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THE MARKET STRUCTURE OF THE BALI CATTLE IN EAST NUSA TENGGARA, INDONESIA

Nendissa Doppy Roy*, **Kapioru Charles**, **Bernadina Lika**
Department of Agribusiness, Faculty of Agriculture, University of Nusa Cendana Kupang, Indonesia
*E-mail: roynendissa@staf.undana.ac.id

ABSTRACT
Knowing the cattle market structure will provide an explanation of competition in the market. This study was to determine the market structure of the Bali cattle, involving 200 farmers and 14 inter-island traders. The market structure is known to measure market concentration by measuring Concentration Ratio (CR4), Hirschman-Herfindahl Index (HHI) and Rosenbluth index (IR), look at the barriers to entry, market knowledge and product differentiation. The results of the analysis show that the cattle market at the research location from the breeder's side is in a perfectly competitive sales market dealing with oligopsonistic inter-island traders. In this situation the oligopsonists act as price makers and farmers are only price takers. The price takers will accept any price offered because it is in a weak position and the income earned is low. Breeding for producers is a way of life and part with culture, so low income does not prevent them from continuing to work as farmers. To overcome this problem farmers needed to join cooperatives to be able to work together to overcome difficulties. The government needs to develop the auction market so as to increase the bargaining power of farmers in selling cattle.

KEY WORDS
Cattle, market structure, perfect competition.

Demand for beef in Indonesia each year continues to increase along with the increase in revenue and an increase of revenues and the number of residents, while beef production and availability is still low. On the other hand the Indonesian beef consumption is still low, only 2.56 kg per capita in 2016 (Badan Pusat Statistik RI, 2016). Consumption of beef in several countries in ASEAN, such as Singapore and Malaysia about 15 kg per capita, while in Germany and Brazil 40-45 kg to 55 kg per capita per year. Beef demand in 2017 reached 604 966 tons while domestic meat production target of only 354 770 tons or 58.64%, meaning there is a shortfall of 41.36% of the needs (Pusdatin Kementerian Pertanian, 2017). So that beef imports also increased from 2016 amounted114.5 million kg to 115.8 million kg 2017 kg, and in 2018 increased to 160.6 million kg, (Badan Pusat Statistik RI, 2018), until May 2019 already imported73 million kg. National meat needsexceed estimated demand due to lower domestic production. Higher meat demand cause prices to the consumer level is very fkluktuasi, so that the import path taken to stabilize the price of meat. Imports of beef to Indonesia dominated by Australia, New Zealand, USA, and India. 2019 Indonesian trying to import from Brazil is not less than 50 thousand tons. Such market conditions have made the structure of the beef market is not efficient because of the level to the level of market competition is not perfect. Cattle production in Indonesia 59.43% are from the five provinces of 34 provinces in Indonesia, which became the center of the largest cattle population. The Province of East Nusa Tenggara (ENT) ranks fifth as a center of beef cattle population in Indonesia, namely 6.01% (Pusdatin Kementerian Pertanian RI, 2018). Total shipments of beef cattle out of the ENT ranks fourth in the number of shipmentsaround 50,000 to 70,000 head per annum (Pusdatin Kementerian Pertanian RI, 2018, and the Dinas Peternakan ENT year, 2018). Data delivery to cattle outside of ENT in 2017 reached 60 360 head or about 2.43% of the domestic beef demand, and as many as 49 790 individuals (82.49%) were from the mainland island of Timor (Pusdatin Kementerian Pertanian RI, 2017, and Dinas Peternakan ENT, 2017).

Delivery of beef cattle outside ENT is only done by a number of inter-island traders, supported by several transporters and brokers or intermediary traders. Over the past five years NTT inter-island traders have sent beef cattle outside the province of 50,000 - 70,000 per year, on average (Dinas Peternakan 2018). Special in 2018 the number of cows in ENT send out as many as 60 220 tail and 81.43% came from the island of Timor Request for beef from outside ENT increases will provide opportunities and encourage inter-island trader (between islands) and the ranchers raise transaction beef cattle, These conditions give rise to competition between producers (farmers) as sellers and inter-island traders as buyers who number not much compared to the breeder. The level of competition is getting tighter due to the imbalance between production and consumption of beef. Cattle market competition conditions between farmers and inter-island traders, the barrier to entry and market information asymmetry tends to form structures in the province cattle market less efficient. Inefficient market structure gives unfair advantage to players who have a large market share. Analysis market structure shows the level of market competitiveness will decline is possible to inhibit the efficiency of the market, which can be demonstrated by market performance (Scarborough and Kydd, 1992 and Nyoro, et al. 2005). The market structure is characterized by the level of market concentration, presence or absence of market barrier to entry, market knowledge, and product differentiation. The study objective is to determine the market structure of the Bali cattle in Timor ENT that can affect market efficiency so that it is expected to find the best path for the welfare of market participants fairly.

METHODS OF RESEARCH

Secondary data comes from various related agencies in the form of sales and purchase data and beef cattle delivery to NTT. Cattle market structure identified by measuring the level of market concentration, barriers to entry (barrier to entry), knowledge of, and presence or absence of different products. Concentration gives an overview of the overall total number of sales of certain products in the market which is distributed to a number of specific companies. Market concentration is the distribution of the number of intercompany sales are different, (Kazemzadeh and Sheikh, 2015), An industry with a little number of companies in the market tend to be more concentrated on the contrary if the industry with a relatively large number of companies that market is not concentrated. The concentration level increased when the company in the market is uneven. According to Khodadad, K.F, (2000), that the concentration (c) is a function of unequal distribution of the market (I) and the function of decreasing the number of companies (n), where c = f (I, n).

Measuring the market concentration of beef cattle sales can be used several measurement methods. Measuring instruments commonly used by various researchers is the Concentration Ratio (CR4) in the four companies that control the largest sales volume, Hirschman-Herfindahl Index (HHI) and Rosenbluth Inbdex (RI). According to Naldi and Flamini, (2014a) and Ginevičius and Čirba (2007), the most commonly used and trusted measuring devices to measure the strength of competition in an industry are CR4 and HHI.

The concentration ratio of a certain number of companies (CRn) will provide an overview of the role of n existing companies in the industry. The concentration ratio of the 4 largest companies (CR4) is most often used in measurements (Gwin, 2001), although there are no standard provisions on how much should be included in calculating CRn, (Lipczynski, et al; 2005). Concentration Ratio for Biggest Four (CR4) is an analysis tool to determine the degree of concentration of the four largest market shares of a market area (Anindita and Baladina, 2017). The formula for measuring CR4 in this study is:

$$CR4 = \sum_{i=1}^{4} Si$$

Si = Market Share

CR4 classification associated with the structure of the market by Gwin, (2001) categorized concentration:

- Minimal when CR4 = 0, perfect competition, monopolistic competition;

- Low if 0 <CR4 <0.40%, effective competition or monopolistic;
- Lower middle if ≤ 0.40 CR4 <0.60, monopolistic competition or oligopoly / oligopsony loose;
- Upper middle if ≤ 0.60 CR4 <0.90, market competition oligopoly / oligopsony tight;
- High if CR4 ≥ 0.90, effective monopoly market;
- Maximum concentration CR4 = 1, perfect monopoly market.

The weakness for the CR4 size is that if there are differences in market structure it might not appear. In a market where each of the four largest companies have the same percentage of market share (Naldi and Flamini, 2014a) even though the level of competition is very different to four companies of the same size than four companies of different sizes. Another thing CR4 does not consider the market as a whole but only in a limited number of companies. To overcome this weakness, it is equipped with Hirschman-Herfindahl Index (HHI) and Rosenbluth Index (RI) measurements.

Measurement Hirschman-Herfindahl Index (HHI). HHI calculation requires a complete knowledge about the overall market share, (Naldi and Flamini, 2014b), mentioned that IHL be an indicator of the degree of competition in the market. HHI is very well used in a measure of market concentration, especially in the measurement of company mergers (Werden, (1991). The formula used to measure HH is:

$$\text{HHI} = \sum_{i=1}^{n} MSi^2 \text{ or}$$
$$\text{HHI} = \{100 \times CR_1\}^2 + \{100 \times CR_2\}^2 + \ldots + \{100 \times CR_n\}^2$$
$$Si = \text{market share to i}$$

Criteria HHI by Anindita and Baladina, (2017) classified:

- High if HHI between 1800-10000, market monopoly;
- Medium if HHI between 1000-1800, the market oligopoly / oligopsony;
- Low if HHI between 0-1000, perfectly competitive market.

Rosenbluth Index (RI).The concentration of the market in the next marketing agency measured by Rosenbluth index (RI):

$$\text{RI} = \frac{1}{(2\sum_{i=0}^{n} i.Si) - 1}$$

Where: RI = Rosenbluth index; *Si* = Market share of companies between the i-th (i = 1,2,3, ..., n). RI value range between 1 / n ≤ RI ≤ 1. If the value obtained is close to the minimum limit it tends to form a perfectly competitive market, on the contrary if the value mendekatan maximum limit it tends to be a competitive market oligopoly (Anindita and Baladina, 2017).
Barrier to entry conducted by questionnaire, as in done by by Dee (2011) were grouped into 3 major groups namely barriers to market access barriers in the ownership and barriers in regulation. Thus the situational nature of entry barriers.

Market knowledge include the type of information you have, the flow of market information sources and better pricing, support facilities and government policy related to the marketing of beef cattle. Product differentiation, livestock refers to the different characteristics between cows with each other. The characteristics observed in this study include different types of live cattle (ideal) traded, which causes the price difference based groups (classification) types of cattle and weight.

RESULTS AND DISCUSSION

The measurement results of cattle market structure through the level of market concentration, barriers to entry, knowledge / information market, and whether diferensiadi product gives the following results.

The results of the analysis of market concentration of the cattle to farmers (producers) and the inter-island trader, shown in Table 1.

Table 1 – Concentrations of Beef Cattle Market and Criteria Year 2017

Company	CR4	HHI	IR	Competition criteria
breeder	0.23	138.21	0.78	The concentration level low / high competition (Perfect competition)
Inter-island trader	0.65	1223.33	0.08	The concentration level high / low competition (oligopoly / Oligopsony)

Source: Adapted Secondary Data, 2019.

The level of market concentration selling cattle by ranchers, indicated by the value of CR4, HHI and RI are at the level of competition is very high or low concentrations based on the criteria of each measurement (CR4 = 0.23; HHI = 138.21, and (RI = 0.78) shown in table 1. Means no producers (farmers) who dominate sales in the market.

The calculation of the level of market concentration is obtained based criterion traders are in a tight market concentration level (CR4 = 0.65); HHI = 1223.33 and RI = 0.08), as shown in Table 1. The results of this study do not differ with Nendissa, et al; (2018) and Nendissa, et al; (2019) about the dynamics of market concentration.

Some aspects were identified as barriers to entry include barriers attempted, market access barriers and regulatory barriers, as shown in Table 2.

Table 2 – Shape of barriers to entry in the business Cattle

Shape Barriers Sign	Breeder / producer		traders inter	
	amount	%	amount	%
Barriers tried beef				
• Barriers to feed cattle	3	2,73	-	-
• Barriers to Employment	7	6.36	-	-
• Security barriers	18	16.35	-	-
Market Access Barriers:				
• Transportation barriers	6	5.45	-	-
• barriers Incumben	-		-	-
• Barriers cattle prices	4	3.63	4	41.67
Barriers Regulation:				
• Terms of the licensing / delivery	-	-	10	83.33
• Barriers Taxes / levies	-	-	-	
• Delivery quota restrictions cattle	-	-	8	66.67

Source: Primary data, 2018.

Generally at the farmer level (producers) did not have significant barriers to entry. There are barriers but relatively little on the security aspect expressed by 16.36% of respondents and very few barriers to entry on the availability of labor, transportation barriers and cattle prices. While other aspects that does not really give the meaning of meaning.

While the barriers to entry for inter-island traders on the regulatory aspects; includes requirements licensing administration /delivery of cattle and cows delivery quota restriction barriers. The prospective traders find it difficult in terms of technical requirements that must be met. Regulation was deemed easier just to the acquisition of the company legal legality and earns delivery quotas. However at the technical requirements stage it is difficult for traders to fulfill as stipulated in the 2017 Guidelines for the Implementation of Livestock Trade through Sea Transportation Modes, by the central government and implemented by the local government.

Based on observations of market knowledge possessed cattle breeders in business and marketing cattle relatively homogeneous. The knowledge owned, for example, the price of cattle at the point of sale is relatively the same. Information and knowledge of traders in estimating the weight and price of cattle is based on expertise and experience and is disseminated from generation to generation by farmers / producers. Farmers do not have knowledge about market mechanisms such as cattle prices that develop dynamically. This limited market knowledge is compounded by the very low level of formal education and informal knowledge in the very limited marketing sector as well as inadequate infrastructure. This contributes greatly to the weak bargaining power of farmers in marketing their cattle.

Knowledge about the development of beef prices and the price of cattle in the domestic market in Jakarta as a destination for cattle delivery (consumers) is rarely known directly by farmers. More information on price developments is owned by intermediary / inter-island traders. This inter-island trader is obliged to follow Jakarta price development because each cow will be sent based on needs and price agreement with Jakarta. This must be done prior to the purchase because, according to the guidelines for the delivery of cattle that must be included in the document sending the name of the recipient of the cattle - the price agreed with the recipient (large sword / consumer), the number of cattle and the minimum weight of cattle. So that market knowledge and price dynamics are dominated by inter-island traders.

Based on the criteria of differentiation, there is no product differentiation in both cattle breeders and inter-island traders. Cattle type cultivated and marketed by farmers and inter-island traders is kind of Bali cattle which have long been domesticated into Bali cattle timor. So that the relatively homogeneous product.

Based on the results of the measurement and analysis of the market structure, in terms of breeders (cow produce) with a large number in the degree of market concentration is very low resulting in high competition in the market because of their very large numbers. Barriers to market entry are relatively low and limited market knowledge tends to be asymmetrical in information, so that producers are in perfect competitive condition.

Whereas in terms of inter-island traders (buyers) with a small number having a high degree of purchase concentration (low competition), entry barriers are quite high. These traders are very knowledgeable about cattle market information in ENT that they are in the oligopsonies market category illustrate with figure1. In this condition, the oligopsonies generally play a role as a liaison between producers and large traders who are outside ENT, and they are not as consumers.

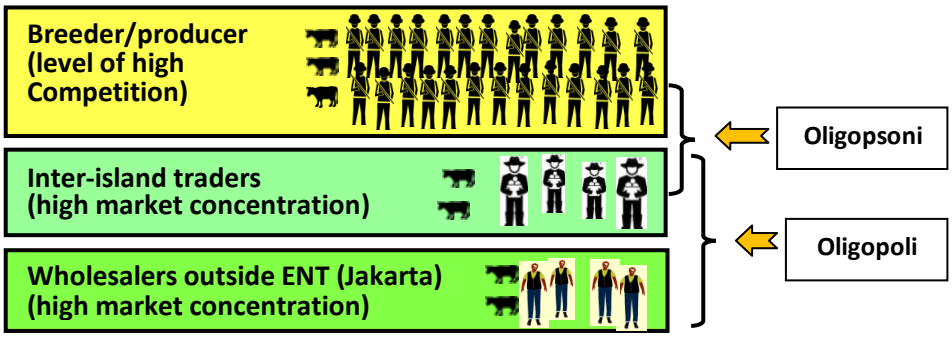

Figure 1 – Market Structure of the Bali Cattle in the Study Area

Companies that are in a more uncompetitive market have market power and bargaining power in the market so that they are able to increase profits. Market power is the ability of individuals or small groups (companies) to negatively influence market prices, (Mankiw, et al. 2013). Research Ayele, et al. (2017) in the Regional State, Ethiopia, concluded that high market concentration indicates a strong oligopoly beef market structure, indicating that the majority of traders are able to get more profit than producers. Also stated by Mohamed, et al. (2015), that the meat market in Malaysia is quite concentrated, because several large companies control a large market share, so that each company can set its own price and quality, without affecting the overall market.

The situation of the cattle marketed in the Timor Island research area in ENT experiences a similar condition where oligopsonies tend to control prices and act as price makers while producers (breeders) are only price takers. Producers accept whatever price is offered by traders. The position of farmers is even more difficult because farmers sell their cattle not because of market demand but generally because of the economic needs of the family, because generally the business patterns are still subsistence. Market conditions such

as these cause low producers income and the welfare level of farmers to fluctuate and even tend to go down.

Observations show that, even though the income earned is low, however, the farmer persists in his business because raising cattle is a work carried out from generation to generation to sustain the household economy. Breeding as a way of life for family income and meeting the social and cultural demands of the community.

CONCLUSION

Based on the results of the discussion on the structure of the beef cattle market, it was concluded that from the producer (breeder) side, the beef cattle sales market is at a high level of competition, entry barriers are low, and market knowledge is limited. So that it leads to perfect competition. On the other hand, the number of inter-island traders is small and uncompetitive in purchasing cattle, barriers to entry are high and they possess information so that they are in oligopsonistic competition. The oligopsonistic cattle market structure, the oligopsonists act as price makers and producers (breeders) only as price takers. This causes farmers to always get low income because they are unable to maintain the price offered.

In order to overcome this market structure, producers need to build cooperation under the auspices of cooperatives that can help farmers in selling cattle. The government needs to create a cattle marketing policy, for example by establishing a cattle auction market to overcome the dominance of traders so that they do not act as price makers.

REFERENCES

1. Anindita, R and Baladina, N. 2017. Pemasaran Produk Pertanian. Penerbit Andi Ofcet. Yogyakarta.
2. Ayele, S; Zemedu, L; Gebremdhin, D. 2017. Analysis of Market Structure, Conduct and Performance of Beef Cattle: The Case of Dugda District, East Shoa Zone, Oromia Regional State, Ethiopia. Journal of Biology, Agriculture and Healthcare ISSN 2224-3208 (Paper) ISSN 2225-093X (Online) Vol.7, No.5, 2017.
3. Dee, P. 2011. Services Liberalization toward the ASEAN Economic Community. Deepening East Asian Economic Integration.
4. Dinas Peternakan, Provinsi Nusa Tenggara Timur (NTT). 2018. Data Pengiriman Sapi and Perusahaan Pengiriman.
5. Ginevičius, R., and Čirba, S. 2007. Determining Market Concentration. Journal of Business Economics and Management, 8(1), 3-10.
6. Gwin, C. R. 2001. A Guide for Industry Study and the Analysis of Firms and Competitive Strategy.
7. Kazemzadeh, E., and Sheikh, Z. A. 2015. Sales Concentration Index in the Iranian Car Market. Industrija, 43(4), 129-149.
8. Kementerian Pertanian, 2018. Statistik Peternakan and Kesehatan Hewan 2018. Penerbit Direktorta Jenderal Peternakan and Kesehatan Hewan Kementan RI, Jakarta.
9. Khodadad, K. F. 2000. Monopoly, Competition And Concentration In The Industrial Markets In Iran (1988-94).
10. Lipczynski, J., Wilson, JO, Goddard, JA, & Goddard, J. 2005. Industrial Organization: Competition, Strategy, Policy. Pearson Education Limited, Harlow.
11. Mankiw, N. G, Quah, E and Wilson, P. 2013. Pengantar Ekonomi Mikro, Principles of Economics. An Asian Edition, Volume 1, Penerjemah: Barvey Nicodemus Hutagalung. Penerbit Salemba Empat, Jakarta.
12. Mohamed, Z., Kasron, N., AbdLatif, I., Sharifuddin, J., Rezai, G., and Terano, R. 2015. Structure, conduct and performance of the Malaysian meat and meat preparation industry. Pertanika Journal of Social Sciences & Humanities, 23(spec. June), 47-62.
13. Naldi, M., & Flamini, M. 2014a. The CR4 Index and the Interval Estimation of the Herfindahl-Hirschman Index: an Empirical Comparison.

14. Naldi, M., & Flamini, M. 2014b. Interval Estimation of the Herfindahl-Hirschman Index Under Incomplete Market Information. In Computer Modelling and Simulation (UKSim), 2014 UKSim-AMSS 16th International Conference on (pp. 318-323). IEEE.
15. Nendissa, D. R., Anindita, R., Hanani N., Muhaimin A. W.2018a. Dynamics of Degree of Beef Cattle Market Concentration in Kupang of East Nusa Tenggara, Indonesia; RJOAS: Russian Journal of Agricultural and Socio-Economic Science 6(78) Juni 2018, pp. 379-384. https://doi.org/10.18551/rjoas.2018-06.44.
16. Nendissa, D.R., Anindita, R; Hanani, N; Muhaimin A.W, and Henukh, Y. L. H. 2019. Concentration of Beef Market in East Nusa Tenggara Province, Indonesia. AEFS, Publishing IOP Conf. Series: Earth and Environmental Science, 260. doi:10.1088/1755-1315/260/1/012023.
17. Pusdatin Kementerian Pertanian RI, 2018. Outlook Daging Sapi, Komoditas Pertanian Subsektor Peternakan. Penerbit Pusata data and Informasi Pertanian, Sekretaris Jenderal Kementerian Pertanian RI, Jakarta.
18. Werden, G. J. 1991. Horizontal Mergers: Comment. The American Economic Review, 81(4), 1002-1006.