The Economic Determinant Factors of Indonesia Crude Palm Oil Exports to India

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Abstract

This study examines the economic determinants of Indonesia Crude Palm Oil (CPO) export performance to India using time series data from quarter 1, 2006 to quarter 2, 2016. India is one of Indonesia's main export destinations for CPO commodities. The results indicate that the price of soybean oil, as a substitution good of CPO, significantly influences the value of CPO exports. Another variable that significantly affects the CPO exports is the Gross Domestic Product of India as a proxy for the demand of CPO. Although the exchange rate and total production of CPO positively influence the CPO exports, the effects of these variables are too weak, not significant. As the largest exporter of CPO in the world, the Indonesia government should maintain the fluctuation of CPO price, relative to the price of soybean as substitution goods, in the international market. Furthermore, monitoring the global economies, such as the fluctuation of GDP India as the market, is very important to capture the opportunity to increase CPO exports.

Keywords*: Export, CPO, Economic Determinant*

Abstrak

Tulisan ini membahas pengaruh faktor-faktor ekonomi terhadap nilai ekspor *Crude Palm Oil* (CPO) Indonesia ke India dengan menggunakan data dari kuartal I tahun 2006 sampai dengan kuartal II tahun 2016. India adalah salah satu tujuan ekspor utama untuk komoditas CPO. Hasil yang diperoleh dari tulisan ini adalah harga minyak kedelai, sebagai barang substitusi dari CPO, berpengaruh signifikan terhadap nilai ekpor CPO. Variabel lain yang berpengaruh secara signifikan adalah Produk Domestik Bruto India yang mencerminkan kekuatan permintaan produk CPO. Walaupun nilai tukar dan total produksi CPO berpengaruh positif terhadap ekspor

CPO, pengaruhnya terlalu lemah atau tidak signifikan. Sebagai negara pengekspor CPO terbesar di dunia, pemerintah Indonesia seharusnya dapat menjaga fluktuasi harga CPO relatif terhadap harga minyak kedelai di pasaran internasional. Selain itu, memonitor perekonomian global, seperti fluktuasi PDB India, adalah hal yang penting untuk mengetahui peluang untuk meningkatkan ekspor CPO.

Kata Kunci : *Ekspor, CPO, Faktor Ekonomi*

A. INTRODUCTION

As a tropical country, Indonesia is the perfect place to grow palm trees. The combination of very fertile land, an abundance of sunrise along the year, high rainfall intensity, and spacious available land makes Indonesia the largest crude palm oil (CPO) producers. Indonesia exports this commodity to more than 20 countries for advanced processing to fulfill the demand for food, cosmetics, biofuel, and biodiesel. In 2015, Indonesia produced 31.3 million tons CPO or equivalent to 51% of the total production of the entire world.

CPO consumption in the world has an increasing trend and it is predicted to continuously increase in the upcoming years due to the population growth and the more familiar with biodiesel as a renewed energy source. The human population on the earth is estimated to grow around 80 million at a rate of 1.1% per year. Now, there are nearly 7.4 billion people on this planet and it is predicted to be 7.6 billion in 2020 and almost 8.3 billion 10 years later. This huge population means myriad potential consumers of food, cosmetics, and other products derived from CPO. Also, the proportion of biodiesel as an alternative energy source increases significantly. Many experts argue that biodiesel is better than conventional diesel in terms of the environmentally friendly and the ignition engine.

To respond to this trend, the area of palm plantation in Indonesia increases as well. In 2010, the palm tree was yielded by 8.5-million-hectare land and increased to 11.3 million in 2015. In line with this expansion, the total production of CPO has a positive trend from 22.5 million tons in 2010 to more than 31 million tons five years later. The palm plantations in Indonesia spread among provinces and islands. All large islands in Indonesia produce CPO with Sumatera and Kalimantan as the main producers. The largest proportion of palm plantation is owned by private companies that control more than half of total plantations. Forty percent of the plantation is cultivated by society while the state-owned enterprises manage the remains.

Most of the CPO produced by Indonesia is exported instead of consumed by domestic people. Asian countries i.e. India, China, Singapore, and Malaysia market are the targets of this export. The value of exported CPO, either in weight or dollar value, has increased in the last seven years. Almost 18 million tons of CPO was exported across the world in 2010 with around USD 15 billion of money was obtained. This value increased to be 28 million tons of USD 17 billion in 2015. This outstanding production and value of export give positive impacts on the economy of Indonesia. Plantation, which palm tree is the main vegetation, shared almost 4% of the total Gross Domestic Product (GDP) of Indonesia. Moreover, it is predicted that roughly 5 million people are working in the plantation and related work. Finally, CPO contributes to foreign exchange accumulation and surplus in the balance of payment.

India is a giant country, not only in population and area of the country but also in the scale of economy. India is the country whose economic growth was tremendous in the last several years. Although India encountered a slowdown in economic growth in 2011 (6.6%) to 2012 (5.5%), its growth continuously increases and achieved growth of 7.9% in 2015. It was still one of the highest growths in the world. The combination of a large population and scale of the economy makes India as a potential market of commodities from around the world including Indonesia. India is the largest market of Indonesia's CPO. In 2015, 49% of the total export of CPO is shipped to India.

From 2006 to 2016, the value of Indonesia CPO exports to India had fluctuated, increasing at the beginning but decreasing in recent years. Many factors contribute to the value of CPO exports to India. One of which is exchange rate fluctuation since depreciation or appreciation of domestic money will cause the price of commodities to be cheaper or more expensive for the foreigner. Another factor is the total production of CPO. As the production increases, the value of export will rise as well and vice versa. The price of substitute goods i.e. soybean also affects the value of CPO exports since people can alter their preferences. Lastly, the demand for goods fluctuates over years shown by the variation of real GDP of importing country. As result, this variable will influence the total amount of exported goods. Understanding these factors and the relationship between will be useful for the policy formulation of CPO and maintain Indonesia's foreign exchange and balance of payment.

B.   LITERATURE REVIEW

With the exchange rate, exporters can compare the price they get compared to domestic prices or the price with other countries when making an international trade. That is why the exchange rate is very important to determine whether a country will export the commodities to a particular country, consume domestically, or export to other countries. In the context of CPO trade between Indonesia and India, the appreciation and depreciation of the rupiah to the rupee will influence the consideration of the expensiveness of CPO.

Many studies have been conducted to determine the relationship between the exchange rate and the value of exports. Pasasa, Fechter, and Bustaman (2010) studied the relationship between exchange rate volatility and trade equation Indonesia-US. Using data from 2000 to 2008, the results show that, if the rupiah or here the real exchange rate depreciates by 1%, exports increased by 2.27%. Similar to this finding, Malhotra and Kumari (2015) studied the determinants of exports in major Asian countries and showed that the exchange rate harms the value of exports in Indonesia and Bangladesh.

Soybean oil is originated from Central America but palm oil is widespread over the world from Asia. Although the origin country or producer of soybean oil and palm oil are different, both are considered as a substitute good. Sahra, et al (2015) investigate the relationship between CPO, crude oil, and soybean oil. The authors suggest that palm oil price influenced by soybean oil price as the demand for this product increase. Their study is linear with findings by Basri et al (2007) in which examine the relationship between crude oil, crude

palm oil, and soybean oil price. In summary, with the fluctuation of soybean oil price in the market, influence the palm oil price. As the price has fluctuated over time, the value of CPO export will change.

Indonesia's production of palm oil experienced significant growth every year. In 2015, Indonesia produced 17.07 million metric tons and ranked top among other major producer countries. About 75% of palm oil production in Indonesia is exported to the world market (Statistik Sawit Indonesia, 2015). Besides, the palm oil industry has the capacity for development in the future among other vegetable oils on the world market due to the various usage of palm oil including for biofuel industry, food, cosmetic and hygiene products. This factor strengthened demand for palm oil in the world market (Basiron, 2001) and PT Data Consult Indonesia (2009). According to Purba (1999), the increase in the level of production leads to an increase in CPO export performance.

One of the signs of crude palm oil growth is the higher demand for foreign country/importer. As many economists believe foreign demand as a key driver for export growth, Nie and Taylor (2013) examine growth in US Export related to importer country demand. They conclude that as economic growth is low, foreign demand tends to decrease because people have less income to consume goods and services. Their findings stated demand for good and service reflect aggregate demand for U.S product. Francis and Winters (2008) insert an additional perspective that India's outlook demand for food and nonfood depends on several factors, including demographic change, eating habits, and policy reform. According to the data from Care

Ratings, the demand-supply gap of Edible in India has been satisfied by importing from other countries which are Indonesia and Malaysia.

C. DATA AND RESEARCH METHOD

The data of variables in this paper is quarterly data from quarter 1, 2006 until quarter 2, 2016 that obtained from several resources. The data is published by the Statistic Center Agency (Badan Pusat Statistik/BPS), CEIC, and FRED. The total sample we used is 42 observations. The variables we used in this paper are export CPO, exchange rate, the price of soybean, CPO production, and GDP India.

The export CPO in this paper is the weight of total CPO exported by Indonesia to India which has a code of Harmonized System (HS) 1511100000 (Crude Palm Oil). This data is obtained from the publications of BPS. BPS provides monthly data that can be transformed into quarterly data by doing summation 4 months of that data. The exchange rate in this paper is the exchange rate between the Indonesia currency, Rupiah (IDR), and India currency, Rupee (INR). Considering Indonesia is a local country, the exchange rate is expressed directly so the value of the exchange rate is units of IDR per unit of INR. The exchange rate data is collected from CEIC which is the average of four months of exchange rate data.

The price of CPO in this paper is the price of palm oil in the international market (Northwest Europe) measured in USD per metric ton. The data is monthly data published by CEIC so we adjust by adding four months of data. The price of soybean oil in this paper is the price of soybean oil in the international market (Dutch Port) measured in USD per metric ton. Like the price of CPO data, the data

is stated monthly and published by CEIC as well. The adjustment is done by adding four months of data. The production of CPO Indonesia is the total production of all plantations in all provinces in Indonesia. The data of CPO production is gathered from the book "Statistik Kelapa Sawit Indonesia / Statistic of Palm Tree of Indonesia) published by BPS from 2006 to 2016. The data is monthly data so needs to be adjusted by adding four months of data to get quarterly data. The GDP of India used in this paper is real GDP which applies 2010 price as a baseline. The data is quarterly seasonally adjusted. The data is collected from the Federal Reserve Economic Data (FRED).

To determine the relationship between economic factors and the value of CPO exports, in this model we use variables the exchange rate of Indonesia Rupiah and India Rupee, price of soybean oil, total production of Indonesia CPO, and the real Gross Domestic Product (GDP) of India as independent variables while the dependent variable is the total value of CPO exports to India. We transformed the data into logarithmic value since the value of differences value among variables is so high. We measure the variables and get the value of the CPO exports in hundreds of tons, the exchange rate in hundreds of rupiahs, CPO and soybean oil price in hundreds of dollars, CPO productions in thousands of tons, and India real GDP in billions of dollars. Therefore, we use the log-log model by transforming the value into logarithm value. The estimated model will be:

$$lnEXPT = \beta_1 + \beta_2\, lnEXCR + \beta_3\, lnPSOY + \beta_4\, lnPROD + \beta_5\, lnGDPI + \varepsilon$$

The description of the variables is those described in the data section:

lnEXPT   = Logarithm of the amount of Indonesian CPO export to India;
lnEXCR   = Logarithm of the Rupiah exchange rate to Rupee;
lnPSOY   = Logarithm of the Soybean price in international market;
lnPROD   = Logarithm of the amount of CPO production in Indonesia;
lnGDPI   = Logarithm of the real GDP of India quarterly

We will estimate the relationship among variables using OLS regression by running the regression model on STATA. Based on the theoretical framework above, we develop the following alternative hypothesis:

1. H_A : There is a relationship between the exchange rate to the value of CPO exports from Indonesia to India.

2. H_A : There is a relationship between the price of soybean oil to the value of CPO exports from Indonesia to India.

3. H_A : There is a relationship between the production of CPO to the value of CPO exports from Indonesia to India.

4. H_A : There is a relationship between the real GDP of India to the value of CPO exports from Indonesia to India.

D. RESULT AND DISCUSSION

Before interpreting the result, several tests are required to test the specification of the model and diagnostic test i.e multicollinearity test, RESET test, and test of assumption by OLS that the error term is IIDN (independent, identical, and normal distribution). According to the test for the model, we get the following results:

1. JB score in the normality test is 1.3742. The value of chi-square with $\alpha = 5\%$ and d.f = 2 is 5.99. Since the value of FB less than X^2_2, we conclude that the error term is normally distributed.

2. By adding more variables i.e. $(lnEXPT)^2$, $(lnEXPT)^3$, and $(lnEXPT)^4$ and conducting Regression Specification Error Test (RESET), the value of F is 2.651346 while $F_{(3,34)}$ is 2.882604. Since the value of F test less than $F_{(3,34)}$, we conclude that the model is adequate.

3. Using Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, Prob > chi2 = 0.8087. In that order, the errors have a constant variance.

4. Using Durbin–Watson test to check for first-order serial correlation in the errors, *Du (1.230) < DW stat (1.93122) < 4 – Dl (2.146).* Therefore, it can be concluded that there is no autocorrelation in this first-order autoregressive equation.

5. According to correlation coefficient matrix, there are not independent variables that have the coefficient is more than 0.80. Therefore, there is no multicollinearity problem in this model.

After completing the specification test and diagnostic check, we conclude that the estimated model is proper. The error term in this model is normally distributed, independent of each other, and has an identic variance. Moreover, the independent variables are no significant correlation with each other. Therefore, the final model is as follow:

$$lnEXPT = -31.0140 + 0.8540 \, lnEXCR + 0.4843^{**}PSOY \\ + 0.0922 \, lnPROD + 0.96138^{***} \, lnGDPI + \varepsilon$$

The coefficient of variables, standard errors, t-values, and the significances can be seen in the **Table 1**.

From the **Table 1**, we see that the p-value of lnEXCR is 0.195. Thus, we accept H_0 that the exchange rate does not significantly affect

the value of CPO exports to India at any significant level 1%, 5%, or 10%. This result probably associates with CPO market price which is determined by global demand and supply. Thus, trade between India and Indonesia shows no direct relationship with the world market price. Also, this insignificant effect might be caused by the fact that the exchange rate only influences the CPO traded in the short term. In long term, the strength of demand influences more when CPO is traded in another market, for instance, the European market which used the US Dollar as the currency. Consequently, the effect of the exchange rate between the Indonesia Rupiah and India Rupee on the value of traded CPO is weak.

Table 1
The Regression Result of The Final Model

	Coefficient	Std. Error	t-Value	P > |t|
Constanta	-31.0140	10.0080	-3.10	0.004** *
Ln Exchange Rate	0.8540	0.6469	1.32	0.195
Ln Soybean Oil Price	0.4843	0.1917	2.53	0.016 **
Ln CPO Production	0.0922	0.3199	0.29	0.775
Ln GDP India	0.9614	0.3070	3.13	0.003***
R^2	42.93%			
Adjusted R^2	36.76%			
Prob > F	0.0003			

* Significant in $\alpha = 10\%$, ** Significant in $\alpha = 5\%$, Significant in $\alpha = 1\%$

The t-value of lnPSOY in the regression result is 2.53 with a p-value 0.016. Thus, the price of soybean oil significantly affects the

value of CPO exports and we can reject H0 and receive HA at a significance level of 5%. The coefficient of this variable is 0.4843 which means an increasing 1% of soybean oil price will increase 0.48% of the export of CPO to India. As a substitute for CPO, the demand for soybean oil has the opposite direction to the demand of CPO. When the price of soybean oil increases, the demand for this product will decrease. On the other hand, the demand for CPO will increase since the people of India will substitute their choice from consuming soybean oil to consuming CPO more.

Unlike the other variables, lnPROD has a t-value close to zero, i.e. 0.29, with p-value 0.775 which means the total production of CPO does not significantly affect the value of CPO exports at any level 1%, 5%, or 10%. Hence, we accept H0 and reject HA. This can be explained by knowing the characteristic of the demand for CPO. Although Indonesia is the largest CPO exporter in the world, Indonesia cannot be the price maker since there are strong substitute goods of CPO such as soybean oil and sunflower oil. The need for CPO, soybean, or sunflower oil is certain and tends to be sticky. Consequently, the supply of CPO does not affect the amount of traded CPO.

lnGDPI has coefficient 0.9614 with t-value 3,13 and p-value 0.003. From this result, we can conclude that the real GDP of India as a proxy for demand has a significant effect on the value of CPO exports. When the real GDP grows 1%, the value of the export of CPO increases by 0.96%. When the real GDP grows, the economy able to produce and consume more goods and services. This growth will lead

to higher demand for food, cosmetics, biofuel, and biodiesel. To fulfill these needs, the value of trade CPO will increase as well.

According to the result above, the value of the adjusted R-squared is 0.3676. This value means that a 36.76% variation of the value of CPO exports from Indonesia to India can be explained by the variation of the exchange rate between the Indonesia Rupiah and India Rupee, the price of soybean oil, the production of CPO, and the real GDP of India. While 63.24% of the variation is determined by other factors such as the export policy of Indonesia and the import policy of India.

The government of Indonesia has set CPO export policies from 2011 to 2016. The policies include the adjustment of tariff and set minimum value of export which has a 0% tariff. These policies aim to protect the domestic consumer to get a reliable price, an adequate amount of CPO needed, and to increase government revenue from tax of exported goods. These policies will affect the value of CPO exports including to India. This government policy is not a variable used in the model in this paper. Similarly, the value of CPO traded by Indonesia and India is influenced by the policies of the Indian government.

E. CONCLUSION AND SUGESTION

This paper examines the relationship of the exchange rate of IDR and INR, the price of soybean oil, production of CPO of Indonesia, and GDP India to determine the value of export of CPO from Indonesia to India. After completing all the regression test procedures, we can conclude as follows:

The coefficient of lnEXCR is positive but the test of significance shows that the exchange rate between Indonesia Rupiah and India Rupee does not affect significantly the export of CPO.

1. The price of soybean oil, a substitute good of CPO, has a significant effect on the export of CPO. The relationship is positive.

2. Although the coefficient of lnPROD is positive, the test of significance shows that the total production oaf CPO does not affect significantly to the export of CPO.

3. The real Gross Domestic Product (GDP) of India significantly determines the value of the export of CPO from Indonesia to India. The relationship is positive.

Several factors determine the value of CPO Export. In this paper, the author only examines some factors that are considered as a major factor. To enhance value export keep increasing in the future, the government take into account its position as the largest producer of palm oil in the world. However, when the authority can control it reflect production, some variables are far-managed such as market price and soybean oil price.

As the largest producer of palm oil, the Indonesia government together with the other world producers should establish an agency in which its objectives to maintain palm oil price levels worldwide. This will give an advantage to Indonesia export and prevent the price of palm oil decrease too deeply. Also, this approach is indirectly solving the situation whenever soybean oil price is cheaper relative to the palm oil price. In the case of the Indian market, the consumption of soybean

is elastic to the price of palm oil considered Indian fourth-largest soybean exporter.

Besides, Indonesia should expand its strategy to focus on countries whose experienced GDP growth, and high demand for CPO while keep tracking to another potential market good. For example, India and China's economy which are predicted to be flourished will benefit Indonesia as the largest palm oil exporter country.

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