

Performance Analysis of Beef Cattle Supply Chain from Sinjai Regency to Makassar City, South Sulawesi Province, Indonesia

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Abstract

This research aims to analyze the performance of the beef cattle supply chain from Sinjai Regency to Makassar City. The research was conducted from May to June 2023 in Sinjai Regency, South Sulawesi Province. The data collected in the research consisted of primary data using observation and interviews using questionnaires and FGDs. Next, secondary data is data collected at the initial stage (pre-survey/Baseline Survey). The data analysis used for beef cattle supply chain performance is descriptive statistics, using several indicators, namely the distribution of margins and profits across all supply chain institutions involved as well as channel efficiency. The research results show Financially, businesses run by breeders who are also inter-regional traders are considered feasible. If viewed in terms of flexibility, namely: in the upstream sector of the supply chain (upstream SC) beef cattle are not flexible in terms of volume and delivery and the speed of response (responsiveness) is low, but in the downstream sector (downstream SC) it is more flexible in terms of volume and delivery as well as high responsiveness.

Keywords: supply chain, beef cattle, traders, breeders.

INTRODUCTION

Beef self-sufficiency has been achieved by South Sulawesi, where South Sulawesi's beef needs have been met by around 59,325 heads slaughtered through slaughterhouses and outside slaughterhouses in 2012. South Sulawesi's beef/beef cattle stock is safe, and there is even a surplus. This surplus is also used as a supply for other provinces, even South Sulawesi has the opportunity to cover the shortage of beef supply on the island of Java, only it is hampered by the high cost of transportation compared to shipping to other regions in Eastern Indonesia [1]. The existence of demand for meat requires producers who offer meat to make an effort, namely to regulate the amount of beef supply so that there is a match between the amount of consumer demand and the beef offered [2]

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Commodity retail prices are highly dependent on the efficiency of distribution activities. The efficiency of commodity distribution activities, also known as the 'commerce system', is greatly influenced by the length of the distribution chain and the size of the profit margin set by each distribution chain. The shorter the distribution chain and the smaller the profit margin, the more efficient the distribution activities. Apart from that, the efficiency of commodity distribution activities is also influenced by the condition of the transportation sector. Supply chain involving producers, transporters, logistics service providers, retailers, and consumers. This chain is seen as a whole as a whole and not a fragmented group, although each performs its function [3].

The success of the organization is highly dependent on success-supply chain participation as partners. Supply chain management effectiveness is the main determinant of an organization's competitive advantage. Next, performance is presented supply chain focused on the ability of the supply chain to meet end customer needs [4]. If system supply is being developed in the beef cattle business in South Sulawesi, it means that all components can be arranged in a structured manner in the supply of beef, starting from the development and procurement of beef cattle breeds, development of beef cattle farming, development of partnership systems and development of distribution systems down to the final consumer. the purpose of the supply chain can be achieved [5].

One of the main destination areas for the supply of beef cattle from Sinjai Regency, South Sulawesi Province is Makassar City, where around 300 heads are sent every month. Therefore, it is necessary to research the performance supply chain beef cattle from Sinjai Regency, South Sulawesi Province to fulfill public consumption in Makassar City.

RESEARCH METHODS

The time for carrying out this research is from May to June 2023. This research will be carried out in Sinjai Regency and Makassar City as marketing places for beef cattle, with the reason that the number of cattle sent to Makassar City is quite high every month, namely 300 head per month. The data collected in the research consisted of primary data using observation and interviews using questionnaires and FGDs. Interviews with respondents consist of the respondent's identity, costs incurred, number of cows owned, number of sales, and other necessary data. The next observation is to see the development of sales of beef cattle to Makassar City. Furthermore, secondary data is data collected at the initial stage (pra-survey/Baseline Survey). Analysis of data used for performance supply chain Beef cattle is descriptive statistics, using several indicators, namely the distribution of margins and profits across the institution supply chain involved as well as channel efficiency.

RESULTS AND DISCUSSION

Added Value for Beef Cattle Breeders

Analysis of added value at the beef cattle breeder level is carried out to obtain estimates of added value, profits and compensation for production factors for each beef cattle farmed. Added value is the concept of increasing value by increasing the functional value of an agricultural commodity (Nurhayati et al., 2016) through several ways in its development (Maulidian et al., 2020; Soetriono et al., 2019). Added value is obtained from the difference between the output value and the input used in a beef cattle farming business which can be seen in Table 1

Table 1. Calculation of added value for beef cattle breeders.

No	Variable	Value
Output, Input, and price		
1	Output (tail/production)	330
2	Input (tail/production)	305
3	Direct labor (hours/production)	863
4	Conversion factor	1,08
5	Labor coefficient	3,83
6	Output Price (Rp/head)	11.342.424
7	Average labor wages (Rp/Day)	41.800
Revenue and Profits		
8	Price of Raw Materials (Rp/head)	10.660.474
9	Other input contributions (Rp/head)	766.497
10	Output value (Rp/head)	12.272.131
11	a. Additional value (Rp/head)	845.160
	b. Incremental value ratio (%)	6,9 %
12	a. Labor compensation (Rp/head)	118.205
	b. Labor share (%)	1%
13	a. Profit (Rp/head)	726.955
	b. Profit rate (%)	5,9 %
Remuneration for Owners of Production Factors		
14	Margin (Rp/head)	1.611.657
	a. Labor income (%)	7,3 %
	b. Contribution of other inputs (%)	47,6 %
	c. Farm profit (%)	45,1 %

Source: Processed primary data, 2023.

Table 1 shows that the output of this livestock business is live cattle, each respondent owns a variety of livestock. Livestock business in rural areas is predominantly carried out traditionally, either focusing on fattening or breeding cattle, so that the inputs used tend to be grass and bran without using concentrates. This greatly influences the growth of cow body weight, which causes a long harvest period for fattening businesses. The advantage is that the costs used are quite low compared to the beef cattle farming industry.

Other input values are obtained from the costs of purchasing medicines, vitamins, credit, car rental for transportation, and IB costs for inseminator officers (basically free but the farmer only gives appreciation), as well as electricity costs which the farmer combines with personal use. The technology used is also quite simple, such as the cage equipment used, namely shovels, machetes, and sickles, the depreciation value of the investment, namely the materials and cage equipment used, as well as the labor costs used every day. Added value to beef cattle can be obtained from the application of artificial insemination technology so that selling prices increase (Wantasen and Paputugan, 2017).

During the harvest period, this beef cattle business produces an added value of IDR. 845,160 per head with a profit rate of 5.9% (Rp. 726,955/head), although statistically, this value is low, beef cattle breeders are still motivated in the beef cattle business, because this business is still used as a sideline for those whose main profession is as a farmer or planters to meet the daily needs of the family. Nevertheless, this beef cattle farming business activity can absorb the workforce and provide them with a source of life savings for sudden or urgent needs.

Income of Beef Cattle Farmers

The calculation of farmer income in this research starts from calculating fixed costs and revenues during one beef cattle harvest period. Furthermore, to see the efficiency of business feasibility, it can be calculated by calculating the R/C Ratio value which can be seen in Table 2

Table 2. Analysis of business income of beef cattle farmers in Sinjai Regency.

No	Variable	Details
1	Reception:	
	a. Production (Tail)	330
	b. Price of Cattle (Rp/head)	11.342.424
	Receipt (Rp)	3.742.999.920
2	Fixed and Variable Costs	
	a. Depreciation of Cages & Equipment (Rp)	62.243.469
	b. Labor Salary (Rp)	4.181.250
	c. Cattle Purchase (Rp)	3.012.200.000
	d. Operational Costs (Rp)	249.469.650
	Total cost	3.328.094.369
3	Income (Rp)	414.905.551
4	R/C ratio	1,12

Source: Processed primary data, 2023.

Table 2 shows the amount of revenue obtained from 100 beef cattle breeders of IDR. 3,517,956,507. This value indicates that the amount received by farmers is very large, but the amount is still limited to gross income/receipts. If we look at the total fixed costs and variable costs that must be incurred by farmers for the operation of their livestock business, it is IDR. 3,328,094,369, this amount is also not much different from gross receipts. Income is the total income of breeders which has been reduced by costs incurred for production purposes.

Table 2 also shows the net income received by 100 breeders of IDR. 189,862,051 or Rp. 1,898,620 per capita (breeders). An R/C value of 1.10 indicates that this business is still feasible to run, with a value above 1, even though the profits tend to be slim. Hastang's research results, et al., (2019) found that beef cattle fattening businesses have low competitiveness. Farmers do not get income from livestock alone, but there are other sources such as the off-farm and non-farm sectors (Martha et al., 2020). Therefore, farmers must have many sources of income to be able to meet the daily needs of their families.

The production of beef cattle farming is a business that has a relatively long harvest period, except for the focus of the fattening business, around 4-6 months can be harvested. This is different from the breeding business which requires quite a long time, namely 1 year, to reach harvest age for beef cattle. People's beef cattle farming still tends to be carried out non-commercially, only as a side business which also functions as savings for farmers/breeders. This is also influenced by the capital resilience of breeders which is still relatively weak, resulting in all cattle farming activities being carried out at minimal costs, starting from inputs such as feed to the use of labor that still only empowers family workers, this is a sign that the business is still in the category traditional. The availability of land for breeders is also still inadequate, however, the beef cattle business still exists and is popular among rural communities.

Added Value for Beef Cattle Traders

Added Value of Beef Cattle Traders refers to the economic contribution added by traders in the beef cattle supply chain. Beef cattle traders have an important role in the distribution of beef cattle from farmers to cattle slaughter units. The creation of added value by beef cattle traders carries out various activities, including collecting cattle from breeders, selecting appropriate livestock, handling cattle maintenance and safe transportation, as well as selling to slaughterhouse/slaughter unit entrepreneurs at adequate prices.

The role of beef cattle traders is not only as intermediaries in buying and selling transactions, but they also play an important role in maintaining an efficient and orderly beef cattle supply chain, enabling farmers to reach a wider market and earn a decent income.

The added value of beef cattle traders can also be seen from a socio-economic perspective. They often act as intermediaries between small farmers and the market, helping farmers to market their products and gain access to markets that may be difficult for small farmers to reach directly. Thus, the role of beef cattle traders also includes aspects of economic empowerment for farmers and local communities.

Analysis of the Added Value of the beef cattle supply chain at each marketing institution is important in understanding their contribution to the local economy as well as their strategic role in supplying quality beef to the consumer market. This can be a basis for developing policies that support the growth of the livestock sector, improve the welfare of farmers, and increase the efficiency of the beef cattle supply chain. This research uses farmer respondents, inter-regional cattle traders, and butcher entrepreneurs. To be clearer, the researcher presents data for each marketing channel formed in the supply chain of beef cattle in Sinjai Regency.

Calculation of Margin, Added Value, and Profits for Beef Cattle Traders in Channel 1 Supply Chain

Supply Chain in channel one shows that there are institutions that have a role in it; including livestock breeders, inter-regional traders (PAD), and butcher entrepreneurs. Farmers are actors in the upstream sector whose role is to provide raw materials in the form of beef cattle, where they will sell their livestock to inter-regional traders. Inter-regional traders will market the cattle to the Makassar City Slaughterhouse (RPH). Another institution is the Butcher Entrepreneur, who has a role as the final institution in the sale of live beef cattle before they are made into meat, which will be distributed to traditional markets and to

restaurants that have dishes made from beef. This upstream channel shows institutions synergizing with each other in terms of providing raw materials, namely beef cattle.

Margin or margin shows the difference between the selling price and the buying price of the slaughtered cattle they trade. This calculation reflects how efficiently they manage operational costs, including transportation, maintenance, and logistics costs. The added value of beef cattle traders can be seen from the difference in the selling price of the cattle they have bought from breeders and the selling price to slaughter entrepreneurs. This added value is the economic contribution they make in the process of distribution, selection, and handling of cattle which brings added value until it reaches the market at a higher price. Beef cattle traders' profits include the net margin they obtain after deducting all operational costs, this can be seen in Table 3

Table 3. Analysis Margin, Added Value, and Profits in Supply Chain Channels 1

No	Marketing institute/ description	Price (Rp/head)
1	Breeder	
	Selling price*	11.384.615
	Inter-regional Traders (PAD)	
	a. Purchase price	11.384.615
	b. Selling price	12.700.000
2	c. Margin PAD	1.315.385
	d. Other input costs:	
	- Pre-transaction fees	105.714
	- Operating costs	275.571
	- Sales costs	162.143
	e. Value added	771.956
	f. Labor costs	357.143
	g. Total Cost + cow purchase price	12.285.186
	h. profit	414.813
3	Butcher Entrepreneur	
	Purchase price	12.700.000
4	R/C ratio	1,034

Source: Primary data after processing, 2023.

Based on Table 3, shows that farmers are the upstream institutions responsible for preparing raw materials in the form of live cattle by selling their cattle at an average price of Rp. 11,384,615, - per head, this calculation is based on the breeder's sales range of Rp. 3,000,000 – Rp. 18,000,000, -. This sales data shows that the next institution is inter-regional traders, who also act as traders who collect live cattle from one village to another.

The results of data analysis in Table 3 describe the average purchase price by traders of Rp. 11,384,615, -/head. Variations in the purchase price of beef cattle by traders between

regions are in the price range of Rp. 5,000,000, - up to Rp. 17,000,000, -. The price is determined based on the trader's estimate of the weight of the meat, which will result in price haggling between breeders and beef cattle traders. However, traders as intermediary institutions between breeders and slaughtering entrepreneurs, also have a target of making a profit, because they (traders) will sell directly to the Makassar City abattoir. By establishing a long marketing channel, each institution wants to gain greater profits.

Other costs borne by inter-regional traders include pre-transaction costs, namely the costs incurred by traders to find beef cattle that breeders want to sell, including transportation costs to find cattle that want to be sold, communication costs, and other costs amounting to Rp. 105,714, -. In addition, operational costs include expenses for forage, concentrate, bran, salt, medicine, and vitamins, around Rp. 275,571 per head. These costs are incurred because traders also carry out maintenance after purchasing from breeders, to increase body weight and wait for high prices to be immediately marketed by the next Institution.

Meanwhile, sales costs are costs incurred by inter-regional traders to market beef cattle to the Makassar City abattoir, including transportation costs (transporting cattle), communications, and fees with an average cost of around Rp. 162,143 per head. These expenses vary within each maintenance period. Interregional traders can save a significant amount of costs by selling cattle in large quantities, which reduces some of their expenses when they sell cattle to the Makassar City abattoir.

From the data listed in Table 3, it can be seen that the average sales of beef cattle at the inter-regional trader level reached around IDR 12,700,000 per head. These price fluctuations are influenced by the estimated weight of beef and the level of negotiating ability between inter-regional traders and slaughtering entrepreneurs (buyers). The selling price range varies between IDR 4,500,000 to IDR 20,000,000 per head, depending on the estimated weight of the beef being sold.

Based on the purchase price and selling price of beef cattle, the average margin obtained reaches around IDR 1,315,385/head, the average added value is around IDR 771,956/head, and the profit is around IDR 414,813/head. The margin obtained by collecting traders varies, ranging from IDR 1,000,000 to IDR 3,000,000 per head. This variation is influenced by the length of time beef cattle are kept before being sold and depends on their ability to identify market opportunities when selling to Makassar City. Cattle rearing by inter-regional traders generally aims to increase the cow's body weight and look at the marketing conditions of beef cattle to gain greater profits.

The R/C ratio obtained by collecting traders is 1.034, indicating that every Rp. 1,000 spent on costs generates an income of Rp. 1,034 from the livestock business activities. With an R/C ratio = 1.034 which exceeds 1, this indicates that from a financial perspective, the business run by inter-regional traders is profitable or feasible.

Calculation of Margin, Added Value, and Profits for Beef Cattle Traders in Channel 2 Supply Chain

The breeders referred to in this research are breeders who also work as beef cattle traders, where the breeders sell directly to the Antang RPH, Makassar City. Therefore, they gain more profits because the supply chain is shorter so it is more efficient than the first channel.

Calculation of margins, added value, and profits for beef cattle traders is a vital element in analyzing the economic performance of their business in the livestock supply chain. Margin, which is the difference between the purchase price and sale price of beef cattle, reflects gross profit before considering operational costs such as transportation, storage, and logistics.

The added value of traders is reflected in the difference between the purchase price of cattle from farmers and the price they sell to butcher businessmen or cattle slaughter units, representing an economic contribution in the distribution, selection, and handling of cattle

until they reach higher value markets. Merchant profits, i.e. net margin after subtracting operational costs, allow them to evaluate business efficiency, identify areas to reduce costs, as well as plan strategies to increase profitability. This review helps beef cattle traders understand their business performance, improve operational efficiency, and develop plans to maintain the sustainability and growth of their business in the livestock supply chain, which can be seen in Table 4

Table 4. Analysis Margin, Added Value, and Profits in Supply Chain Channels 2

No	Marketing institute/ description	Price (Rp/head)
1	Breeder (Trader)	
	a. Purchase price (HPP)	10.660.474
	b. Selling price	12.700.000
	c. Breeder's Margin	2.039.526
	d. Other input costs:	
	- Depreciation costs for cages & equipment	622.435
	- Operating costs	249.469
	- Sales costs	162.143
	e. Value added	1.005.479
	f. Labor costs	41.813
	g. Total Cost + purchase price	11.736.334
	g. profit	963.667
	R/C ratio	1,082
2	Butcher Entrepreneur	
	Purchase price	12.700.000

Source: Primary data after processing, 2023.

Table 4 shows the results of the analysis for the average purchase price of beef cattle by breeders as well as cattle traders (HPP), namely IDR. 10,660,474, -. Variations in the purchase price of beef cattle by breeders are in the price range of Rp. 5,000,000, - up to Rp. 17,000,000. In the context of price determination, traders tend to use a more traditional sales method, namely estimating the weight of meat (live cattle), where this method still tends to result in estimated prices and price haggling. Traders in this channel have a bargaining position (bargaining power) is stronger, because bargaining directly with slaughter entrepreneurs only, no longer intersects with inter-regional traders, where they will still get lower prices because there is still a chain that will also take advantage of the sales transaction process beef cattle.

Another cost incurred by breeders is the average cost for depreciation of cages and livestock equipment, which is IDR. 622,435, -, and also operational costs include the costs of forage, concentrate, bran, salt, medicine, and vitamins, namely Rp. 249,469/head, while selling costs are the costs used by breeders in marketing beef cattle to the Makassar City abattoir, including transportation costs (transporting cattle), electricity, communications, and levies with an average cost of Rp. 162,143/head. The expenses mentioned above are expenses whose amounts are dynamic each maintenance period. Feed price trends tend to fluctuate, and the costs incurred to market livestock also depend on the road levy season when the

cattle are to be sold. Farmers can also save a lot of profits when they release/sell beef cattle on a partial basis (large scale), this will save some expenses for breeders who also work as cattle traders for the Makassar City RPH.

Based on Table 4, shows that the average sales value of beef cattle at the collector level is around IDR 12,700,000 per head. These price fluctuations are influenced by the estimated weight of beef and the negotiating power between collecting traders and traders from other regions (buyers). The sales price range varies between IDR 4,500,000 to IDR 18,000,000 per head, depending on the estimated weight of the beef being sold.

Taking into account the purchase price, selling price, and costs associated with beef cattle, the average margin obtained is around IDR 2,039,526 per head, the average added value is around IDR 1,005,479 per head, and the profit is IDR 963,667 per head. The margin obtained by collecting traders varies, ranging from IDR 1,000,000 to IDR 3,000,000 per head. This variation is caused by some farms not keeping beef cattle for too long before selling them, on the other hand, it depends on their intelligence in terms of seeing market opportunities. When they want to bring them to Makassar City, whether sales are on a large scale (will minimize expenses) or sales on a large scale. small results in the thinning of the margin they will obtain. Maintenance carried out by breeders who are also inter-regional traders generally aims to increase the animal's weight, as well as the breeder's skill in looking at the market to gain greater profits.

The R/C ratio value achieved by collecting traders is 1.082, indicating that for every IDR 1,000 spent, they receive IDR 1,082 from the livestock business activities. With an R/C ratio = 1.082 which is greater than 1, this shows that financially, businesses run by breeders who are also traders between regions are considered feasible.

CONCLUSION

The performance of the beef cattle supply chain in each Supply Chain 1 and 2 channel chain, obtained margin figures, added value, and profits in each existing marketing institution, namely channel one In the upstream sector, the marketing margin reached Rp. 1,611,657, - per head, while farmers obtained an added value of Rp. 845,160, - per head with profits reaching Rp. 726,955, - per head. Meanwhile, in channel 1, farmers who also act as cross-regional traders managed to get a margin of Rp. 1,315,385,-, added value of Rp. 771,956, - per head, and a profit of Rp. 414,813, - per head. In channel 2, cross-regional traders earned a profit of Rp. 963,667 per head, added value of Rp. 1,005,479 per head, and a marketing margin of Rp. 2,039,526 per head.

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