Analysis of Market Structure, Conduct and Performance of Beef Cattle: The Case of Dugda District, East Shoa Zone, Oromia Regional State, Ethiopia

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Abstract

This study was aimed to identifying the major market actors and their role in beef cattle market, and examining the market structure, conduct and performance in Dugda woreda of East shoa zone. Both primary and secondary data were used in this study. Primary data was collected from 120 sampled farmers and totally 39 traders at different levels by using semi-structured interview. Descriptive Statistics data analysis techniques were employed to analyze the beef cattle market structure, conduct and performance. The study result revealed that producers, both small and larger traders, small feedlot operators, butcheries, individual farmers for replacement or draft purposes and the final domestic consumers were the major beef cattle market actors in the study area. The market concentration ratio shows that there is strong oligopoly beef market structure in the study area. This shows only few traders were share the majority of market share and earn more profit than producers. Trading license, initial working capital, the risk of seasonal variation in demand and price offered were considerable barriers to entry to beef trading in the study area. The market conduct on the other hand shows there was no selling activity on credit basis, and the negotiation tool between sellers and buyers was mostly used for price determination in the study area. The marketing margin analysis indicates butcheries and hotels were received highest profit followed by small feedlot operators. The producers' share of final selling price or the consumer's price was found to be the highest in which producers directly sell to consumers. Intervention in improving market infrastructure, credit facilities and adding value is crucial in the study area to improve competitions among beef market actors.

Keywords: Market Structure-Conduct-Performance, beef cattle, Dugda district

Introduction

Livestock plays an important role in the agriculture of Ethiopia. It contributes 15 to 17% of GDP and 35 to 49% of agricultural GDP, and 37 to 87% of the household incomes (CSA, 2008). Cattle contribute about 80% of GDP that come from livestock (Tefera, 2011). The subsector is the second major source of foreign currency earnings through export of live animals, hides and skins (Ayele *et al.,*2003). Despite this accounts, however, development of efficient livestock marketing in most African countries including Ethiopia has remained a major challenge due to the prevailing high transaction costs, lack of access to credit, poor market infrastructure (WB, 2008).

The livestock supply chain in Ethiopia is further characterized by numerous intermediaries/actors namely: brokers, collectors; agents; animal trekkers, small, medium and big traders; wholesalers; abattoirs; butcheries; exporters; local authority and Department of Veterinary Services. This makes the supply chain unnecessarily long with increased transaction costs and without significant value added activities (Negassa *et al.*,2011).

For the Ethiopian livestock marketing for live animals and livestock products to be competitive in the global as well as domestic markets, it is imperative to reduce the transaction costs prevailing along the supply-chain by identifying cost-effective marketing channels and coordinated supply chains is crucial. This requires a proper understanding of how the marketing chain is organized as well identifying transaction costs along the supply chain/marketing channel starting from production to processing, handling, distribution and trading (Hailemariam *et al.*, 2009). However, in the study area the evidence shows that there is a little information on economic distribution among actors, structural characteristics of market actors and the competitiveness behavior of market actors in beef cattle market chain.

Hence, undertaking research on market structure, conduct and performance of beef cattle is believed to improve farmers' profitability by finding more economic market channels which creates efficient beef marketing system in the study area is crucial. Therefore, this study will provide relevant information with respect to the market chain of beef cattle by (1) identifying the major market actors and their role in beef cattle market, (2)

identifying the marketing channels, (3) examining the market structure, conduct and performance.

2. Research Methodology
2.1. Description of the Study Area
Dugda is one of the ten Woredas found in East Shoa Zone of Oromia Regional State, Ethiopia. The Woreda is composed of 36 rural *kebeles* and 3 urban *kebeles*. Dugda Woreda is located about 260 kms south of Addis Ababa the capital city of Ethiopia and 160 kms east of Adama town, the capital of East Shoa Zone of Oromia Region. The economy of the woreda is dominated by traditional cash crop farming mixed with livestock husbandry. The major crops produced in the woreda include teff, wheat, maize, vegetables (potato, cabbage, onion, and tomato), haricot bean.

2.2. Data and Sampling Procedure
The data used for this study was collected from primary and secondary sources. Formal and informal sample survey methods were used to collect primary and secondary data. The formal survey was undertaken through formal interviews with randomly selected farmers, traders and processors (butcheries and hotels) using a semi-structured questionnaire for each group. Totally 120 sample farmers were selected randomly based on proportional to the population size using Yemane (1967) formula. Accordingly, the required sample size at 95% confidence level with degree of variability of 5% and level of precision equal to 9% are recommended to obtain a sample size required which represent a true population (equation 1). In addition 39 beef cattle traders were selected randomly and interviewed using semi-structured questionnaire.

$$n = \frac{N}{1+N(e^2)} \qquad (1)$$

Where, n = sample size, N= Population size and e = level of precision assumed 9%.

2.3. Data Analysis Technique
To identify major beef marketing channels, the roles and linkages of marketing actors, the commodity approach was applied. Additionally, Structure, Conduct and Performance (S-C-P) framework was used in this study.

In agricultural marketing studies, market structural characteristics are used as a basis for classification of three categories of market: competitive, oligopolistic and monopolistic. According to Scott (1995), four salient aspects of market structure could be identified: degree of seller concentration, degree of buyer concentration, degree of product differentiation, and the condition of entry to the market.

Market concentration is defined as the number and size distribution of sellers and buyers in the market. It is felt to play a large part in the determination of market behavior within an industry because it affects the interdependence of action among firms. The greater the degree of concentration the greater the possibility of noncompetitive behavior, such as collusion would be occurred (Pomeroy and Trinidad, 1995).

The concentration ratio of an industry is used as an indicator of the relative size of firms in relation to the industry as a whole. It is calculated as the sum of the percent market share of the top *n* firms. This may also assist in determining the market structure of the industry. One commonly used concentration ratio, the *four-firm concentration ratio*, or C_4, consists of the market share of the four largest firms as a percentage of the total volume of goods or services mobilized in the total industry. To measure the degree of concentration, a few techniques, including Concentration Ratio (C), Hirschman Herfindahl Index (HHI) and Gini-Coeficient could be used. For this study market concentration was used. The concentration ratio of individual firms was calculated using a formula:

$$Ck = \sum_{i=1}^{r} Si \qquad (3)$$

Where C_k - concentration ratio for the first k largest firms
S_i - percentage share of the ith firm
r - the number of firms for which the ratio is going to be calculated.
i= 1,2,3,..., r

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

Bain (1968) contends that a barrier to entry is simply any advantage held by existing firms over those that might potentially produce in a given market. Potential entry barriers would be investigated based on demand conditions, product differentiation, absolute unit-cost advantages, legal and institutional factors, economies of scale, capital requirement and technological factors.

Market conduct refers to the patterns of behavior of firms, especially in relation to pricing and their practices in adapting and adjusting to the market in which they function.

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

components, it is possible to evaluate the impact of structure and conduct characteristics on market performance (Cremer and Jense, 1982). The major indicators or measures of market performance are: Net returns, marketing margins; marketing costs; producer's share; and value added and the analysis of market channel efficiency. A large number of studies have analyzed the marketing margins for different types of commodities to examine the performance of agricultural products marketing (e.g, Sexton *et al*. 2005 as cited on Jema, 2008) argued that even though variations in the margin over time might be attributable to marginal marketing costs under perfect computation, additional factors such as seasonality, technological changes, and sales volume may also explain the variations in the margin. For this study marketing margin was selected to analyze the marketing performance in study area.

A marketing margin is the percentage of the final weighted averages selling price taken by each stage of the marketing chain. The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words it is the difference between retail price and farm price (Cramers and Jensen, 1982). Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$TGMM = \frac{End\ buyer\ price - first\ seller\ price}{End\ buyer\ price} \times 100 \quad (4)$$

Where, TGMM = Total Gross Marketing Margin

It is useful to introduce the idea of 'farmer's portion', or 'producer's gross margin' (GMMp) which is the portion of the price paid by the consumer that goes to the producer. The producer's margin is calculated as:

$$GMMp = \frac{End\ buyer\ price - Market\ Margin}{End\ buyer\ price} \times 100 \quad (5)$$

Where, GMMp = the producer's share in consumer price

The Net Marketing Margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted.

$$NMM = \frac{Gross\ Margin - Marketing\ cost}{End\ buyer\ price} \times 100 \quad (6)$$

3. Results and Discussion

3.1. Socio-Economic characteristics of sample producers and traders

Table 2, shows socio-economic characteristics of sample producers, out of the total sample respondents, 82% were male-headed households and only 18% were female-headed households. Average household heads age was 41 years. The average family size of the total sample respondents was found to be 7 persons. With regards to farm experience, 14 average years of farming experience in beef cattle production/rearing.

The socioeconomic profile of cattle traders shows that all (100%) of them were male with a mean age 41 years that range between 22 and 60 years. The mean trading experience for sampled traders in the area was 7.6 years (Table 3.)

3.2. Commodity Chain Analysis

According to KIT (2008), chain actors includes direct chain actors, which are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors, which provide financial or non financial support services. The direct actors identified in the area along the commodity chain are producers, small traders, large traders, small-scale feedlot operators, butchers and other farmers who purchase for draft purposes.

Producers: As depicted in Appendix 1, producers are the first link along the cattle commodity chain, who decide on how much to produce, and how much, where and when to sell. Producers sold 13% of their total sale at their farm gate, 86% at the primary or woreda and 1% at secondary or central markets respectively in the study area. About 24%, 17%, 37% and 15% of total sale of producers was supplied to small-scale fatteners, butcheries, small traders and other individual farmers for draft purposes respectively in the study areas. The remaining 7% was supplied to the individual consumers for holydays and festivity which locally known as "*kircha*" which means in a group buying beef cattle and sharing meat.

Small traders: These market agents usually operate in the primary beef markets, buy up to 5- 8 animals on a given marketing day using their own capital or big traders' money and they have trade ties with affiliated large traders. Small traders have little working capital which results in their collecting limited numbers of animals on a weekly or even biweekly basis. Some small traders have relations with the larger traders and will often feed animals into the larger traders (Solomon *et al.,*2003). This study also confirmed that small traders buy on average 6 animals per/week at woreda market. As indicated in Appendix 1, small traders supply 28% of their total sale to larger traders, 18.8% to butcheries, 15.6% to small-scale fatteners, 20% to other farmers for draft purposes and 17.6% to traders out of area.

Larger traders: Large traders, which are few in number, are those who are permanently operating in the live animal and meat value chain business and are known for purchasing large numbers of animals from a variety of

sources in order to supply their customers (Solomon, 2004). They also purchase and sell beef cattle from out of the study areas, but it is rare. For instance, they purchased from Arsi-Negale woreda and Ziway-Dugda market and sold at woreda market to their customers.

Small feedlot operators: Feedlots generally purchase livestock, either from the farmers or small traders at woreda markets. Feedlots generally purchase older animals (more than five years old) for the domestic market. They feed/fattening beef cattle, mostly older oxen for targeting holiday markets like Ethiopian new year, Meskel, Easter and Arafa. They also sold the fattened beef to the butcheries and hotel owners (Solomon *et al.,* 2003). This study also investigated that small feed lot operators purchase on average two-three animals and fattened for three to four month targeting holiday markets. They sold about 90% of fattened beef cattle to butcheries and hotel owners (Appendix 1).

Farmer trader (other farmers): The rural farmers traders purchase heifer and young bulls for breeding and replacement purposes from farmers either at farm gate or woreda market place. The oxen are usually castrated and are used for draft purpose. They purchase oxen from farmers and small traders either at farm or woreda market for draft purpose.

Butcheries: Butchers are the final links before the consumers along the commodity chain. They have purchased 17% of total sales by producers, 18.8% of total sales by small traders, and 91% of the total sales by small feedlot operators (Figure 1).

Consumers: Beef consumers as mentioned are domestic consumers who buy either processed meat from butchers and hotels or who, as a group, buy beef animals to slaughter and then share the meat particularly during holidays and other social occasions.

3.2. Analysis of Beef Market Structure-Conduct- Performance

3.2.1. Market Structure of Beef Cattle

3.2.1.1. Market concentration

Market concentration refers to number and size of distribution of sellers and buyers in the market. For this study major actors which participate in beef cattle buying and selling activity was taken for considering market structure. The concentration ratios for the four large enterprises (CR4) for beef cattle market in the study area was 93% which indicated that the beef market in the study area was inefficient and non-competitive. That means it was found to be characterized by a strong oligopoly.

3.2.1.2. Barriers to entry

According to the survey result, only about 8% of the beef cattle traders and small feedlot operators had trade license from the total traders interviewed. All the butcheries and hotels owners have trade license. The study result shows that the beef trade in the study area require the trade license. This indicates that license is a barrier entry to the beef cattle market. The survey result indicated that traders experience ranges from 4 up to 20 years with an average experience of 7.6 years. The existence of wider gap between traders indicated that experience was not a barrier to enter in to beef trading in the study area. Capital requirements serve as an entry barrier because only those who can afford such a monetary can enter the market. In order to handle reasonable quantity of the commodity, traders need sufficient amount of money that assists their business to operate in healthy way. Market information was not barrier to entry in the study area. In addition to this, the risk of seasonal variation in demand and price of beef cattle imposes considerable barrier on beef trade.

3.2.2. Market conduct

3.2.2.1. Pricing setting strategies

The price setting activity of beef cattle in the study area is known to be accomplished by various actors in the market. The survey result indicated that 75% of the respondents reported that beef price decision was set by negotiation between farmers and traders. About 17% of the respondents reported that market price was set by farmers. The remaining 3% and 5% replied that traders and brokers were set the beef market price respectively.

3.2.2.2. Buying and selling strategies

All respondents in the study area indicated that the selling system was based on cash payment. The study result also revealed that about 8% of the traders were sold the beef cattle in credit basis for waiting to one week for payment. The remaining about 92% of the traders replied that they sell based on cash payment at transaction time.

3.2.3. Beef market performance

The performance of beef market was evaluated by considering associated costs, returns and marketing margins. The methods employed for analysis of performance were channel comparison and marketing margin. Marketing margin is one of the commonly used measures of the performance of a marketing system. It is defined as the difference between the price the consumers pay and the price the producers receive. The marketing margin of cattle is the difference between the revenue from the sales of cattle and the costs incurred in running the market operation.

The survey result indicated that total marketing costs of each actors participating in different channels in the beef cattle marketing system, big traders have the highest costs, followed by butcheries and hotels who

process beef and beef product or meat to the final consumers, small traders and then producers accordingly. Here, the total marketing cost for small feedlot operators was low compared to other market actors; this is due to most of the fatteners were located in the woredas town and mostly they purchase beef cattle by their own without involvement of intermediatiaries (Table 4).

As indicated in table 1, the total gross marketing margin (TGMM) is the highest in channel V and III which is about 37.2 % and 25.2% respectively. The results revealed that the butcheries and hotels were received highest gross marketing margin followed by small feedlot operators in channel V and III. This shows that adding value to the product is very important in the study area like fattening before sale. Without considering channel VII (producers sell directly to consumer) producer's share (GMMp) is highest (88.3%) from the total consumers' price in channel I, II and IV because of the herders sold their beef cattle directly to the traders without involvement of any intermediatiaries. Table 1 shows the costs and profits that each agent along the market channel. Butcheries earned the largest profit of 5950.2 Birr per head followed by small feedlot operators (3044.1 Birr per head) and small traders (569.2 Birr per head). Channel VI indicates that the channel in which producers directly sell to the other farmers for draft purposes.

Table 1. Average marketing margins for different market participants for beef cattle

Market actors	Marketing measure	Market channels						
		I	II	III	IV	V	VI	VII
Quantity flow	Head/year	25	18	50	16	39	34	16
Producers	Price/head	7600	7600	8714	7600	9451	7600	7990
Small traders	Price/head	8611.3	8611.3		8611.3			-
	Gross margin	1011.3	1011.3		1011.3			-
	Marketing cost	442.0	442.0		442.0			-
	Net marketing margin	569.3	569.3		569.3			-
Small feedlot operators	Price/head			12071.4				-
	Gross margin			3357.4				-
	Marketing cost			313.3				-
	Net marketing margin			3044.1				-
Butcheries	Price/head					16000		-
	Gross margin					6549		-
	Marketing cost					598.8		-
	Net marketing margin					5950.2		-
	Total gross marketing margin (%)	11.7	11.7	25.2	11.7	37.2		0
	Producers portion (%)	88.3	88.3	74.8	88.3	62.8		100

Source: Own survey result, 2015

4. Conclusion and Recommendations

The market structure of the beef cattle in the study area shows that non-competitive in nature. The market concentration ratio (CR4) for the top four cattle traders is 93% which indicates that the beef cattle market in the study area is inefficient.

Beef trading in the study area need a trading license and more initial working capital, due to the reason that licensing and working capital in relation to beef trading was observed as entry barriers. However, no entry barrier was observed with respect to years of experience of traders at different levels. In addition to this, the risk of seasonal variation in demand and price offered imposes considerable barriers to entry to beef trading.

The market conduct of beef shows that 96% of the traders get accurate, timely and consistent price information largely from their own observation. Some of the traders involve brokers and commission agents in buying and selling processes. About 75% of them believe negotiation as a tool for price decision.

The total marketing costs of each actors participating in different channels in the beef cattle marketing system indicates big traders have incurred the highest costs followed by butcheries and hotels, small traders, producers and then small feedlot operators respectively. The most significant cost was transportation cost followed by the payment for buying and selling agents. Butcheries and hotels were received highest profit followed by small feedlot operators. This could be reason for adding value. The producers' share of final selling price or the consumer's price was found to be the highest along the channel VII in which producers directly sell to consumers, followed by channel I, II and IV that was 88.3 percent.

To create efficient marketing system in the study area, improving market information, market infrastructure, access to credit and upgrading or adding value are crucial. These improvement actions will raise the household income and bargaining power of producers that could improve their income and getting a larger share of consumers prices. In addition, expanding the number of links among actors both horizontal and vertical

and removing unnecessary intermediatiaries which increases unnecessary costs is important in the study area. Thus, it is important to encourage shorter channels in order to enhance the benefit of producers.

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Appendixes

Table 2. Socio-economic characteristics of sample producers (N= 120)

Variables	Statistical parameters			
	Mean	Min	Max	Std. error of mean
Age	41	22	60	1.004
Family size	7	2	20	0.225
Farm experience	14	1	45	0.937
Education	3	1	7	0.1076

Table 3. Socio-economic profiles of sample traders (N = 39)

Variables	Statistical parameters			
	Mean	Min	Max	Std. error of mean
Age	41	22	60	1.004
Family size	6	3	10	0.324
Trade experience	7.6	1	20	0.804
Education	4	1	6	0.231

Table 4. Average marketing costs of the main actors along the value chain

Cost components	Producers	Small traders	Big traders	Small fatteners	Butcheries and hotels
Selling price/head	7600	8611.3	9311.3	12071.4	16000
Feed costs/head	77.0	-	33.3	220.0	-
Veterinary costs/hed	26.8	-	-	190	-
Labor costs/day	5.6	-	-	50	-
Marketing costs					
Labor(guarding/grazing)	-	-	240.0	-	-
Broker fee	55.5	162.0	267.2	50.0	34.4
Trekking/truck	272.7	100.0	267.7	133.3	-
Market search cost	-	150.0	-	100.0	-
Processing costs	-	-	-	-	544.4
Total tax payment	-	30.0	30.0	30.0	20.0
Total marketing cost (Birr/head)	**328.2**	**442.0**	**804.9**	**313.3**	**598.8**

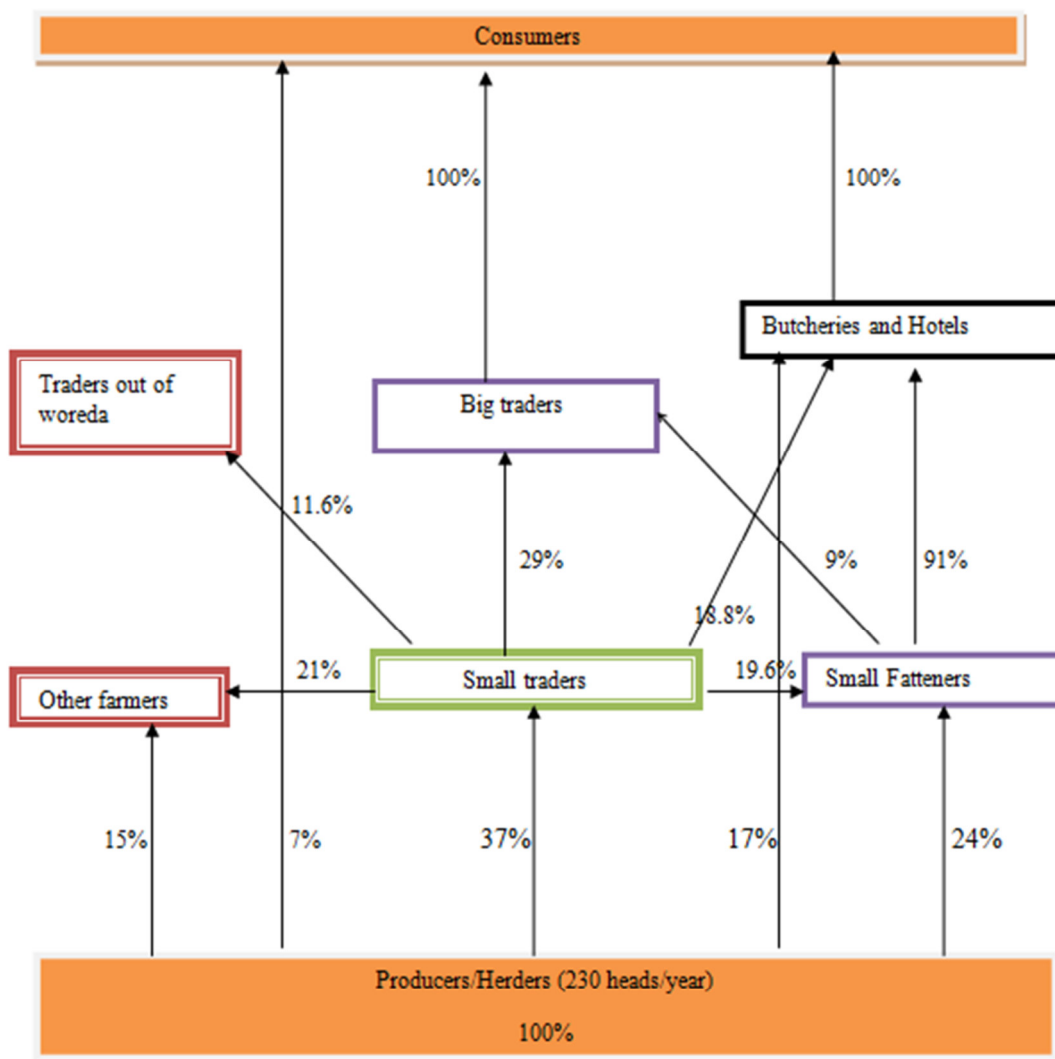**Source:** own survey result, 2015

Figure 1. Sketch of beef marketing channel in the study area
Source: Own survey result, 2015