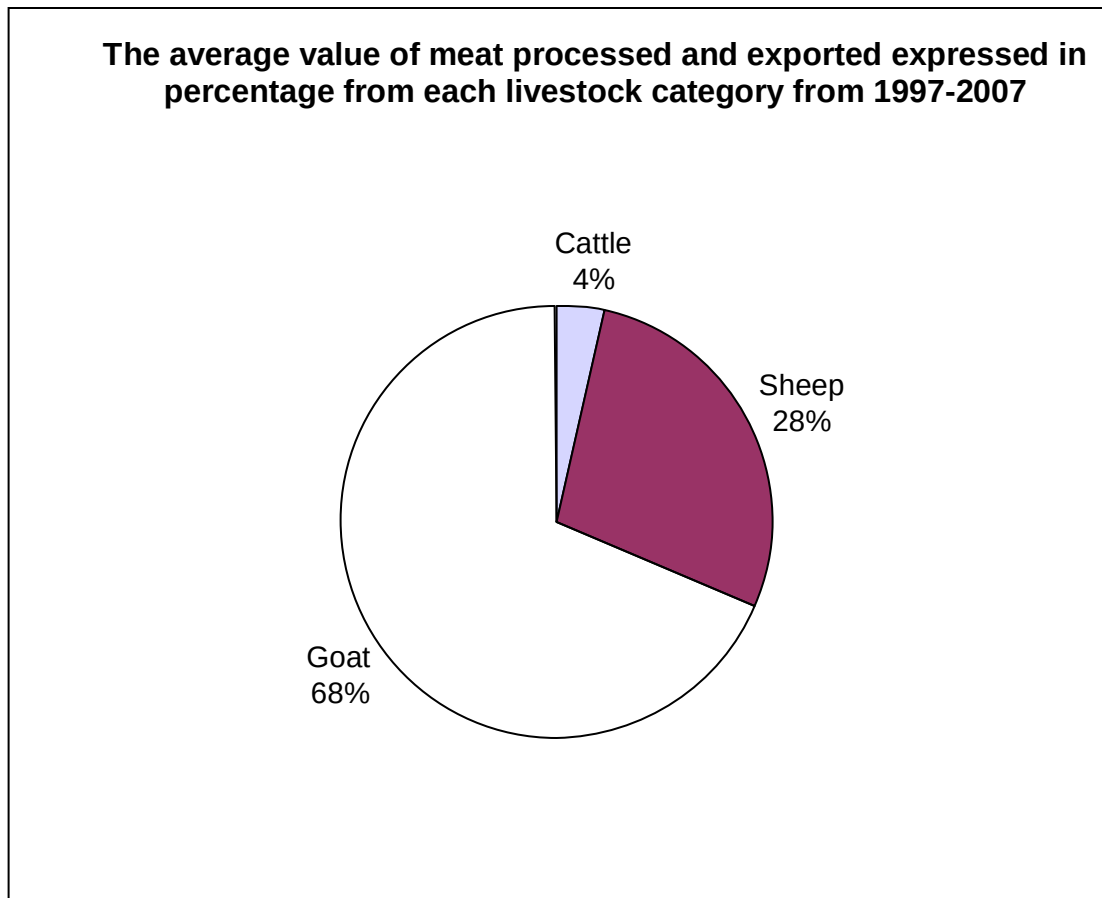


Figure 4.2

Source: Computed based on data collected by the researcher

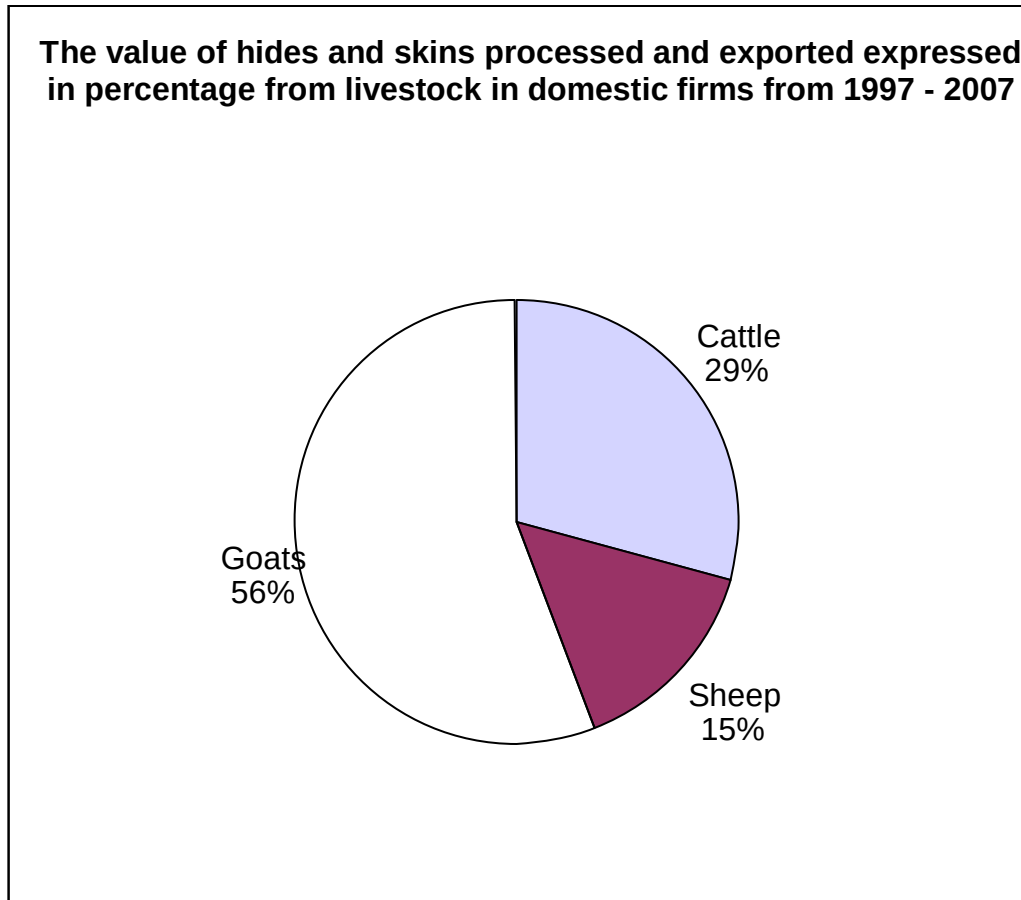


Figure 4. 2

Source: Computed based on data collected by the researcher

Based on the data collected from respective institutions, and using the information and the developed conversion factor, the descriptive analysis results of the meat processing and exporting firms are presented in the Table 4.2 – Table 4.4. Though it needs further investigations for the most important factors that contributed for the under performance of the Ethiopian meat processing firms in a holistic manner; these descriptive analyses results indicated that the export of live animals has an impact on meat processing firms.

The analysis made on the benefits (or loss) from local processing of livestock (cattle, sheep, and goats) products export as compared to the revenue earnings from the export of livestock (unprocessed) and the revenue generated by processing domestic firms from livestock (cattle, sheep, goats) products (meat and hides and skins) exports is presented from Table 4.2 to Table 4.4. From these tables, as expected, it can be clearly seen that the revenue

obtained from local processing firms outweigh the revenue obtained from the export of live animals, provided these live animals are processed in the local meat processing firms.

From the descriptive analysis carried out the estimated benefits or loss whether to export live animals or to process, the comparison of two revealed that processing animals fetches better benefits as compared to exporting live animals. For cattle the benefits obtained per head ranges from 23.21 (in 2007) to 1,871.35 (in 2000) and on average it is 387.76 ETB; for sheep it ranges from 8.33 (in 2007) to 10.02 (in 1999) and on average it is 10.00 ETB and for goat it ranges from 23.09 (in 2007) to 47.95 (in 2004) and on average it is 29.20 ETB. In all livestock categories the difference become narrower and the benefits obtained per head is becoming smaller in the year 2007. This might be due to the recent general rise in world food prices.

Therefore, with the assumption that local firms operate at full or near full capacity, it is clearly observed that there is a positive net gain. Consequently, it is possible to say that local meat and hides and skins processing firms would be benefited if the exported live animals would have been processed. Besides, the country would have been benefited from foreign exchange earnings from the hides and skins and these hides and skins could be used in tannery industry.

Another interesting finding can be seen from the graph indicating that the total value of export of live animals and the value of the export of processed animal products expressed in percentage (the value taken only from these two items) depicted exactly a contrasting (opposite) trend, that is, when the value of the export of live animals is higher the value of the animal products gets lower and the reverse is also true (Annex II). Again, this clearly shows that there is an impact on local meat processing firms due to the export of live animals. In the past 21 years, on average the value of meat obtained from export was 32.60 millions ETB. The highest peak period of the value of processed and exported meat was recorded in 2005/06 (160.84 millions ETB) that the best capacity utilization in the history of meat processing firms, as firms stated, the maximum utilized capacity that reached 60% might be this period. From this evidence the remaining unutilized capacity would be 40%, roughly this can be estimated at the value of 64.34 million ETB. Hence, the current average capacity of meat processing firms, that is, 50% capacity utilization indicates that there is a

possibility to expand the production to the installed capacity, and this estimated amount would be equivalent to 225.18 million ETB per year. In a similar manner, since there is high livestock potential, there could be a possibility to export live animals beyond the meat processing firms' capacity, that is, the value of processed meat above 225.18 million ETB per year.

As depicted in Annex I, when the export of the value of live animals and animal products are compared, the value of hides and skins shows a yearly increment, where as in the case of live animals and meat products a fluctuating trend is observed; indicating the instability of these trade components in the external markets.

The data computed from a 22 years of National Bank of Ethiopia (NBE, March 2008) with respect to the animal sub-sector contribution to foreign exchange earnings revealed very low contribution, that is, with a fluctuating trend the lowest 8.06 percent (1999/00), the maximum 21 percent (1991/92), and in 2006/07 only 8.84 percent from the total export earned (Annex I). This is an indication that livestock sub-sector is an important area that has been neglected in the past and in the current too, though the country has the highest stock in Africa. From this same source it is possible to observe that starting from 1970/71 there was an earnings of foreign exchange from the export of live animals; however, the contribution was minimal even today there is little indication in the transformation of marketing of live animals.

The yearly compiled data from the export of daily recordings of ECA data base of revenue generated from the export of processed livestock products (meat and hides/skins) indicates that there are mixed scenarios. In the case of cattle, the value obtained from both meat and hides shows a declining trend over time; in the case of sheep, the meat export shows an increment with a little ups and downs and with respect skin though there is a slight increments no definite trend is observed, that is, very high fluctuations are observed. In the case of goat in both meat and skin exports starting from 2001 every year an increasing trend was observed (see Appendix II).

In the next section, we examine the results of these same data (monthly data) which was obtained from daily recordings of Ethiopian Customs Authority and compiled on monthly basis for analysis purpose. In this particular case the symbol used for variables of data series

are included and indicated along with each kind of livestock category (for cattle, sheep and goat).

Descriptive analysis of the benefits (or loss) from processing of livestock (cattle, sheep, goats) products export as compared to the revenue earnings from the export of livestock (unprocessed).

Table 4.1 Comparison of Live Cattle export and its processed products (in millions)

Year	A=Quantity of live cattle exported	B= Earnings From live cattle export at FOB Value (ETB) (in millions)	C=Value of meat (from A) if processed in local firms(ETB) (in millions)	D=Value of hides (from A) if processed firms(ETB) (in millions)	E=C+D= Total value if processed in local firms (ETB) (in millions)	F=B-E= Gain if processed locally(in millions)
1997	563	0.68	1.36	0.03	1.38	0.70
1998	1,081	1.90	2.60	0.05	2.66	1.44
1999	531	0.71	1.28	0.03	1.31	0.37
2000	342	0.90	0.82	0.02	0.84	0.64
2001	237	0.10	0.57	0.01	0.58	0.05
2002	330	0.39	1.14	0.02	1.15	0.06
2003	1,636	2.86	10.27	0.08	10.35	1.99
2004	11,913	12.39	74.79	0.60	75.39	8.45
2005	73,103	175.15	458.94	3.66	462.60	45.27
2006	76,816	209.78	482.25	3.84	486.09	31.53
2007	71,105	217.88	446.40	3.56	449.95	1.65
Total	237,657	622.74	1,480.42	11.90	1,492.30	92.15
Mean	21,605	56.61	134.58	1.08	135.66	8.38
Standard Error	10,141	28.13	63.88	0.51	64.39	4.62
Minimum	237	0.10	0.57	0.01	0.58	0.05
Maximum	76,816	217.88	482.25	3.84	486.09	45.27

Source: Computed based on data collected by the researcher from the survey of meat processing firms

Table 4.2 Table Comparison of Live Sheep export and its processed products

Year	A=Quantity of live sheep exported (heads)	B=Earnings from the export of live sheep at FOB Value (ETB) (in millions)	D=Value of meat (from A) if processed in local firms (ETB) (in millions) (in millions)	E=Value of hides (from A) if processed in local firms (ETB) (in millions)	F=D+E=Total value if processed in local firms (ETB) (in millions)	G=B-F= Gain if Processed Locally (in millions)
1997	159,093	14.92	2.06	16.98	15.39	1.59
1998	28,330	2.66	0.37	3.02	2.74	0.28
1999	78,804	7.39	1.02	8.41	7.62	0.79
2000	119,880	11.24	1.55	12.80	11.60	1.20
2001	3,420	0.32	0.04	0.37	0.33	0.03
2002	52,977	4.97	0.69	5.66	5.13	0.53
2003	69,050	6.48	0.89	7.37	6.68	0.69
2004	60,709	5.69	0.79	6.48	5.87	0.61
2005	45,119	4.23	0.58	4.82	4.37	0.45
2006	472,795	44.35	6.12	50.47	45.74	4.73
2007	2,400	0.23	0.03	0.26	0.23	0.02
Total	1,092,577	102.48	14.14	116.64	105.70	10.92
Mean	99,325	9.32	1.29	10.60	9.61	0.99
Standard Error	39,889	3.74	0.52	4.26	3.86	0.40
Minimum	2,400	0.23	0.03	0.26	0.23	0.02
Maximum	472,795	44.35	6.12	50.47	45.74	4.73

Source: Computed based on data collected by the researcher from the survey of meat processing firms

Table 4.4. Comparison of Live Goat export and its processed products

Year	A=Quantity of live goat exported (heads)	B=Earnings from live goat exported at FOB Value (ETB) (in millions)	C=Value of meat (from A) if processed in local firms(ETB) (in millions)	D=Value of skin (from A) if processed in local firms (ETB) (in millions)	E=D+E= Total value if processed in local firms (ETB) (in millions)	F=B-E= Gain if processed locally(in millions)
1,997	15,667	1.09	1.42	0.20	1.63	0.54
1998	6,856	0.33	0.62	0.09	0.71	0.38
1999	4,500	0.28	0.41	0.06	0.47	0.19
2000	600	0.04	0.05	0.01	0.06	0.02
2003	5,819	0.40	0.53	0.08	0.60	0.20
2004	3,400	0.19	0.31	0.04	0.35	0.16
2005	5,339	0.36	0.49	0.07	0.55	0.19
2006	46,970	3.23	4.27	0.61	4.88	1.65
2007	118,406	9.56	10.76	1.53	12.29	2.73
Total	207,557	15.48	18.86	2.69	21.54	6.06
Mean	23,062	1.72	2.10	0.30	2.39	0.67
Standard Error	12,816	1.03	1.16	0.17	1.33	0.30
Minimum	600	0.04	0.05	0.01	0.06	0.02
Maximum	118,406	9.56	10.76	1.53	12.29	2.73

Source: Computed based on data collected by the researcher from the survey of meat processing firms

4.2 Results of the Econometric Analysis

As described in the previous discussions of time series economic data; in this section the value of the exported livestock if processed on the one hand is taken, and the value of the export of live animals, the value of the export of meat and the value hides and skin exported on other hand was considered and the impact on the meat processing firms in terms of value was estimated and assessed using error correction econometric model. In time series economic data it is customary to test for the presence of non-stationarity; and as econometric books recommend the tests mentioned here under are required to detect stationarity and helps to make necessary adjustments to carry out analyses.

4.2.1. Augmented Dickey-Fuller (ADF) Test and Test Result

Among many types of test for unit root ADF is the most popular. The ADF is the extension of DF. The DF test is to test whether the value of a variable at time, Y_t , is the sum of its value at time $t-1$, Y_{t-1} and the random term. If it is so it is a random walk (has unit root), or non-stationary, mathematically this can be written as

$$Y_t = \rho Y_{t-1} + \Sigma_t \quad \text{-----(4.1)}$$

Or $\Delta Y_t = \alpha Y_{t-1} + \Sigma_t$

The null hypothesis is that variable Y_t is not stationary (i.e., $\rho = 1$ or $\alpha = 0$). This test can also add constant, and trend parameters at the right hand side of the equation however; the null hypothesis remains the same (Maddala, 1992).

The null hypothesis of a unit root is rejected if the t-statistic associated with the estimated coefficients exceeds the critical values of the test.

Table 4.4 The ADF test statistics for the variables

Variable	Without constant and trend		With constant and trend	
	Level	Difference	Level	Difference
Cattle				
ttlvlui	-1.563	-2.862**	-3.260	-2.814
mtprcxpr	-3.260	-4.902**	-2.347	-4.856**
lcexpfob	-1.563	-2.862**	-3.260	-2.814
hidevalu,	-3.301	-5.288**	-4.053	-5.231**
sheep				
shpvlui	-3.368	-6.639**	-3.348	-6.596**
xptvlush	-3.368	-6.639**	-3.348	-6.596**
mspfob_va	-3.181	-5.425**	-3.151	-5.384**
spsfobvalue	-3.204	-6.956**	-3.964	-6.939**
Goat				
ttlvlui	-1.969	-2.986**	-2.210	-3.070*
lgxpvtvl	-1.600	-2.386*	-1.815	-2.467
mtxpfrfob	-5.464	-10.518**	-5.646	-10.518**
gsxpfrfob	-4.304	-6.718**	-4.257	-6.583**
Critical values				
At 5%	-1.95	-1.95	-3.50	-3.50
At 1%	-2.62	-2.62	-4.15	-4.15

* Unit root is rejected at 5% critical level and

** Unit root is rejected at 1% critical level

The ADF test statistics (Without constant and trend and with constant and trend) results above fail to reject the null hypothesis, that is, the variables are $I(0)$ at level, both at 5% and at 1% are significant. This is so because the calculated t-value of each variable are less than the critical values of the stated significance level, implying $\rho = 1$ or $\alpha = 0$. Therefore, the variables (at level) have unit root except for the variable *ttlvlui* (with constant and trend) in cattle and except for the variable *lgxpvtvl* in goat (with constant and trend). When the variables are differenced and of the table the resulting t-value with the critical values indicated at the bottom of the table we reject that they are not stationary at difference. Therefore, all the variables are integrated of order one meaning they have to be differenced once before they become stationary.

4.2.2 Test for co integration

If one performs regression using variables that are non-stationary it may lead to spurious-result, that is, the variables ‘seems’ to have long run relationship while actually they do not. Therefore, test must be undertaken whether the variables of interest have long run equilibrium relationship, in other words whether they are co integrated. Variables are co integrated if the linear combination of integrated order b, that is, I(b), has residual integration order if it is less than b. In order for this to happen the “trends” in the variables must cancel out when the linear combination is formed (Griffith E.W. 1993). Since the variables are I (1), in this analysis, the residual need to be stationary to fail to reject the null hypothesis that the variables are co integrated. If the variables are co integrated, meaning to make the variables to have long-run equilibrium relationship, and there can be an error correction mechanism, which has both the short run and long run adjustments of the variables.

As discussed by Gregory W. and Haug A. (1998), a test for cointegration commonly used is the type used in many applied research report tests. The test is the residual based Granger causality test approach and the test result is made according to the following procedures.

Taking the residual of the long run model, the cointegration test is performed as follows.

$$\Delta \check{U}_t = \sigma \check{U}_{t-1} + U_t \text{-----(4.2)}$$

The null hypothesis is **H₀: $\sigma = 0$**

The alternative hypothesis **H_A: $\sigma < 0$**

Where $\Delta \check{U}_t$ is the estimated residual value from the long run model

$\Delta \check{U}_{t-1}$ is the lag value of the estimated residuals

U_t is the error term

Augmenting the above equation of the residual with lags is ADF test. Using the above unit root test for the residual the null hypothesis is rejected in favor of no unit root which implies that the variables are cointegrated (the result of the test is presented in Table 4.6 and Table 4.7).

Table 4.6. Engle Granger (EG) test result of cointegration

Results of residual ADF test statistic

Livestock category	t-statistic	Critical values at		
		1% level	5% level	10% level
Cattle	-6.51***	-2.617	-1.950	-1.610
Sheep	-18.92***	-3.555	-2.916	-2.593
Goat	-8.29***	-3.736	-2.994	-2.628

Significant at critical level of 10% *, 5%** and 1%***.

Table 4.7 Durbin-Watson statistics test results

Livestock category	DW statistic	Critical values at	
		1% level	5% level
Cattle	Durbin-Watson d-statistic (2, 57) = 1.898**	1.548	1.724
Sheep	Durbin-Watson d-statistic (3, 68) = 2.100**	1.546	1.703
Goat	Durbin-Watson d-statistic(2, 27) = 1.945**	1.319	1.556

The Null hypothesis is the residual has unit root (no cointegration); from table 4.6 we can see that all value of test statistics are significant (less than the critical values) at both critical levels indicating the residual has no unit root, meaning the variables are cointegrated.

Test with regard to Durbin-Watson d-statistic in the same way give the result. The null hypothesis is that $d=0$ rather than $d \neq 0$. Since the cointegrating regression result of the Durbin-Watson d statistics (DW = 1.898 for cattle, DW=2.100 for sheep and DW=1.945 for goat show all values are greater than the critical values. Hence, we reject the null hypothesis of zero Durbin-Watson value. The result suggest the same conclusion as that of the EG procedure test, which is there is long run equilibrium relationship between the variables considered.

4.2.3 The Johansen System Based Approach

This approach, unlike that of single equation approach, does not impose structural relationship and or the exogeneity of some of the variables. All variables in the model are potentially endogenous. Therefore, there could be $n-1$ cointegrating vectors. The numbers of cointegrating vectors are determined with the help of two statistics: the trace statistics and the maximum eigen value.

The superiority of Johansen approach is it gives information that helps not only to determine whether the variables are cointegrated but also to know the number of cointegrating vectors, which the EG and CRDW tests imposes that it is one (if there exists). In a regression analysis, where there are n numbers of variables there could be $n-1$ cointegrating vecotors. Meaning there could be feedback relationship between variables, hence many cointegrating vectors. Therefore, how many cointegrating vecors are present in a multivariate equation is a question that needs careful investigation. To do this we use the Johansen approach. The cointegration analysis made using STATA-9 is presented in Table 4.8.

Table 4.8. Cointegration analysis of meat export performance

Livestock category	Null hypothesis	r=0	r≤1	r≤2	r≤3	r≤4
Cattle	Lambda trace	44.37	271.02	157.40	70.34	2.24*
	0.05% critical value	68.52	47.21	29.68	15.41	3.76
	0.01% critical value	76.07	54.46	35.65	20.04	6.65
	Lambda max	173.35	113.62	87.05	68.10	2.24*
	0.05% critical value	33.46	27.07	20.97	14.07	3.76
	0.01% critical value	38.77	32.24	25.52	18.63	6.65
Sheep	Lambda trace	88.83	38.18	9.67*	0.00	
	0.05% critical value	47.21	29.68	15.41	3.76	
	0.01% critical value	54.46	35.65	20.04	6.65	
	Lambda max	50.65	28.51	9.67*	0.00	
	0.05% critical value	27.07	20.97	14.07	3.76	
	0.01% critical value	32.24	25.52	18.63	6.65	
Goat	Lambda trace	85.8143	29.36*	12.1499	4.4152	
	0.05% critical value	47.21	29.68	15.41	3.76	
	0.01% critical value	54.46	35.65	20.04	6.65	
	Lambda max	56.4562	17.21*	7.7347	4.4152	
	0.05% critical value	27.07	20.97	14.07	3.76	
	0.01% critical value	32.24	25.52	18.63	6.65	

Note: the statistics lambda max and lambda trace are Johanne's maximal eigen value and trace eigen value for testing cointegration

* denotes rejection of the null hypothesis both at 0.01% and at 0.05% level

From the result above the trace statistics λ_{trace} and the max-eigenvalue statistics λ_{max} are greater than the critical values at 5% significance level when the null hypothesis $r=0$ (r is rank) against the alternative hypothesis $r=1$. This helps us to reject the null hypothesis implying that there is at least one cointegrating vector. As we follow this argument, that is, the null hypothesis is $r=1$ against the alternative $r=2$, still we reject the null hypothesis since both λ_{trace} and λ_{max} are less than the critical values (independently). Therefore, the result

indicates the variables are cointegrated and the cointegrating vector is not single; meaning there is an integration of the value of exported live animals if processed and export with the export of live animals, meat export and the export of hides and skin.

4.2.4 Test for Granger causality

In Gaussian, standard, or classical linear regression model we have a number of assumptions that a model required to fulfill in order the estimators be BLUE (for detail see Gujarati (1995)). If a model fails to fulfill (using different tests) those assumptions that OLS estimators may not retain its best, linear and unbiased estimator property. Among these assumption values taken by the regressors are fixed in a repeated sample is one. In a time series analysis this can be explained as;

Given an economic model and the

$$Y_t = \alpha_0 + \gamma X_t + \alpha_1 Y_{t-1} + v_t \dots\dots\dots (4.3)$$

and the data generating process of X_t is described by

$$X_t = \xi X_{t-1} + \varepsilon_t$$

If u_t and ε_t are not correlated, we can state that $E(u_t \varepsilon_s) = 0$ for all t and s , and then it is possible to treat X_t as if it were fixed for the purpose of estimating the above economic model of equation (5.3). That is the independent variable X_t is independent of the error term, $E(X_t, u_t) = 0$, and we can treat it as (strongly) exogenous in the model (Harris 1995). This assumption can be tested using Granger Causality test as presented below.

Given variable X and Y , the test

$$X = \sum \alpha_i Y_{t-1} + \sum \beta_j X_{t-j} + U_{1t} \dots\dots\dots (a)$$

$$Y = \sum \lambda_i X_{t-1} + \sum \delta_j Y_{t-1} + U_{2t} \dots\dots\dots (b)$$

U_{1t} and U_{2t} are uncorrelated.

We regress X_t on lag value of its area and Y_t and take the residual sum of squares. Again we regress X_t on the lag value of itself only and take the residual sum of squares. If the variable Y belongs to the model, meaning Y granger cause X , the residual sum of square of the later

regression (regression where Y is not included) will increase significant. This can be tested using the usual F test. If the calculated F-value is greater than the critical F value at the given degree of freedom, we say that the RSS of the restricted model is significantly greater than the unrestricted model. Hence, the variable excluded in the restricted model belongs to the model. The results of these test for the variables of the model is presented Table 4.9.

Table 4.9. Result of granger causality test for cattle

Cattle				
Variable	ttlvl_u_i	lcexpfob	hidevalu	mtprcxpr
ttlvl_u_i=Value of meat if exported live cattle were processed locally		117.61***	.263	0.14
lcexpfob=Value of live cattle exported	4.26		2.22	8.86***
hidevalu=Value of hide exported	0.69	0.12		0.26
mtprcxpr= Value of Meat processed and exported	3.71	0.25	1.86	
Sheep				
Variable =	shpvl_uif	xptvlush	mfpob_va	spsfobvalue
Shpvl_uif= Meat if processed locally		89.29***	24.63***	1.15
Xptvlush= Value of live sheep exported	0.13		----	-----
mfpob_va=Value of Meat processed and exported	2.33	7.23**		0.58
Spsfobvalue= Value skin exported	0.77	0.62	0.73	
Goat	ttlvl_uif	lgxprtl	mtxpfbob	gsxpfbob
Ttlvl_uif= Meat if processed locally		1.02	8.23***	2.92
Lgxprtl= Value of live goat exported	3.80		7.25***	2.82
Mtxpfbob= Value of Meat processed and exported	8.03***	9.21***		2.72
Gsxpfbob= Value skin exported	1.18	0.60	0.34	

***, ** and * represents the significance of the calculated X^2 - value at 1%, 5% and 10% respectively (for 7.38, 5.99 and 4.61 of tabulated X^2 -value).

From the above result we can see that in the case of cattle the casual relationships were observed between Value of meat if exported live cattle were processed locally and the value of live cattle export, meaning the export of live cattle is caused by cattle being not processed; and also live cattle export has a significant impact on meat export, that is, live cattle export is the cause for meat processing and export. Where as for the sheep the meat

export direction is dependent on the value of skins and the quantity of sheep exported and it is affected by the value of live sheep exported and the quantity of sheep processed, and in the case the value of goat meat export direction is mainly dependent on the value of goat skin processing, the value of live goat exported is affected by quantity of heads exported, quantity of meat processed is affected by the quantity of heads exported and the processed meat weight is affected by value of skins processed. In all cases the causation between the dependent and the independent variables is unidirectional, that is, the independent variables cause the dependent variable not the reverse. Therefore, some of the explanatory variables are likely exogenous to the model.

4.2.5 Long run model

The result of unique consideration vector and weak exogeneity of all the right hand side variables thus suggests that it is legitimate to represent the model with single equation. OLS method in such regression is super consistent, meaning the estimated parameters quickly converge to the true values than in stationary variables (Harris, 1995).

The following estimation result (Table 4.10) is the regression of the value of processed meat export performance if processed in domestic firms with respect to variables considered in each livestock category and all variables are integrated of order one, that is, $I(1)$.

Table 4. 10. The long run equation result:

Cattle Dependent variable is ttlvlu_i= value of meat and hide if live cattle exported are processed				
Independent variable	Coefficient	Standard error	t-value	Probability
lcexpfob=Value of live cattle exported	-1067.83	57.39	-18.61	0.000
hidevalu=Value of hide exported	1789.21	993.94	1.80	0.077
mtprcxpr=value of Meat processed and exported	100.19	122.29	0.82	0.416
Constant	65931.02	1241425	0.05	0.958
R ² = 0.8652 Adj.R ² = 0.8577 DW=1.71* F(3, 55) = 44.52 [0.0000]*				
Sheep: Dependent variable is Shpvluif=Total value if processed locally				
Independent variable	Coefficient	Standard error	t-value	Probability
xptvlush=Total export value from live sheep=Value sheep exported	-8.51	0.77	-11.13	0.00
mspfob_va=Value sheep meat exported	0.06	0.07	0.85	0.40
spsfobvalue=Value sheep skin exported	0.10	0.06	1.62	0.11
Constant	162,279.20	1,123,433.00	0.14	0.88
R ² = 0.6571 Adj.R ² = 0.6415 DW(4,70) = 3.17* F(3, 66) = 42.15 [0.0000]*				
Goat: Dependent variable is ttlvluif=Total value if processed locally				
Independent variable	Coefficient	Standard error	t-value	Probability
Lgxprtvl=Total value of live goat exported	-0.55	0.13	-4.25	0.00
Mtxprfob=Value of meat exported	0.29	0.17	1.76	0.09
Gsxprfob=Value of skin exported	0.01	0.01	1.06	0.30
Constant	11,919.15	295,177.30	0.04	0.97
R ² =0.7120 Adj.R ² = 0.6727 DW(4, 26) = 1.701* 18.13 [0.0000]*				

* Denoted significance of the variable at 5% significance level

To test for a spurious regression, as Granger and Newbold have suggested, an $R^2 > d$ is a good rule of thumb to suspect that the estimated regression suffers from spurious regression (Gujaratti, 1995). Accordingly, all cases show none existence of spurious regression, as indicted in table 4.6, for cattle R-squared =0.7097 and Adj.R-squared=0.6939, similarly

Durbin-Watson d-statistic (4, 59) = 2.15 indicates that it is free from spurious regression; for sheep $R^2 = 0.6571$ and $\text{Adj.}R^2 = 0.6415$, $DW = 3.17$; in the same way the case of goat also enables to arrive on the conclusion.

$$\text{Cattle} = \text{ttlvl}_i = 86.67 - 4.95(\text{lcexpfob}) + 2.13(\text{hidevalu}) + 0.29(\text{mtprcxpr}) \dots\dots\dots(4.10)$$

(SE) (3006.88) (0.43) (2.42) (0.30)

Where, ttlvl_i = value of exported live cattle value if processed locally
 lcexpfob = Value of live cattle exported,
 hidevalu = Value of hide exported,
 mtprcxpr = value of Meat processed and exported

Elasticity

- of ttlvl_i with respect to lcexpfob $\frac{dy}{dx} \cdot \left(\frac{x}{y}\right) = -1754.204 \cdot \left(\frac{106.233}{1118363.9}\right) = \mathbf{-0.17}$
- of ttlvl_i with respect to mtprcxpr $\frac{dy}{dx} \cdot \left(\frac{x}{y}\right) = 1203.701 \cdot \left(\frac{441.146}{1118363.9}\right) = \mathbf{0.47}$
- of ttlvl_i with respect to hidevalu $\frac{dy}{dx} \cdot \left(\frac{x}{y}\right) = 154.4146 \cdot \left(\frac{3166.67}{1118363.9}\right) = \mathbf{0.44}$

$$\text{Sheep} = \text{shpvlui} = 162,279.20 - 8.51(\text{xptvlush}) + 0.06(\text{mspfob_va}) + 0.10(\text{psfobvalue}) \dots\dots(4.11)$$

(SE) (1,123,433.00) (0.77) (0.07) (0.06)

Where, shpvlui = value of exported live sheep in terms of processed value
 xptvlush = Value of live sheep exported,
 spsfobvalue = Value of skin exported,
 mspfob_va = value of sheep meat processed and exported

Elasticity

- of shpvlui with respect to xptvlush is $\frac{dy}{dx} \cdot \left(\frac{x}{y}\right) = -8.511974 \cdot \left(\frac{22427.3}{21582.551}\right) = \mathbf{-8.85}$
- of shpvlui with respect to mspfob_va is $\frac{dy}{dx} \cdot \left(\frac{x}{y}\right) = 0.055953 \cdot \left(\frac{318571}{21582.551}\right) = \mathbf{0.83}$
- of shpvlui with respect to spsfobvalue is $\frac{dy}{dx} \cdot \left(\frac{x}{y}\right) = 0.1009696 \cdot \left(\frac{320677}{21582.551}\right) = \mathbf{1.50}$

Goat=ttlvluiif=Total value if processed locally:

$$\begin{array}{ccccccc} \text{ttlvluiif} = & 380031.8 & - & 0.636(\text{lgxpvtl}) & + & 0.183(\text{mtxprfob}) & + .006(\text{gsxprfob}) \dots(4.12) \\ (\text{SE}) & (102926.2) & & (0.091) & & (0.134) & (0.004) \end{array}$$

Where, ttlvluiif = value of exported live goat in terms of processed value

lgxpvtl =Value of live cattle exported,

gsxprfob =Value of hide exported,

mtxprfob =value of Meat processed and exported

Elasticity

- of ttlvluiif with respect to lgxpvtl is $dy/dx \cdot x/y = -0.64(5894.41/507699.57) = \mathbf{-0.01}$
- of ttlvluiif with respect to mtxprfob is $dy/dx \cdot x/y = 0.183 \cdot (412057/507699.57) = \mathbf{0.15}$
- of ttlvluiif with respect to gsxprfob is $dy/dx \cdot x/y = 0.1009696 \cdot (9.7e+06/507699.57) = \mathbf{0.11}$

In all cases, the sign of the elasticities are as expected, meaning the export of livestock negatively affected the performance of meat processing firms, that is, the current locally meat processing and exporting has a positive relationship with the total value of processed products (meat and hides and skin) if the exported livestock are processed; and the value of hides and skins obtained also shows a positive relationship if the live animals exported are slaughtered locally and the hides and skins obtained from the meat processing firms has similar relationships.

In general, a unit value of livestock export results a loss of 0.17, 8.85 and 0.01 units in cattle, sheep and goat respectively. However, processing in meat and hide and skins has an incremental of 0.47, 0.83 and 0.15 units in meat; and 0.44, 1.50 and 0.11 units in hide and skin for cattle, sheep and goat respectively.

4.3 Error Correction Model of meat exporting firms' performance

If variables are cointegrated OLS estimates are consistent. Although the level of regression (the cointegrated regression) is consistent it is usual to proceed to estimation of the error correction model (ECM), which contains both the long run and short run relationship between the variables. To do this we define the 'error correction term'. R_{t-1} , which is the residual from the level regression. This error correction term together with the differences of value of meat if livestock products are domestically processed as dependent variable and, value of exported livestock, value of meat processed and exported and value of hides and

skins variables are regressed on the difference of the independent variable as indicator for firms performance. The general error correction models, which have lags of the explanatory variables, is;

$$\Delta y = \alpha_0 + \alpha_{1t-i} \sum_{i=0} \Delta x_{t-i} + \alpha_{2t-i} \sum_{i=0} \Delta z_{t-i} + \alpha_{3t-i} \sum_{i=0} \Delta w_{t-i} + R_{t-i} + \varepsilon_t \dots (4.13)$$

where, Δy =difference value of meat if livestock products are domestically processed

Δx = difference value of exported livestock

Δz = difference value of meat processed and exported

Δw = difference value of hides and skins variables are used.

The above unrestricted error correction models are general. We utilize the Hendry's general to specific modeling strategy to arrive at parsimonious model of the type indicated in equation (4.13). In this (Hendry's general to specific modeling) procedure we use the standard t and F – tests since the variables are stationary as they are differenced of order (1).

Table 4.11 The ECM of meat export performance

Cattle =Dependent variable is ttlvlu_i= value of meat and hide if live cattle exported are processed	Coefficient	Standard error	t-value	Prob.
Variable				
ttlvlvlu_i=Meat if processed locally	1	.	.	.
lcexpfob=Value of live cattle exported	-3498.6	.0001	.	0.000
hidevalu=Value hide exported	1.22×10^{-05}	.00002	0.560	0.576
mtprcxpr= Value of Meat processed and exported	2.80×10^{-04}	0.00021	1.200	0.232
R_{t-i} =Residual	-4.52×10^{-08}	3.2×10^{-08}	-1.410	0.158

Table continued from Table 4.12

Sheep: Dependent variable is ShpvluiF=Total value if processed locally				
Variable	Coefficient	Standard error	t-value	Prob.
ShpvluiF=Total value if processed locally	1	.	.	.
xptvlush= Value of live sheep exported	-1.075	0.094	-11.50	0.000
mshpfob_va= Value of Meat processed and exported	0.023	0.005	4.52	0.000
spsfobvalue= Value of skin exported	0.001	0.004	0.230	0.821
R _{t-i} =Residual	1.445	.0296	48.90	0.000
Goat: Dependent variable is ttlvluiF=Total value if processed locally				
	Coefficient	Standard error	t-value	Prob.
	1	.	.	.
lgxpvtvl= Value of live goat exported	-0.99*	0.203	-4.87	0.000
mtxprfob= Value of Meat processed and exported	0.55	0.225	2.49	0.013
msxprfob= Value skin exported	0.002	0.003	0.85	0.397
R _{t-i} =Residual	-1.47*	0.144	-10.20	0.000

* denotes the significance of the coefficient t of the variables at 5% significance level.

Cattle=Durbin-Watson d-statistic (. 56) = 2.690366

Sheep=Durbin-Watson d-statistic (. 63) = 2.22199

Goat=Durbin-Watson d-statistic (., 22) = 1.569808

$$\text{Cattle} = \text{ttlvlui}_i = -3498.60(\text{lcexpfob}) + 1.22 \times 10^{-05}(\text{hidevalu}) + 2.80 \times 10^{-04}(\text{mtprcxpr}) - 4.52 \times 10^{-08}R_{t-i} \quad \text{.....(4.14)}$$

(SE) (0.0001) (0.00002) (0.00021) (3.2x10⁻⁰⁸)

$$\text{Sheep} = \text{ShpvluiF} = -2.413(\text{xptvlush}) + 0.0001(\text{mshpfob_va}) + 0.002(\text{spsfobvalue}) - 0.014R_{t-i} \quad \text{.....(4.15)}$$

(SE) (0.150) (0.0002) (0.001) (0.003)

$$\text{Goat} = -0.99(\text{gxprtvl}) + 0.55(\text{mtxprfob}) + 0.002(\text{msxprfob}) - 1.47R_{t-i} \quad \text{.....(4.16)}$$

(SE) (0.203) (0.225) (0.003) (0.144)

4.4 Discussion of the test and result summary

Following time series econometric analyses procedures, necessary tests and adjustments were carried out as required. By including important kinds of tests to make corrections and perform the analyses and to arrive at the right conclusions, the tests carried out confirmed that the required adjustments were made and indicated the possibility to undertake the analyses as per the model in question.

Accordingly, the regression for the goodness of fit and error correction analyses models were Undertaken. The result carried out for the goodness of fit as indicated by adjusted R^2 is 0.8577, 0.6415 and 0.6727 for cattle, sheep and goat respectively. The R^2 s show that about 85.77, 64.15 and 67.27 percent of the variation for cattle, sheep and goat respectively in processed meat export performance in the long run is explained by the model. Significance levels for rejecting the null hypothesis are as indicated shows that the information of these tests is; no serial autocorrelation (using lag length up to five), the residual from the model is normally distributed, and the model is correctly specified. The diagnostic tests, therefore, presented above shows that the overall explanatory power of the model is satisfactory. The null hypothesis that the coefficients of all variables in the model are jointly zero is rejected by the result of the F-statistics test indicated above; meaning the export of live animals significantly affected the performance meat processing firms.

Therefore, from the regression result carried out for the goodness of fit, the conclusion follows that the export of livestock in all the three categories (cattle, sheep and goat) has shown a negative relationship with the same quantity of livestock value if processed in domestic firms, which means a unit livestock export results a loss of 4.95, 8.51 and 0.64 per unit in cattle, sheep and goat respectively from the same amount if not processed. Similarly, the gain due to processing from meat and sheep can thus be observed from each analyses result for each category of livestock (see Table 4.10, equations 4.1.4, 4.15 and 4.16).

Although the approach and the techniques to conduct the error correction model is a bit different from the regression analyses for the goodness of fit, in that the estimation of the error correction model (ECM) contains both the long run and short run relationship between the variables, the final result obtained in general do not differ from the later, except for a

variation in figures. Likewise, in all considered indicators the export of livestock of the three categories (cattle, sheep and goat), this model also has revealed similar results, that is, negative relationship was observed between the export of livestock (not processed) with the same quantity of livestock value if processed in domestic firms, and also the net gain obtained from processed and exported meat and the net income obtained from hides and skins depicted a positive relationships with the hypothetical value of the value of processed livestock products.

CHAPTER V

5.0. Conclusion and Recommendation

5.1 CONCLUSION

Local processing firms state that they operate below their capacity mainly due to the shortage of livestock supply. On the other hand, the yearly off-take rates confirm that there is very high supply stock. Provided that the local meat processing firms' capacities is strengthened and is well facilitated to operate at maximum capacity, the benefit of processing domestically has better comparative advantage.

The analyses made with both descriptive and econometric methods using data obtained from different sources have shown that processed meat generates more benefits as compared to exporting unprocessed livestock. Based on the benefits obtained, several conclusions can be drawn from the analyses which may provide useful insights towards the general designing and implementation of strategies to alleviate the shortage of live animals supply in the market. Though the country has large livestock supply stock, the number of livestock exported and processed in domestic firms is far below the assumed supply compared with the annual off-take rate.

As stated from agro-processing firms the lack of sustainable flow of trade in export and the fluctuation problems makes this sub-sector vulnerable to shocks. Firms mainly state that the problems emanated mainly from the supply shortage and for some years due to a disease occurrence in Eastern Africa though the occurrence was not confirmed in Ethiopia and due to this, the export ban lasted from the end of 1999 to the end of 2002.

The most important fact in the present day is the export of live animals is a very cumbersome business for a land locked country like Ethiopia. Moreover, the economic considerations as well as the standard requirements of the world are among the biggest challenges. Because livestock exporting is a commercial activity with profitability largely tied to the operator's capacity to contain costs. From this standpoint, animal welfare standards are a 'problem' where they are perceived by operators to add more to costs than

they return through saleable product. When the required standards are strictly applied, obviously with existing infrastructure and facilities these challenges, particularly the profitability question may be a problem, indicating a combined problems of higher costs with the standard requirements of the world.

5.2 RECOMMENDATIONS

The Ethiopian export in livestock sub-sector mainly composed of live animals and animal products (meat, hides and skins), however, meat and hides and skin processing firms complain that they operate below their installed capacity mainly due to supply shortage. Besides, it was found that the traditional method of animal husbandry of Ethiopia, the current output per unit of domestic breed of livestock is low, which shows the existence a of gap to be filled and calls for an investment in this sub sector. Therefore, though it needs further research, this study come across the indication of the shortage of modern livestock management and breeds. This shows the existence of investment opportunities and the potential in the areas of modern commercial livestock breeding, production and processing of meat, milk and eggs. At the same time, hides and skins are important by-products of meat production, employment and other multiple effects that will come through forward and backward linkages and its contribution to the country's economy are important insights that policy makers need to consider. However, the issue needs the attention of policy makers and the need for improvements and consideration of further investment in this sub-sector. If backward and forward linkage and detailed studies are considered, its multiple effects would have been more.

As shown in the previous sections, due to the current population trend, in the future the SSA needs to meet its demands through imports. This suggests that increased domestic production can be injected in the market with increasing overall supplies as well a big chance for the Ethiopian livestock products to take a lions share in the market.

This study recommends the export of processed livestock products as compared to livestock export. However, it should not be forgotten that the current annual off-take rate of the total livestock supply is very high as compared to both total livestock exported and processed; indicating the existence of livestock marketing out of the official route. As several literatures mentioned such trade might took place through unofficial border trade.

The role of government in facilitating export marketing activities is becoming an increasingly important determinant of competitiveness for small and medium-size firms competing in the global market place. Because firms are usually reluctant to undertake market research of a public good type, government assistance in developing new and existing export markets is generally beneficial.

The types of activities that the government may support include international market research, international market intelligence of a strategic nature, trade fairs, and improvement of the national image through brand recognition particularly when consumers have strong negative prior beliefs about the products of a particular country, and providing assistance with market access issues. Generally, since Ethiopian firms are small and medium-size firms, such firms do not have adequate resources, skills, and capabilities to undertake such activities. In addition, small and medium-size firms selling in the global market place often face competition from well-organized multinationals with far greater resources to devote to advertising and marketing and to secure preferential access to markets.

Therefore, since processing meat has better advantage as compared to exporting livestock, due to these reasons and others the need for the provision of marketing assistance (such as market intelligence, market research, trade promotion, brand development etc.), infrastructural facilities, animal health provisions and the required standards should be in place to enhance the competitiveness of firms and gain from the benefits of modern agricultural transformation both locally and internationally.

In general, processing livestock which undertakes a series of value addition has many advantages as compared to export of livestock and it is more feasible to export processed livestock products due to relative ease of transportation, employment creation, and other multiple advantages

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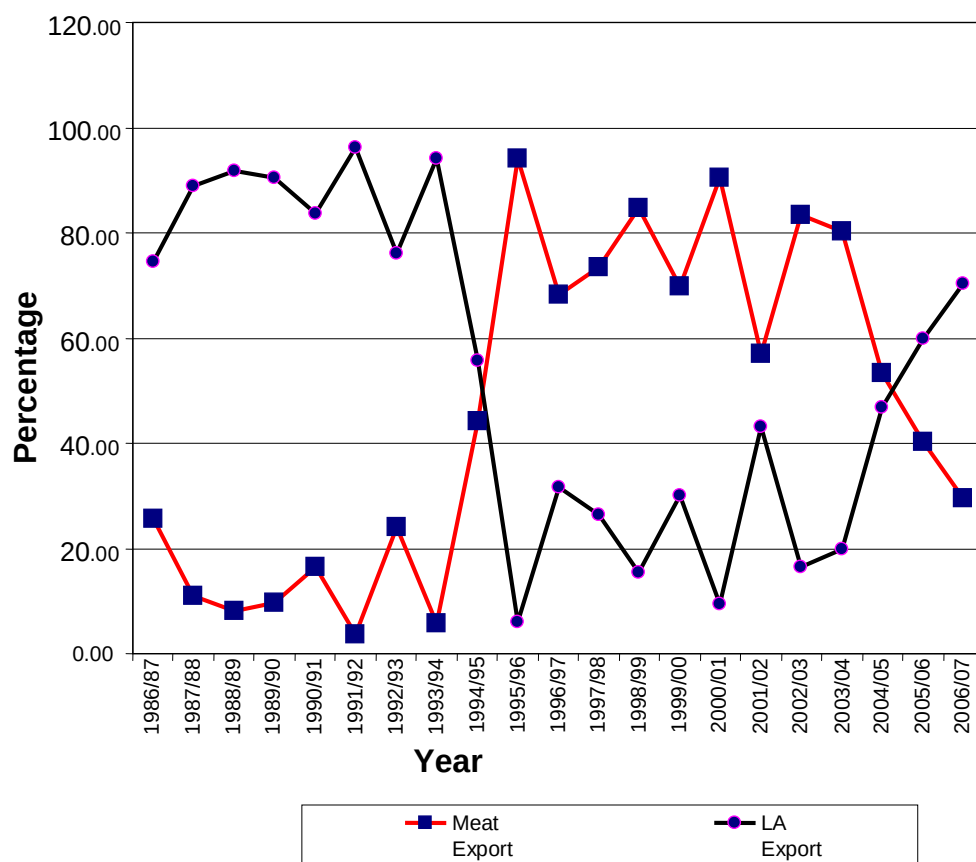
Annex I

Value of Export live animals, meat and other animal products in millions of Birr (1986/87-2006/07)

Year	Meat & Meat Products= (A)	Live Animals= ((B)	Total value of Live Animals and Animal products export= C	Total value of Live Animals and Meat export = (D)	Hides & Skins (E)	Share of Hides & skins (%) = (E/C)*100	Share of Meat (%) = (A/D)*100	Share of Live Animals (%)= (B/D)*100	Difference in value = (A-B)
1986/87	5.37	15.65	129.31	21.02	108.29	83.75	25.55	74.45	(10.28)
1987/88	4.04	32.36	169.40	36.40	133.00	78.51	11.10	88.90	(28.32)
1988/89	2.09	23.54	149.13	25.63	123.50	82.81	8.15	91.85	(21.45)
1989/90	1.15	10.82	146.02	11.97	134.05	91.80	9.60	90.40	(9.67)
1990/91	1.02	5.17	98.39	6.18	92.21	93.71	16.41	83.59	(4.15)
1991/92	0.02	0.47	59.13	0.49	58.65	99.18	3.71	96.29	(0.45)
1992/93	0.42	1.32	136.26	1.74	134.52	98.72	24.02	75.98	(0.90)
1993/94	0.67	10.76	215.04	11.43	203.61	94.69	5.88	94.12	(10.09)
1994/95	6.07	7.66	387.28	13.73	373.55	96.46	44.24	55.76	(1.58)
1995/96	12.17	0.77	322.64	12.94	309.70	95.99	94.05	5.95	11.40
1996/97	24.18	11.20	407.63	35.38	372.25	91.32	68.34	31.66	12.97
1997/98	29.34	10.56	387.60	39.90	347.70	89.71	73.53	26.47	18.78
1998/99	31.64	5.72	280.42	37.37	243.05	86.67	84.68	15.32	25.92
1999/00	32.71	14.14	333.30	46.84	286.46	85.95	69.82	30.18	18.57
2000/01	14.37	1.51	649.62	15.87	633.75	97.56	90.51	9.49	12.86
2001/02	9.42	7.13	490.98	16.56	474.43	96.63	56.92	43.08	2.29
2002/03	20.78	4.13	472.91	24.91	448.00	94.73	83.42	16.58	16.65
2003/04	66.68	16.45	458.97	83.13	375.84	81.89	80.21	19.79	50.22
2004/05	126.15	110.87	822.21	237.03	585.18	71.17	53.22	46.78	15.28
2005/06	160.84	239.24	1,051.41	400.08	651.33	61.95	40.20	59.80	(78.40)
2006/07	135.52	323.07	1,247.75	458.58	789.16	63.25	29.55	70.45	(187.55)

Source: computed using data obtained from NBE, March 2008.

Comparison of the proportion of the export of the value of live animals and meat (in percentage)

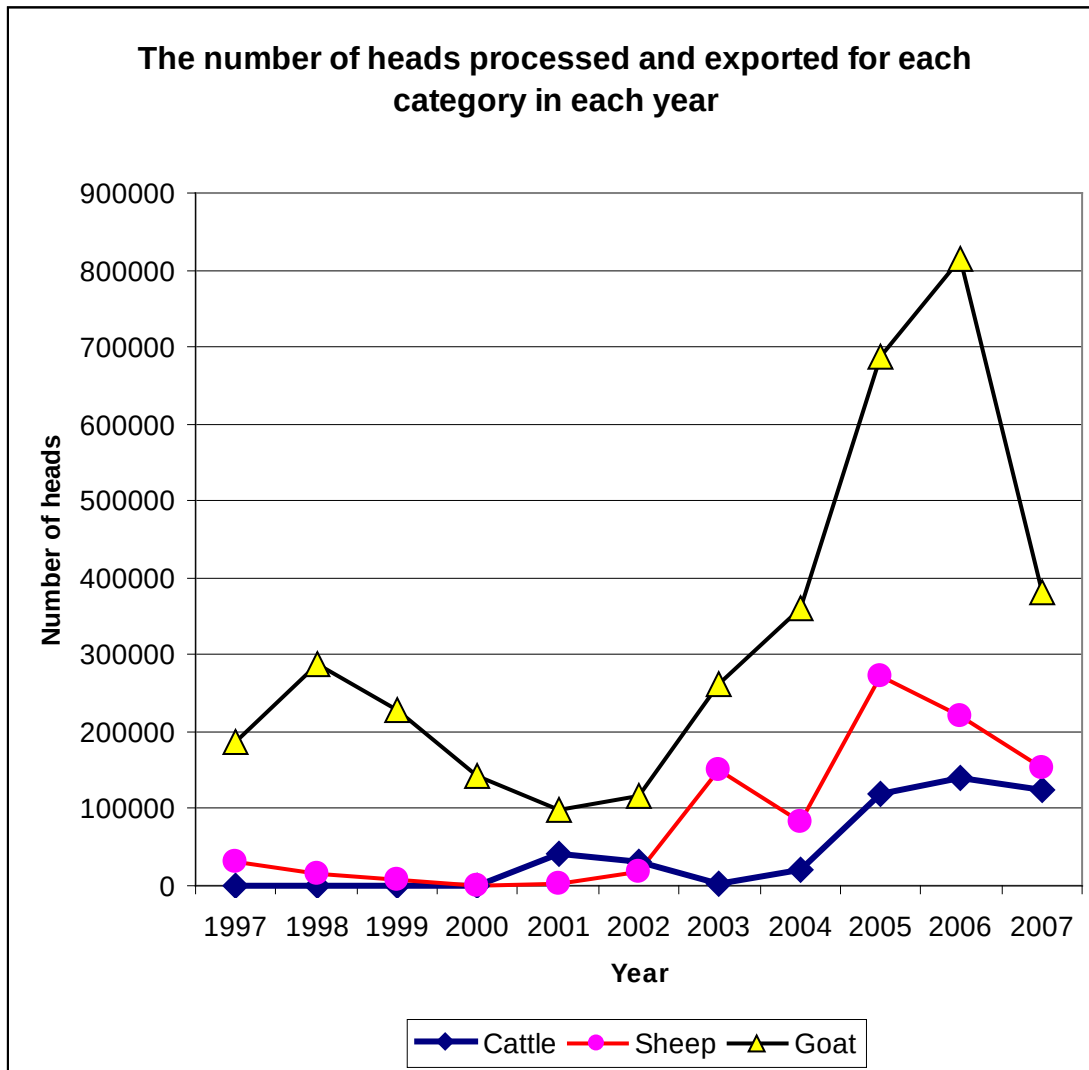


Source: National Bank of Ethiopia, 2008.

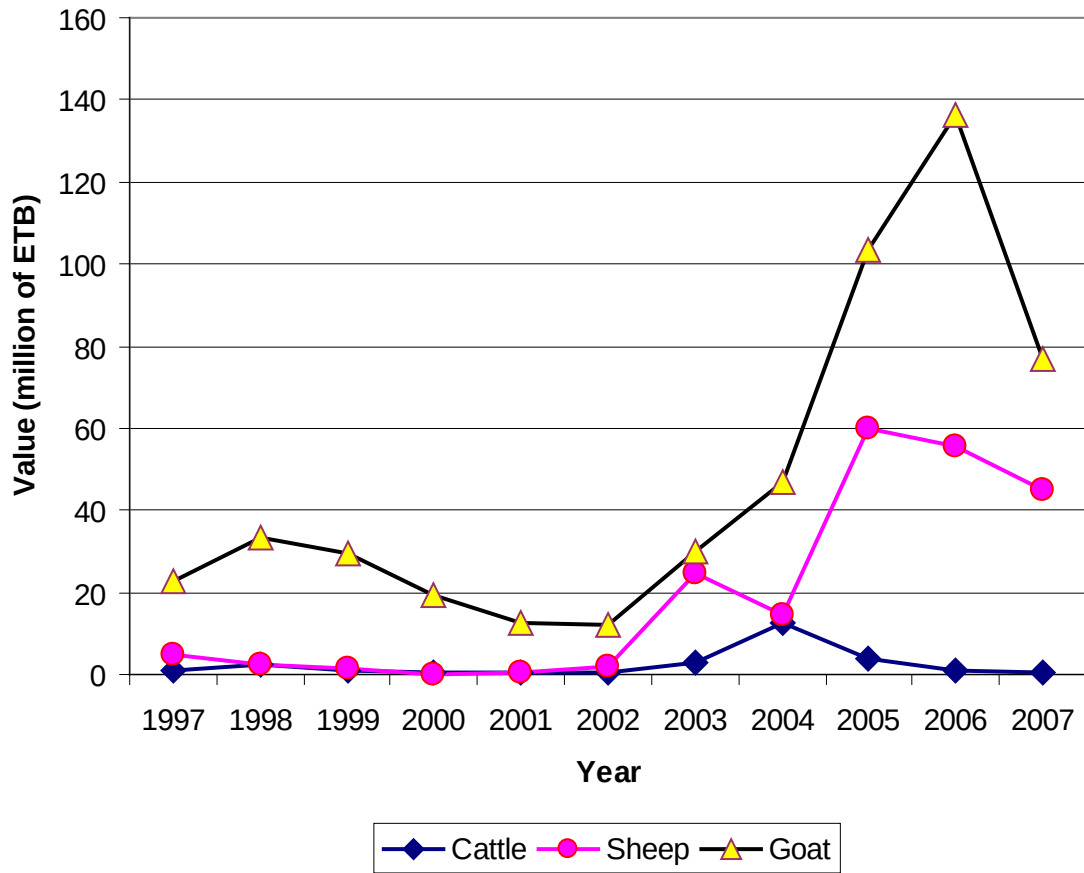
Note: The percent is calculated from the total value of the export of live animals and meat.

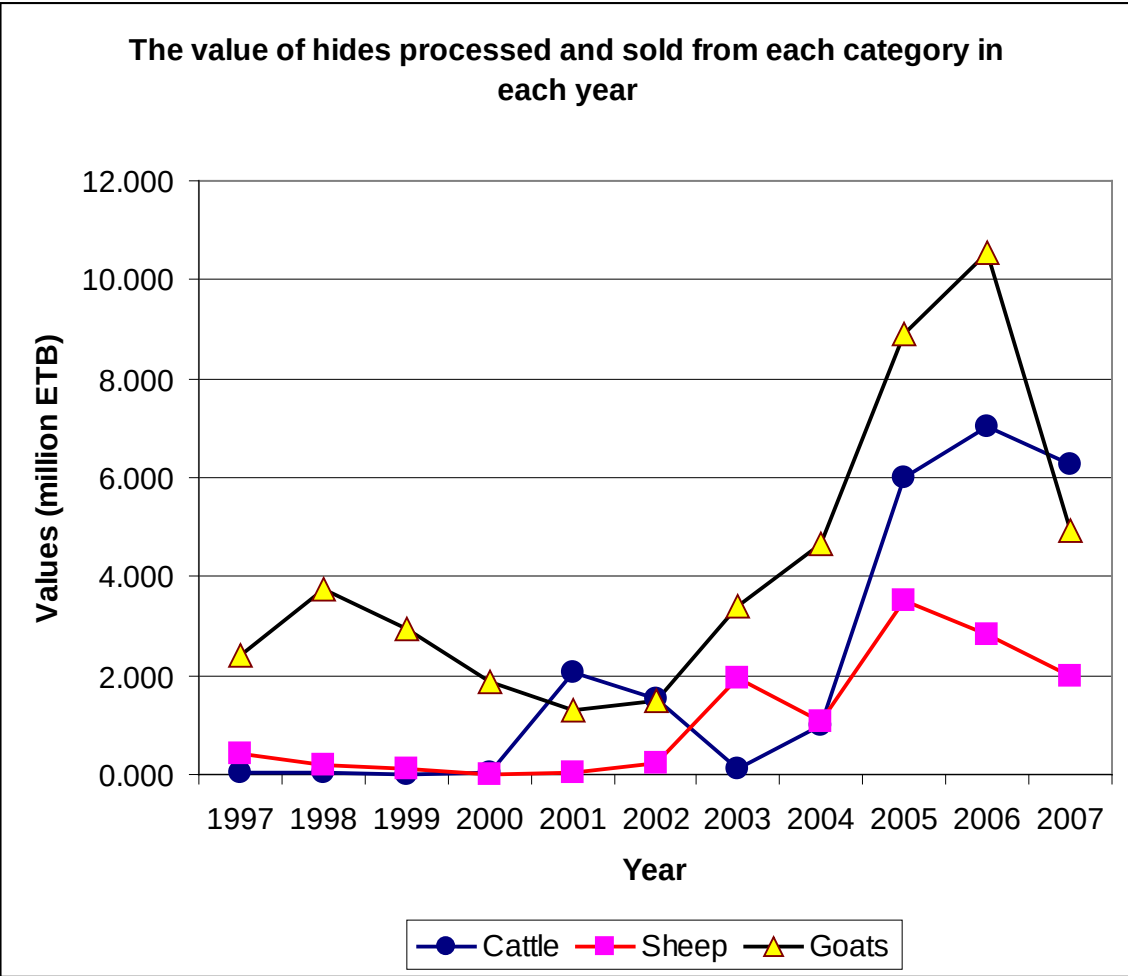
Annex II

Analysis of the revenue generated from processed livestock (cattle, sheep, and goats) products (meat and hides and skins) exports.



The value of meat processed and exported for each category in each year





A/ Quantity processed and Revenue generated from processed cattle products from 1997-2007

Year	Quantity processed (number of heads)	Earnings from the export of processed meat at CIF value (ETB) (in millions)	Earnings from the processed hides at CIF value (ETB) (in millions)
1997	556	0.853	0.028
1998	926	2.526	0.046
1999	314	1.067	0.016
2000	555	0.633	0.028
2001	41,374	0.317	2.069
2002	30,552	0.648	1.528
2003	2,296	2.860	0.115
2004	19,723	12.405	0.986
2005	119,919	3.861	5.996
2006	140,439	0.989	7.022
2007	124,970	0.657	6.249

Source: Computed by the researcher using data obtained from Ethiopian Customs Authority (ECA) and NBE.

b/ Table 12. Revenue generated from processed sheep products from 1997-2007

Year	Quantity processed (number of heads)	Earnings from the export of processed meat at CIF value (ETB) (in millions)	Earnings from the processed skin at CIF value (ETB) (in millions)
1997	31,204	4.85	0.404
1998	15,545	2.60	0.201
1999	8,663	1.50	0.112
2000	1,264	0.21	0.016
2001	3,656	0.62	0.047
2002	18,412	2.12	0.238
2003	150,061	24.61	1.943
2004	82,357	14.73	1.067
2005	272,580	59.94	3.530
2006	219,832	55.73	2.847
2007	153,012	44.76	1.982

Source: Computed by the researcher using data obtained from ECA and NBE.

c/ Table Revenue generated from processed goat products from 1997-2007

Year	Quantity processed (number of heads)	Earnings from the export of processed meat at CIF value (ETB) (in millions)	Earnings from the processed skin at CIF value (ETB) (in millions)
1997	185,972	22.74	2.408
1998	287,763	33.58	3.727
1999	227,260	29.26	2.943
2000	143,641	19.13	1.860
2001	99,637	12.78	1.290
2002	115,932	12.19	1.501
2003	262,172	29.75	3.395
2004	359,596	46.83	4.657
2005	687,116	103.50	8.898
2006	813,750	136.40	10.538
2007	380,007	76.77	4.921

Source: Computed by the researcher using data obtained from ECA and NBE.

Annex III

Conversion factors used to compute tropical livestock units

Animal category	TLU*
Calf	0.25
Weaned calf	0.34
Heifer	0.75
Cow or ox	1.00
Horse/mule	1.10
Donkey adult)	0.70
Donkey young)	0.35
Camel	1.25
Sheep or goat adult)	0.13
Sheep or goat young)	0.06
Chicken	0.013
Bull	0.75

*Tropical Livestock Unit (TLU) is a standardized measure of the number of live animals or all suits using a conversion factor of 250 Kg as one TLU.

Source: Storck *et al.*, 1991

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all sources of material used for the thesis has been duly acknowledged.

Declared by

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Date: July 2008

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Name: Beyene Tadesse (Ph.D)

Signature: _____

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July 2008