The Analysis of Export Determinant of Indonesian Pepper in the International Market

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Abstract: *Indonesian pepper is well known as the king of spices because its position is more important than other spices in Indonesia, in terms of production and export. Indonesia become the second largest of pepper exporter in international market. The largest producer and exporter of pepper is Vietnam. But, in 2015, about 39% of Indonesian pepper were exported to Vietnam whereas Vietnam already known as the largest exporter in the world. Therefore, the main objective of this study is to determine factors that may affect the trade flow of Indonesian pepper in the international market, in order to know the appropriate strategy to develop export of Indonesian pepper in the international market. This study uses export demand approach to analyze the determinant of Indonesian pepper trade flow. The objects of this study are whole pepper and ground pepper using the 6-digit classification of harmonized system (HS) code, with code 090411 for whole pepper and 090412 for ground pepper. The result shows factors that statistically significant in affecting export demand of Indonesian pepper are the GDP per capita of importing countries, economic distance, export price, real exchange rate, and participation in FTA. GDP per capita of the importing countries shows positive effect to the export volume of Indonesian pepper. Meanwhile, the economic distance, export price, real exchange rate, and participation in FTA have a negative effect to the export volume of Indonesian pepper.*

Keywords: export, pepper, trade flow, export demand

1. Introduction

Indonesia is an agricultural country which has a lot of natural resources. As an agricultural country, agriculture sector is one of the most important sector to encourage the economic growth in Indonesia. The agricultural sector accounts for 13.52% of Indonesia's total gross domestic product (GDP). Plantation subsector is the largest contribution to the Indonesia's GDP of the agricultural sector. The percentage contribution of this subsector reaches 95.61% of the total value of exports of agricultural commodities [1].

One of the main commodities in the plantation subsector is pepper. Indonesian pepper is well known as the king of spices because its position is more important than other spices in Indonesia, in terms of production and export. Pepper is one of the main export commodities in Indonesia. The production of pepper is higher than other spices and has a widely plantation in Indonesia. Therefore, Indonesian pepper is one of the main commodities which has a good potential to be developed.

Nowadays, globalization occurs to the countries through international trade. It caused increasing the dependent relationship between countries [2]. Two countries participate in international trade through the export and import activities. A country gains benefit from this activities, such as to fulfill the necessity of its society for importing activities and to gain higher income and expand its commodities market for exporting activities.

Indonesia is the second largest of pepper exporter in the international market, while Vietnam is the largest exporter and become an Indonesia's competitor in exporting pepper to the world. But, the data in 2015 [1] showed that most of Indonesian pepper (39%) were exported to Vietnam, whereas Vietnam is already known as the largest producer and

exporter of pepper in the world. On the other hand, the destination countries of Vietnam pepper are similar with the destination countries of Indonesian pepper such as United States, Singapore, and Germany. The free on board (FOB) price of Indonesian pepper to those countries is higher than the FOB price to Vietnam [3]. Therefore, Indonesia has an opportunity to increase its export to United States, Singapore, and Germany directly so that Indonesia could gains the higher export values.

Table 1: Export volume and FOB price of Indonesian pepper to the main importing countries in 2015

Destination Countries	Volume (kg)	FOB price (USD/kg)
Vietnam	22 694 608	7.93
United States	10 114 410	10.36
Singapore	6 631 828	11.79
India	4 272 659	7.40
Germany	2 866 198	11.36
China	2 149 012	10.16
Netherland	1 895 254	12.57
Japan	1 820 325	13.18

Based on the description above, the main objective of this study is to determine factors that may affect the trade flow of Indonesian pepper in the international market, in order to know the appropriate strategy to develop export of Indonesian pepper in the international market.

2. Literature Review

International trade is the process of exchange goods and services across the countries. International trade gives the opportunities for entrepreneur to gain the advantages between two countries [4]. It is also needed for a country to get the benefit from product specialization by producing goods and services efficiently, while buying the goods and services that not producing in that country [5]. International

trade occurs between two countries because the different condition in their countries in fulfilling their needs. Theoretically, international trade occurs because of two main reasons. First, the countries are basically different from each other. Second, the countries take advantage to achieve economies of scale in production [6]. In addition, some factors that led to international trade are the desire to the marketing expand of export commodities, the acceptance for development activities, the differences in supply and demand between countries, the differences in the relative costs, and every country could not provide everything for its society [7].

Trade flow is the movement of goods and services between countries through export and import activities. Trade flow is an analysis to explain the relationship between the volume of trading products and the affecting factors. Bilateral trade of two countries has a positive correlation to the GDP and a negative correlation to the distance [8]. Most of studies used export as the dependent variable to explain the trade flow [9] [10]. The equation of trade flow has developed using the export total as the dependent variable and GDP per capita and the distance between two countries [11], [12]. Another study explained international trade using the GDP per capita, distance, price, and exchange rate as the independent variables [13].

Rinaldi [14] conducted a study about the trade flow of main export commodities in Indonesia to the South Africa. The study is aimed to determine the factors affecting the trade flow of Indonesian export commodities to the South Africa. The result showed that the factors affecting the trade flow to the South Africa were the real GDP of importing countries, export tariff, export price, and dummy of non-tariff barrier. The real GDP of importing countries had a positive significant effect to the export volume of Indonesian agricultural products, while the tariff barriers, export price, and dummy of non-tariff barriers had a negative significant effect to the export volume of Indonesian agricultural products.

The other study [15] analyzed trade flow of canned tuna using the production of tuna, GDP of importing countries, remoteness, exchange rate, free trade agreement, and food safety standard as the variables. The result showed that the tuna production, GDP of importing countries, and free trade agreement had a positive impact to export value of canned tuna. Meanwhile, the exchange rate and food safety standard had a negative impact to the export value of canned tuna.

3. Methods

3.1 Types and Sources of Data

This study uses secondary data in panel dataset that consists of both time series and cross-sectional data. The number of an observational period as the time series data are 13 years, from 2002 to 2014. The cross-sectional data consists of seven countries, which are the main export destination countries of Indonesian pepper such as United States, Vietnam, Singapore, Germany, India, Japan, and Netherland. The objects of this study are whole pepper and ground pepper

using the 6-digit classification of harmonized system (HS) code, with code 090411 for whole pepper and 090412 for ground pepper. The respective data is obtained from several sources, such as the United Nations Commodity and Trade (UNCOMTRADE), the World Bank, and the Asia Regional Integration Center (ARIC).

3.2 Data Analysis

In this study, the data was analyzed using a model of export demand. The dependent variable of this study is volume of the pepper export, meanwhile the independent variables are the GDP per capita of importing countries, the economic distance between countries, the real exchange rate, the export price of goods, and dummy variable of the participation in free trade agreement. The model equation of export demand can be written as follow:

$$\ln X_{ij} = b_o + b_1 \ln Y_j + b_2 \ln D_{ij} + b_3 \ln P_j + b_4 \ln ER_{ij} + b_5 FTA_i + e_{ij} \quad (1)$$

Where:
X_{ij} : the export volume of Indonesian pepper to country j (ton)
Y_j : GDP per capita in the country j (USD)
D_{ij} : the economic distance between Indonesia and country j
P_j : the export price of Indonesian pepper in country j (USD/ton)
ER_{ij} : the real exchange rate between Indonesia to country j (IDR/local currency unit, LCU)
FTA_i : the dummy variable of free trade agreement participation between Indonesia and country j
b_o : intercept
b_n : estimated parameter (n=1,2,…5)
e_{ij} : error term

To clarify the variables are written in equation (1), the operational definitions of these variables are:
1. Export volume (X) is the export total of Indonesian pepper to the importing country that is expressed in ton.
2. GDP per capita (Y) is a measurement of total GDP per year divided by the total of population in the importing country.
3. The economic distance (D) is an approach that represents the cost of transportation between Indonesia and destination countries. It is measured by the geographic distance between the economic center of Indonesia and the economic center of destination country, divided by GDP of destination country to the total of GDP in destination country during the observed period, expressed in terms of USD. Economic distance is obtained by the formula:

$$D_{ij} = Geographic\ distance_{ij} \times \frac{GDP\ of\ country_j}{\sum GDP\ of\ country_j}$$

4. Export price is the free on board (FOB) price of Indonesian pepper in the destination country. It is obtained by dividing the value of exports in year t with total production in the same year.
5. Real exchange rate (ER) is the real exchange rate of the currency of Indonesian Rupiah (IDR) to the destination country. It is calculated by the multiplication between nominal exchange rate of IDR to the destination country and ratio of consumer price index (CPI) of destination

country to the CPI of Indonesia, expressed in IDR/ LCU. It can be formulated as follow:

$$ER_j = \left(\frac{CPI\ country\ j}{CPI\ Indonesia}\right) \times nominal\ exchange\ rate\ of\ \frac{Indonesia}{country\ j}$$

6. Free trade agreement (FTA) is dummy variable of the participation in free trade agreement between Indonesia and the destination country. It is valued as 1 if there is free trade agreement between Indonesia and the destination country, and as 0 if there is no free trade agreement between Indonesia and the destination country.

The panel data regression has three regression models as the results, such as pooled least square (PLS), fixed effect model (FEM), and random effect model (REM). The best model of panel data regression is selected using Chow test (test for choosing model between PLS and FEM), Hausman test (test for choosing model between FEM and REM), and Lagrange Multiplier test (test for choosing model between REM and PLS).

The selected regression model has to meet the classical assumptions based on Gauss-Markov theory, to get the best linier unbiased estimator. If the best model were PLS or FEM, the model must have no heteroskedastic and autocorrelation. The heteroskedastic test and the autocorrelation test are not necessary if the best model was REM. If the PLS or FEM still has heteroskedastic and autocorrelation, the Generalized Least Square (GLS) can be used in the model because this method assumes no heteroskedastic and autocorrelation problem in the model [16], [17]. REM is the model without heteroskedastic and autocorrelation problem because it is already using GLS technique in the model.

4. Results

The determinants of export demand of Indonesian pepper were analyzed to explain the effect of economic and non-economic variable to the trade flow of Indonesian pepper in the international market. The result of panel data regression of Indonesian pepper export can be seen in the Table 2.

Table 2 : The estimation results of panel data regression

Variables	Coefficient	Probability
C	-24.8403	0.0000**
GDP per capita (Y)	7.5849	0.0000**
Economic distance (D)	-5.6224	0.0000**
Export price (P)	-0.1625	0.0739*
Real exchange rate (ER)	-0.7267	0.0064**
Free trade agreement (FTA)	-0.1724	0.0605*
R-squared	0.9677	
Probability (F-statistic)	0.0000	

*signified at 5%; **signified at 10%

The best model of regression panel data was selected based on the result of Chow test, Hausman test, and Lagrange Multiplier test. Based on those tests, the best regression model is fixed effect model using GLS and SUR cross-section weighted. The R-squared of this model is 0.9677, showed that 96.77% of the change of Indonesian pepper

export volume can be explained by the independent variables in the model, while 3.23% of the change can be explained by other factors outside the model.

The results of t-statistic shows that GDP per capita, economic distance, and real exchange rate have a significant effect at 5% of the significant level, while export price and free trade agreement variables have a significant effect at 10% of the significant level. The estimation model of Indonesian pepper export demand can be written as follow:

$$Ln\ X_{ij} = -24.8403 + 7.5849\ Ln\ Y_j - 5.6224\ Ln\ D_{ij} - 0.1625$$
$$Ln\ P_j - 0.7267\ Ln\ ER_{ij} - 0.1724\ FTA_i + e_{ij} \qquad (2)$$

4.1 GDP per Capita of the Importing Countries

GDP per capita is a variable that shows the level of income and the total of expenditure of goods and services in a country [18]. GDP per capita of importing countries shows the purchasing power of the specific goods and services. Based on the estimation model, GDP per capita of importing countries has a positive effect and statistically significant to the volume of Indonesian pepper export. The estimated coefficient of this variables is 7.5849, which implies that a 1% increase in the GDP per capita of importing countries will lead to a 7.5849% increase in the export volume of Indonesian pepper, ceteris paribus. This result consistent with the theory that shows the purchasing power and absorptive capacity of importing countries of Indonesian peppers. It implies that as the GDP per capita of importing countries increases, it will likely increase the demand of Indonesian pepper as well. The previous studies using GDP per capita as the variables in trade flow model showed the same results [19], [20], [21]. It can be also seen that the coefficient value of this variable is greater than the other variables. It implies that GDP per capita has a greater effect to the export volume of Indonesian pepper.

4.2 Economic Distance

The economic distance variable indicates the transportation costs which is imposed to the importing countries [8]. It also indicates the communication costs and delivery time to the importing countries. This variable has a negative and significant effect to the export volume of Indonesian pepper. The estimated coefficient of this variables is -5.6224. It shows that with a 1% increase in the economic distance, the export volume of Indonesian pepper will decrease by 5.6224%, ceteris paribus. Theoretically, an increase in the economic distance will lead to increase the transportation cost of goods and then the price of goods in that country will increases. As a result, the demand of the goods will decrease because the higher price is imposed to the consumer. Some studies using this variable had the same results with this research [22], [23].

4.3 Export Price

The price of goods has the negative relation with the quantity of demand [5]. It is based on the demand law, if the price of goods increases, the quantity of demand will decrease. Meanwhile, if the price of goods decreases, the quantity of

demand will increase, ceteris paribus. Based on the estimation result, the export price of Indonesian pepper in the importing countries has a negative and significant effect at 10% of the significant level to the export volume. The coefficient of this variable is -0.1625. It is implied that if there is a 1% increase in the price of Indonesian pepper, the export volume will decrease 0.1625%, ceteris paribus. This result appropriates the theory of demand. Some previous studies showed the same result [14], [24].

4.4 Real Exchange Rate

The real exchange rate has a negative and significant effect at 5% of the significant level to the export volume of Indonesian pepper. The estimation coefficient is -0.7267 which implies that with a 1% increase in the real exchange rate, the export volume of Indonesian pepper will decrease by 0.7267%, ceteris paribus. It is already similar with the theory and the previous studies such as [22], [25], [26]. The real exchange rate of exporting country affects the price of goods that is imposed to the importing country. If the real exchange rate of exporting country increases or appreciates, the export price will increase and the importing country will pay higher to import the things from exporting country. Based on demand theory, an increase in the price of goods will decrease the quantity of demand. On the contrary, if the real exchange rate of exporting country decreases or depreciates, the export price will decrease and the quantity demand of importing country will increase.

4.5 Free Trade Agreement (FTA)

Participation in FTA impacts to the trade flow of two countries. A country will get the benefit from reducing or removing tariff barrier in the partner country. As the result, the export cost to the partner country will be reduced.

Based on the estimation result, participation in FTA has a negative and significant at 10% of the significant level to the export volume of Indonesian pepper. The estimated coefficient of free trade agreement variable is -0.1724. It shows that the participation Indonesia in an FTA results in a decrease of export volume of Indonesian pepper by 0.1724%. This result is contrary with the theory that participation in FTA will increase the export volume. It can be explained by identify the FTA membership of Indonesia. Most of the partner countries of Indonesian FTA are also the producer and exporter countries of pepper in international market, such as Vietnam and Singapore (ASEAN). Therefore, those countries are not only have a role as importing countries of Indonesian pepper, but also as Indonesian competitor in international market. The study conducted by Dianniar [27] showed that ASEAN FTA (AFTA) and ASEAN-China FTA (ACFTA) have no significant impact to the trade flow of Indonesian agriculture products, because Indonesia tend to export its products to the countries which have high of GDP per capita.

5. Conclusion and Suggestion

5.1 Conclusions

This study examines the trade flow of Indonesian pepper using demand export analyses. The factors that statistically significant in affecting export demand of Indonesian pepper are the GDP per capita of importing countries, the economic distance, the export price, the real exchange rate, and the participation in FTA. The GDP per capita of importing countries shows positive effect to the export volume of Indonesian pepper. Meanwhile, the economic distance, the export price, the real exchange rate and the participation in FTA have a negative effect to the export volume of Indonesian pepper. Almost all of the estimation results consistent with the hypothesis except the FTA variable which shows negative coefficient.

5.2 Suggestion

Indonesia has to widen the market to other potential export destination countries which have high of GDP per capita. Indonesia also has to establish the free trade agreement to the non-producer country in order to develop the market of Indonesian pepper. To widen the market, Indonesia has to increase the quality and productivity of pepper and improve infrastructure and technology of pepper processing. As a result, the competitiveness of Indonesian pepper will better in the aspect of quality and price.

The recommendation for further research, it needs to analyze the export supply of Indonesian pepper, including other variables such as production of Indonesian pepper and GDP per capita of Indonesia. The further research can also analyze the trade flow using gravity model to enrich the estimation and analyze the sensitivity of Indonesian pepper supply to the pepper world price .

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