Analysis Price Transmission of Cayenne Pepper In South Sulawesi Province

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Abstract: *This study aims to analyze the price transmission of cayenne pepper in South Sulawesi. This study uses a quantitative approach and is implemented in Enrekang and Maros Regencies, Location determination is done purposively. from February to March 2018. This study uses secondary data obtained from various government agencies in South Sulawesi. The data analysis used is the analysis of price transmission. The results showed that the price transmission that occurred in South Sulawesi in the long run had an IMC value> 1, so that the price in the local market (Maros Regency and Enrekang Regency) with prices in the reference market (Makassar City) was not integrated, This indicates that any price changes that occurred in the reference market (Makassar City) in the previous week did not affect the price of cayenne pepper at the local market level (Maros Regency and Enrekang Regency). While the price transmission in South Sulawesi is short-term integrated high for Enrekang Regency. This is because the value of b2 is close to 1 so the difference in price in the previous week in Enrekang Regency influences price formation in the reference market (Makassar City), Whereas in Maros Regency it was integrated low, which caused that the price difference in the previous week did not affect the formation of market prices in Makassar City.*

Keywords: Cayenne pepper, Price Transmission

1. Introduction

Cayenne pepper is one of horticultural commodity which has economical value in Indonesia because it can be used as cooking spices and consumption in the processed form (Setiawati, 2007). Meanwhile, according to Rukmana (2002) Cayenne pepper is one of the selected commodities for commercial farming. The position of cayenne pepper tends to be more important in food consumption patterns, namely as vegetables or spices everyday. This gives an indication that cayenne pepper has wider market opportunities, both to meet the demand for household consumption and domestic and export industries. Based on FAO data in outlook chili (2016), during 2009-2013 Indonesia was in the first position as the largest chili producer in ASEAN with an average production contribution of 95.36% of the total ASEAN chili production. While Malaysia ranked second with a contribution of 2.18% and the Philippines contribution was only 1.31%.

Chili needs and consumption in 2015 reached 645,200 tons, while chili production amounted to 869,954 tons. Based on these data, the production of chili is greater than the level of public consumption. However, most regions continue to experience price increases at certain times. In accordance with the Outlook of chili (2015) stating that if the supply of chili is less or lower than the demand there will be price increases. Conversely, if the supply of chili exceeds the need, the price will go down. However, there has been a significant price spike in Indonesia. The average price of chili continues to increase at the end of 2016 and the beginning of 2017 up to 120% from the previous year, from Rp.35,881, - to Rp.78,947.-. In fact, there are some areas such as Palangkaraya which have increased by more than 200% from Rp.50,000 to Rp.170,000 (Putri, 2017). As for the average price growth at the national and provincial levels of South Sulawesi consumers can be seen in Figure 1
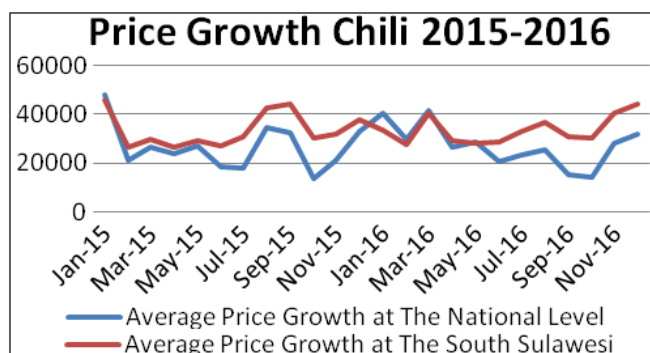

Figure 1: The price of cayenne pepper 2015-2016
Source: Ministry of Agriculture, 2017.

From the price graph of cayenne pepper from 2015 to 2016 above, the price of cayenne fluctuated from month to month.

The amount of chili flour production that continues to fluctuate and its uneven production in various provinces in Indonesia result in different prices of chili in various regions. As illustrated in Figure 1, national price fluctuations increase or decrease, not always followed by an increase and decrease at the level of the Province of Makassar. For example, in July 2015 the average price at the national level of Rp 31,186, - while the price at the level of South Sulawesi only around Rp 17,895, -. Price fluctuations at the level in South Sulawesi are higher than the price fluctuations at the national level, although in certain months the average price at the provincial level is lower than at the provincial level as in January 2016

By looking at price fluctuations that occur in various regions in South Sulawesi, it is necessary to study the extent to which the consumer market in South Sulawesi is integrated with local markets in Enrekang and Maros Regencies. Based on the description, the purpose of this study is to analyze the transmission of the price of cayenne in the province of South Sulawesi.

2. Review of Literature

Market integration based on market relations, according to Wyeth (1992) in Carolina (2016), can be divided into two, namely spatial market integration and vertical market integration. Spatial market integration is defined as the magnitude of a change that occurs in prices in a market that causes price changes in other markets proportionally.

Ravallion (1986) states that a market can be said to be spatially integrated with other markets if there is a trade between the two markets and the price in the importer region is equal to the price in the exporter area plus the transportation cost required to move goods from the importer area to the exporter area . Meanwhile, vertical market integration represents the degree of relationship of a marketing agency with other marketing institutions in a marketing chain. A market can be said to be well integrated if the price at a marketing agency can be transformed to another marketing agency within a marketing chain. Vertical price linkages are often associated with the structure, behavior and performance of a market. How much price changes can be transmitted in every marketing chain can be an important indicator for measuring the strength of a market (Dang and Lantican 2011).

Two or more integrated markets can be seen from the transmission of prices that occur from one market to another. Price transmission is a study to see how price changes that occur in a market can affect or be transmitted to other related markets. Similar to the concept of market integration, the study of price transmission can be divided into two types: horizontal price transmission and vertical price transmission. Horizontal price transmission is based on the Law of One Price theory which states that markets that are in different regions, but have trade and arbitration relations, tend to have the same price (Fackler and Goodwin 2001).

In his book, Marshall (1890) states that if the structure of a market is nearing perfect, the greater the tendency of the market to have the same price for the same goods at the same time.

Economic globalization characterized by reduced trade barriers can encourage integration between two or more markets in different locations. In addition, increasing trade efficiency as indicated by the decreasing transportation costs, as well as the latest market information that is more easily accessed via the internet, can support the integration between two or more separate markets.

Higher trade transactions are expected to create perfect integration so that prices in these two markets move in the same direction and in the long run can create a single price condition (Zheng in Carolina 2016)

In addition, the transmission rates are also affected by government policies in both markets, both in normal conditions and specific conditions, such as when commodity prices being very low or very high (Acharya et al.2012. Price transmission cannot occur perfectly if there are policies that affect prices in one market

3. Research Methods

This research was carried out in Maros Regency and Enrekang Regency, South Sulawesi Province. The time for conducting research began from February to March 2018 with a total of 27 informants.

Price transmission is analyzed quantitatively, using Ravallion's (1986) formula which explains the integration between two markets.

$$P_{it} = b_1 P_{it-1} + b_2 (P_{jt} - P_{jt-1}) + b_3 P_{jt-1} + e_t$$

Where :

P_{it} = Price at the local market level i at time t (Rp / kg)

P_{it-1} = Lag on local market prices at time t (Rp / kg)

P_{jt} = Prices at the reference market j at time t

P_{jt-1} = Lag prices on the reference market j at time t

X_t = Exogenous variables such as seasonal factor dummy and other relevant variables in market i at time t

b_i = estimation parameters (b_i = 1,2,3, ...n)

e_t = Random error

In general, the equation shows how prices in a market (reference market) affect price formation in other markets (local markets) by considering the effect of prices at a certain time (t) with prices at the previous time (t-1). Pricing at a previous time (t-1) in a certain period of time aims to see the price fluctuations that occur. To show the influence of the provincial market's past prices and the reference market's past prices on the formation of producer prices in regional markets at certain times the Index of Market Connection (IMC) is used. IMC was developed by Timmer (1986) which is defined as the ratio of the local market coefficient to the reference market coefficient

$$\text{IMC} = \frac{b_1}{b_3}$$

According to Timmer (1986), IMC with less value from one indicates the occurrence of short-term integration. In general, if the IMC value gets closer to zero, the higher the degree of integration. In this case b2 is a measure of the degree of price change in the reference market which is transmitted to the regional market. This parameter measures long-term integration and the expected value is the same or close to 1. If the coefficient value is equal to one (b2 = 1), then the two markets are perfectly integrated in the long run.

The difference between these two indicators is that b2 shows how many percent of the price changes that occur in the reference market are transmitted to the market other provinces.

4. Results and Discussion

4.1. Enrekang Regency

Regression analysis results to calculate market integration by using price transmission with the consumer price

dependent variable on the market in Enrekang Regency and the consumer price independent variable in Makassar City so that the similar model is obtained as follows:

$$Y = 1821,866 + 0,693X1 + 0,640X2 + 0,182X3 + \varepsilon$$

The calculated F value is 346.875 with a significance level of 0,000. This indicates that the probability < tolerance is tolerated (0,000 <0.05). This shows that there is a significant positive influence on Price Lag in the enrekang market, the difference in price in Makassarcity and the lag of prices in Makassar city together with the Consumer Price in Enrekang Regency.

The value of R-Square (R2) of 0.953 shows that 95.3% of the price change in Makassar City is influenced by price changes in Enrekang market. While 4.7% price changes are influenced by other factors not included in the model.

Coefficient value X1 (Lag Market price in Enrekang Regency) is 0.693 with a positive value. This means that every increase in consumer prices in Enrekang Regency is 1 time, so the lag of the market price in Enrekang Regency will increase by 0.693 assuming other variables are constant.

Coefficient value X2 (Difference in the reference market price in Makassar City) is 0.640 with a positive value. This means that for every increase in consumer prices in Enrekang Regency by 1 time, the market price difference in Makassar City will increase by 0.640 assuming other variables are constant.

Coefficient value X3 (Lag The reference market price in Makassar City) is 0.182 with a positive value. This means that every increase in consumer prices in Enrekang Regency is 1 time, so the market price lag in Makassar will increase by 0.182 assuming other variables are constant.

Next, in calculating market integration, it is calculated using the price-price IMC formula as follows :

$$\text{IMC} = \frac{b_1}{b_3} = \frac{0,693}{0,182} = 3,80$$

In general, short-term integration balance is achieved, if IMC < 1, meaning higher degree of market integration. The IMC value of the consumer market in Maros Regency with Makassar City is 3.80. This shows that the IMC value > 1, so there is no price integration between prices in the local market (Kab Enrekang) with prices in the reference market (Makassar City). This is consistent with the opinion of Arnanto (2014) which states that an IMC value of more than 1 indicates a very weak integration between producer regions. This shows that whatever price changes that occur in the reference market (Makassar City) in the previous week did not affect the price of cayenne pepper at the local market level (Enrekang regency).

To see long-term integration, the value coefficient b2 is 0.640 which means that the closer the value of one to the coefficient is, the higher the degree of integration. Two markets are said to be perfectly integrated in the long run if the value of the regression coefficient equals one. This shows that the long-term market integration between the consumer market in Enrekang Regency and Makassar City is high.

4.2 Maros Regency

The results of regression analysis to calculate the integration of the price transmission market with the consumer price dependent variable on the market in Maros Regency and the consumer price independent variable in Makassar City so that the similar model is obtained as follows:

$$Y = 3148,149+0,632X1 + 0,010X2+ 0,120X3 + e$$

F value calculated at 145.559 with a significance level of 0.000. This shows that the probability <significance level is tolerated (0,000 <0,05). This shows that there is a significant positive influence on Price Lag in the maros market, the difference in prices in the city of Makassar and the lag of prices in the city of Makassar together against Consumer Prices in Maros Regency.

The R-Square value (R2) of 0.895 shows that 89.5% of the price changes in Makassar City are affected by price changes in the Enrekang market. While 10.5% price changes are influenced by other factors not included in the model.

Coefficient value X1 (Lag market price in Maros Regency) is 0.632 with a positive value. This means that every increase in consumer prices in Maros Regency is 1 time, so the lag of market prices in Maros District will increase by 0.632 assuming other variables are constant.

Coefficient value X2 (Difference in the reference market price in Makassar City) is 0.010 with a positive value. This means that every increase in consumer prices in Maros Regency by 1 times the difference in market prices in Makassar City will increase by 0.010 assuming other variables are constant.

Coefficient value X3 (Lag The reference market price in Makassar City) is 0.120 with a positive value. This means that every increase in consumer prices in Maros Regency is 1 time, so the market price lag in Makassar will increase by 0.120 assuming other variables are constant.

Next, in calculating market integration, it is calculated using the price-price IMC formula as follows :

$$\text{IMC} = \frac{b_1}{b_3} = \frac{0,632}{0,120} = 5,266$$

In general, the balance of short-term integration is achieved, if the IMC is < 1, it means that the higher the degree of integration of the market. The IMC value of the consumer market in Maros Regency with Makassar City is 5.266. This shows that the IMC value > 1, so there is no price integration between prices in the local market (Maros Regency) with prices in the reference market (Makassar City). This matter It can be concluded that the local consumer market in Maros Regency in the short term does not play a role in price formation in the reference market in Makassar City, but price formation in Maros Regency is influenced by last week's price in the region itself. In accordance with the results of Arnanto's (2014) study which

states that price increases in consumers which are used as a reference in the short term will not affect prices in other regions. In the short term the price is every the area is not affected by the area reference but influenced by the price at the area in the previous period.

To see long-term integration, the coefficient of b2 is used. The value of b2 is 0.010, which means that getting closer to the zero value of the coefficient, the degree of integration is low. Two markets are said to be perfectly integrated in the short term if the value of the regression coefficient is equal to one. This shows that the short-term market integration between the consumer market in Maros Regency and Makassar City is low. The value of 0.010 shows that the price of cayenne in Maros Regency is not too influenced by prices in Makassar City consumers, if the price in Makassar City is 1 percent, the price in Maros Regency will increase by 0.010 percent.

5. Conclusions

1) The degree of short-term integration shown in two districts in South Sulawesi shows that there is no integration between the reference market in the city of Makassar and local markets in both Enrekang and Maros. This is shown by the IMC figures which are more than 1. The price increase in the market in Makassar City which is used as a reference in the short term will not affect prices in the local market. In the short term prices in each local market are not affected by the reference market but are influenced by prices in those markets in the previous period.
2) The value of b2 shows that in Enrekang District has long-term integration well. Market structure, efficiency trade and information access between the area has gone well thus causing long-term market integration to occur Whereas for Maros Regency the level of integration spatial between regions shows the integration process hasn't proceeded yet good.

References

[1] Acharya SS, Chand R, Birthal PS. 2012. Market integration and price transmission in india: a case of rice and wheat with special reference to the world food crisis of 2007/008. Rome (IT): Food and Agriculture Organization of the United Nations
[2] Arnanto, Sri Hartoyo, Wiwiek Rindayati. 2014. Analisis Integrasi Pasar Spasial Komoditi Pangan Antar Provinsi di Indonesia. Jurnal Ekonomi dan Kebijakan Pembangunan 3 (2): 136-157.
[3] Carolina, Ratna Anita. 2016. Analisis Integrasi Pasar Dan Transmisi Harga Kedelai Indonesia Dengan Kedelai Dunia. *Tesis*, Bogor : Insitut Pertanian Bogor
[4] Dang NV, Lantican FA. 2011. Vertical integration of tea markets in Vietnam. J ISSAAS. 17(1):208-222.
[5] Fackler PL, Goodwin K. 2001. Spatial price analysis:handbook of agricultural economics. Vol.1. In:Gardner B, Rausser G, editors. North Carolina (US): North Carolina State University, Department of Agricultural and Resource Economics
[6] Marshall A. 1890. Principles of economics.8th edn. New York (US): Macmillan Company.
[7] Outlook Cabai 2015. Komoditas Pertanian Sub Sektor Hortikultura.Cabai. Pusat Data dan Sistem Informasi Pertanian. 2015.
[8] Outlook Cabai. 2016. *Komoditas Pertanian Sub Sektor Hortikultura.Cabai Merah*. Pusat Data dan Sistem Informasi Pertanian Kementrian Pertanian. 2016.
[9] Putri, Ajeng Dianingtyas. 2017. *Harga Cabai Masih Mahal?*.Departemen Kajian Strategis BEM FEB UGM.
[10] Ravallion M. 1986. Testing market integration. Am J Agr Econ 68:102-109.
[11] Rukmana, Rahmat. 2002. *Usahatani Cabai Rawit*. Penerbit Kanisius. Yogyakarta.
[12] Setiawati, W., R. Murtiningsih., G.A. Sopha., dan T. Handayati. 2007. Petunjuk Teknis Budidaya Tanaman Sayuran. Balai Penelitian Tanaman Sayuran. Pusat Penelitian dan Pengembangan Hortikultura. Bandung.
[13] Timmer PC. 1986. Getting Prices Right–The Scope and Limits of Agricultural Price Policy. Ithaca, NY: Cornell University Press.

Author Profile

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