



Analysis of Competitiveness and Factors Affecting the Level of Potato Export to Singapore and Malaysia

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ABSTRACT

This study purpose to analyze competitiveness and the factors that influence the level of Indonesian potato exports in Singapore and Malaysia. The analytical method used in this study is the quantitative Revealed Comparative Advantage (RCA) method, Export Product Dynamic (EPD), and OLS analysis. The destination countries for potato exports in Indonesia are Singapore and Malaysia. This study uses annual time series data from 1989 to 2018. The results of the RCA analysis show that Indonesian potatoes have strong competitiveness in Singapore in 1999-2017, although in 1999-2003 the value of Singapore RCA was inferior to Malaysia. Whereas in Malaysia, Indonesian potatoes have strong competitiveness only in 1999-2006. The results of analysis of Indonesian potato EPD on the Singapore market are in a retreat position and Malaysia is in a lost opportunity position. The results of OLS analysis in both countries show that the variable that has a significant effect on the level of potato exports is the GDP of the destination country and the real exchange rate. While the price of exports only affects Singapore.

Keywords: Export of Potatoes, Competitiveness, OLS
JEL Classification Code: P33, C22, N10

INTRODUCTION

International trade is trade carried out by residents of a country with another country based on mutual agreement. The population in question can be between individuals, individuals with the government, and the government and the government. International trade occurs because of differences in the potential resources possessed by each country (Hiziroglu et al., 2013). In addition, the main factor in the occurrence of international trade is that there are differences in relative prices that occur in various countries.

The theory of absolute advantage put forward by Adam Smith, argues that each country will benefit or benefit from international trade, because each country will specialize in production and carry out goods export activities if the country has an absolute advantage, as well as import goods if the country does not have absolute advantage (Rundassa et al., 2019). Meanwhile, the comparative advantage theory put forward by David Ricardo, namely, mutually beneficial trade between countries can still take place, even if the country experiences losses or does not have an absolute advantage in producing two commodities when compared to other countries and countries that are less efficient will specialize in producing. commodity exports to commodities that have an absolute loss (Abu Hatab & Romstad, 2014).

Trade is one of the important factors in increasing economic growth in a country, one of which is by carrying out export-import activities (Widodo, 2008). Exports and imports in international trade open up and provide opportunities for every country to compete well in the international market. Export activities are one of the factors that can improve a country's economy because export activities are related to income.

Exports have an important role for a country, one of which is as a driver of the national economy, because export activi-

ties can generate foreign exchange which can later be used to finance imports and development of domestic sectors (Sheetal et al., 2020). The role of exports for Indonesia has also become increasingly important. The creation of these export activities allowed Indonesia to connect with other countries both in the ASEAN region and in the world. Indonesia's abundant natural resources can be utilized in export activities from the non-oil and gas sector, especially in the agricultural sector.

Agriculture is a sector that has an important role in human life. Agriculture in Indonesia is divided into several sub-sectors, including the sub-sector of food crops, horticulture and plantation crops (Hoang, 2020). Horticulture is one of the sub-sectors that has an important role in agricultural development and national economic development. The horticulture sub-sector in Indonesia is divided into four groups, namely fruit crops, vegetable crops, biopharmaceuticals, and ornamental plants. Vegetables are a commodity that plays an important role both in the source of vitamins and minerals as well as in supporting the national economy, because they have a high economic value and can be a source of income for small, medium and large-scale people (Shuai et al., 2019).

Indonesia's horticultural commodities that excel in the Asean market are mango, mangosteen, avocado, guava, watermelon, cut flowers, potatoes, tomatoes, ginger and ginger. Meanwhile, according to the performance measurement of the Directorate General of Horticulture in 2016, there were 18 main performance indicators which resulted in 6 indicators that were quite successful, 7 indicators with very successful category achievements and 5 indicators with successful categories which included the production of large chilies, other fruits, potatoes, and other vegetables.

Potato is one of the horticultural crops which is a leading commodity and

is the fourth food crop in the world after wheat, rice and maize. Potatoes have an important role in the world, because potatoes are used as an alternative priority that can substitute for the community's food needs. The development of the processing industry and the lifestyle of today's society that is increasingly leaning towards vegetarianism have made consumption levels increase. Based on the level of vegetable production in Indonesia, potatoes rank second after the cabbage commodity. In addition, according to the performance report of the directorate general of horticulture, potato is also a plant that has added value and is competitive.

Indonesia is listed as a fresh potato exporter, although its contribution is only 0.1%. Exports of potatoes in 2017 to Singapore as the destination country were mostly in the form of fresh potatoes with the HS code (070190), namely US \$ 2,774,481. When viewed from the import side, Indonesia imports most of the potatoes from Germany with a value of US \$ 9,897,161. The current era of globalization of trade makes Indonesian vegetable commodities, especially potatoes, compete with other countries in intense competition. Each country shows its best products in order to dominate the international consumer market. The potato is still not able to optimize its exports so that various efforts are needed to improve the export performance. Of course, in these export activities there are various factors that influence, one of which is an indicator of Indonesia's competitiveness both in the destination country and in the international market as well as various other factors. Thus, to increase the export of potatoes in the destination country, it is necessary to know what factors can influence the level of potato exports in the destination country. So that by knowing these factors, it can be obtained a policy that is appropriate and benefits various groups.

Based on the description above, the objectives to be achieved from this

study are (1) Knowing and analyzing the development of potato competitiveness in export destination countries (2) Knowing and analyzing the position of Indonesian fresh potato competitiveness in export destination countries (3) Knowing the factors which affects the level of Indonesian potato exports in export destination countries.

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METHODOLOGY

This research uses descriptive quantitative. The focus of this research is to look at developments in the competitiveness of potatoes, the market position of the potato commodity and the factors affecting potato exports in destination countries. This study uses secondary data based on annual time series, from 1989 to 2018. Secondary data in this study were obtained from the Department of Agriculture, the Central Statistics Agency (BPS), UNComtrade, Food Agricultural Organization, World Bank, IMF and studies. other libraries. The data obtained include data on potato exports, GDP per capita of Singapore and Malaysia, export prices, and real exchange rates.

The dependent variable used in this study was the volume of Indonesian potato exports to Singapore and Malaysia. In this study, the export volume to Singapore and Malaysia is denoted by EKS in Kg units. The independent variables used are the GDP per capita of Singapore and Malaysia, the export price and the real exchange rate.

The method of analysis of this research uses the Revealed Comparative Advantage (RCA) method to determine the competitiveness of potato commodities in destination countries, Export Product Dynamic (EPD) to determine the position of a country's commodity to a certain destination market, and the ordinary least square (OLS) method is used to test the influence of the GDP per capita variable, export prices and the real exchange rate of the destination country using eviews 9.

RCA analysis is used to determine the resilience of the industry in the international market. According to Batra and Khan (2005) in (Nayantakaningtyas and Daryanto, 2012) revealed that if the RCA value is more than one, the country has a comparative advantage (above the world average) for potato commodity. Conversely, if the value is less than one, the comparative advantage for potato commodity is low. This analysis method is based on the concept of inter-regional trade which shows a comparative advantage.

EPD analysis is used to measure the market position of a country's commodity to a particular destination market. This analysis has the ability to compare the export performance of various countries around the world. The EPD matrix consists of market attractiveness and information on business strengths. Market attractiveness is calculated based on the amount of demand for a commodity for a particular market destination and information on business strength as measured by the growth of the market share. The combination of attractiveness and business strength information is analyzed in four categories namely "Rising Star, Falling Star, Lost Opportunity and Retreat". The general formula used in measuring EPD is:

a. Determine the X axis (Growth of business power):

$$\frac{\sum_{t=1}^t \left(\frac{X_{ij}}{W_{ij}} \right)_t \times 100\% - \sum_{t=1}^t \left(\frac{X_{ij}}{W_{ij}} \right)_{t-1} \times 100\%}{T}$$

b. Determining the Y axis (Growth of market attractiveness) :

$$\frac{\sum_{t=1}^t \left(\frac{X_t}{W_t} \right)_t \times 100\% - \sum_{t=1}^t \left(\frac{X_t}{W_t} \right)_{t-1} \times 100\%}{T}$$

Information :

Xij: The export value of Indonesian potatoes to export destination countries; Wij: The value of world potato exports to export destination countries; Xt: The total value of Indonesia's exports to export destination countries; Wt: The total world export value to the export destination country; Q: Number of years of analysis used; t: Year t.

The market position aimed at gaining the highest share of exports is Rising Star. The Rising Star shows that a country in this position is gaining market share in the fast-growing demand for vegetable products. Meanwhile, Lost Opportunity is related to a decline in market share in dynamic products. The Falling Star position is also undesirable, the opportunity position is better when compared to a falling star, because in this position the market share continues to increase even though the movement of products in the global market has decreased. And lastly, Retreat is a position of decline from vegetables, which means the product is no longer desired by the market, due to the movement of products that are not dynamic and uncompetitive in the market.

The OLS method is a method used to estimate a regression line by minimizing the number of error cycles from each observation (Kuncoro, 2003). According to Gujarati (1995), each OLS estimator must meet the BLUE criteria and if one of these assumptions is violated, the regression

equation obtained will no longer be BLUE. The equation model in this study is transformed in a logarithmic form so that the model meets the classical assumption test and avoids the model from bias. In addition, according to Juanda (2009) the transformation of the model in the form of natural logarithms can overcome the problem of heterosexuality. Transforming the model into a natural logarithmic form can also avoid the model from problems of normality, so that the transformed model estimate is as follows:

$$\text{LnEks}_{it} = \beta_0 + \beta_1 \text{LnGDP}_{it} + \beta_2 \text{LnHRG}_{it} + \beta_3 \text{LnNTR}_{it} + \varepsilon_{it}$$

where EKS is an export; GDP is the Gross Domestic Product; HRG is the export price; and NTR is the exchange rate. The *i* and *t* notations indicate the identifier (in this case the agricultural sector) and time. In connection with the OLS method, to produce better estimator parameter values, to test whether the model deviates from classical assumptions, hypothesis testing and classical assumption tests must be performed first. This study uses four classical assumption tests, namely: a) normality test, b) multicollinearity test, c) heteroscedasticity test, d) autocorrelation test. If the model is free from the classical assumption test, then it is followed by hypothesis testing, namely the simultaneous test (F test); partial test (t test) and the coefficient of determination test.

RESULTS AND DISCUSSION

Based on the estimation results, Indonesian potatoes during the period 1999 - 2017 had a comparative advantage in Singapore, while in Malaysia, Indonesian potatoes had strong competitiveness only in 1999 - 2003. Malaysia in 1999 - 2003 continued to occupy the highest RCA value. The highest RCA value of the two countries was achieved in 1999 in Malaysia, namely 8.14. This happened because in that year

the export value of Indonesian potatoes in Malaysia reached US \$ 2,464,251. However, from 2007 to 2017 Indonesian potatoes no longer had a comparative advantage over the Malaysian market, because at that time the potato commodity in the Malaysian market was controlled by China so that the competitiveness of Chinese potatoes was better than Indonesian potatoes and Indonesian potatoes every year from 1999 - 2017 only has strong power in the Singapore market.

Based on the results of the EPD calculations and estimates in, the Indonesian potato market in Singapore is in the "Retreat" position even though Singapore has strong competitiveness based on the calculation of the RCA method. This condition illustrates that there is a decline in the share of the export market and the share of Indonesian potato products so that the market growth and commodity product of Indonesian potato is no longer dynamic. Based on the current phenomenon, this condition is due to the fact that when compared to other competitors, Indonesia is not able to supply high quantities and the potatoes that are offered have high prices. The increase in prices was also caused by movements in exchange rates. Meanwhile, in Malaysia, the Indonesian potato market is in the "Lost Opportunity" position, meaning that potatoes are a dynamic and fast-growing commodity, but their market share is less competitive, so that the potato commodity market in that country is filled by competing countries.

The regression equation for this study obtained the following equation model:

$$\text{LnEks} = 16.38560 - 1.627454\text{LnGDP}^{***} - 0.649886\text{LnHRG}^{**} + 3.467938\text{LnNTR}^{***}$$

Where : ***, **, * is significant 1%, 5%, 10%.
LnEks= Indonesian potato export volume to Singapore (kg); LnGDP= Gross Domestic Product Per capita (US\$); LnHRG = Export prices (US\$); LnNTR = Real exchange

Table 1.
Singapore and Malaysia RCA Analysis Results

Year	Singapura	Malaysia
1999	7,14	8,14
2003	3,79	5,23
2007	3,08	0,64
2011	1,73	0,07
2015	2,74	0,05
2016	2,79	0,05
2017	2,91	0,03

rate (US\$). Based on this equation, a constant value of 16,38560 is obtained, meaning that the export volume of Indonesian fresh potatoes to Singapore will be worth 16,38560 kg if the variables GDP per capita, export price, and exchange rate are equal to zero. The volume level of potato exports to Singapore will remain at the value of 16,38560 if there is no activity from the independent variables.

The GDP per capita variable shown by the above equation has a coefficient value of -1.627454, meaning that every time there is an increase in GDP of 1US \$ while the other variables are constant, the volume of potato exports will decrease by 16,38560 Kg. The price variable shown by the above equation has a coefficient value of -0.649886, which means that if the export price increases by 1US \$, the volume of potato exports in the destination country will decrease by 0.649886 Kg. The real exchange rate variable shown by the above equation has a coefficient value of 3.467938, meaning that if the real exchange rate increases by 1US \$, while the other variables are constant, the volume of potato exports will increase by 3.467938Kg.

The regression equation for this study obtained the following equation model:

$$\text{LnEks} = 33.72787 - 3.9901\text{LnGDP}^{***} - 0.3123\text{LnHRG} + 3.7303\text{LnNTR}^{**}$$
Where : ***, **, * is significant 1%, 5%, 10%.
LnEks= Indonesian potato export volume to Malaysia (kg); LnGDP= Gross Domestic Product Per capita (US\$); LnHRG = Export prices (US\$); LnNTR = Real exchange rate (US\$). Based on this equation, a constant value of 33.72787 is obtained, meaning that the export volume of Indonesian fresh potatoes to Malaysia will be worth 33.72787 Kg if the real GDP per capita variable, the export price, and the exchange rate are equal to zero. The volume level of potato exports to Malaysia will still be at the value of 33.72787kg if there is no activity from the independent variables.

The real GDP variable shown by the equation has a coefficient value of -3.9901, meaning that every time there is an increase in real GDP of 1 US \$, while the other variables are constant, the volume of ketang exports will decrease by 3.9901 Kg. The price variable shown by the above equation has a coefficient value of -0.3123, which means that if the export

price increases by 1US \$, the export volume level will decrease by 0.312361 Kg. The real exchange rate variable shown by the above equation has a coefficient value of 3.730309, meaning that if the real exchange rate increases by 1US, while the other variables are constant, the volume of potato exports will increase by 3.730309 Kg.

This study uses four classical assumption tests, namely normality, multicollinearity, heteroscedasticity, and autocorrelation. Based on testing the normal distribution using the JB Singapore probability value, namely 0.96112 and JB Malaysia 0.369326. This value is greater than the critical value so that this test has fulfilled the classical assumptions of normality. The multicollinearity test in this study was seen from the VIF value. If the VIF value is less than 10, there is no multicollinearity problem, and vice versa. The multicollinearity test results in Singapore were (5.353940; 9.163395; 2.935639) and the multicollinearity test in Malaysia was (3.430237; 1.290228; 3.051204). The test results indicate that each independent variable has a value below 10. Thus, in this study there is no multicollinearity problem.

The results of the heteroscedasticity test in the Singapore study were shown in the prob value. Chi-Square is (0.3080), while in Malaysia it is (0.1488). The results of the heteroscedasticity test have a value above 0.05, meaning that the model is free from heteroscedasticity problems. The results of the autocorrelation test in this study used the LM test. The autocorrelation test results in Singapore and Malaysia are indicated by the prob value. Chi-Square is 0.0539 and 0.0006. The autocorrelation test results on the Singapore regression model have a value above 0.05, meaning that the model is free from autocorrelation problems. Meanwhile, the Malaysian regression model has a value below 0.05, meaning that the model has an autocorrelation problem.4. Hasil Statistical Test Re-

sult.

The regression estimation results in the research of the two countries show that both partially and simultaneously, each independent variable, namely gdp, export price, real exchange rate has a significant effect on the level of potato exports. This can be seen from the t-count probability value of each variable which is smaller than the significant level (0.05). This shows that overall each independent variable is able to explain the dependent variable. However, the variable export price in Malaysia does not have a significant effect, because the probability value is above 0.05.

The results of the adjusted R2 estimate in the Singapore estimate show a value of 0.904499, meaning that all independent variables affect the dependent variable by 90%, while the rest is influenced by other variables outside the model. Meanwhile, the Malaysian estimate shows a value of 0.890583, meaning that all independent variables affect the dependent variable by 89%, while the rest is influenced by other variables outside the model.

Based on the regression estimation results using the OLS method, the following will explain the effect of the independent variables on the level of potato exports in Singapore and Malaysia. The GDP calculated in this study is the GDP per capita of the export destination country, namely Singapore in US \$ units. Based on the estimation results, it was found that the Singapore GDP variable had a negative coefficient value and had a significant effect on the volume of potato exports. This means that when there is an increase in Singapore's GDP, the volume of Indonesian potato exports will decrease.

The negative coefficient indicates that although Singapore's GDP has increased, Indonesia's potato exports to Singapore will decline, because when GDP increases Singapore prefers to import potatoes from China and America. This is due

to the relatively high price level of fresh potatoes from Indonesia. This result is in accordance with the current phenomenon where at this time the price of Indonesian potatoes is more expensive than China, so that Singapore tends to meet the need for fresh potato supplies by importing from other countries including the world's fresh potato exporting countries such as China and America. So that is what causes it a negative relationship between the GDP of the destination country and the level of potato exports from Indonesia.

Based on the estimation results, it is found that the variable Singapore export price has a negative coefficient value and has a significant effect on the volume of potato exports. The export price variable has a coefficient of -0.649886 and has a significant effect on potato exports. This means that if there is an increase in the export price of 1US \$, the export volume of Indonesian potatoes will decrease by 0.649886 Kg. The results of this regression estimation are in accordance with the hypothesis and the law of demand which states that the higher the price set, the amount of demand will decrease (Kea et al., 2020). The estimation results are in accordance with the data obtained, where when there is an increase in the price, the level of Indonesian potato exports has decreased.

An increase in export prices in the destination country tends to result in a decrease in the quantity of the commodity demanded. So that when the export price increases, the importers tend to look for other exporters who can export the potato commodity to their country at a much cheaper price in order to get maximum profit (Saki et al., 2019). The results of research which show that export prices have a negative relationship with exports of goods.

The estimation results of the model show that the coefficient of the real exchange rate variable is positive at 3.467938, which means that if the coun-

try's exchange rate strengthens against the dollar by one percent, it will increase the volume demand for Indonesian potato exports by 3.467938 Kg. Besides the coefficient of the real exchange rate is positive and according to the theory the probability value is also smaller than the real level used so that the real exchange rate variable is significant or has a significant effect on the level of potato exports in Singapore.

The positive coefficient is in accordance with the predetermined theory and hypothesis. The real exchange rate states the rate at which we can trade goods from one country for goods from another country. If the real exchange rate is high, the price of foreign goods is relatively cheap and domestic goods are relatively expensive, and if the exchange rate is low, the price of domestic goods is relatively cheap and the price of foreign goods is relatively expensive (Supongpan Kuldilok et al., 2013). The relationship between the real exchange rate and the volume of exports is positive. Thus, the weakening of the domestic exchange rate will increase export commodities. The weakening of the exchange rate has an impact on increasing the competitiveness of commodities export.

The relationship between the real exchange rate of the United States of America to the supply of Indonesian potato exports to Singapore is positive and individually has a significant effect. An increase in the currency exchange rate of the destination country will cause the price of goods in the destination country to become expensive, so that the destination country will tend to buy cheaper goods abroad. However, based on existing data, the positive results of the exchange rate are not accompanied by the level of exports, where the positive exchange rate is inversely proportional to the existing export data. This is due to the fluctuation of the exchange rate and the existence of the Asia-China trade war as well as trade poli-

tics which caused the level of export prices to rise so that the export of potatoes in the destination country has decreased. The exchange rate has a positive effect on the level of exports (Maryam et al., 2018). Exchange rate volatility has a negative effect on export demand both in the short and long term.

Based on the estimation results, it was found that the real GDP per Malaysia variable had a negative coefficient value and individually had a significant effect on the volume of potato exports. If a country's income increases, it will cause the export volume to increase with the assumption of *ceteris paribus* (Wei & Chunming, 2012).

A fairly good level of Malaysian GDP will have a positive effect on the volume of potato exports. However, the results of the study show that the volume level of Indonesian potato exports and the GDP of Malaysia has a negative relationship. This means that if Malaysia's GDP level increases, Indonesia's potato exports will experience a decline. This is because, in addition to relatively high prices and poor quality of potatoes compared to competing countries, it causes the level of potato imports in Indonesia to fluctuate or can be said to have a low trend. Apart from that, the politics of trade and the Asia-China trade war caused Indonesian potatoes to not have a strong competitiveness so that this also caused the level of potato exports to decline. The real GDP factor of Malaysia shows that increasing income in these countries will increase the demand for fresh potatoes to fresh potato producing countries such as China, Bangladesh, Germany, Pakistan, India, and America.

Based on the estimation results, it is found that the Malaysian export price variable has a negative coefficient value but has no effect significantly to the volume of potato exports. With the meaning that if there is an increase in export prices by 1%, the export volume will decrease by 56666504 Kg. States that the higher the

price is set, the amount of demand will decrease. An increase in export prices in the destination country tends to result in a decrease in the quantity of the commodity demanded (Jayawickrama & Thangavelu, 2010). However, because the results show that the price does not have a significant relationship with the level of Indonesian potato exports to Malaysia, changes in the export price of export potatoes do not have much effect on the level of export. This is because the higher the price set, the importers tend to look for other exporters who can export the commodity potato to their country at a cheaper price.

The estimation results of the model show that the coefficient of the real exchange rate variable is positive and significant at 3.730309, which means that if the country's exchange rate strengthens against the dollar by one percent, it will increase the demand for Indonesian potato export volume by 3.730309 Kg. The positive coefficient is in accordance with the predetermined theory and hypothesis. The exchange rate is the relative price of the commodity traded by the two countries.

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The results of this study are in line with the research of Roy et al. (2012), Kusuma and Firdaus (2015) which show that the exchange rate has a positive effect on the level of exports. Meanwhile, according to Arize et.al. (2000) conducted research on exchange rate volatility on foreign trade in 13 developing countries during 1973-1996. In general, it is found that exchange rate volatility has a negative effect on export demand both in the short and long term. Research conducted by Sabuhi Sabouni and Piri (2008) on the effect of volatility on exports of the agricultural sector shows that different results are found. Exchange rate volatility has a positive long-term impact on exports of the agricultural sector in Iran.

CONCLUSIONS

The Indonesian potato commodity had a fairly strong competitiveness in Singapore during the 1999 - 2017 period, although in 1999 - 2003 the value of Singapore's RCA was inferior to Malaysia. In the Malaysian market, comparative advantage only occurred in 1999-2006. Whereas 2007-2017 the RCA value was less than 1, meaning that in the Malaysian market starting from 2007-2017, Indonesia had weak competitiveness. Analysis using the EPD method shows that the position of potato competitiveness in Singapore is in the position of Retreat even though Indonesian potatoes in Singapore have a comparative advantage. Meanwhile, in the Malaysian market, Indonesian potatoes are in the position of Lost Opportunity, meaning that this commodity is dynamic and grows fast, but its market share is less competitive.

The results of multiple regression analysis show that the real GDP variable has a negative and significant effect on Indonesian potato exports at the 5% real level, while the real exchange rate has a positive and significant effect on potato exports to Malaysia. However, the price vari-

able has a negative and insignificant effect on the level of exports. The results of the multiple regression analysis in Singapore show that the real GDP and price variables have a negative and significant effect, while the real exchange rate has a positive effect on potato exports to Singapore.

The Ministry of Agriculture can develop a more focus on its vegetables has strong and dynamic competitiveness in the destination country, just like potatoes. Because the research results show that not all destination countries get a good position. Development carried out to continuously improve the quality, quantity, continuity and productivity of potatoes, such as developing superior seeds and new varieties, providing subsidies to vegetable farmers, developing technology to make it easier for farmers to process these vegetables from start to finish and so that the vegetables produced are maximized.

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