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RESEARCH PAPER

Key Factors Affecting Beef Cattle Marketing and Its Profitability: The case of Ethiopia's Oromia Regional State's West Showa Zone

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Abstract

This research was carried out in the West Showa administrative zone in Oromia regional states, Ethiopia. Analysis of beef cattle marketing profitability and its important determinants among smallholder farmers who raise and market beef cattle was one of the main goals of the research. By adopting the scheduled interview data collection approach, 12 well-trained data collectors who were pooled from Development Agents collected socioeconomic data from 400 beef cattle producers and performers who were selected at random. The collected data was analyzed using a multiple regression econometric model and descriptive statistics techniques. The results of the multiple linear regression showed that family size, the frequency of extension visits annually, the distance from and to the nearest market, the experience of the smallholder farmers in the production, raising, and keeping of beef cattle, and the ownership of beef cattle all had a significant impact on their participation in the market and their profitability. Evidence from a marketing gross margin analysis indicated that beef cattle producers earn the largest profit gross margin (49.63%), followed in their earnings by butcheries (40.35%) and hotels (36%). Compared to beef cattle actors, beef cattle merchants have the lowest gross profit margins (27%). The data analysis result suggested that the concerned body should provide adequate and continuous extension services for the beef cattle producers, the policymakers have to construct sufficient infrastructures such as roads and others in the study area and increase the number of beef cattle owned by the smallholder farmers, provision of adequate veterinary service and provision of improve beef cattle breeds are highly recommended in the future interventions.

Keywords: Key factors, beef cattle, gross margin, profitability, value chain

Introduction

Agriculture is the mainstay of the African and Ethiopian economies. About 70% of Ethiopia's workforce is employed in agriculture, which also accounts for about 35% of the country's GDP and 12% to 15% of foreign exchange revenues (World Bank, 2020). However, the agricultural sector is dominated by smallholder subsistence farming.

Ethiopia ranks first in Africa in terms of beef cattle population, but the capability of this subsector to improve the farmers' economic viability is not clearly shown in livestock farmers in general and beef cattle smallholder farmers in particular (Mekuriaw and Harris, 2021).

Despite the enormous number of beef cattle in Ethiopia generally and in the west Showa Zone specifically, there are few animals supplied to the market. Farmers who raise beef cattle are reluctant to sell their animals to marketplaces. Various issues, including a lack of market intelligence, poor transportation, and inadequate infrastructure development, contribute to the smaller quantities of beef cattle that are supplied to the market (Deng, 2020).

Concepts of markets and marketing

The word "market" has several meanings. It may refer to a real place where people meet to exchange products and services (Meshack, 2015). On the other hand, Kotler (2007) defined a market as a system where buyers and sellers regularly engage, enabling the transfer of ownership of goods and services. The system is driven by supply and demand dynamics. A market is made up of people who can afford certain products or services and have the necessary needs to buy those (Mdoe *et al*., 2019). This allows for interactions that benefit both parties.

Smallholder farmers in many Sub-Saharan African nations have little negotiating leverage, especially when it comes to local producers of beef cattle. Farmers frequently turn on unofficial networks (tradespeople, friends, and family) for market information as a result of insufficient public information channels (FAO, 2015). Agricultural product marketing requires effective marketing management techniques that prioritize the marketing mix, which consists of price, place, promotion, and product. "Market potential, production, and financial elements of selling and distributing beef cattle and their products are all included in the term "beef cattle marketing" (Puarada and Gurning, 2022).

Market Involvement

Agribusiness market involvement is essential and has been characterized in a number of ways. It entails taking part in market activities that support the sale of crops and improve farm households' financial situation through exchanges of cash, goods, or services (Paul *et al*., 2021). In order to boost revenue and lessen poverty, market participation can also refer to the integration of subsistence producers into input and product markets (Jagwe *et al*., 2010). Access to markets, which enables smallholder farmers to sell directly to customers or transport their goods to markets, is a crucial component of market engagement (Osmani and Hossain, 2015).

Numerous variables impacting market involvement are highlighted by studies on smallholder farmers' market participation in Sub-Saharan Africa. For example, a study conducted in Ethiopia found that important factors impacting market participation were family size, distance to the closest market, number of hens maintained, breed of poultry, and education level of the household head (Tarekegn and Yosefe, 2017). High transportation costs, inadequate infrastructure, high dependence ratios, market distance, cooperative membership, and output size were found to be obstacles to effective market participation in research conducted in Northern Taraba State, Nigeria (Tang et al., 2022). According to research conducted in South Africa and Nigeria, obstacles that impede market access include inadequate market infrastructure, inadequate usage of grades and standards, inadequate market knowledge, inadequate market transportation, and bad organizational maintenance (Schalkwyk *et al*., 2021).

Transaction Costs

Transaction costs, sometimes referred to as "hidden costs," in the marketing of beef cattle include both visible and invisible expenses related to the exchange of products and services (Jagwe *et al*., 2021). Friction in the transaction process, which includes the transfer and enforcement of ownership rights, is the cause of these expenses. The reason behind some farmers' participation in markets and others' independence might be attributed to transaction expenses. Smallholders' involvement in the market is probably influenced by variations in transaction costs as well as their access to resources and services that help to offset these costs.

Fixed transaction costs (FTCs) and variable or proportional transaction costs (PTCs) are the two types of transaction costs. Regardless of the volume sold, locating trade partners, negotiating, and contract enforcement expenses are all included in FTCs, particularly in credit sales where managing the default risk is necessary (Fafchamps, 2008). Transportation charges and other moving-related expenditures

are included in PTCs, which change depending on the amount transacted. Ineffective market usage is caused by high infrastructure expenses, insufficient market transportation, a lack of market expertise, and inadequate organizational support (Makhura *et al*., 2021).

Gross Marketing Margin and Profitability

In marketing, "price spread" and "gross margin" is not the same thing. The difference between what a market participant pays and receives is known as the gross margin. For instance, in meat markets, the value of the carcass and by-products less the value of the animal is used to determine the packer's gross margin per head of cattle. Smallholder beef cattle farmers find it challenging to obtain financial services in rural Africa due to the frequent absence of financial markets. As a result, cattle, particularly beef cattle, are employed as substitute financial instruments for risk management and wealth accumulation (Islam and Maitra, 2018).

Small-scale producers of beef cattle in developing nations encounter difficulties in reaching markets because they lack the requisite knowledge and abilities. Inadequate dissemination of information and additional obstacles impede market access or restrict the advantages of involvement. Farmers have few choices for diversifying their income outside of growing cattle due to the unsatisfactory pay and disorderly sales that arise from the poor link between output and the market (Mussema *et al*., 2013).

Many beef cattle development initiatives have little effect on output and productivity in terms of reducing poverty and ensuring food security for rural communities in sub-Saharan African countries (Hatab *et al*., 2019). Animals in traditional livestock systems in Sub-Saharan Africa frequently forage for food, water, and shelter without access to veterinary care (Covarruvias *et al*., 2012).

Nevertheless, raising livestock serves a variety of reasons for subsistence farmers, including socioeconomic advantages including savings, manure, skins, insurance against crop failure, and investment diversification (Weyori *et al*., 2018).

Development plans sometimes fail to acknowledge the complexity of livestock production systems in rural households, which results in poor productivity and inefficient livestock policies in SSA nations like Ghana (Salmon *et al*., 2018). Cattle development initiatives should be strengthened by taking into account the economic and cultural responsibilities that livestock play, which are typical in other countries (Traore *et al*., 2017; Ejlertsen *et al*., 2013).

Value-related considerations plays a major role in the reason non-market advantages in beef cattle programs are frequently disregarded. For evaluating subsistence beef cattle systems, policy analysts and technical staff must employ more sophisticated techniques than the conventional cost and benefit analysis approaches (Al-Khalidi *et al*., 2013; Zezza *et al*., 2016). Due to a lack of information flow, a variety of entrance hurdles, and insufficient market knowledge and skills, small-scale manufacturers in developing nations have difficulty accessing markets. This limits farmers' possibilities for income diversification by causing disorderly sales and poor pay (Mussema *et al*., 2018).

Diverse agricultural commodities exhibit differing levels of market efficiency and profitability, according to research on profit analysis and market margin. According to research conducted in Addis Ababa, smallholders' portion of the selling price decreased with time, and butchers had a substantial profit margin of 31.7% (Yacob, 2020). According to Solomon's (2004) study, farmers earned a lesser fraction of the overall gross marketing margin, but meat dealers in Addis Ababa obtained a bigger proportion in the southern area of Ethiopia.

Numerous livestock development strategies in SSA nations have minimal impact on productivity and production of beef cattle in terms of reducing poverty and ensuring food security for rural communities (Hatab *et al*.,

2019). Cattle in traditional livestock systems often forage for food, water, and shelter without access to veterinary care (Covarrubias *et al*., 2012).

Livestock is raised by subsistence farmers for a variety of reasons, including socioeconomic advantages such manure, hides, savings, crop failure insurance, and investment diversification (Weyori *et al*., 2018). Because animals serve so many purposes in rural farm homes, the systems for producing livestock are complicated. But these complexities are frequently overlooked by development attempts, which results in ineffective regulations and low livestock output (Salmon et al., 2018). The efficiency of initiatives to promote cattle might be increased by including the socioeconomic and cultural aspects of livestock in development plans (Traore *et al*., 2017; Ejlertsen *et al*., 2013).

In conclusion, Sub-Saharan Africa's marketplaces and marketing provide a number of difficulties, especially for smallholder farmers. In order to address these problems, comprehensive approaches that take into account the socioeconomic and cultural functions of cattle as well as increase market access, lower transaction costs, and improve market knowledge are needed. Smallholder farmers may boost their revenue, engage more effectively in markets, and advance the growth of the agricultural industry as a whole by doing this.

Materials and methods

The research study was undertaken in West Showa Zone, (Toke Kutaye, Bako Tibe and Ejere districts) Oromia region, Ethiopia.

To choose sample farm household head, a three-stage sampling method was used. In the 1st and 2nd stage, Oromia Regional State, West Showa Zone and the three districts were purposively selected because of their easy accessibility and their potential in beef cattle production and marketing. Finally, in the 3rd stage sample residences were chosen at random from families that raise beef cattle in each peasant association (PA).

Table 1. Sample farm families' distribution within the Districts and PAs

Selected District	Total no of cattle producers in the district	Sample size per District	Selected PAs	Sample size per PA
Ejere	112,000	189		
			Kimoye	54
			Dhamottu	70
			Gaba Jimata	65
Bako Tibbe	110,000	187		
			Dambi Dima	62
			Dambi Gobbu	66
			Shoboka	59
Tokke Kuttaye	13, 516	24		
			Malka Dhaga	6
			Dhaga File	10
			Birbirssa	8
Total	235,516	400	9	400

Source: own survey data computation, 2023

Based on the size of the beef cattle herd and market accessibility, basic random sampling was utilized to choose PAs and marketplaces. Three PAs from each district were chosen using the basic random sampling approach, for a total of nine PAs throughout the three districts. The zone was grouped into three homogenous clusters namely the highland, the midland, and the lowland. One district from each homogeneous cluster districts was randomly selected by lottery method. That is one district from high land, one district from midland, and one district from low land.

Based on Taro Yemane's (1967) technique for calculating sample size, 400 respondents who are beef cattle farmers in total were selected for the study. As given:

$$n = N/[1+N(e)2] \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, n=sample size,
N= Population size,
e= the degree of precision, articulated as a proportion = 0.05
Accordingly;

$$n = \frac{235{,}516}{[1+235{,}516(0.05)2]} \approx 400 \quad \ldots\ldots\ldots (2)$$

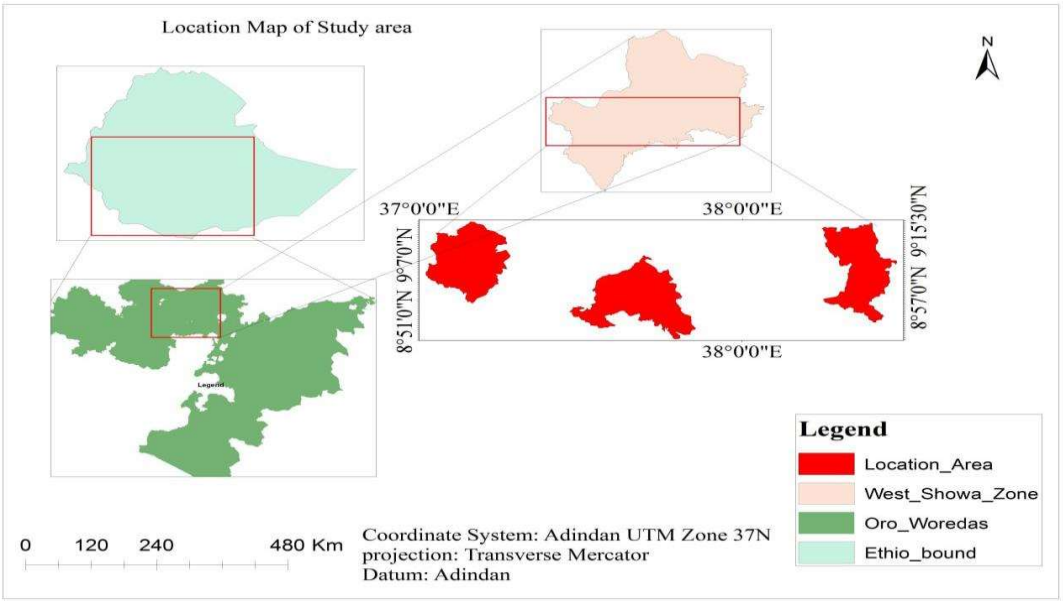

Figure 1. Map of the study area
Source: Zone Agricultural Development Office and Own Computation (2023)

Methods of Data Analysis

Data analysis was undertaken by the use of descriptive statistics /Gross Margin/ and inferential statistics /multiple regression analysis/. An aspect study of the accounts of the firms is necessary to determine the Gross Margin of various enterprises in varying levels along actors in the beef cattle value chain, noting exactly the costs incurred and the value generated at each stage with the value-added nods (Kadigi *et al., 2013*; Debertin, 1993). Gross Margin in order to analyze the profit for local beef cattle and beef cattle products were used. The gross margin association is given as:

$$GrossM\arg in = TR - TVC \quad \ldots\ldots\ldots\ldots (3)$$

TR stands for Total Revenue (sales of beef cattle) and TVC for Total Variable Costs (i.e. feeds, labor cost, fuel cost, transport cost, electricity, maintenance, animal health costs, etc.).

Determinants of Beef Cattle Marketing Profitability In determining the determinants of live cattle marketing profitability multiple regression analysis was used. Utilizing a profit function, regression analysis was generated to the association between these factors and profit as;

$$\prod i_j = f(x_{ij}) \quad \text{.....} \quad (4)$$

The profit function was calculated using the Multiple Linear Regression Model, as illustrated in Equation 4. That is as a proxy for Marketing Gross Margin.

$$\prod_{ij} = \alpha + \beta_i x_{ij} + u_j \quad \text{.....} \quad (5)$$

Where,

$\prod_{ij}$= Profit for i^{th} respondent in j^{th} District.

u = The Y-intercept or a constant term.

β_{ij}= independent variable coefficients.

μ_{ij} = The Error term or the disturbance term, referring to whole variables which impact the variation of the independent variables

The gross margin is the output value (gross value of production) of a single firm less the variable expenses directly associated with producing the value. For the investigation of beef cattle farmers' profitability, gross margin was employed as a stand-in.

The profitability of the beef cattle marketing was calculated by using the Gross Marketing Margin formula. Which is given as,

Gross Marketing Margin /GM/ =TR - TVC

Where,

GM = Gross Margin

TR =Total Revenue

TVC = Total Variable Cost

The factors that affect a farmer's profitability were examined using multiple regression analysis. The following are the model's specifications:

The factors that affect a farmer's profitability were examined using multiple regression analysis. The following are the model's specifications:

$$Yi = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + U_t \quad \text{... (6)}$$

Where,

Yi is the GM, B_0 is constant of the equation, *and Bi* is coefficient of the explanatory variables.

Xi = Independent variables. U_t is the error term or unexplained variation.

Results and discussions

The research survey data analised output indicated that beef cattle farmers get the highest profit gross margin (49.63%), this is mainly because of cost minimization. For instance,, most farmers do not purchase animal feeds, they use from their lands and crop leftovers, except for some minerals such as salt and the like. Butcheries got the second highest profit gross margin (40.35%). This is mainly because of profit maximization. They increase the price of a kilo of meat to get higher profits. Hotels got the third profit gross margin (36%), and beef cattle traders got the fourth profit gross margins (27%) along the beef cattle marketing value chain actors, (Table, 2,3,4.5) respectively. Results similar to those found by (Nkadimeng *et al*., 2021) and (Camilla *et al*., 2022) dealing with goat marketing in South Africa.

Table 2: Gross margin analysis for beef cattle Farmers taking average costs

No.	Description	Cost in Birr/year	Proportion of TVC (%)
	Cost /Birr		
1	Labour for herding	4081.30	24.69
2	Dipping/Spraying	134.13	0.81
3	Drugs/Medications	2,392.80	14.47
4	Deworming	1,140.40	6.90
5	Feed	9,415	56.95
6	Other Variable Costs	3,450	20.87
	Total Variable Costs	16,532.33	100
	Revenue		
1	Selling Price /average/ /Birr	32,820	
2	Gross Margins(GM) /Birr	16,287.67	
3	GM as a % of sales	49.63	

Source, Survey data output, 2023

Table 3. Gross margins for beef cattle traders

Cost Description	Unit Cost/Head /Birr/	%age of TVC
Average Cost of One Cattle		
Purchasing Price	29,788.13	71.26
Movement permit	131.05	0.31
Market fees	54	0.13
Transportation (Buying)	7,000	16.75
Transportation (Selling)	3500	8.37
Communication	9.65	0.02
feed	310	0.74
Labour (header wages)	145.66	0.35
trekking	863.33	2.07
Total costs	41,801.82	100
Income from the sale of a single beef cattle		
Average retailing value/Price/ of cattle	57,957.08	
Gross Margin	16,155.26	
Gross margin as a % of sales	27.87	

Source, Survey data output, 2023

Table 4. Gross Margin Analysis for Butchery

No	Description	Cost in Birr	% of TVC
1	Purchasing Price (Average live cattle)	40,754.64	95.48
2	Buying /movement permit	80	0.19
3	Market (charges) fees	40	0.09
4	Transportation (to slaughtering and shop)	360	0.84
5	Holding pen fee	200	0.47
6	Slaughtering fee	400	0.94
7	Labour (meat seller)	200	0.47
8	Others	650	1.52
	Total Costs	**42,684.64**	**100**
	Income from the sale of a single beef cattle		
	Carcass 1kg @600 Birr	66,000	
	Head	300	
	Hide	30	
	Offal and legs	1,200	
	Others	4,000	
	Total Revenue	71,530	
	Gross margin	28,865.36	
	Gross margin as a % of sales	40.35	

Source, Survey data output, 2023

Table 5. Gross Margin Analysis for Hotels

No	Description/week	Cost in Birr	% of TVC
1	Purchasing Price (Average) Meat	2,400	73.17
2	Labour (seller and service giver)	300	9.15
3	Transportation	80	2.44
4	Others	500	15.24
	Total Cost	3,280	100
	Revenue from the sale of one beef cattle		
1	Meat (Birr)	3,600	
2	Meat plus other foods	1,022.86	
3	Others	502.56	
	Total Revenue	5,125.42	
1	Gross margin	1,845.42	
2	Gross margin as a % of sales	36	

Source, Survey data output, 2023

Gross margin was utilized as a stand-in for assessing the drivers of beef cattle marketing profitability in the analysis of those factors. Five of the eight variables that were introduced into the multiple regressions model, the number of household members had a positive impact on the profitability of beef cattle marketing at a level of significance below 5%, according to the model's output data. A similar finding was made using another method by Jobirov *et al*., (2022). They found that a number of household members considerably and favourably influenced profitability with beef cattle farmers marketing with 5% or less significant level in the Baljovan District of Khatlon region, Tajikistan. The tumber of extension visits per year affected beef cattle marketing profitability positively at less than 1% significant level, same finding was obtained by (Ehinmowo *et al.*, 2015), and they found that number of extension visits significantly affected beef cattle marketing profitability in Nigeria by less than 5% significant level.

Distance from and to the nearest market affected beef cattle marketing profitability negatively, at less than 1% significant level; a similar result was obtained by K Natukunda *et al*., (2011).

Experience of the farmer in beef cattle keeping affected profitability of beef cattle marketing negatively at less than 5% significant level. A similar result was obtained by (Nkadimen *et al.*, 2021), and the number of beef cattle owned significantly affected the profitability of beef cattle marketing positively at less than 1% significant level. A negative outcome was obtained by (Jobirov *et al*., (2022). They found that number of beef cattle owned significantly affected the profitability of beef cattle marketing negatively at less than 1% significant level.

Moreover, the experience of the farmer was statistically significant at probability less than 0.05 and negatively to Gross Margin. According to this result, farmers with many years of experience compared to farmers with less years of expertise, have a better likelihood of earning a higher gross margin. However, after some years of experience, farmers become laggards/resistant to changes/ and can't increase their Gross Margin or profit. If the experience in raising beef cattle rises by a year for the farmer, Gross margin or profit decreases by 528.71 Birr/cattle keeping all other variables kept constant. On the contrary Nganga *et al*., (2010) indicated that, due to their technical expertise, which is affected by having worked in the field for a considerable amount of time, farmers with greater experience typically display better levels of profit margins. Further research is required in this regard.

In contrast, education level, access to information and land size owned were found to be non-significant variables, (Table 6).

Table 6. Regression output on determinants of Beef Cattle Profitably

Variables	B	Std. Error	P-value	VIF
(Constant)	-4182.174	6339.028	.510	
Number of house hold members	1460.106	618.519	.019**	1.242
Education Level	-883.978	1373.070	.520	1.359
Access to information	1480.448	4487.237	.742	1.292
No of Extension visit/year	792.543	173.971	.000***	1.438
Distance to the nearest market	-1321.033	658.365	.045**	1.162
Land size owned (Heck)	1212.253	1263.811	.338	1.308
Experience in Cattle farming	-528.708	236.438	.026**	1.814
Number of Cattle owned	1258.124	457.174	.006***	1.432
Observation	400			
R	0.862			
R^2	0.790			
Adjustment R^2	0.766			

At a 1% and 5% significant level, respectively, *** and **.

Source, Survey data output, 2023

As can be seen from Table 5 above, the number of household members, number of extension visits/year, distance to the nearest market, experience in cattle farming and number of beef Cattle owned significantly affected beef cattle marketing profitability at different significant level. These findings are in line with Jabrov *et al.*(2022), Deogratius *et al.* (2023), Kassa *et al*.(2022) and Jimoh *et al* . (2023).

Conclusions

To calculate the /Gross Margin/ profit earned by various players at the various value-chain nodes were used. According to the results, farmers received the greatest Gross Margin (49.63%), butcheries the second-largest Gross Margin (44.35%), hotels the third-largest Gross Margin (36%) and traders the fourth-largest Gross Margin (27.87%) in the beef cattle value chain of operations.

The other objective involved was researching the key factors that affect beef cattle farmers' profitability in the districts of Bako Tibe, Toke Kutaye, and Ejere. The results revealed that the number of household members, the number of Extension visits each year, the distance from and to the nearest market, the amount of years' experience in beef cattle farming, and the number of cattle owned all had a beneficial impact on profitability at different significant levels. As opposed to that, components such as education standards, information availability, and size of the land owned were determined to be non-significant factors in the beef cattle marketing value chain actors profitability.

Policy Implications and Recommendations

1. It was shown that number of extension visit affected the beef cattle marketing profitability positively, the concerned body should provide adequate and continuous extension services for the beef cattle producers,

2. The distance from and to the nearest market affected the beef cattle marketing profitability negatively. In here we recommend the policy makers to construct sufficient infrastractures such as roads and others in the study area and

3. The number of beef cattle owned affected the beef cattle marketing profitability positively. To increase the number of beef cattle of the small holder farmers, provision of adequate veterinary service and provision of improve beef cattle are highly recommended.

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Declaration of Conflict of Interest

We all authors have no conflict of interest either in financial situations or in any other interests.

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