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THE ANALYSIS OF BEEF CATTLE STRUCTURAL MARKETING IN NORTH SULAWESI-INDONESIA

Verry Lengkong Hanny Rembang[1], Budi Hartono[2], Hari Dwi Utami[2], Vicky V.J. Panelewen[3]

1-Doctorate Candidate, Faculty of Husbandry, University of Brawijaya, Malang, Indonesia
2-Faculty of Husbandry, University of Brawijaya, Malang, Indonesia
3-Faculty of Husbandry, University of Sam Ratulangi, Manado, Indonesia

Abstract: The development of population in a region affect the chance in business world including the Beef Cattle Breeding Industry. The increase of pupulation is usually not followed by the increase of products availability, such as cattle. One of the problems in the marketing system of cattle products is on how to decide a good marketing pattern for cattle products in order to make it sustainable. The development of livestock business in North Sulawesi is supported by the availability of cattle market. The cattle central market is in Manado, Tomohon and Minahasa. Based on the problems above, this research is aimed at determining the marketing structure of beef cattle in North Sulawesi. This research was conducted in North Sulawesi on the cattle marketing model with a purpose to find out the market structure of integrated model of beef cattle marketing and the efficiency of cattle marketing in Manado City with its pasar blantek in Tomohon and Minahasa City. The result of market structure of the beef cattle marketing in North Sulawesi are as follows: (1) The calculation results in a percentage of Concentration Ratio (KR) on three (3) collecting markets of 85.86 percent, shows that the structure of the market tends to lead to the high-concentration oligopsony market. The analysis showed that the magnitude of price transmission elasticity (B) is approximately 0.915 for Manado market, 0.936 for Tomohon market, and 0.817 for Minahasa market (not equal to 1), indicate that the marketing of beef in Manado, Tomohon and Minahasa is less efficient, (2) From the result of simultaneous model, three out of four independent variables are significant in determining the prices in the producers level (Y) in Manado, Tomohon, and Minahasa markets, that are the prices in the retail level (X1), supply (X3), and demand (X4), (3) The calculation of the short-term Indeks Market Connection (IMC) between the producers and the retailers markets in Manado, Tomohon, and Minahasa Market is not equal to 1, means that the prices between the producers and retailers in those three markets are not integrated (the markets are not run efficiently). It shows that in a short-term, if there is a price change, will not affect the price change in producers market. The price integration in the producers and retailers level, in a long-term, shows the coefficient which is not equal to 1, means that in a long term, the producers and consumers markets will be integrated perfectly, in which the prices of both markets are mutually affecting.

Keywords: Beef Cattle, Structural Marketing, North Sulawesi, Regression

1. Introduction

The development of population in a region affect the chance in business world including the Beef Cattle Breeding Industry. The increase of pupulation is usually not followed by the increase of products availability, such as cattle. In results, the supply cannot meet the demand volume, so that the price of economic commodity is always increasing [1,7]. It encourages the business actors implement the strategy of marketing distribution management in order to enter and grab the chances in the market, also to struggle it to be long-lasting. Empirically, these marketing chains consists of 2 or more chains. Kodrat [3], Muwanga and Snyder [6] explains that the pattern of marketing distribution can establish the interest relationship with both the equal and unequal chains. This interest relationship establish an interaction pattern that modeling a

marketing model. Marketing as a model is formed by the elements of marketing channels that channel a marketing chain to another [5,6,8,9].

One of the problems in the marketing system of cattle products is on how to decide a good marketing pattern for cattle products in order to make it sustainable [13,14]. Marketing is an important aspect in production process: market availability can encourage the development of implementation of technology in agricultural business system. Particularly, marketing is a result of study or evaluation towards the product channels physically and economically from the producers to the consumers through the brokers [1,4].

The development of livestock business in North Sulawesi is supported by the availability of cattle market [10,11]. The cattle central market is in Manado, Tomohon and Minahasa. While the potential and actual consumers of cattle beef are in Manado City, Tomohon City, and Minahasa City. At the beginning, this cattle market is a cattle barter market (in Manado language it is called as pasar blantek). In this market, there are many sellers and buyers go in and out freely without any slot allocation [14,16,17,18]. Based on the problems above, this research is aimed at determining the marketing structure of beef cattle in North Sulawesi.

2. Research Methodology

This research was conducted in North Sulawesi on the cattle marketing model with a purpose to find out the market structure of integrated model of beef cattle marketing and the efficiency of cattle marketing in Manado City with its pasar blantek in Tomohon and Minahasa City. This research was conducted for 3 (three) months: January to March 2015. The research population is 37.383 cattle farmer households. The sampling was by using purposive sampling on the presence of pasar blantek in North Sulawesi, the farmers who have cattle(s), cattle brokers/sellers, and the butchers/marketers also the retailers in Manado City, Tomohon City and Langowan City and the farmers who have cattle(s) in Kawangkoan, Kawangkoan Sub-District. The sampling technique used is snowball technique.

The approach used to find out the available market structure was

(1) Analyzing the Ratio Concentration (Kr). Besides, the analysis of market structure was also conducted by using the Ratio Concentration and price elasticity. Ratio Concentration is a ratio between the amount of bought commodity (Vb) and the marketed commodity (Vm) that is stated in percent [7].

$$Kr = Vb/Vm \times 100\%$$

(2) Transmition elasticity was used to find out the relationship between the price elasticity in cattle farmer level and in the retail [5]

$$Pf = \alpha\ Pr^{\beta}$$

$$Ln\ Pf = Ln\ \alpha + \beta\ Ln\ Pr$$

with Pf = Cattle farmer price and Pr = Retail price

The analysis tool to solve the problems above was by using a simple linear regression analysis to the cattle marketing model on four marketing channels that become the research target. Sugiyono [15], and Gujarati [2] proposes a model of regression analysis that is used in this research in the marketing analysis on for observed markets (Manado, Tomohon, Minahasa), as follows:

$$Y_i = a + b_i X$$

With Y_i = Ln Pf_i is the logaritm natural of cattle farmer price in i^{th} market (i=1 Manado, i=2 Tomohon, i=3 Minhasa), and X_i = Ln Pr is the logaritm natural of retail price in i^{th} market (i=1 Manado, i=2 Tomohon, i=3 Minhasa)

In addition to the regression equation above, there was a regression analysis tested that tested the short- and long-term integration through Index of Market Connection (IMC), as follows:

Short Term Integration:

$$P_{fi(t)} = b_0 + b_1\ P_{ri(t)} + e_{it}$$

Long Term Integration:

$$P_{fi(t)} = a_0 + a_1\ P_{fi(t-1)} + a_2\ P_{ri(t)} + a_3\ (P_{ri(t)} - P_{ri(t-1)}) + e_{it}$$

If $b_1 = 1$, than the equilibrium of short term integration in each market. If $a_3 = 1$, then the equilibrium of ong term integration in each market [2,15].

3. Result and Discussion

3.1. Qualitative Approach

The reality of the occurrence of beef cattle marketing process can be seen from the trade between the cattle farmers and sellers (Figure 1). Actually, the beef cattle marketing process, both in the group and individual of cattle farmers, has an economic learning process through the ability of cattle farmers in reducing the role of belantik (brokers). They realize that the brokers will increase or decrease the profit. The efforts made by the cattle farmers in the beef cattle marketing process that have reduced the role of the brokers can be understood through the marketing process in the cattle farmer group in selling the beef cattles.

Furthermore, through the group mentoring process, it can be interpreted with the existence of a group that is also capable of providing consideration to the seller-farmers (members) both related to the desired price and payment model. Through a group that sells cows in the communal cowshed, a farmer should receive a cash payment, and if the traders offered the prices out of the group consideration, then the cows will not be sold. The group is responsible to try to find more potential traders. The existence of group mentoring to its members can provide a stronger bargaining position on the sales process by the members.

Next, in the level of beef cattle marketing by individual farmers, as in the groups they behave in order to reduce the role of brokers. The factual conditions can be seen that the emergence of economic learning by the farmers when they sell cattle, before offering to the traders they first offer to the fellow farmers around their living place. However, if the offer is not attractive, then they look for traders who are also not far from their living place.

The findings of this research, at least, can be a breaker on the marketing chain of beef cattle that is too long, especially by small-scale farmers, as well as the results of the study by Suryana [16], and Suarda [13] on the large-livestock marketing as cows and buffaloes in North Sumatra. The profit estimation earned by all players in the chain is no less than Rp. 1 million, or 20% of the average price level of sales in the farmer level of Rp. 5 million per head.

Other consideration is that it seems to the farmers who chose the traders and butchers, the farmers attitude that prefers to a package of sales and the procurement of seeds the through traders (butchers) seems on the basis of other economic consideration that is when the results from selling the cows unsolicited overall money, then the money will be deposited to the butchers. With this consideration, in fact, the farmers have made the process of economic learning through the attitude that is emerged in the selection of cows still have a good chance to be maintained on the basis of physical that are the good seeds, but just less treated. So that it can be interpreted if the seeds are treated properly, especially for the good feeding pattern (nutritional), it will result in a compensatory growth in which the beef cattle are going through a growing (gain) on weight significantly as a result of the supply of higher quality feeding [11,12].

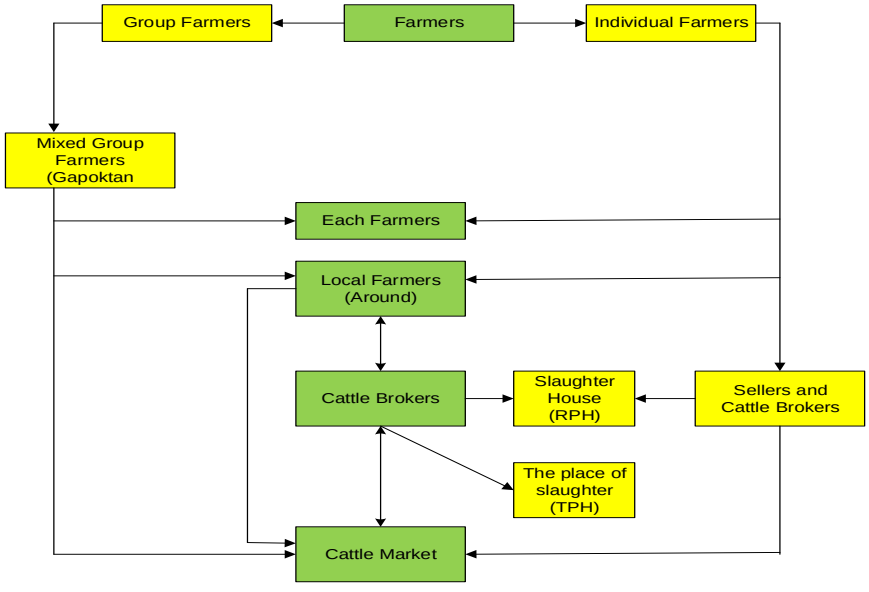

Figure 1: Beef cattle marketing process

3.2. Mathematical approach

From the calculation, it produces a percentage of the cummulative Kr on 3 (three) collecting markets of 85,86 percent, shows that the structure of the market tends to lead to the high-concentration oligopsony market.

Table 1. Calculation of Ratio Concentration (Kr)

Market	Amout of Bought Commodity (Vb)	Marketed Commodity (Vm)	Kr
Manado	295	345	85.51
Tomohon	237	280	84.71
Minahasa	306	350	87.36
Total			85.86

The percentage of cumulative Kr in the Minahasa market is 87,36 percent, shows that the structure of the market tends to lead to the high-concentration oligopsony market. The percentage of cumulative Kr in the Manado market is 85,51 percent, shows that the structure of the market tends to lead to the high-concentration oligopsony market. The percentage of cumulative Kr in the Tomohon market is 84,71 percent, shows that the structure of the market tends to lead to the high-concentration oligopsony market.

The next measurement is the transmission elasticity. The analysis of price transmission to find out the response of cattle prices at the producer-farmer level because of the price changes at the retail. From the research data, the results of simple linear regression analysis can be seen in Table 2 as follows:

Table 2. Analysis Result of Transmissin Elacticity

Market	Variable	Coeff B	t	P-value	R^2
Manado	Constant	0.796			
	Ln Pr	0.915	40.232	0.000	98.8%
Tomohon	Constant	0.573			
	Ln Pr	0.936	39.093	0.000	98.8%
Minahasa	Constant	1.860			
	Ln Pr	0.817	52.507	0.000	99.3%
Dependent Variable : Ln Pf					

The equation of price transmission analysis in Manado, Tomohon and Minahasa Markets as follows:

Ln Pf Manado = 0.796 + 0.915 Ln Pr

Ln Pf Tomohon = 0.573 + 0.936 Ln Pr

Ln Pf Minahasa= 1.860 + 0.817 Ln Pr

The analysis showed that the magnitudes of price transmission elasticity (B) in Manado, Tomohon and Minahasa Markets are 0,915, 0,936, and 0,817 respectively and the results of testing in all locations show the P-value of 0.000> 0.05, indicates that the marketing of beef in Manado, Tomohon and Minahasa is inefficient.

The price transmission elasticity of beef in Manado for 0,915 indicates if there is an increase in price by 1% at the retail, it will raise the price by 0,915% at the level of farmers (producers). The determination coefficient of 98,8% indicates that beef prices at the producer level are influenced by 98.8% of beef prices at the retail level.

The Figure 2above show that the highest elasticity is in Tomohon market (0.936), and the lowest is in Minahasa market (0.817). By knowing the price transmission elasticity, it is expected to obtain information that can be used to improve the bargaining power of the producers (farmers). Seeing from the coefficient of determination (R^2), the beef price in response to the level of farmers (producers) due to the price changes at the retail ranged above 90%, which means that the role of commodity prices at the retail level is quitely large that determines the commodity price at the producer level.

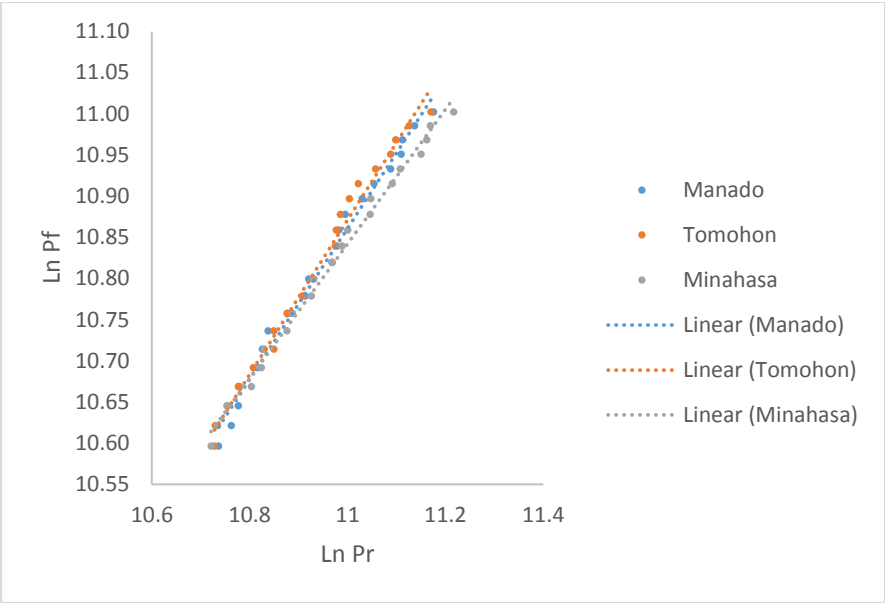

Figure 2. Analysis Result of Transmissin Elacticity

In the next section there was a simultaneous test on the effect of beef price at the retail, the concentration ratio, and supply and demand for beef on the beef prices at the producer level in the three markets (Manado, Tomohon and Minahasa).

Table 3. Simultaneous Model

Market	Variables	Coef B	Coeff Beta	t	P-value
Manado	Constant	0.057			
	Prices at the retail level (X1)	0.682	0.597	5.729	0.000
	Concentration Ratio (X2)	0.186	0.081	0.777	0.437
	Supply (X3)	0.078	0.452	4.313	0.000
	Demand (X4)	0.160	0.698	6.640	0.000
	Dependen: Prices at the producer level (Y), R^2 = 75.3%				
Tomohon	Constant	1.745			
	Prices at the retail level (X1)	0.756	0.529	4.420	0.000
	Concentration Ratio (X2)	0.354	0.117	1.025	0.305
	Supply (X3)	0.109	0.496	4.406	0.000
	Demand (X4)	0.156	0.786	6.865	0.000
	Dependen: Prices at the producer level (Y), R^2 = 71.1%				
Minahasa	Constant	3.845			
	Prices at the retail level (X1)	0.359	0.336	2.900	0.004
	Concentration Ratio (X2)	0.138	0.058	0.544	0.586
	Supply (X3)	0.085	0.451	3.703	0.000
	Demand (X4)	0.153	0.799	7.186	0.000
	Dependen: Prices at the producer level (Y), R^2 = 73.4%				

The existence of significant effect among the variables is marked with T-stat value > 1.96 and P-value < 0.05. The simultaneous equation for each market is as follows:

Manado : Y = 0.057 + 0.682 X1 + 0.186 X2 + 0.078 X3 + 0.160 X4
Tomohon : Y = 1.745 + 0.756 X1 + 0.354 X2 + 0.109 X3 + 0.156 X4
Minahasa : Y = 0.057 + 0.682 X1 + 0.186 X2 + 0.078 X3 + 0.160 X4

The effect of the price at the retail (X1) on prices at the producer level (Y) on each market at 0.682, 0.756 and 0.359 with the t value > 1.96, and P-value < 0.05, showed a significant relationship between prices in the retail level (X1) and producer prices (Y) in Manado, Tomohon and Minahasa Markets. The positive-marked coefficient indicates that the higher prices at the retail level (X1), the higher the producer prices (Y).

The effect of the concentration ratio (X2) on prices at the producer level (Y) on each market at 0.186, 0.756, and 0.359 with the t value < 1.96, and P-value > 0.05, showed a non-significant relationship between concentration ratio (X2) and producer prices (Y) in Manado, Tomohon and Minahasa Markets.

The effect of the supply (X3) on prices at the producer level (Y) on each market at 0.078, 0.109 and 0.085 with the t value > 1.96, and P-value < 0.05, showed a significant relationship between the supply (X3) and producer prices (Y) in Manado, Tomohon and Minahasa Markets. The positive-marked coefficient indicates that the higher the supply (X3), the higher the producer prices (Y).

The effect of the demand (X4) on prices at the producer level (Y) on each market at 0.160, 0.156 and 0.153 with the t value > 1.96, and P-value < 0.05, showed a significant relationship between the demand (X4) and producer prices (Y) in Manado, Tomohon and Minahasa Markets. The positive-marked coefficient indicates that the higher the demand (X4), the higher the producer prices (Y).

Three out of four independent variables are significant as the determinants of prices at the producer level (Y), the prices at the retail level (X1), supply (X3) and demand (X4) for Manado, Tomohon, and Minahasa markets. Furthermore, for Manado market by 75.3% of producer prices (Y) are determined by the prices at the retail level (X1), offers (X3) and demand (X4). While for Tomohon and Minahasa Markets respectively by 71.1% and 73.5% of producer prices (Y) are determined those three things. From the magnitude of standardized regression coefficients (beta), it seems that the demand for beef (X4) is the strongest determinant factor of beef prices at the producer level (Y) in Manado, Minahasa, and Tomohon markets.

The next analysis was the Index of Market Connection (IMC) Analysis. The data used in this research were the monthly price data of the average producer and retailer prices in the three markets (Manado, Tomohon and Minahasa) of 2014-2015. The short-term and long-term analyses were by using the IMC from the time series data (monthly data) between the producer price and the retailer price that can be seen in Table 4 below:

Table 4 shows that the short-term IMC between the producers and retailers market in Manado market is not equal to 1 (1.155), based on different test showed the value of t of 121.316 > 1.96 and P-value of 0.000 < 0.05, means that the prices between the producers and retailers in Manado market are not integrated (the market is not run efficiently). It shows that there are price changes in the retailers market that will not affect the price changes in the producers market. While for the long-term IMC, the IMC coefficient is 1.166 (not equal to 0), means that between the producers market and the retailers market are not integrated, where the price changes between the two markets in the last period (last month) on the formation of prices on the farmers (producers) are currently not mutually affecting. The price integration in producer and retail show a coefficient of 0.568 (not equal to 1) in the long-term, based on the result of difference test, T-stat value is 4.808 > 1.96 and P-value of 0.000 < 0.05, means that between the producers and consumers markets are integrated perfectly in the long-term, where the prices on both markets (producers and retailers) are affecting each other.

Table 4. Index of Market Connection (IMC)

Market	Term	Variable	Coeff	T	P-value	IMC
Manado	Short	Constant	-2605.501			
		$P_{r(t)}$	1.155	121.316	0.000	
	Long	Constant	-2071.751			
		$P_{f(t-1)}$	0.576	4.813	0.000	IMC=0.575/0.493 = 1.166
		$P_{r(t)}$	0.568	4.808	0.000	
		$P_{r(t)-r(t-1)}$	0.493	4.830	0.000	
Tomohon	Short	Constant	-2376.159			
		$P_{r(t)}$	1.150	97.364	0.000	
	Long	Constant	-1817.854			IMC=0.524/0.615 = 0.852
		$P_{f(t-1)}$	0.524	4.672	0.000	

		$P_{r(t)}$	0.615	5.644	0.000	
		$P_{r(t)-r(t-1)}$	0.531	5.570	0.000	
Minahasa	Short	Constant	-3101.726			
		$P_{r(t)}$	1.165	100.315	0.000	
	Long	Constant	-3019.015			
		$P_{f(t-1)}$	0.570	4.540	0.000	IMC= 0.570/0.508 = 1.122
		$P_{r(t)}$	0.593	4.738	0.000	
		$P_{r(t)-r(t-1)}$	0.508	4.744	0.000	
Dependent Variable: $P_{f(t)}$						

The short-term IMC between the producers and retailers market in Tomohon market is not equal to 1 (1.150), based on different test showed the value of t of 97.364 > 1.96 and P-value of 0.000 < 0.05, means that the prices between the producers and retailers in Tomohon market are not integrated (the market is not run efficiently). It shows that there are price changes in the retailers market that will not affect the price changes in the producers market. While for the long-term IMC, the IMC coefficient is 0.852 (not equal to 0), means that between the producers market and the retailers market are not integrated, where the price changes between the two markets in the last period (last month) on the formation of prices on the farmers (producers) are currently not mutually affecting. The price integration in producer and retail show a coefficient of 0.615 (not equal to 1) in the long-term, based on the result of difference test, T-stat value is 5.644 > 1.96 and P-value of 0.000 < 0.05, means that between the producers and consumers markets are integrated perfectly in the long-term, where the prices on both markets (producers and retailers) are affecting each other.

The short-term IMC between the producers and retailers market in Minahasa market is not equal to 1 (1.165), based on different test showed the value of t of 100.315 > 1.96 and P-value of 0.000 < 0.05, means that the prices between the producers and retailers in Minahasa market are not integrated (the market is not run efficiently). It shows that there are price changes in the retailers market that will not affect the price changes in the producers market. While for the long-term IMC, the IMC coefficient is 1.122 (not equal to 0), means that between the producers market and the retailers market are not integrated, where the price changes between the two markets in the last period (last month) on the formation of prices on the farmers (producers) are currently not mutually affecting. The price integration in producer and retail show a coefficient of 0.593 (not equal to 1) in the long-term, based on the result of difference test, T-stat value is 4.738 > 1.96 and P-value of 0.000 < 0.05, means that between the producers and consumers markets are integrated perfectly in the long-term, where the prices on both markets (producers and retailers) are affecting each other.

4. Conclusion and Reccomendation

4.1. Conclusions

Based on the results of research and discussion in the previous section, the conclusions obtained for the market structure of the beef cattle marketing in North Sulawesi are as follows:

(1) The calculation results in a percentage of Concentration Ratio (KR) on three (3) collecting markets of 85.86 percent, shows that the structure of the market tends to lead to the high-concentration oligopsony market. The analysis showed that the magnitude of price transmission elasticity (B) is approximately 0.915 for Manado market, 0.936 for Tomohon market, and 0.817 for Minahasa market (not equal to 1), indicate that the marketing of beef in Manado, Tomohon and Minahasa is less efficient.

(2) From the result of simultaneous model, three out of four independent variables are significant in determining the prices in the producers level (Y) in Manado, Tomohon, and Minahasa markets, that are the prices in the retail level (X1), supply (X3), and demand (X4).

(3) The calculation of the short-term Indeks Market Connection (IMC) between the producers and the retailers markets in Manado, Tomohon, and Minahasa Market is not equal to 1, means that the prices between the producers and retailers in those three markets are not integrated (the markets are not run efficiently). It shows that in a short-term, if there is a price change, will not affect the price change in producers market. The price integration in the producers and retailers level, in a long-term, shows the coefficient which is not equal to 1, means that in a long term, the producers and consumers markets will be integrated perfectly, in which the prices of both markets are mutually affecting.

4.2. Reccomendation

There are some suggestions based on the conclusions of the research:

(1) The information about the prices has not yet perfectly reached the producers, so that there has to be a more effective effort from the related agency to inform the price. In a broader sense, there are some efforts to collect and distribute the prices of beef cattle based on the type and quality prevailed in a region.

(2) There is a need for an organization that deals with the production and marketing of beef products, such as a cooperative. The farmers has to incorporate in a business group that can strengthen their bargaining positions to the direct consumers

(3) There is a need for a consistent products (beef) standardization to obtain the more relatively-stable market segment so that it can increase the income of the cattle farmers. Therefore, there is a need for attention and cooperation from the related agency in terms of technological development.

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