

## Conference Paper

# Competitiveness and the Factors Affecting Export of the Indonesia Canned Pineapple in the World and the Destination Countries

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## Abstract

Indonesia has a comparative advantage as the largest pineapple exporter in the world. Most of the pineapples are exported in the form of canned pineapples. This study examines the competitiveness of Indonesian exports of canned pineapple in the world and in the destination countries by using the method of Revealed Competitive Advantage (RCA), Export Product Dynamics (EPD), Intra-Industry Trade (IIT), and a panel data regression analysis approach through E-views 6 for the period 2004 until 2013. RCA analysis results indicate that the Indonesian canned pineapple has a comparative advantage in the world as well as in the export destination countries. EPD analysis results indicate that the Indonesian canned pineapple has a highly competitive advantage by positioning a rising star in the world and in the seven export destination countries, including the United States, Spain, Italy, Canada, Denmark, Austria, and China. IIT analysis results indicate that Indonesia has a one-way trade flows and a lower degree of integration towards export destination countries. Finally, the results of panel data analysis indicate that Factors that affect the export volume of Indonesia canned pineapple in the destination countries are Indonesia canned pineapple export prices to the export destination countries, real GDP and the population of destination countries.

**Keywords:** Competitiveness, RCA, EPD, IIT, Panel Regression.

## 1. Introduction

Indonesia as a tropical country has a great potential in producing various kinds of fruit. Most of the fruit is exported to the international market and gives the largest contribution to the Gross Domestic Product (GDP) horticulture with an average contribution of 54.7 percent from 2008 to 2012 [1]. Most of the total fruit export is still in the fresh form. However, the world community lifestyle changes lead to increase consumption of processed fruit because it is considered more practical. In addition, a long expired date causes more suitable for export purpose. This is an opportunity

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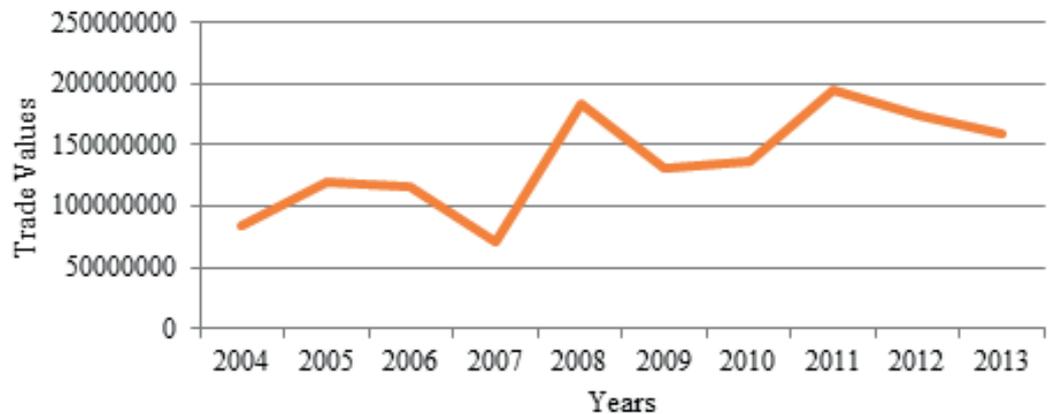
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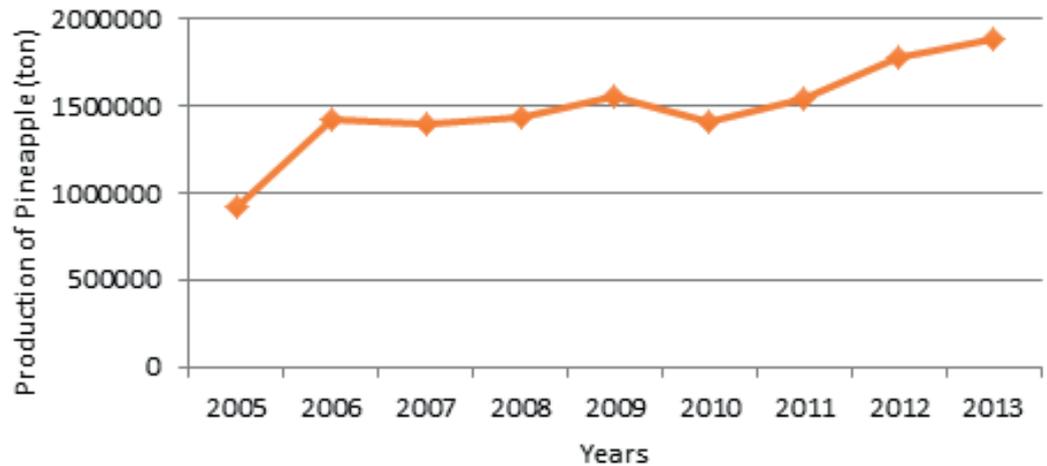


**Figure 1:** Export Value of Indonesia Processed Fruit from 2004 until 2013. Source: UN Comtrade [2].

for the domestic processing industry to increase the added value of its product and job creation. These conditions are also supported by an increase in fruit processing technology. Data indicates that the total export value of processed fruit in Indonesia tended to increase over the past decade (Figure 1).

In 2013, the total export value of processed fruit in Indonesia reached 159 million US\$. When compared with the export value of fresh fruit, the number reached 418 million US\$. Meanwhile, the total value of world export of processed fruit reached 13,463 million US\$. Overall, the value of Indonesia processed fruit export share, compared with world exports reached by 1.18 percent. This condition indicates that there is still a big opportunity for Indonesia to increase its market share of processed fruit export in the future through an integration of the fruit production and fruit processing industry. One of the main fruit produced and has a potential to be processed into refined products is pineapples. Pineapple production data for the period 2000 to 2011 indicated there was an increase trend with an average of 16.08 percent growth per year (Figure 2).

This condition leads Indonesia as one of the main exporter of fresh pineapples and the third largest exporter of canned pineapple in the world [3]. The main export destination countries of canned pineapple involve the United States, European Union, Canada and Asian country such as Japan. The total world demand for canned pineapple tends to increase. In 2014, total world demand for this product reached 1,079 million US\$. It increased by 29 percent of the total demand in 2004. While it is assumed that there is a growth of 2.9 percent per year, then the estimated total world demand in 2025 will increase by 31 percent of the total current demand. These conditions provide an opportunity for Indonesia to develop its own processing industry through export of canned pineapple that will increase the value-added that have been dominated by fresh products. Therefore, it is necessary to analyze the competitiveness position and the factors that affect the export of Indonesia canned pineapple that can generate appropriate policies to improve the canned pineapple exports competitiveness in the



**Figure 2:** Indonesia Pineapple Production from 2005 until 2013. Source: BPS-Indonesian Statistics, 2013.

international market. This study is aimed to analyze the competitiveness position of Indonesia canned pineapple export in the international market and the factors that influence it. The result is expected to contribute as basic information of canned pineapple export competitiveness position for further research. In addition, by knowing the factors that affect the export of canned pineapple can determine the direction of the right policy and strategy to improve the canned pineapple export competitiveness.

## 2. Methodology

### 2.1. Data Collection

This study uses secondary data that covers export value and export volume of Indonesia canned pineapple from 2004 until 2013 to analyze the competitiveness position of Indonesia canned pineapple exports based on the data from UN Comtrade Harmonized System (HS) 1996 six digits (HS 200820) in 17 export destination countries include the United States, Germany, Netherlands, Japan, Spain, Australia, Italy, France, United Kingdom, Norway, Finland, Canada, Sweden, Denmark, Austria, China and Belgium. While analyzing the factors that affect the export of canned pineapple secondary data was employed which included a variable export prices, real Gross Domestic Product (GDP) in the export destination countries, population, and the exchange rate obtained from various sources (Table 1).

TABLE 1: Type and Source of Data.

Type of Data	Source
Export Value and Export Volume	UN Comtrade
GDP	www.worldbank.org
Population	www.worldbank.org
Exchange Rate	www.unctad.org
Source: Various sources of research data	

### 2.2. Data Analysis

Revealed Competitive Advantage (RCA) was used to analyze the position of Indonesia canned pineapple export competitiveness in the international market. In this method, it compares canned pineapple export market share with the export market share of the similar products in the export destination countries [4-7]. Mathematically RCA formulated as follows.

$$RCA = \frac{X_{ij}/X_j}{X_{iw}/X_w} \tag{1}$$

Where X represents the value of exports (US\$), then i, j, and w indicate the type of product/sector, country and world respectively. An RCA value of more than one indicates Indonesia’s comparative advantage of canned pineapple export competition in the international market. To analyze the competitive advantages of canned pineapple, Export Product Dynamics (EPD) is employed by calculating the market share of total exports (X) and the commodity export market share (Y). Mathematically, the value of X and Y is defined as follows.

$$X = \frac{\sum_{t=1}^T \left( \frac{X_{ij}}{X_{iw}} \right)_t \times 100\% - \sum_{t=1}^T \left( \frac{X_{ij}}{X_{iw}} \right)_{t-1} \times 100\%}{T} \tag{2}$$

$$Y = \frac{\sum_{t=1}^T \left( \frac{X_j}{X_w} \right)_t \times 100\% - \sum_{t=1}^T \left( \frac{X_j}{X_w} \right)_{t-1} \times 100\%}{T} \tag{3}$$

Where T is the number of years of the analysis. Matrix EPD competitiveness position consists of *Rising star*, *Lost opportunity*, *Falling star* and *Retreat* (Table 2).

To analyze the flow of Indonesia international trade with the export destination countries the calculation of Grubel-Lloyd Index of Intra-Industry Trade (GLIIT) is employed. This indicates whether the flow of trade that occurs between Indonesia and the destination countries is only a one-way or two-way (exports and imports) and it also covers the degree of the trade integration towards the export destination countries. GLIIT index ranges from 0 to 100 percent. IIT equals to 0 indicates the flow of the trade is an inter-industry trade means that a country is only importing or exporting

TABLE 2: Export Product Dynamics (EPD) Position Matrix Competitiveness.

Share of country's export in world trade	Share of product in world trade	
	Rising (dynamic)	Falling (stagnant)
Rising (competitiveness)	<i>Rising star</i>	<i>Falling star</i>
Falling (non-competitiveness)	<i>Lost opportunity</i>	<i>Retreat</i>
Source: Estherhuizen, 2006		

a product. Instead, GLIIT equals to 100 percent indicates the flow of the trade is an intra-trade exchange means that the exports value equal to the imports value and there is high trade integration between the two countries [8]. Mathematically, the index GLIIT formulated as follows.

$$GLIIT = \left( 1 - \frac{|X_{ij} - M_{ij}|}{(X_{ij} + M_{ij})} \right) \times 100 \tag{4}$$

Where X is export value, M is import value (US\$), then i and j indicate the type of product/sector and country respectively. To analyze the factors that affect the export of canned pineapple, a panel regression model is employed initially following Suprehatin [9] as follows.

$$\ln EV_{it} = \beta_0 + \beta_1 \ln EP_{it} + \beta_2 \ln DRGDP_{it} + \beta_3 \ln POP_{it} + \beta_4 \ln RER_{it} + e_{it} \tag{5}$$

Where EV is export volume (Kg), EP is export price (US\$/Kg), DRGDP is destination countries' real GDP (US\$), POP is population of destination countries (people) and RER is real exchange rate between Indonesia and destination countries,  $\beta_0$  is a constant,  $\beta_1, \beta_2, \beta_3, \beta_4$ , are coefficients,  $e_{it}$  is random error, i is cross section, and t is time series. The form of natural log is used to normalize the variable distribution [10]. Data processing is carried out through a gravity model of panel data regression with three approaches, namely Pooled Least Square (PLS), Fixed Effect Model (FEM) and Random Effects Model (REM). Selection of the best model is carried out through a series of tests consisting of a Chow test, Hausman Test and Test LM or The Breusch Pagan.

After obtaining the best model, the process is continued with the classic assumption test to determine whether the model meets the assumptions of normality through Jarque Bera test, as well as free of the problems of multicollinearity, heteroscedasticity and autocorrelation. Multicollinearity can be identified through the correlation matrix values greater than 0.8 and the value of the partial coefficient greater than R-squared ( $R^2$ ). Heteroscedasticity is identified through the test of Breusch Pagan and White tests while autocorrelation is identified through Durbin Watson test. Both heteroscedasticity and autocorrelation problems can be overcome by giving weight Weighted Least Squares (WLS) through the Generalized Least Squares (GLS) model [11]. The data processing is carried out by employing Microsoft Excel and Eviews 6.0.

TABLE 3: RCA and RCA Index Estimation Results of The Indonesian Canned Pineapple Export in The World.

Indicators	Years									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
RCA	14.020	15.742	14.400	7.905	16.707	13.196	11.457	11.782	12.389	12.335
RCA Index	-	1.123	0.195	0.549	2.113	0.79	0.868	1.028	1.051	0.996

Source: UN Comtrade 2014, Processed

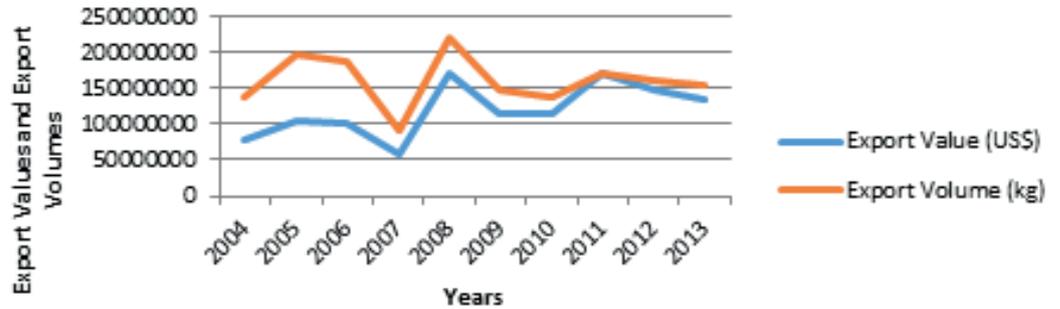
### 3. Results and Discussion

#### 3.1. Canned Pineapple Export Competitiveness Position of Indonesia to the World from 2004 until 2013

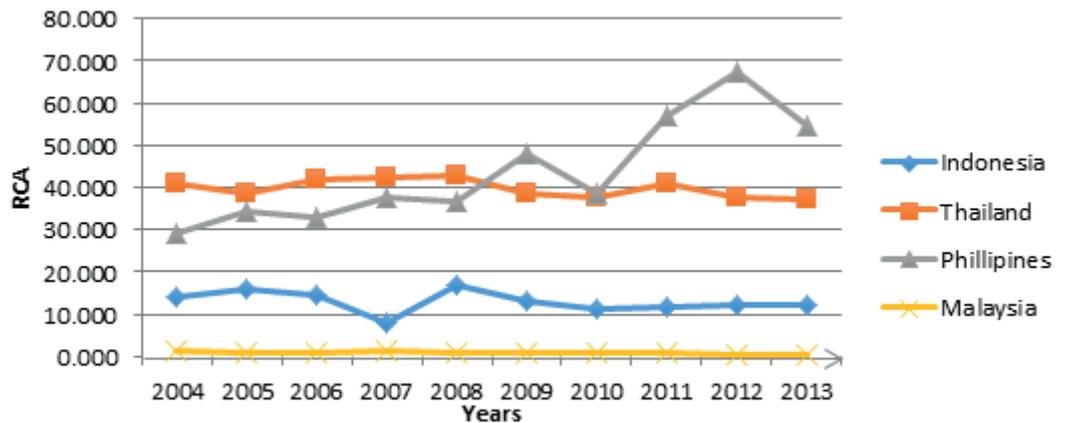
The average value of RCA during the period 2004 to 2013 is 12.993 means that Indonesian canned pineapple has a high competitiveness in the international market. This is not surprising considering Indonesia as the third largest exporter of canned pineapple in the international market. The average value of the RCA index is 0.968, means that the average increase of Indonesia canned pineapple export performance is still not significant compared to the previous years. The RCA value decreased in 2007, amounting to 7.905 from the previous year at 14.400. The same conditions occurred in 2009 to 2010 (Table 3).

The growth rate of the export value and the export volume in 2007 was -42.33 percent and -51.20 percent. This negative growth rate was due to a decrease in the national pineapple production of 1,427,781 tons in 2006 to 1,395,566 tons in 2007. In 2009, the growth rate of export value and volume of canned pineapple was -32.73 percent and -33.24 percent. This decline was not caused by a decrease in production while the national pineapple production increased by 8.72 percent from 1,433,133 tons in 2008 to 1,558,196 tons in 2009. The negative growth rate was caused by the economic crisis that occurred in the export destination countries of Indonesia, especially the United States and the European Union. The growth rate of world demand for canned pineapple in 2009 of -17.98 percent. The United States and the European Union as the main export destination countries have negative import growth rates that were equal to -2.5 percent and -26.61 percent. In 2010, the growth rate of export value and export volume of canned pineapple was 0.13 percent and -7.11 percent. The low rate of growth of exports was due to a decrease in the national pineapple production that amounted to 9.73 percent (Figure 3).

When compared with the RCA from the producers and exporters of canned pineapple in ASEAN region, Indonesia has a lower RCA value than Thailand and Philippines, but still higher than Malaysia. This is in line with the fact that Thailand and Philippines



**Figure 3:** Export Values and Export Volumes of Indonesian Canned Pineapple in 2004–2013. Source: UN Comtrade [2].



**Figure 4:** RCA of The Main Pineapple Producers in The World. Source: UN Comtrade, 2014.

have a higher level of production than Indonesia [12]. Beside their domestic industry is supported by capital, high technology innovation, government incentives and low labor costs [13].

The estimation results EPD indicates the position of canned pineapple competitiveness is in the quadrant of rising star. It indicates that Indonesia canned pineapple has a high competitive advantage to compete in the international market. However the growth of market share of canned pineapple Indonesia is still relatively low at 0.192 percent per year, as well as the world market share of canned pineapple in the amount of 0.019 percent per year (Table 4).

### 3.2. Canned Pineapple Export competitiveness position of Indonesia to the Export Destination Countries from 2004 until 2013

The estimation results of RCA Indonesian canned pineapple exports to the export destination countries implies that there is a high export opportunity of canned pineapple

TABLE 4: EPD Estimation Results of The Indonesian Canned Pineapple Export in The World.

Years	Share of country's export growth in world trade	Share of product growth in world trade
2004	0.424	0.010
2005	2.250	0.000
2006	-1.048	0.000
2007	-5.568	0.000
2008	7.927	0.100
2009	-2.002	0.100
2010	-0.447	0.106
2011	1.414	0.100
2012	-0.021	0.100
2013	-0.993	0.100
Average	0.192	0.019

Source: UN Comtrade 2014, Processed

in the 17 export destination countries. This indicates that Indonesia canned pineapple have a high competitiveness in the international market. The biggest export opportunity is in Austria with an average RCA value of 655.316. Indonesia is the second largest exporter to the country after Thailand. Whereas the smallest export opportunities is in Japan with an average RCA value of 3.785. It is estimated that one of the reason is due to the strict rules and procedures [1].

Figure 4 indicates the four main exporters of canned pineapple to Japan. Of the four exporters, Indonesia has the lowest average value of RCA. Exporters with the highest average value of RCA is Thailand, then followed by Philippines and Malaysia. This means that Indonesia canned pineapple export competitiveness is still low compared with those three countries. The average Japanese demand for canned pineapple products amounted 46,693.099 tons per year. This condition should be followed in particular through quality improvement strategies exports of Indonesia canned pineapple.

The average value of the RCA index to the export destination countries during the period 2005 to 2013 was more than one, which means that there was an increase in the Indonesia canned pineapple export performance compared to the previous years. EPD estimation results indicate that the average position of Indonesian canned pineapple competitiveness was in the position of *rising star* which means that Indonesia canned pineapple has a highly competitive advantage to compete in the international market. In Germany and Netherlands, Indonesia canned pineapple competitiveness position was in the position of *lost opportunity*. This position has to be considered because

TABLE 5: RCA, RCA Index, EPD and GLIIT Estimation Results of The Indonesian Canned Pineapple Export in The Export Destination Countries.

Importers	Average RCA	Average RCA Index	Share of country's export growth in world trade (%)	Share of product growth in world trade (%)	EPD Matrix Position	Average GLIIT
USA	16.971	1.095	0.297	0.011	<i>Rising Star</i>	0.244
Germany	45.347	1.084	-0.111	0.001	<i>Lost Opportunity</i>	0.116
Netherlands	36.547	1.238	-1.153	0.021	<i>Lost Opportunity</i>	0.091
Japan	3.785	1.152	0.127	-0.030	<i>Falling Star</i>	0.452
Spain	48.447	1.156	1.271	0.005	<i>Rising Star</i>	0.000
Australia	5.601	1.328	1.373	-0.023	<i>Falling Star</i>	0.934
Italy	28.150	1.469	1.083	0.016	<i>Rising Star</i>	0.000
France	38.480	1.095	-0.007	-0.002	<i>Retreat</i>	0.010
United Kingdom	13.832	1.142	-0.352	-0.002	<i>Retreat</i>	0.000
Norway	282.262	1.677	-0.078	-0.001	<i>Retreat</i>	0.000
Finland	91.295	1.646	0.303	-0.013	<i>Falling Star</i>	0.000
Canada	8.333	1.695	0.249	0.001	<i>Rising Star</i>	0.000
Sweden	81.926	1.370	0.986	-0.003	<i>Falling Star</i>	0.000
Denmark	42.548	2.139	0.065	0.006	<i>Rising Star</i>	0.000
Austria	655.316	1.231	0.331	0.000	<i>Rising Star</i>	0.000
China	15.621	1.379	0.323	0.024	<i>Rising Star</i>	0.036
Belgium	24.372	1.549	0.094	-0.013	<i>Falling Star</i>	0.000

Source: UN Comtrade 2014, Processed

the average growth of canned pineapple exports decreased by -0.111 percent and -1.153 percent thus Indonesia was not able to meet the increasing market demand in Germany and in Netherlands that amounted to 0.001 percent and 0.021 percent. Unexpected condition is also occurred in Japan, Australia, Finland, Sweden and Belgium where the position of Indonesia canned pineapple Indonesia was in the position of *falling star*. This condition indicates that on average there is an increased growth in canned pineapple exports to the destination countries but it is not accompanied by an increase in demand in those countries. In France, Norway, and United Kingdom, Indonesia's canned pineapple has not desirable anymore. This condition is indicated

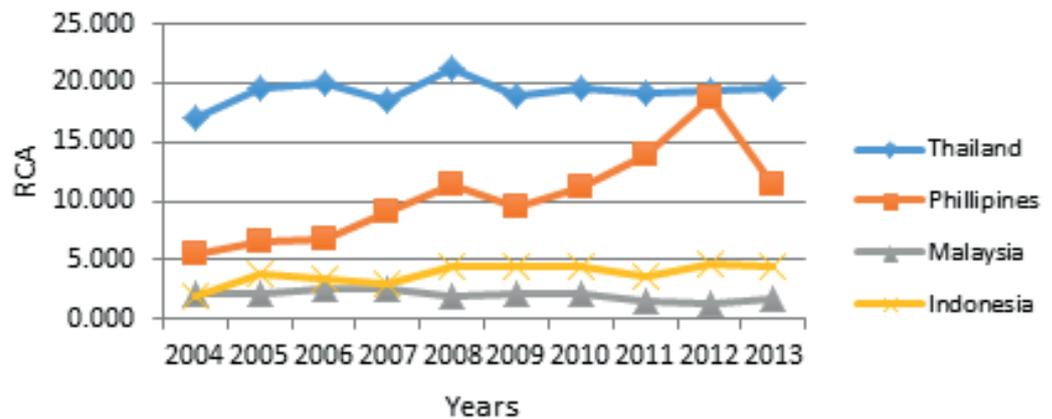


Figure 5: RCA of The Main Pineapple Exporters to Japan. Source: UN Comtrade, 2014.

by a decrease in the average export growth of Indonesia and the decline in demand in those countries. These conditions also need to be considered carefully. One way that can be carried out is through diversifying the market.

GLIIT estimation results indicate that Italy, United Kingdom, Norway, Finland, Canada, Sweden, Denmark, Austria and Belgium have an average value of zero, which means the flow of trade is one-way trade. Similarly, Germany, Netherlands, Japan, France and China also have one way-trade flow where the average value of their GLIIT still below 0.5 means the country's dependence on Indonesia canned pineapple is very high. Australia has the highest value of GLIIT by 0.934. It indicates the trade flow between the two countries is intra-trade exchange and there is high trade integration between the two countries.

### 3.3. Analysis of Factors Affecting Indonesia Canned Pineapple Export Volume to the Destination Countries

Factors that affect the export volume of Indonesia canned pineapple to the destination countries are Indonesia canned pineapple export prices in the export destination countries, real GDP and the population of destination countries (Table 6).

The best model selection is obtained through Chow test with the value of Chi squared probability less than alpha ten percent ( $0.0000 < 0.10$ ), therefore it is concluded that Fixed Effect Model (FEM) approach is best applied. Based on the model estimation equation, the model has a probability of F-statistic value that is smaller than alpha ten percent ( $0.0000 < 0.10$ ) indicates that the ability of the independent variables to explain its effect on the volume of Indonesia canned pineapple export. R-squared value of 0.9158 indicates that the model can be explained by the independent variables by 91.58 percent, while the rest is explained by other variables outside the

TABLE 6: The estimation results of The Factors That Affect The Volume of Indonesia Canned Pineapple Export to The Destination Countries from 2004 until 2013.

Dependent Variable: Export Volume (LnEV)			
Independent Variables		Coefficients	Probabilities
Constant		-138.9555	0.0001
Export price (EP)		-0.3916	0.0359**
Destination countries' real GDP (DRGDP)		1.2833	0.0964*
Population (POP)		6.8312	0.0017***
Real exchange rate (RER)		0.0135	0.2738
Weighted Statistics			
R-squared	0.9158	Sum squared resid	48.3259
Prob (F-statistic)	0.0000***	Durbin-Watson stat	2.1599
Unweighted Statistics			
R-squared	0.8560		
Sum squared resid	49.9978		
***, **, * Significant at 1%, 5%, 10% probability level, respectively			

model. The classical assumption test shows that the model is free from the problems of heteroscedasticity, multicollinearity, and autocorrelation. Normality resolved by a model transformation into natural logs. Based on the correlation matrix, the correlations between the independent variables are under the R-squared value that indicates that there is no correlation between the variables. The sum squared residual on weighted statistics value (48.3259) that is smaller than the sum squared residual on unweighted statistics (49.9978) indicates that there are problems of heteroscedasticity in the model. Durbin Watson test result shows that there is a problem of autocorrelation in the model with the value 2.1599 of Durbin Wason statistics. However, this problem can be overcome by using a fixed effect model with weighting Generalized Least Squares (GLS) cross section weights.

The export price has a coefficient value of -0.3916 and a probability of 0.0359 that means the export price has a significant negative effect on the volume of Indonesian canned pineapple export, *ceteris paribus*. An increase in the price of Indonesian canned pineapple export by one percent will lead a decrease in the volume of Indonesian canned pineapple export by 0.39 percent. Price is one of the factors that affect consumer demand [14]. An increase in the price of Indonesia canned pineapple exports in the destination countries will reduce the demand for the product. These conditions will result in the tendency of the importing countries looking for the product at a cheaper price from other exporters.

Destination countries' real GDP has a coefficient value of 1.2833 and a probability of 0.0964 that means Destination countries' real GDP has a significant positive effect on the volume of Indonesian canned pineapple export, *ceteris paribus*. An increase in the destination countries' real GDP by one percent will lead an increase in the volume of Indonesian canned pineapple export by 1.28 percent. GDP is one of the indicators of the population welfare in a country. An increase in the destination countries' real GDP indicates that the country's purchasing power increases that will lead a higher consumption of goods and services. This condition will lead to an increase in Indonesia canned pineapple export.

The population of the destination countries has a coefficient value of 6.8312 and a probability of 0.0017 that means the population of of the destination countries has a significant positive effect on the volume of Indonesian canned pineapple export, *ceteris paribus*. An increase in the population of the destination countries by one percent will lead to an increase in the volume of Indonesian canned pineapple export by 6.83 percent. Population in the destination countries is a market for the Indonesia canned pineapple export. An increase in the population will increase the demand for food products, one of which is the canned pineapple. The destination countries will do import when they are not able to meet domestic needs.

#### 4. Conclusion and Recommendation

Indonesia canned pineapple has a high export competitiveness in the world and in the export destination countries, but the value still below its competitors such as Thailand and Philippines. The position of Indonesia canned pineapple export market share generally is in a position of *Rising star*. However, in some countries such as Germany, Netherlands, Japan, Australia, Finland, Sweden, Belgium, France, Norway, and The United Kingdom the market share position needs to be considered. The highest export competitiveness is in Austria and the lowest is in Japan. Generally, Indonesia's trade flow with its importers is one-way trade. The highest trade integration occurs with Australia. Factors that affect the volume of Indonesian canned pineapple exports in the destination countries are Indonesia canned pineapple export prices to the export destination countries, real GDP and the population of destination countries. This study recommends that Indonesia should improve the quality and quantity of pineapple production through technological innovation, capital incentives and investment in the domestic processing industry. It is also necessary to do market diversification, especially in countries that have a declining market share.

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