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Beef Cattle Large Commodity Chain in East Java: Market Structure and Performance Analysis

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ABSTRACT

Smallholder farmers dominate in the beef cattle industry (98%), and the contribution of large farmers is only 2%. National beef cattle industry could not fulfill domestic demand. This research focuses on the identification of the contribution of larger beef cattle farmers. The objectives of this study are to analyze the market structure and performance of large beef cattle farmers in East Java Province. The analytical methods are Concentration Ratio, Gini Coefficient, and barrier to entry and exit the market. The research results are: 1) Market structure of calf suppliers and processors are weak oligopoly while the farmers and traders reveal strong oligopoly; 2) The performance analysis of beef cattle commodity chain shows that the calf suppliers, farmers, traders, and processors were profitable and efficient; 3) There are relationship between market structure and performance of beef cattle industry. The higher concentration ratio will affect the higher level of profitability and efficiency.

Keywords: Concentration Ratio, Large Beef Cattle, Oligopoly, Profitability

INTRODUCTION

The performance of Indonesia's beef cattle is dominated by smallholder farmers. The share of the smallholder farmers was about 98%. They have low economic scale, and face minimal livestock infrastructure such as traditional cage and limited livestock scale. So, the population growth rate of beef cattle was low (Sodiq et al., 2018). This condition was worse than the previous period which (Yusdja et al., 2006) mentioned that the structure of the livestock industry is dominated by smallholder farmers (60-80%). The smallholder farmers have limited beef cattle. It was about 2 to 4 heads. According to the Directorate General of Livestock (2006), there are 4 million farmers that have 10.5 million beef cattle. These farmers have low bargaining position and income and use the traditional production technology. The development of smallholder beef cattle industry faces several problems as mentioned before. It takes a long time to come out of the situation because Indonesia had to compete with other countries.

The large beef cattle industry was only 2% of the national population (Nuhung, 2015), but the contribution of large farmers was higher than smallholder farmers. In terms of economic perspective, the large industry can force the cost per unit into a competitive price. Besides, if the large farmers have good market structure with strong backward and forward linkage will encourage the productivity of other sectors in beef cattle commodity chain.

According to Dodo & Umar (2015), the good market structure tends to have a good measure of market performance. There are

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several analytical tools to identify market structure, such as concentration ratio and Gini Coefficient. It is clear that inefficient marketing systems that incur high costs for consumers. It will affect food security and the welfare of the society.

The growth of local production of beef cattle does not match the growth of its local demand. Thus, Indonesia has become dependent on imported beef. The contribution of large beef cattle farmers is very important to increase beef cattle production. The major constraint on increasing the welfare of the large farmers is their inability to access expand to the new market due to lack of capital dan sustainability of the production. The existing structure of the beef cattle market has placed the farmers into a position of low market power.

The same condition happens in East Java where most of the farmers have small scale capacity. They have limited accessibility in terms of capital, technological information, market information (price, supply and demand), and managerial and entrepreneurial skill (Mayrowani, 2006). Policy and development program for smallholders' farmers are not effective and they encounter marketing problems. There is no price incentive for feeders and breeders to encourage them to engage in commercial operation. The import policy of beef cattle and its by-products also has a negative effect on the local price and local production (Rahmanto, 2004). Based on the information above smallholder farmers faced very complicated problems. To keep the goal meat self-sufficiency program, we have to consider the potency of the large beef cattle industry. The study about this industry is important, especially in market structure and performance.

Stifel (1975), used market structure concept to analyze the characteristics of the market that affect the behavior of traders and other actors. Further, affect their performance. He used the structure-conduct-performance model with concentration ratios, supply elasticity, and market entry conditions as analytical tools. This model was supported by (Samad, 2008) that mentioned the market share does not affect a firm's profitability and that profitability is the result of a monopoly behavior measured by concentration. According to Ahn et al. (2013), the industry will go to a perfectly competitive market, if the market concentration was low.

The government has an important role in empowering beef cattle communities. The government policies affecting firms' organizational forms influence the structure of product markets. Moreover, some of these policies boost competition, whereas others may be anticompetitive. According to Takechi & Higashida (2012), one example policy such as business contracts will drive the market more competitive because the activity strengthens the advantage of not being vertically integrated.

The demand-side externalities have a stronger effect than production scale economies. It means network effects are very effective to drive market structure (Amir & Lazzati, 2011). They have proven that market structure affect market performance. It can be concluded that the customer has an important role. It is supported by Li et al. (2018) and Acosta et al. (2019), explained the mechanism how market structure and the behavior of agents are affecting price transmission.

METHODOLOGY

The research was conducted in the province of East Java located in Java, the most densely populated island in Indonesia. This research covered six municipalities in East Java, namely, Malang, Probolinggo, Pasuruan, Sidoarjo, Magetan, and Bangkalan. Based on the information from the Beef Cattle Research Institute of Grati-East Java, the large farmers were identified.

This study used primary and secondary data. The primary data were collected from calf suppliers, beef cattle farmers, traders and processors using questionnaires. The secondary data were collected from several institutions such Indonesian Ministry of Agriculture,

Directorate General of Livestock, and East Java Livestock Office,Data gathering started from beef cattle farmers since they perform the primary activity in the marketing system analysis of beef cattle. The next steps involved the following: 1) tracing the upstream actors such as the calf suppliers; and 2) following the product downstream through the traders and processors. The number of respondents were 25 calf suppliers; 11 farmers, 14 traders and 24 processors.

Descriptive analysis was used to analyze the socio-economic characteristics of the actor in the beef cattle industry as well as beef cattle business activities. Market structure analysis involved the use of various indicators such as market concentration ratio, Gini coefficient, and barriers to entry and exit. This was done for the various sub-markets involved in the chain.

Market concentration ratio. It refers to the proportion of industry sales made by its largest firms. It measures the percent of traded value of beef cattle in rupiah accounted for by a given number of participants and is designated by the formula:

$$CR = \sum_{i=1}^{r} S_i \qquad i = 1, 2, 3, ... r \quad (1)$$

Where **CR** is a concentration of ratio, $\mathbf{S_i}$ the percentage market share of the i^{th} participant, andr the number of the relatively larger participants for which the ratio is to becalculated

Some references suggested that as a rule of thumb, a four largest firms concentration ratio of 50% or more is indicative of a strong oligopolistic industry; 33-50% ratio denotes a weak oligopoly, and less than that, an un-concentrated industry or competitive industry (Kohls & Uhl, 1985).

Gini coefficient. A shorthand summary measure of concentration is the Gini coefficient is computed using the formula (Bhuyan et al., 1988 cited in (Zeberga, 2010):

$$G = 1 - \sum_{i=1}^{n} (T_i - T_{i-1})(F_i + F_{i-1}) \quad i = 1, 2, 3, ... n \quad (2)$$

Where **G** is a Gini coefficient, $\mathbf{T_i}$ is cumulative proportion of participants, $\mathbf{F_i}$ cumulative proportion of the traded value of beef cattle in rupiahhandled by participants, and **n** is number of participants

The Gini coefficient has a value that ranges between 0, where there is no concentration (perfect equality) and 1, where the concentration is full (perfect inequality).

Barriers to entry and exit. In this study, the barriers to entry and exit were identified using the following indicators that were tested for the presence or absence of: a) legal barriers in terms of patents, franchise, and legal regulatory activities; b) technical barriers such as the availability of specific production technology and specialized knowledge.

As a measure of market performance, the ***profitability ratio*** measures the efficiency of the inputs used by the firm. It is the value of profit expressed per unit of cost. The profitability ratio is specified as follows:

Profitability ratio (PR) = π/TC x 100%

Operational efficiency ratio. Operational efficiency ratio can be measured using the cost return analysis. To compute the operational efficiency ratio the following formula was used:

Operational efficiency ratio (RC) = TR/TC

If RC > 1 then the industry being evaluated is operationally efficient; otherwise, it is inefficient.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of Respondents

Respondents of this research consisted of four categories i.e., calf suppliers, farmers, traders, and processors. Calf suppliers involved in the commodity chain that provide calves for the farmers in the next step. The specific activities of the calf suppliers are buying cow and artificial insemination process. The farmers are the

larger beef cattle farmers who are the key actors and directly involved in producing beef cattle. Traders in this research are the actors who buy and sell beef cattle from the farmer or other trader. There are four levels of traders depend on the coverage area. Processors of beef cattle transform beef cattle to the beef. They have three levels based on the scale of operation.

Tabel 1, discussed about socio-economic characteristics of the respondents. The age bracket of the actors were 30-50 and more than 50. 73% of respondents from four kinds of respondents were within the age bracket of 30 and 50. It means most of the respondents are in the productive period. This result similar to (Donkor, Onakuse, Bogue, & De Los Rios-Carmenado, 2019) mentioned that the mean ages of adopters and non-adopters are similar (48 year old) and the farmers are generally growing old. The difference in age is not statistically different at the 5% level with sig value 0,051. This result related to the duration of business variables in four groups of respondents. Most of respondents (61%) are involved in beef cattle industry for more than ten years.

The difference result is shown in education. The level of education of four group respondents is significantly different with the sig value 0,002. For calf suppliers (72%) and farmers (64%), the education levels were in elementary school. Otherwise, 64% of traders and 54% of processors have high-level education. From the analysis there is contradiction between this result and results research (Chogou et al., 2018) and (Tuffour & Dokurugu, 2015). Those results mentioned that Half (52%) of traders, or 53% of retailers and 49% of wholesalers, were not formally educated. It means that the level of education of agricultural traders continues to be low in rural areas of Africa.

There were two variables correlated to the beef cattle business. The first is engaged in contract variable. All of calf suppliers and traders were not involved in the contract. It means they sell beef cattle directly to the market or to the trader/farmer who comes to their ranch. The difference phenomenon happened in the farmer and processor. They tend to have contract with other actors. The farmer has contracted with trader or processor, and the processor has contracted with farmer and trader. They have an agreement to make sure that they have beef cattle at the right time and quality.

The last variable is extra work. There were significant differences among actors in the large beef cattle commodity chain. For the upstream sectors i.e. calf suppliers and farmers, most of them have extra work. It was 91% and 78%, respectively. Conversely, in the downstream sectors, the number of trader and processor who have extra work were only 60% and 40% respectively. It indicated that the group actor who have relative low of revenue tend to have extra work.

Beef Cattle Business Activities

The core business of beef cattle industry is fattening to have a high average daily gain. Tabel 2, discussed several variables such as the number of household and hired workers, how to differentiate beef cattle, and source of information. Some of them are significantly different, I.e. how to differentiate beef cattle and source the information for the actors.

Table 2, shown that the number of household workers between 1 and 15 people. There was no significant difference among actors. The mean of household worker was one person. 96% of the respondent answered that they only employ one person in their business. This result support (Dodo & Umar, 2015) that mentioned over 70% of the retailers had household sizes between 1 and 10. Tambi, (2005), who opined that the respondents that kept large family provide cheap family labor on the farm. A similar condition also happened in the number of hired workers. The number of employed workers was 104 people. Most of them were working in the beef cattle processing activity.

Table 1
Socioeconomic Characteristics of Respondents

Variable	Type of respondent								Total		Significance
	Calf Supplier		Farmer		Trader		Processor				
Age Group (years)									74	100%	0,051
30 - 50	22	30%	5	7%	11	15%	16	22%	54	73%	
> 50	3	4%	6	8%	3	4%	8	11%	20	27%	
Education									74	100%	0,002*
Elementary school (6 yrs)	18	24%	7	9%	3	4%	5	7%	33	45%	
Junior high school (9 yrs)	3	4%	0	0%	2	3%	6	8%	11	15%	
Senior high school (12 yrs)	4	5%	2	3%	8	11%	13	18%	27	36%	
Under Graduate (16 yrs)	0	0%	1	1%	1	1%	0	0%	2	3%	
Magisster (18 yrs)	0	0%	1	1%	0	0%	0	0%	1	1%	
Duration in Business									74	100%	0.170
< 10	6	8%	4	5%	9	12%	10	14%	29	39%	
10 - 20	17	23%	5	7%	5	7%	13	18%	40	54%	
20 - 30	2	3%	2	3%	0	0%	1	1%	5	7%	
Engaged in contract with whom									74	100%	0.000*
No	25	34%	7	9%	14	19%	13	18%	59	80%	
Yes	0	0%	4	5%	0	0%	11	15%	15	20%	
Extra Work									74	100%	0.007*
On Farm	14	19%	4	5%	1	1%	3	4%	22	30%	
Off Farm	0	0%	0	0%	3	4%	5	7%	8	11%	
Non Farm	9	12%	5	7%	6	8%	8	11%	28	38%	
None	2	3%	2	3%	4	5%	8	11%	16	22%	

Source: Primary Data, 2018

The respondents in the large beef cattle commodity chain went to the market to buy inputs. The calf supplier went to market to purchase concentrate, medicine, and went to the forage supplier. The farmers went to the several markets regularly to buy calves and sell beef cattle. The traders and processors were also preferred going to the market to have quality of beef cattle.

There were two aspects that have been considered by the actors in selecting the beef cattle, i.e. species (31%) and size (46%). The calf supplier considered species while the rest preferred size. The calf supplier reason was the species determined the growth rate of the calf and also the potential average daily gain. The results of this research in line with (Setiyono et al., 2017) showed that breed and age had very significant differences ($P<0.01$) on slaughter's weight, carcass's weight, and carcass's percentage.

The first variable that has significant role in the beef cattle industry was source of information for the actors. Report from the survey stated that the actors have data from two major sources and significant with the value 0,000. Data from the traders was the primary source of the beef cattle information in the research area especially

calf suppliers have data from the traders (100%) while for the processor (100%) have data from the government. In several districts such as Malang, the government provided important information, i.e. price, market, and production.

Market Structure of Large Beef Cattle Industry

According to (Williams, Spycher, & Okike, 2006) the components of market structure consist of marketing channels, volume of selling product, degree of market concentration, and existence or non-existence of barriers to entry to the market. Further et al. (1990), mentioned that market structure consists of the number and size of sellers and buyers, and Gini Coefficient. In this research, we used three analytical tools, i.e. Concentration Ratio, Gini Coefficient and Barrier to entry and exit.

Market Concentration Ratio refers to the proportion of product sell by the largest firms. If the industry was more concentrated, they tend to dominance in the industry. On the contrary, if the industry has a similar proportion in the market, the farmer tends to perfectly competitive.

As indicated in Table 3, CR4 of calf supplier in large farmer commodity chain was 36.08 % which suggests that

Table 2
Core Business Activities of Larger Beef Cattle Industry

Variable	Type of respondent								Total		Significance
	Calf Supplier		Farmer		Trader		Prosessor				
Number of household workers									74	100%	0,414
1	23	31%	11	15%	14	19%	23	31%	71	96%	
2	2	3%	0	0%	0	0%	0	0%	2	3%	
15	0	0%	0	0%	0	0%	1	1%	1	1%	
Number of hired workers									74	100%	0.304
< 5	25	34%	9	12%	13	18%	22	30%	69	93%	
5 - 10	0	0%	2	3%	1	1%	1	1%	4	5%	
> 10	0	0%	0	0%	0	0%	1	1%	1	1%	
How do you buy the input									74	100%	0.550
Pick up	25	34%	11	15%	14	19%	23	31%	73	99%	
Delivered	0	0%	0	0%	0	0%	1	1%	1	1%	
How to differentiate beef cattle									74	100%	0.000*
Species	17	71%	0	0%	0	0%	6	25%	23	31%	
Size	1	4%	6	25%	11	46%	16	67%	34	46%	
Species and size	7	29%	5	21%	3	13%	2	8%	17	23%	
Source the information for the actors									74	100%	0.000*
Farmer directly sale without considering those aspects	0	0%	2	3%	0	0%	0	0%	2	3%	
Market research	0	0%	3	4%	0	0%	0	0%	3	4%	
Information from other farmers	1	1%	0	0%	0	0%	0	0%	1	1%	
Information from traders	24	32%	4	5%	6	8%	0	0%	34	46%	
Information from government	0	0%	0	0%	0	0%	23	31%	23	31%	
Information from processor	0	0%	2	3%	8	11%	1	1%	11	15%	

Source: Primary Data, 2018

the market type is weak oligopoly. CR4 of the large farmer was 59.84% which indicates a strong oligopolistic industry. Traders had CR4 of 54.57%, which also suggests a strong oligopolistic industry. Processors can be characterized as a weak oligopolistic industry since CR4 was 37.62%. CR4 of Calf supplier was the lowest compared to other actors. It means the bargaining position of the calf supplier was relatively small. The research result was consistent with Saripalle (2016), explained that farmers have no bargaining power in the price determination of the flowers. Some of government policy measures will go a long way in ensuring security and profitable livelihoods for small and marginal farmers (Saripalle, 2016). There is a positive correlation between demand and market structure and at the same time a positive correlation between sales and prices (Hackl et al., 2014).

Gini Coefficient was used to measure the concentration of the beef cattle sub-market in large commodity chains. The coefficient indicates whether there was concentration or non-concentration in each sub-market. Table 4, shows that the calf supplier of calf sub-market had a Gini coefficient of 0.320. It can be classified as relatively equitable distribution. It means that the value of calf products among calf suppliers was relatively the same. Although the number of calves produced by the suppliers was higher than in the smallholder commodity chain, the calf sub-market was still a small scale industry. The lack of capital is a major problem among calf suppliers.

The Gini coefficient in the farmer sub-market was 0.349. This can be classified as equitable distribution among the farmers in this commodity chain. The Gini coefficient of farmers is higher than that of other actors. It was caused by the difference in the volume of the product traded. The Gini coefficient of the processor in the large commodity chain was 0.322. It was

Table 3
Market Concentration Ratio of Larger Beef Cattle Industry

Aspect	Calf Supplier	Farmer	Trader	Processor
Number of Participants	25	11	14	24
Value of four larger participants (Rp)	935.000.000	2.242.350.000	1.386.750.000	2.106.532.530
Total value of beef cattle (Rp)	2.591.250.000	3.747.200.000	2.541.250.000	5.598.913.081
CR4 (%)	36,08	59,84	54,57	37,62
Minimum	32.500.000	60.000.000	70.000.000	69.467.248
Maximum	315.000.000	1.098.000.000	525.000.000	776.036.748
Sum	2.591.250.000	3.747.200.000	2.541.250.000	5.598.913.083
Mean	103.650.000	340.654.545	181.517.857	233.288.045
Standard Error	13.747.333	82.517.231	36.983.406	34.029.237
Standard Deviation	68.736.665	273.678.693	138.379.233	166.708.534
Variance	4,72E+15	7,49E+16	1,91E+16	2,78E+16

Source: Primary Data, 2018

Table 4
Gini Coefficient of Larger Beef Cattle Industry

ITEM	CALF SUPPLIER	FARMER	TRADER	PROCESSOR
Number of participants	25	11	14	24
Gini coefficient	0.320	0.349	0.342	0.322

Source: Primary Data, 2018

lower than that of other sub-markets as noted the Gini coefficient with modification by a continuous distribution function into an environmental Gini coefficient, which is then used to measure the economic and ecological spatial balance of regional industrial economic development (Shu & Xiong, 2018). It is very relevant for the beef cattle industry that closely related to the environment. Further the fact that the improved technology will affect increases in local income (Ding et al., 2011).

The Barriers to entry to the sub-markets in the large beef cattle commodity chain are shown in Table 5. Large capital investment was considered as the most critical barrier to entry according to 28% of the calf suppliers, 18% of farmers, 64% of traders in all levels, and 54% of processors in all levels.

The leading barrier to entry for the calf suppliers is production technology. About 32.0% or 8 respondents explained that they had problems in implementing good breeding practice due to lack of working capital and knowledge. They were not able to feed the cows and calves with enough nutrients primarily in the drought season. Barrier to entry in trader sub-market is the large investment according to more than 70% of the sub-district and district traders. Other barriers to entry were marketing problem and strong competition. It was difficult for the new traders to enter the market because it seemed that there was collusion among the market participants.

The barriers to exit from the market in the large beef cattle commodity chain are shown in Table 6. The top exit barrier in all sub-market levels was the large demand,

Table 5
Barrier to Entry of Larger Beef Cattle Industry

Variable	Type of respondent								Total		Significance
	Calf Supplier		Farmer		Trader		Prosessor				
Barrier to entry beef cattle market									74	100%	0.000
Production technology	8	11%	0	0%	0	0%	0	0%	8	11%	
Large capital investment	7	9%	2	3%	9	12%	13	18%	31	42%	
Low price of beef cattle	0	0%	4	5%	0	0%	0	0%	4	5%	
Large number of importation	4	5%	5	7%	1	1%	0	0%	10	14%	
Marketing problem	0	0%	0	0%	1	1%	2	3%	3	4%	
Strong competition	5	7%	0	0%	2	3%	5	7%	12	16%	
Economic of scale	1	1%	0	0%	1	1%	4	5%	6	8%	

Source: Primary Data, 2018

Table 6
Barrier to Exit of Larger Beef Cattle Industry

Variable	Type of respondent								Total		Significance
	Calf Supplier		Farmer		Trader		Prosessor				
Barrier to exit beef cattle market									74	100%	0.002
Large capital invested	6	8%	3	4%	1	1%	0	0%	10	14%	
Large demand	11	15%	4	5%	6	8%	11	15%	32	43%	
Contract with other actors	0	0%	1	1%	4	5%	0	0%	5	7%	
Main job	2	3%	1	1%	0	0%	9	12%	12	16%	
Source of income	4	5%	2	3%	3	4%	4	5%	13	18%	
Large of forage	2	3%	0	0%	0	0%	0	0%	2	3%	

Source: Primary Data, 2018

the main reason why the respondents would continue competing in the beef cattle industry. They believed that the demand for beef cattle is big and tends to increase due to population growth.

The large capital investment is also a barrier to exit from the market. Farmers need Hed, equipment, and to buy calves to start a beef cattle business. Similarly, even the calf suppliers must also spend much money because they also have to buy cow. Besides, they also have to wait much longer before they can get the returns from this business.

At the trader level, the large potential demand is the second exit barrier in the beef cattle industry. While they were positive in thinking that the beef cattle industry has a good business prospect, their existing contract with other actors, however, was for them the second constraint to exit from the market. According to the processor respondents, the large demand for meat and the beef cattle business being their primary job and source of income ranked first and second in terms of exit barriers.

Profitability of Large Beef Cattle Industry

As a measure of market performance, the profitability ratio measures the efficiency of the inputs used by the firm. It is the value of profit expressed per unit of cost. Table 7, presents the profitability ratios of calf suppliers (9%) and farmers (14%). The values mean that for every 100 rupiah invested, the calf supplier and farmer obtained a profit of 9 rupiah and 14 rupiah, respectively. This shows that their businesses are profitable. According (Chogou et al., 2018) to improve economic performance, efforts should be made to reduce transaction costs.

Table 7
Profitability of Large Beef Cattle Commodity Chain for Calf Suppliers and Farmers (Rp per head)

Component	Calf Supplier	Farmer
Depreciation	118.102	117.052
Fixed Cost	157.167	265.098
Variable cost	7.678.797	10.578.407
Total cost	7.954.065	10.960.557
Total Revenue	8.637.500	12.490.667
Profit	683.435	1.530.110
R/C (Profit)	1,086	1,140
Cash Profit	1.620.435	2.226.443
R/C (Cash Profit)	1,231	1,136
Profit/TC	9%	14%

Source: Primary Data, 2018

The calculated R/C ratios for calf supplier and farmer were 1.086 and 1.140, respectively, indicative of efficient business operation. The calf supplier in the large chain has positive R/C, which implies that

Table 8
Profitability of Large Beef Cattle Commodity Chain for Traders (Rp per head)

Component	Trader		
	Sub-District	District	Province
Depreciation	7.050	9.624	27.525
Fixed Cost	15.755	53.472	893.969
Variable cost	6.297.450	7.800.205	5.686.100
Total cost	6.320.255	7.863.301	6.607.594
Total Revenue	6.750.600	8.537.153	9.701.601
Profit	430.344	673.852	3.094.006
R/C (Profit)	1,068	1,086	1,468
Cash Profit	436.675	692.998	3.373.232
R/C (Cash Profit)	1,069	1,088	1,088
Profit/TC	7%	9%	47%

Source: Primary Data, 2018

Table 9
Profitability of Large Beef Cattle Commodity Chain for Processors (Rp per head)

Component	Processor			
	Village	Sub-District	District	Province
Depreciation	24.199	12.544	15.983.333	3.153
Fixed Cost	101.386	50.707	125.800.000	46.260
Variable cost	7.618.382	7.032.489	17.044.284.375	9.415.411
Total cost	7.743.967	7.095.740	17.186.067.708	9.464.825
Total Revenue	9.951.413	8.213.198	23.749.100.000	13.183.760
Profit	2.207.447	1.117.458	6.619.282.292	3.718.935
R/C (Profit)	1,285	1,157	1,386	1,393
Cash Profit	2.355.715	1.210.112	6.993.782.292	3.765.445
R/C (Cash Profit)	1,310	1,173	1,417	1,400
Profit/TC	29%	16%	39%	39%

Source: Primary Data, 2018

the calf production business in the large commodity chain is profitable. This may be due to economies of scale in the operation of calf suppliers in the large chain. However, the profitability and R/C has to improve. When a new technology becomes available, the adopting households will reallocate resources to increase the production of beef cattle (Yifu, 1999).

The profitability ratios of traders were 7% for sub-district, 9% for district, and 47% for provincial levels (Table 8). These values mean that for every 100 rupiah invested, traders gained 7, 9, and 47 rupiah, respectively. This shows that beef cattle trading business at all levels was profitable. The calculated R/C ratios for traders were 1.068, 1.086, and 1.468, respectively. These ratios mean that the traders were efficient.

Table 9, shows the profitability ratios of the processor at the village, sub-district, district, and provincial levels in large commodity chain. The values were 29%, 16%, 39% and 39%, respectively, which indicate that for every 100 rupiah invested, the processors realized net profit of 29, 16, 39, and 39 rupiah, respectively. This result shows that beef cattle processing at all levels was a profitable business. The calculated R/C ratios for processor were 1.285, 1.157, 1.386 and 1.393, respectively. The positive ratios indicate efficient business operation for the processors.

Relationship Market Structure and Profitability of Large Beef Cattle Industry

From illustration above, there were relationships between the type of market and ratios of operational efficiency and profitability. The market structure of calf supplier sub-market was weak oligopoly with higher ratios of operational efficiency (1.09) and profitability (0.09). The same result was obtained in the farmer sub-market. the farmer's market structure was a strong oligopoly, the operational efficiency and profitability ratios were higher at 1.14 and 0.14, respectively. So, the oligopoly market which is characterized by the high level of concentration has higher operational efficiency and profitability ratios than monopolistic competitive market. It means the oligopoly market is more operationally efficient and profitable. Besides that, the difference in the level of operational efficiency and profitability in the large commodity chain was caused by the difference in price and size of traded beef cattle.

CONCLUSION

This paper comprehensively investigates the beef cattle market structures and their performance in the large beef cattle farmers'. Market structure was analyzed using market concentration ratio, Gini coefficient and barrier to entry and exit. Performance analysis was identified through profitability ratio and R/C analysis.

Our main findings are as follows. First, the market structure of calf supplier and processor is weak oligopoly with the ratio 33% – 50%. Further, farmer and trader has concentration ratio more than 50%. It indicated that the market structure was strong oligopolistic industry. CR4 of Calf supplier was the lowest compared to other actors. It means the bargaining position of the calf supplier was relatively low. Second, The profitability ratio of all actors varied from 7% to 47%. It means the beef cattle industry was profitable. In terms of operational efficiency ratio, the R/C of all actors was more than one meaning all of beef cattle industry were efficient. Third, there were relationships between type of market and ratios of operational efficiency and profitability. The high concentration ratio will lead to high level of profitability and efficiency.In order to increase the bargaining position of the calf supplier and beef cattle farmer, the government should facilitate them such as soft loan to buy calves, livestock infrastructure (weighing scale and feed technology), and providing some regulation about both prices of cattle and beef.

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