

Original Research Article

Indonesian Crude Palm Oil Export Performance during the Period (1990Q1-2015Q4)

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Abstract

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This study aims at analysing the Indonesian Crude Palm Oil (CPO) export performance. Therefore, there are two main aspects economically important to study. The first is to examine the competitiveness of Indonesian CPO product in the global market. The second is to examine the Indonesian CPO export volume growth (dependent variable) on its correlation with certain variables (independent variables), i.e. world CPO prices, CPO domestic production, rupiah exchange rate to US dollar, including residual variable. Data observation is quarterly where $n = 104$ (1990Q1-2015Q4). In this framework, it is used two main tools of analysis i.e. (1) Revealed Comparative Advantage Index (RCA-Index), and (2) Regression Estimation equipped with Error Correction Model (ECM). The implications of research findings are explored deeply by using descriptive analysis. Overall results of studies indicate that Indonesian CPO export performance within (1990Q1-2015Q4) were relatively, fluctuant, unstable and less competitive condition from year to years. Those facts are reflected by the following research findings: (a) the competitiveness of Indonesian CPO exports in the world market during the period of 1990Q1 to 2015Q4 was not strong if it is compared with competitiveness forces of world CPO exports or other exporting countries. Most of RCA-Indices during the period of study were less than one, even though in average is greater than one; (b) the Indonesian CPO export volume growth during the period (1990Q1-2015Q4) was less responsive to the change of independent variables; (c) the CPO world price and the rupiah exchange rate to US dollar variables are found in negative correlation with and have significant effects on Indonesian CPO export volume growth at different magnitudes for both in the long and short-term; (d) the domestic CPO production variable is found in positive correlation with and have significant effects on Indonesian CPO export volume growth at different magnitudes in long and short term; (e) the coefficient regression residual variable (ECT) is found in negative correlation with and have significant effects on Indonesian CPO export volume growth at different magnitudes in long term. The negative sign of ECT coefficient indicates low rate of adjustment in the short term toward an equilibrium condition long term. In brief, overall independent variables influence significantly dependent variable in the short and long term. Therefore, the Indonesian CPO export performance is in general quite good. But some policies are important to rise in order to increase the Indonesian CPO export competitiveness in global market.

Keywords: Competitiveness, Indonesian CPO Export volume, world CPO prices, domestic CPO production, rupiah exchange rate to US dollar.

INTRODUCTION

Research Problems

In an open economic system requires the role of international trade to accelerate the economic development of a country. The interaction between one country with other in export-import activities will open

dynamically the economic cooperative relationship among countries. For example, some countries can do export if they have production surplus of certain goods and services in domestic market or otherwise they can do import for certain goods and services from other countries when they do not have enough those goods

Tabel 1. Contribution of Indonesian CPO export to GDP (1990-2015)

1	2	3	4	5	6
1990	845.663,44	4.880,81	332,48	0,039	6,81
1991	911.668,16	7.262,19	519,41	0,057	7,15
1992	979.761,64	9.537,93	934,35	0,095	9,80
1993	1.047.425,32	11.451,95	1285,43	0,123	11,22
1994	1.088.460,52	14.419,80	2.084,95	0,192	14,46
1995	1192349,74	19.565,64	2.543,86	0,213	13,00
1996	1.314.866,37	22.829,68	2.232,07	0,170	9,78
1997	1.329.120,81	33.300,27	4.134,92	0,311	12,42
1998	1,086,456.64	58.383,87	2.557,37	0,235	4,38
1999	1,144,680,13	40.481,97	2.132,90	0,186	5,27
2000	4.241.901,08	63.604,42	4.633,36	0,109	7,28
2001	4.308.143,67	58.881,07	4.171,79	0,097	7,08
2002	4.509.922,60	54.787,72	7.333,91	0,163	13,37
2003	4.718.820,90	54.940,56	9.103,18	0,193	16,57
2004	5.056.617,49	63.583,80	12.978,13	0,257	20,41
2005	5.314.839,76	84.429,68	15.458,35	0,291	18,31
2006	5.636.728,75	97.084,84	18.341,74	0,325	18,89
2007	5.966.035,55	103.621,26	35.214,36	0,590	33,98
2008	6.281.191,20	133.158,57	71.846,57	1,144	53,96
2009	6.632.954,41	133.147,24	63.071,76	0,951	47,37
2010	6.864.133,10	162.448,40	82.091,05	1,196	50,53
2011	7.287.635,30	178.156,07	99.887,53	1,371	56,07
2012	7.727.083,40	147.744,54	64.882,27	0,840	43,91
2013	8.156.497,80	164.825,90	60.987,03	0,748	37,00
2014	8.566.271,20	161.007,32	52.794,60	0,616	32,79
2015	8.976.931,50	143.195,36	48.116,53	0,536	33,60
Average				0,42	22,53
N	1.	<i>Years</i>			
O	2.	<i>Gross Domestic Products (GDP) in million rupiah</i>			
T	3.	<i>Total export of Indonesian plantation products in million rupiah</i>			
E	4.	<i>Total Indonesian CPO export in million rupiah</i>			
S	5.	<i>CPO export contribution to GDP in persen (%)</i>			
	6.	<i>CPO exports contribution to total export of plantation products in persen (%)</i>			

Source: Directorate General of Plantation, Oil World and World Bank (processed data)

and services or commodities. The export and import activities have the important role in accelerating economic welfare development of a country, it is reflected by its net contribution in formation of country's Gross Domestic Product (GDP), see Table 1. It is an evidence in developed countries that their international trading are much dominated by the export of manufacturing products and by the import of natural resource products. On the other hand, for the developing countries such as Indonesia, its imports are dominated by manufacturing product and its export dominated by the commodities that produced in agricultural sector, especially those produced by plantation sub-sector, such as: natural rubber, coffee, cocoa, cinnamon, coconut, tea, clove, and the fresh fruit bunch (FFB) of palm oil which is used as main input in making CPO products.

The Indonesian statistical data presented that the value of contribution of plantation sub-sector to Indonesian GDP was fluctuative while its trend was positive during the periode of 1990-2015. It was reflected by the following facts, see Table 1, i.e: from its contribution to GDP in 1990 was about 4 persen, ten

years later on 2000 enhanced to 11 persen, then increase continuously to the highest level at 137 persen in 2011, but turn down slightly to the level at 54 persen in 2015.

According to some studies the unsteadiness of Indonesian CPO export are caused mainly by several problems, i.e: less capital of investment, less human capital skill, labor intensive in plantation of palm oil, lack of product technology, high domestic CPO production costs, instability of world CPO prices and strong dependence of rupiah exchange rate to US dollar, etc. Nevertheless, the CPO is one of Indonesian products that is very important in overall of Indonesian export from years to years regardless the facts which indicated downward trend in term of quantity, starting from 2011 to 2015 (see, Table 1). The deceleration of world economic growth in that last five years was the main factor that has caused slightly reduction the volume of Indonesian CPO exports. These data determined as well that Indonesian CPO export performance in periode of 1990-2015 can be considered as it was less competitive in the world market.

The experiences of developed countries shown that

the conducive business environments in domestic market is very advantageous to support the competitiveness of export products against competitor countries in the global market. The demand of Indonesian CPO and any its derivative products are predicted in increasing trend from year to years, especially buyers that mostly come from some European Countries, USA and China.

In the long term perspective, it is essential that Indonesian government has to take any policy in order to maintain the stability of CPO export growth and to increase the competitiveness of Indonesian CPO export. In the same time, making action to wide extend the palm oil plantation areas and improve the processing quality FFB toward end product for export oriented.

Before any policy imposed to make an expansion of CPO production and export, it is necessary to define precisely the economic variables which influence significantly the Indonesian CPO export growth performance in the world market.

Research Objectives

The main research objective is to analyze the Indonesian CPO export performance during 26 years starting from 1990 until 2015. There are three main variables which are considered to have strong influence on Indonesian CPO export performance, thus so important to study it, those variables are related to the export price of CPO in the world market (f.o.b. basis), the volume of domestic production of CPO in Indonesia, and the exchange rate of rupiah to US dollar. Therefore the research objectives can be formulated into two parts, i.e: (1) to analyze the competitiveness of Indonesian CPO export in the world market within 26 years (1990-2015). The factors of Indonesian CPO market share in the world market are going to be analyzed deeply. (2) to analyze the correlation between the volume of Indonesian CPO export growth as a dependent variable and its independent variables, i.e: world CPO price, total volume of Indonesian CPO production, and rupiah exchange rate per US Dollar.

Theoretical Framework

Why Do Export-Import Activities Exist?

The theory of comparative advantage is an economic development theory about gains from doing trade for individuals, firms, or nations that arise from differences in their endowment factors or technological progress (Jhigan, 1996; Salvator, 1993).

In an economic model, one country has a comparative advantage over other countries in producing the particular goods and services if they can produce that

goods and services at a lower relative opportunity cost, i.e. at a lower relative marginal cost prior to trade. In fact, one does not compare the monetary costs of production or even the resource costs (labor needed per unit of output) of production. Instead, one tends compare the opportunity costs of producing goods and services across countries. The principle of comparative advantage holds that under free trade, a country will produce more of and consume less of goods and services for which they have a comparative advantage.

Adam Smith first refers to the concept of absolute advantage as the basis for international trade. If a foreign country can supply us with a good cheaper than we ourselves can make it, better buy it from them instead of making it (Jhigan, 1996; Stephen, 1988).

David Ricardo developed the classical theory of comparative advantage in 1817 to explain why countries engage in export-import activities even when one country's workers are more efficient in producing every good if it is compared to workers in other countries. He believes that if two countries capable of producing two different goods engage in the free market, then each country will increase its overall consumption the good for which it has a comparative advantage besides exporting while importing the other good that provided the differences in labor productivity between both countries. In brief, Ricardo's theory implies that comparative advantage model tend to be applied much instead of absolute advantage model in international trade (Jhigan, 1996; Balassa and Noland, 1989).

One of the most popular trade theories is that the theory of comparative advantage which developed by David Ricardo and Hecksher Ohlin (H-O). According to the H-O theory, a country's comparative advantage is determined by its relative factor scarcity (i.e. its factor endowment ratios, relative to the rest of the world or a set of countries). Their theory explains that a country will be more profitable to produce and to export a product that has its comparative advantage compared to other countries (Salvator, 1993; Tan, 2014; Widayanti, 2009). The comparative advantage can be either in term of low wages of labor or abundant in natural resources or both.

The theory of comparative advantage turned into a competitive advantage theory which developed by Porter (1990), where an export product not only measured in term of labor costs and availability of natural resources but also driven by other factors, i.e.: Product technology, product quality, product design and promotion, and supporting facilities of infrastructure, which in turn will decrease the cost of production and increase the quality of export product.

In relation to Indonesian case, the agricultural products, especially plantation products, not only have a comparative advantage but also expected to have a competitive advantage in the international market. One of the the products which has a comparative advantage for export purposes is the CPO product, its comparative

advantages are in term of relatively low cost of labor (labor intensive) and the availability of land resources for plantation areas. This condition could strengthen the competitiveness of CPO product in the world market

Basically, there are several objectives why do export-import activities exist, among others are (a) to obtain profits derived from the differences between export or import prices compared to domestic prices, (b) to sale the production surplus in domestic market to the other countries or to import the production surplus from other countries, (b) to sale consumption surplus in domestic market due to the reduction of domestic consumption or unchanging of domestic consumption, or to buy consumption surplus from other countries, (c) to get greater benefit by promotion better product quality compared with imported countries, or to import with the purpose of consuming better quality products from other countries, ect., (Tan, 2014; Alatas, 2015; Salvator, 1993).

Export Product Competitiveness

The more global and liberal world economy has created tighter competition among countries in international trade or in export-import activities; it has pushed economic competition shifting from relying on comparative advantage to competitive advantage. The competitiveness of export products depends not only on the growth of domestic production, but also closely related to the efficient use of labor inputs, investment capital, natural resources, skills and technology, and so on. In fact, between comparative and competitive advantages are integrated and complement each other. Comparative advantage can be considered as a necessary condition to achieve competitive export products in the global market (Amalbert et al., 1987; Jhigan, 1996; Widayanti, 2009).

There are at least two main indicators of export products in order to have stronger competitiveness in global market, namely: cheaper prices and better product quality. This condition can be happened, not only because of the benefits derived from cheap labor wages and the abundance of natural resources, but also can apply product technology in accordance with the availability of resources owned, supported by the development of marketing channels and human resource skills (Salvator, 1993; Jhigan, 1996).

Balassa (1990) explains that one way used to measure the competitiveness of export products is by using the formula "Revealed Comparative Advantage Index (RCA)" (Balassa and Noland, 1989). If the RCA Index is greater than unity or one from year to years, meaning there are adequate potentiality and strong competitiveness of the export product in the country. It implies as well that the competitiveness of export products of one country tends to be stronger than the average competitiveness of all export products over the

world. In contrast, if the RCA Index tends to close to zero or much smaller than unity or one, implying the low competitiveness of the export product compared with the same product from other countries in the international market. Therefore, any policy and strategy to accelerate the export growth of a country cannot be released from the influences of other countries, thus it is inevitable that one country must compete with other countries in export-import activities. In case of Indonesia, the exporters are considered as a price taker in the world market, but in buying the fresh fruit bunch in local market to agent/wholesalers, and from agent/wholesalers to farmers tend to exist the monopsony pricing forces This business environment implies that the development of Indonesian CPO export cannot stand alone but it must be adapted to the business environment of external factors from other countries (Hall et al., 2010; Nesti and Tan, 2016; Tan, 2005; Tan, 1985).

The Export Determination

Export product performance can be determined at least in three ways, namely from its growth during the certain period of times, its contribution to GDP and its competitiveness in comparing with other products (Tan, 2014; Magginson WL, 2000). One technique of measuring export performance is by analyzing the fluctuation of its growth monthly and yearly or in certain period of time. A positive export growth implies that the export is in condition of increasing rate compared with the previous years or periods. Export performance can be also measured by analyzing the fluctuation of increasing certain export product contribution to total export products or its contribution to volume of GDP during a period of time.

The value of competitiveness of export products is indicated how big its market share. Implying that the more market share its owned the more competitive that product in the market. The higher product competitiveness imply as well those products are more demanded or more competitive in comparing with the same export products from other countries.

In facts, many factors can affect the growth of exports, it can be seen both from demand and supply. On the demand side for example, there are several factors affecting Indonesian CPO exports, i.e: the relative prices of exported product to domestic prices, the revenue of country's importers, income per head of country's importers, social welfare of country's importers, the rupiah exchange rate per US dollar and Indonesian government trade policy, etc. While from the supply side, also there are several factors affecting growth of export, i.e: exported products prices, domestic value of production, domestic technology used, exported product quality, rupiah exchange rate per US dollar and trade policy (Winarno, 2015; Alatas, 2015).

According to Widayanti (2009), the price of exported products at the international market will influence the price of exported product in domestic market. The domestic price of exported product (at "f.o.b") is derived from the export price at international market. Thus, the supply function of exported product is depended on the price of exported product in the world market with assumption that exporters are in condition as price taker in the world market. It means that the exported product price (at f.o.b. basis) is a derivative price of export product itself at international market. The relative price is the ratio between the export price and the domestic price (P_x/P_d). Export prices will have a positive impact on the growth of a country's export supply. If the relative price of export products will be higher, then the number of exported products will tend to increase more and more, and if the opposite happen, will lead to reduced amount of export offered. Moreover, if the rupiah exchange rate per US dollar depreciates, it will boost export growth because the exporter will get a higher Rupiah exchange rate with the same dollar amount. In other words, importer demand will increase if the value of US dollar is more expensive than Rupiah (see, method 1) (Alatas, 2015; Park, 2007; Magginson WL, 2000; Winarno, 2015).

In summary, there is a significant joint effect between domestic CPO production, world CPO prices, and the rupiah exchange rate per US dollar against the export volume of Indonesian CPO. Nevertheless, each variable has the different influence on the export volume of Indonesian CPO. Theoretically speaking, the volume of CPO domestic production and the export price of CPO in the world market should have a positive effect on the growth of Indonesian CPO exports. Nevertheless, the rupiah exchange rate per US dollar tends to have a negative effect on growth of Indonesian CPO exports assuming unchanged in production cost and technological products.

RESEARCH METHODS

Research Approach and Data Sources

This research use quantitative and descriptive approaches. The data observation for the purpose of regression estimation are used quarterly data within the period of 26 years from 1990 to 2015 ($n=104$). The data are modified from annually data time series with interpolation method.

The types of data are mostly secondary data which have been processed and recorded officially by Indonesian government. However some of other data are also required from the private agency sources. Those data consist of the value and volume of Indonesia CPO exports, the world CPO export prices and the rupiah exchange rate per US dollar, including the value of

Indonesian total exports, the value of world CPO exports, the value of world total exports, total value of export commodity of plantation in Indonesia and total value of export commodity of plantation in the world.

The export value and volume of CPO and then CPO domestic production and its prices are taken from the Directorate General of Plantation Minister of Agriculture of Indonesia. While the world CPO prices are obtained from the World Bank's data. The Rupiah Exchange Rate against US Dollars and Indonesia's GDP is taken from Indonesian Central Bank (Bank Indonesia). The others related data are explored from several literature studies.

Analysis Based on RCA-Index

RCA-Index has been used to help assess a country's export potential. The RCA-Index indicates whether a country is in the process of extending the products in which it has a trade prospective as opposed to situations in which the number of products that can be competitively exported is static. It can also provide useful information about potential trade prospects to new partners. Countries with similar RCA-Index profiles are unlikely to have high bilateral trade intensities unless intraindustry trade is involved. RCA-Index measures, if estimated at high levels of product disaggregation, can focus attention on other nontraditional products that might be successfully exported. The RCA index of country i for product j is often measured by the product's share in the country's exports related to its share in world trade:

$$RCA_{ij} = (x_{ij}/X_{it}) / (x_{wj}/X_{wt}) \quad (2)$$

Where x_{ij} and x_{wj} are the values of country i 's exports of product j and world exports of product j and where X_{it} and X_{wt} refer to the country's total exports and world total exports. A value of RCA-Index less than unity ($RCA < 1$) implies that the country has a revealed comparative disadvantage in the product. Similarly, if the RCA index exceeds unity ($RCA > 1$), the country is said to have a revealed comparative advantage in the product. In this study, X_{ij} is the value of Indonesian CPO exports; X_{it} is the total value of Indonesian export; W_{ij} is the value of world CPO exports; and W_{it} is the total value of world export.

Analysis Based on Regression Estimation.

The regression estimation is for purpose to examine some influences of independent variables to the dependent variable. There are three main independent variables which are considered economically very important in determining the Indonesian CPO-export performance. Those variables are the world price of CPO, the volume of Indonesian CPO production and the

rupiah exchange rate to US dollar. In this context, Error Correction Model (ECM) method and its related tools of analysis are used to analyze the influences of independent variables on the dependent variable in the short and long-term.

Error Corection Model

Error-correction model is an econometrical model which is used to correct the deviation of variables from equilibrium conditions in the short term. The short-term dynamics of the variables in regression estimation is frequently happen the deviation from equilibrium condition in the long term. The relationship between short term and long-term variables illustrates that how variables might adjust to any discrepancies in long-run equilibrium relationship. This model was chosen because it can help to calculate and examine the short-term and long-term effects of independent variables on the dependent variable. It can corect properly the diviation problems during the periode of short term toward the equilibrium condition in the long term. In term of functional relationships among variables can be written in form of a regression equation as follows:

$$VCPOEX_t = f(WCPOPR_t, ICPOPD_t, RERUSD_t) \quad (3)$$

Where:

$VCPOEX_t$ = Volume of Indonesian CPO export at year t ($t= 0-\infty$) in ton

$WCPOPR_t$ = World CPO price at year t ($t= 0-\infty$) in US \$

$ICPOPD_t$ = Indonesian CPO Production at year t ($t= 0-\infty$) in ton

$RERUSD_t$ = Rupiah Exchange Rate per US Dollar at year t ($t= 0-\infty$)

Therefore, from (3) can be formed the initial equation regression estimation model as follows:

$$VCPOEX_t = \alpha_0 + \alpha_1 WCPOPR_t + \alpha_2 ICPOPD_t + \alpha_3 RERUSD_t + e_t \quad (4)$$

Two conditions must be fulfilled in using ECM (Enders, 2004, Chan Park S, 2007) at least one variable is not stationary at certain level of significance (α) and the variables in equation have a cointegration relationship each other. If both criteria are not fulfilled, then the ECM method cannot be used to examine the problems of deviation and cointegration. If the data are not cointegrated at certain level, therefore the model must be run by using doubled log equation (Park, 2007; Walter, 2010). Referring to Agus and Prawoto (2016), they said that cointegration among variables might be existed in long term, therefore the regression equation model must be performed in econometrical doubled log equation, as

follows:

$$\text{Log}VCPOEX_t = \alpha_0 + \alpha_1 \text{Log}WCPOPR_t + \alpha_2 \text{Log}ICPOPD_t + \alpha_3 \text{Log}RERUSD_t + e_t \quad (5)$$

The regression equation (5) requires three kinds of econometrical tests that must be done, i.e.: (a) stationarity test (unit root test); (b) integration degree test; and (c) cointegration test. Moreover, the initial model of econometrical equation in the long-term can be composed as follows:

$$VCPOEX_t = \beta_0 + \beta_1 WCPOPR_t + \beta_2 ICPOPD_t + \beta_3 RERUSD_t + \varepsilon_t \quad (6)$$

In term of doubled log equation, the econometrical equation model in the short-term should be as follows:

$$\text{Log}VCPOEX_t = \beta_0 + \beta_1 \text{Log}WCPOPR_t + \beta_2 \text{Log}ICPOPD_t + \beta_3 \text{Log}RERUSD_t + \varepsilon_t \quad (7)$$

Hence, in the long-term, econometrical doubled log equation model should be as follows:

$$\Delta \text{Log}VCPOEX_t = \beta_0 + \beta_1 \Delta \text{Log}WCPOPR_t + \beta_2 \Delta \text{Log}ICPOPD_t + \beta_3 \Delta \text{Log}RERUSD_t + \beta_4 ECT + \varepsilon_t \quad (8)$$

Hypothesis Testing

There are several tests that should be run in order to understand well about the relationships between dependent variable and independent variables. The hypothesis is that the joint contribution of independent variables influences significantly the dependent variable instead of separate contribution. In this case, we can apply the simultaneous econometrical testing by using F-test. Unlike t-tests that can asses only one regression coefficient at a time, the F-test can assess multiple coefficients simultaneously.

The implication of F-test result is to measure whether all independent variables altogether in an econometrical equation model indicate significantly the existence of simultaneous influence on the dependent variable. While the “statistical t-test” is for purpose to measure how big influence of one independent variable (an individual variable) at level of significance $\alpha = 10\%$, being able individually to explain the dependent variable. If calculated F-statistic is greater or equal to F-table at level of significance $\alpha = 5\%$ ($F\text{-statistic} \geq F\text{-table}$), it implies that reject the null hypothesis and accept the alternative hypothesis, meaning that a joint contribution of variables is quite strong in explaining the dependent variable and vice versa if $F\text{-statistic} < F\text{-table}$. Similarly, when $t\text{-statistic} \geq t\text{-table}$ means there is a significant influence between independent variables individually on

Table 2. Indonesian CPO Export Growth (1990-2015)

Years	Indonesian CPO Export		Indonesian CPO Production		World CPO Export Price		Rp to US dollar	
	Volume (Ton)	Growth (%)	Volume (Ton)	Growth %	(US \$)	Growth %	Rate	Growth %
1990	881.9	-	2,412.6	-	550.48	-	1,901	-
1991	1,084.5	22.96	2,657.6	10.15	713.86	29.68	2,492	31.09
1992	1,170.6	7.94	3,266.2	22.90	871.58	22.09	2,808	12.68
1993	1,221.8	4.37	3,421.4	4.75	877.60	0.69	3,110	10.75
1994	1,306.6	6.94	4,008.0	17.15	930.10	5.98	3,600	15.76
1995	1,404.4	7.48	4,479.7	11.77	978.47	5.20	4,308	19.67
1996	1,106.4	-21.22	4,898.6	9.35	788.80	-19.38	4,583	6.38
1997	1,448.4	30.91	5,448.5	11.22	935.27	18.57	5,915	29.06
1998	403.8	-22.12	6,930.4	27.20	516.69	-44.75	11,591	95.96
1999	865.4	114.30	7,455.6	7.58	841.00	62.77	7,900	-31.84
2000	1,517.7	75.37	8,000.5	7.31	892.96	6.18	9,725	23.10
2001	1,349.1	-11.10	9,396.4	17.45	782.05	-12.42	10,265	5.55
2002	2,804.8	107.89	11,622.2	23.69	915.64	17.08	9,260	-9.79
2003	2,922.1	4.18	13,440.8	15.65	956.72	4.49	8,570	-7.45
2004	3,519.9	20.46	13,830.4	2.90	1,054.34	10.20	8,985	4.84
2005	4,564.8	29.68	15,861.6	14.69	1,281.26	21.52	9,705	8.01
2006	5,199.3	13.90	19,350.8	22.00	1,272.94	-0.65	9,200	-5.20
2007	5,701.3	9.66	21,664.7	11.96	1,297.62	1.94	9,419	2.38
2008	7,904.2	38.64	21,539.8	-0.58	1,422.40	9.62	10,950	16.25
2009	9,119.9	15.38	22,324.3	3.64	1,507.88	6.01	9,400	-14.16
2010	10,158.1	11.38	25,958.1	16.28	1,600.83	6.16	9,036	-3.87
2011	9,228.1	-9.16	27,096.5	4.39	1,233.05	-22.97	9,113	0.85
2012	7,269.8	-21.22	29,015.5	7.08	1,028.79	-16.57	9,718	6.64
2013	6,584.8	-9.42	31,782.0	9.53	907.95	-11.75	12,250	26.05
2014	5,726.8	-13.03	33,278.1	4.71	875.83	-3.54	12,550	2.45
2015	5,855.5	2.25	34,284.3	3.02	789.36	-9.87	14,000	11.55
Average		14.66		11.43		3.45		10.27

Source: Dirjen of Estate Crops. Minister of Agriculture of Indonesia 2015 (processed data)

dependent variable, and vice versa if t -statistics < t -table. The coefficient of determination is (R^2), it measures the relationships between independent variables on the dependent variable. When the value of R^2 is greater than zero or approaches to one or equal to one, implying that explanatory variables (or independent variables) are highly correlated with each other in explaining dependent variable. R^2 is worth between zero to one ($0 \leq R^2 \leq 1$). R^2 is better when the value of R nearly equal to one (1).

EMPIRICAL FINDINGS

Indonesian CPO Export Growth

Table 1 describes mainly the Indonesian CPO export growth in its relation with the world CPO export prices, domestic CPO production, and rupiah exchange rate within the period of 1990-2015.

The development and growth of CPO export during the period of 1990 to 2015 was fluctuant and unstable. The growth of CPO export in average was around 14.66%, while domestic CPO production, CPO export

prices, and rupiah to US dollar in the same period were respectively equal to 11.43%, 3.45% and 10, 27% in average. These figures indicates three economic interpretations, i.e. **(a)** the increasing of CPO export volume was driven from the increase in domestic CPO production and world CPO prices, and depreciation rupiah to US dollar. **(b)** the fluctuations of CPO export volumes growth are closely related to the fluctuation changes of world CPO export prices, especially in last five years (2011-2015) where the world CPO prices dropped too fast to the minus level, i.e.: -22.97% (2011), -16.57% (2012), -11.75% (2013), -3.54% (2014), and -9.87% (2015). This condition has created the bad impact, and it dropped the Indonesian CPO export growth to the negative rate at -13.13% (2014) even though get a little better to be 2.25% (2015). However, overall the data in Table 2 determined in average a positive growth of CPO export volume during the period of 1990-2015. It proved that there was a positive influence the world CPO export prices and domestic CPO production on Indonesian CPO export volume during the period of 1990-2015. **(c)**, the other possibilities, the increase in export volume of CPO can be also due to turn down the rupiah exchange rate to

Table 3. RCA-Index of Indonesian CPO Export (1990-2015)

Year	VICPOEx	VITEx	VWCPOEx	VWTEx	RCA-Index
1990	174.898	2.567.500	2.040.000	17.964.557	0,60
1991	208.429	2.914.200	3.890.000	18.774.545	0,35
1992	332.744	3.396.700	3.820.000	21.304.378	0,55
1993	413.321	3.682.300	4.446.000	23.426.319	0,59
1994	579.153	4.005.500	5.888.000	25.626.672	0,63
1995	590.496	4.541.700	6.285.000	24.068.024	0,50
1996	487.032	4.981.400	6.735.000	34.479.262	0,50
1997	699.056	5.629.800	9.374.000	36.372.063	0,48
1998	220.634	5.037.000	7.417.000	33.462.700	0,20
1999	269.987	5.124.300	10.172.000	39.519.512	0,20
2000	476.438	6.540.300	14.063.000	48.017.790	0,25
2001	406.409	5.736.100	16.793.000	47.355.807	0,20
2002	791.999	5.916.600	18.438.000	49.382.508	0,36
2003	1.062.215	6.410.800	19.910.000	59.401.306	0,49
2004	1.444.422	7.076.661	22.201.000	75.849.333	0,70
2005	1.592.823	8.699.606	24.545.000	87.090.000	0,65
2006	1.993.667	10.552.700	29.000.000	101.310.000	0,66
2007	3.738.652	11.001.300	30.048.000	120.230.000	1,36
2008	6.561.331	12.160.600	37.143.000	131.600.000	1,91
2009	6.709.762	14.164.600	38.243.000	105.550.000	1,31
2010	9.084.888	17.977.910	38.854.000	123.010.000	1,60
2011	10.960.993	19.549.661	39.024.000	143.380.000	2,06
2012	6.676.504	15.203.183	45.530.000	144.960.000	1,40
2013	4.978.533	13.455.175	43.269.000	149.480.000	1,28
2014	4.206.741	12.829.268	46.569.000	149.950.000	1,06
2015	3.436.895	10.228.240	47.616.000	134.820.000	0,95
Average of RCA-Index (1990-2015)					1,54

Source: Directorate General of Plantation Minister of Agriculture RI, World Bank (processed data)

Notes:

VICPOEx	=	The value of Indonesian CPO exports in US \$
VITEx	=	The value of Indonesian total exports in US \$
VWCPOEx	=	The value of world CPO exports in US \$
VWTEx	=	The value of world total exports in US \$
RCA	=	Revealed Comparative Advantage Index

US dollar during the period of 1990-2015. It means that the depreciation of rupiah to US dollar tends to add and create new demand for Indonesian CPO export in the world market.

The highest Indonesian CPO export growth was occurred in 1999, i.e. 114.30% a year after Indonesian monetary crisis in 1998. At the same year the domestic production growth was only 7.58% while the world CPO price expanded extraordinary by 62.77% from previous years (-44.75%) despite that the exchange rate growth was in minus sign (-31.84%). Thus conclusion is that the increase in export volume of CPO in 1999 driven largely by increasing in world CPO prices.

The lowest export growth of CPO during the period of 1990-2015 occurred in 1998, i.e. -72.12%. It was caused mostly by the drastic decline of world CPO export price by 44.75%. In contrast rupiah depreciation policy (95.96%) imposed by the government of Indonesia at that period was unable to boost considerably export growth. The interesting thing is that the amount of CPO domestic production during the period of 1990-2015 increased continuously from 2,412.6 tons (1990) turn into 34,284.3

tons in 26 years later (2015) or increase around 14 times. While the total quantity of CPO export (in ton) increased fluctuant from year to year at the same period of time, i.e. from 881.9 tons (1990) turn into 5,855.5 tons (2015) in 26 years later or increase around 7 times. This express the increasing of domestic CPO production is not totally for export but a part of that utilized to satisfy the domestic demand, or it may be for the purpose to produce derivative products of CPO in domestic market. It reflected by the difference between total domestic CPO production and total CPO export that tends to be greater and greater throughout the time.

In preliminary conclusion, three independent variables, i.e. world CPO prices, the domestic CPO production, and rupiah exchange rate per US dollar contributed significantly on CPO export volume of Indonesia throughout the time (1990-2015).

RCA-Index and Competitiveness

Table 3 describes the expansion of CPO exports and

competitiveness of Indonesian CPO exports computed by using the RCA-Index within 26 years from 1990 to 2015. RCA-Index is 1.54 in average which is greater than 1 (one), illustrates that the competitiveness of Indonesian CPO exports is relatively superior in comparing to the average competitiveness of world CPO exports. It is understandable because Indonesia has an absolute and comparative advantages in term of cost of CPO production due to low cost of labor input and natural resource wealth including the availability of land sources for plantation purpose. Interesting thing, when viewed by annually growth, the most of RCA-index was smaller than 1 (one) before the year of 2006 or from 1990 to 2006, it indicates that during that period of time the competitiveness of Indonesian CPO export product was relatively lower than the competitiveness of the world's CPO export products from other countries. However, from 2007 to 2014, the RCA-Index was relatively greater than one, excepted in 2015 (RCA-Index = 0.95), implying that: (a) the world economic crisis recovery in 2006 has a positive impact on demand for Indonesian CPO export products; (b) there were the technological and skill improvements in CPO production in domestic market starting from the year of 2007 so that the decreasing of CPO export prices in international market not too much influence on Indonesian CPO production and exports.

Nevertheless, the fluctuation of RCA-Indexes from year to year (1990-2015) can be considered as a reflection of unstable competitiveness condition of Indonesian CPO export performance. Mostly the value of RCA-Index was less than one in average or $RCA < 1$ during the period of 1990-2006. It was greater than one only from 2007 to 2014, and then turn down to be less than one again in 2015 ($RCA < 1$). It was the facts that showed the competitiveness of Indonesian CPO export products still much influenced by the external variables at international level. Or in the other word implies that Indonesian exporters of CPO are still in condition of as a price taker facing the importer's countries are as price makers. In a simple conclusion, Indonesian CPO-export depend on demand forces from the world market. Therefore, Indonesian CPO exporters are in position as price takers or as a price follower in the world market.

Regression Estimation

Before running the regression estimation, the stationarity data should be examined, for this purpose there are two statistical tests that are necessary to conduct, i.e. unit root test and cointegration test.

Unit Root Test

The uniformity data in regression equation are examined by using the unit root test at 10% level of significance

($\alpha = 5\%$, 10%) and detecting the the degree of probability (p-value), if $p\text{-value} < \alpha$, therefore H_0 is rejected and H_1 accepted and the data are considered as the stationary data. And if the otherwise happened whereas $p\text{-value} > \alpha$, implying that the data are not stationary. A stationary time series is one which statistical properties such as mean, variance, autocorrelation, etc. are all constant over time

Carrying out of the unit root test is for the reason to verify whether all variables contain unit root or stationary data or not at all or not at certain level of α . The results of testing have found that the variables, i.e. the volume/amount of Indonesian CPO export ($VCPOEX_t$), the Indonesian CPO production or domestic CPO production ($ICPOPD_t$), and the rupiah exchange rate to US dollar ($RERUSD_t$) are not stationary at a certain level of α , but the variable of world CPO export price ($WCPOPR_t$) is stationary (see, Table 4).

In conclusion, these findings indicated that the regression estimation supported by ECM is relevance to be used and can be applied in this research because of it fulfills the criterias required (refer to regression equation 4).

Table 4 describes the results of stationary data test at level which shows that all of variables have $t\text{-critical} < t\text{-stat}$ at level of $\alpha = 5\%$. In term of p-values, the result of testing shows that most of variables are not stationary because of its p-values $> \alpha$, excepted for p-value of variable i.e: $WCPOPR_t$ which is stationary by the reason its p-value smaller than $\alpha = 5\%$ ($p\text{-value} < \alpha$). Since most of all variables are not stationary, except one variable only, i.e. $WCPOPR_t$, thus it obliges to advanced the stationary testing at the first difference level (see, Table 5).

From the results of stationary test at the first difference level as it is described by Table 5 above shows that all variables can be accepted from point of view t-test ($t\text{-critical} < t\text{-stat}$ at level of $\alpha = 5\%$). However, this testing results at first difference level shows that only world CPO price variable is stationary data ($p\text{-value} < \alpha = 5\%$), but the rests of variables are in condition of data which are not stationary at first difference level testing. Since only one variable is stationary, i.e. independent variable $WCPOPR_t$. Thus, it is required to continue to conduct stationary data testing at second difference level for all variables under studies (see, Table 6).

After running the stationary data testing at second difference level as it is described by Table 6, the results indicate that all variable data of regression equation are in stationary condition.

Therefore, the facts in Table 6 imply that the hypothesis of H_0 is rejected and H_1 is accepted. Econometrically implication is that the variables of the CPO export volume, the world CPO prices, the CPO domestic production and the rupiah exchange rate per US dollar are stationary at integration degree of second difference level. It is reflected by evidents that show the t-

Table 4. Stationary Test Results at Level of 26 Years Observation (n=104) 1990Q1-2015Q4

Variables	Method	t-stat	t-crit	(p-value)	Interpretation
VCPOEX _t	ADF	-1.384803	-2.892536	0.5866	Data is not stationary
WCPOPR _t	ADF	-2.857701	-2.892536	0.0543	Stationary data
ICPOPD _t	ADF	-2.923534	-2.893589	0.9997	Data is not stationary
RERUSD _t	ADF	-1.791021	-2.893589	0.7583	Data is not stationary

Note: In statistics and econometrics, unit root test is used to test the assumption that a time series data is not stationary. The commonly used test is the Augmented Dickey-Fuller (ADF) Test. Another similar test is the Phillips-Perron Test. Both indicate the existence of the root of the unit as a null hypothesis. If t-stat < t-crit (t-critical=t-table) retains the null hypothesis; t-crit (t-critical = t-table) & t-stat = t-computed

Table 5. Stationary test results At First Difference Level of 26 Years Observations (N=104) (1990Q1-2015Q4)

Variables	Method	t-stat	t-crit	p-value	Interpretation
VCPOEX _t	ADF	-1.944980	-2.892536	0.3106	Data is not stationary
WCPOPR _t	ADF	-2.866386	-2.893956	0.0534	Stationary data
ICPOPD _t	ADF	-1.820741	-2.893956	0.3684	Data is not stationary
RERUSD _t	ADF	-1.859040	-2.893956	0.3501	Data is not stationary

Table 6. Stationary test results at second difference level of 26 observations (n=104) (1990q1-2015q4)

VARIABLES	Method	t-stat	t-crit	p-value	Interpretation
VCPOEX _t	ADF	-5.245455	-2.892536	0.0000	Stationary data
WCPOPR _t	ADF	-4.285180	-2.893956	0.0009	Stationary data
ICPOPD _t	ADF	-5.760540	-2.893956	0.0000	Stationary data
RERUSD _t	ADF	-5.742354	-2.998064	0.0000	Stationary data

Table 7. Regression results in the long term of 26 years Observations (n=104)(1990Q1-2015Q4)

Variables	Coefficient	Standard Error	t-statistic	p-value	f-statistic
VCPOEX _t	663.0370	151.9555	4.363362	0.0000	
WCPOPR _t	-0.016533	0.006451	-2.562732	0.0119	0.000000
ICPOPD _t	0.328464	0.021125	15.54839	0.0000	
RERUSD _t	-0.416964	0.083666	-4.983653	0.0385	

critical < t-stat and p-value < α (refer to Table 6). In brief conclusion, it is believed that all variables in regression equation are stationary at the same level. Thus the following testing should be done, is cointegration test for all observation variables.

Cointegration Test

After all variables are found as in form of stationary data at the second difference level (table 6), then it is needed to advance the method to testing significance of all variables under studies. In this context, cointegration test method must be conducted in order to examine the effects of all independent variables on the dependent variable. The first step is to carry out the test in order to estimate the magnitude values of each variable under studied in the long term. The results of estimation can be described by Table 7.

The results of regression as it is mentioned by Table 7 above, can be written in a simple form of a regression equation model as follows:

$$VCPOEX_t = 663.0370 - 0.016533 WCPOPR_t + 0.328464 ICPOPD_t - 0.416964 RERUSD_t + \varepsilon_t (4.363362) (2.562732) (15.54839) (-4.983653)$$

After regressing the independent variables to the dependent variable, then the next step is to look at the value of the unit roots of the residual variable which is considered statistically as a standard error variable or the variable of Error Correction Term (ECT) of regression equation (see, Table 8).

OLS, Long Term Regression

Ordinary Least Squares (OLS) model aims to determine

Table 8. Root Unit Test Results on Residual Regression of 26 years Observations (n=104) (1990Q1-2015Q4)

Variable	Method	t-statistic	t-crit	p-value
ETC	ADF	-2.892536	-2.892879	0.0674

Table 9. O.L.S. Regression result in the short term of 26 years observations (N=104), (1990Q1-2015Q4)

Variables	Coefficient	Standard Error	t-statistic	Probability (p-value)
VCPOEX _t	580.6941	155.3275	3.738514	0.0000
WCPOPR _t	-0.013878	0.006502	-2.134310	0.0353
ICPOPD _t	0.331267	0.020917	15.83711	0.0000
RERUSD _t	-0.381433	0.084457	-4.516274	0.0000

Table 10. ECM, Regression results for long term of 26 years observations (N=104), (1990Q1-2015Q4)

Variables	Coefficient	Standard Error	t-statistic	p-value
β_0	567.1544	67.03700	8.460319	0.0000
D(WCPOPR _t)	-0.013152	0.002806	-4.686416	0.0000
D(ICPOPD _t)	0.337287	0.009032	37.34449	0.0000
D(RERUSD _t)	-0.389300	0.036451	-10.68014	0.0000
ECT _t (-1)	-0.889425	0.042933	20.71668	0.0000

the effect of independent variables on the dependent variable in the long term. Table 9 describes the results of OLS Regression estimation of independent variables in the short term against the dependent variable, i.e. the export volume of Indonesian CPO from 1990 to 2015.

There are three independent variables, i.e.: (1) world CPO price (*CPOEPR*), (2) domestic CPO production (*ICPOPD*) and (3) rupiah exchange rate to US dollar (*RERUSD*). The results of estimation by using OLS can be seen in Table 9.

Table 9 describes the results of simultaneously OLS regression estimation in the short term, it can be written as a simple form of a regression equation in double log model as follows:

$$\text{LogVCPOEX}_t = 580.6941 - 0.013878 \text{ LogWCPOPR}_t + 0.331267 \text{ LogICPOPD}_t - 0.381433 \text{ LogRERUSD}_t + \epsilon_t$$

(3.738514) (2.134310) (15.83711) (-4.516274)

Where: F-statistic = 134.3198; F-probability = 0.0000; $R^2 = 0.804375$

ECM, Short Term Regression

Error Correction Model (ECM), in some literatures, is called as Error Correction Mechanisme (ECM) or Error Correction Term (ECT) which is used for time series data analysis. Its role is to equilibre the relationships between economic variables in short term with those in the long term. Thus to see the effects of independent variables on the dependent variable in the long term, the regression of the short term by OLS must be run by entering the

previous residual (-1) as the regression residual which is represented by ECT variable. The results of computing are described by the following Table 10 In econometrical regression equation, the statistical facts in the long term as presented by table 4.7, can be performed as follows:

$$\Delta \text{Log VCPOEX} = 567.1544 + 0.013152 \Delta \text{Log WCPOPR}_t + 0.337287 \Delta \text{Log ICPOPD}_t - 0.389300 \Delta \text{Log RERUSD}_t - 0.889425 \text{ ECT}_t$$

(8.460319) (4.686416) (37.34449) (-10.68014) (20.71668)

Where: F-statistic = 648.1869; F-probability = 0.0000; $R^2 = 0.963937$; $D = \Delta$

ECONOMIC IMPLICATION

The simultaneously test results in the long term obtained that F-statistics is equal to 134.32 and F-probability is equal to 0.00 while the test results in the short term obtained that F-statistics is equal to 648.19 and F-probability is equal to 0.00 at five percent level of significance ($\alpha = 5\%$). Based on these facts, the conclusions are that the overall variables of CPO world price, domestic CPO production and rupiah exchange rate per US dollar are considered significantly and economically to have strong influence on the development and growth of Indonesian CPO export volume within 26 years from 1990 to 2015. However, these findings are also to explain that Indonesian CPO exporters are not yet be independent from the pressure of international trade. Indonesian CPO exporters are in

condition as price takers in the world market so that they are not yet able to control the world CPO price for their owned benefits, they tend to follow or to adapt the price imposed by importers.

The accuracy of influences of independent variables are quite strong due to the value of determination coefficients in the long term which is equal to 0.80 and in the short term that is equal to 0.96. These facts explain that the contribution of all independent variables in explaining the dependent variable is roughly 80 percent in the long term and approximately 96 percent in the short term. The remaining are explained by other variables outside the model (residual variable) such as the external variables which are created by the economic expansion of importing countries, it could be in term of product quality development, products and services innovation, product technology design, marketing networks and strategy, importer's government policies, etc.

In regard of partial testing on domestic CPO production variable, the result shows that in the long term, t-statistic is equal to 15.84 and p-value or probability is equal to 0.00. By using a significant level at five percent ($\alpha = 5\%$) the result of testing hypothesis indicates that there is a positive influence of CPO domestic production variables on the export volume of Indonesian CPO during the period 1990Q1-2015Q4. Its value of elasticity coefficient is less than one or equal to 0.33, this implies the existence of an inelastic supply that determines relatively less responsive of Indonesian CPO export to the change of domestic production. In economic implication means, that one percent of increase in CPO domestic production will increase Indonesian CPO export volume about 0.33 percent. In the short term, the result of calculation yields t-statistic equal to 37.34 and probability (p-value) is 0.00, meaning the domestic CPO production not induce significantly on the expansion of Indonesian CPO export as the dependent variable even if at a confidence level equal to ten percent ($\alpha = 10\%$). This condition indicates that the competitiveness of Indonesian CPO exports is relatively weak in the international market. This problem can be occurred because of high cost of domestic CPO production as the impacts of inefficiencies in the production process, lack of product technology improvement, less strategy in developing marketing networks and services, lack of human resources skills, etc.

In the long term, the results of regression estimation shows that the world price of CPO variable has t-statistic equal to -2.13 and p-value equal to 0.03 while in the short term t-statistic equal to -4.67 with p-value equal to 0.00. And then its coefficient is in negative sign, implying that the world CPO price variable has negative and significant impact on the export volume of Indonesian CPO. In the long term, the increase in world CPO price by one percent will decrease slightly the export volume of CPO around 0.014 percent. In the short term, the coefficient of

price elasticity decreases a little bit to 0.013. Since the magnitude of price elasticity is less than one, describe the existence of an inelastic supply. It means less responsiveness of CPO export volume to change in the world CPO export price. When the world CPO export price increases one percent, be likely to decrease domestic CPO export volumes around 0.013 percent in the long and short term. Economically speaking, the negative sign of coefficient $WCPOPR_t$ indicates that there is a tendency of Indonesian to manufacture more CPO in domestic market in order to sale more final products or derivative products of CPO in the global market.

In the long term, the study proved that the independent variable of rupiah exchange rate per US dollar has a negative and significant effect on Indonesian CPO export volume growth. It can be seen from t-statistic at -4.52 and p-value at 0.00, while in the short term t-statistic is equal to -10.68 with p-value is equal to 0.00, so that it can be concluded that the exchange rate of rupiah to US dollar has a negative and significant effect on export volume growth at five percent of level of significance ($\alpha = 5\%$). The elasticity of coefficient is equal to -0.38 in the long term and -0.39 in the short term. Its implication is that the rupiah exchange rate increase by one percent then will reduce the export volume of CPO around 0.38 percent and 0.39 percent respectively.

From point of elasticity, represented by the regression coefficients, indicating the price elasticity of Indonesian CPO exports or Indonesian CPO supply in the world market in the short term was found as it was an inelastic supply. It is determined by the magnitude of each coefficient, which is less than one for both long and short term. The response of Indonesian CPO export volume against the world CPO prices is smaller in comparing to the impacts of rupiah exchange rate per US dollar on changes in CPO export volume. Indonesian CPO exporters face several constraints to adapt quickly to the dynamic world demand of CPO. Among others, those constraints are in term of weak in the mastery of product technology, high investment costs and expensive sources of financing from within the country, weak labour skills, lack of research and product development, and less of political supports, ect.

In the economic prospective, the data and research results show that oil palm plantations and processing of FFB and CPO are quite advantageous to be grown and developed in Indonesia. The findings of this study indicated that the main problems of Indonesian CPO exporters, including domestic FFB and CPO producers are still (1) highly dependent on world prices setting by buyers or importing countries; (2) strongly dependent on the influence of the American dollar; (3) highly cost to adapt quickly the production due to less mastery in product technology. Therefore the government of Indonesia must do the policy intervention, the Indonesian government must dare to do breakthrough policies to overcome those problems; the international trade

environment in domestic market must be created in manner conducive in order to enlarge the market power of Indonesian CPO exporters.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

1) Indonesia has big potentiality, particularly in term of land sources for plantation of Palm Oil. Therefore, the opportunities are still profitable to enlarge Palm Oil Plantation and to increase the production of FFB and CPO, including its derivative products within the country.

2) The competitiveness of Indonesian CPO exports in the world market during the period of study (1990-2015) was not so strong in comparing with competitiveness forces of other countries, it was reflected by instability, and the fluctuation of RCA-Index values within 26 years (1990-2015). Most of RCA-Index values during that period were less than one, the trend reverse was happened only in 2007 to 2014 ($RCA > 1$) due to improvement the domestic production of FFB and CPO products that in turn accelerates CPO export growth.

3) Indonesian CPO export performance within 26 years from 1990 to 2015 was fluctuant and unstable condition. It is indicated by the fluctuation of the CPO export volume growth in its relationships with the independent variables, i.e. world export CPO prices, domestic CPO production, and the exchange rate rupiah to US dollar. In economic point of view, this condition tends to indicate low competitiveness of Indonesian CPO's exporters in the world market.

4) The independent variables in the long term and short-term influence significantly on the Indonesian CPO export volume growth.

5) Indonesian CPO domestic production per se has positive impact significantly in the short term and the long term on the Indonesian CPO export volume growth (1990-2015). This condition can be taken to mean that the domestic production tend related to increasing in domestic consumption and the development of processing industries to derive more derivatives of FFB and CPO products domestically.

6) The world CPO export price per se shows a positive and very significant relationship as a determinant of the growth of export volume of Indonesian CPO both in the long and short term during the period of study (1990-2015). From an economic perspective, such a condition further reinforces the opinion that the competitiveness of Indonesian CPO exporters is still relatively weak in international competition.

7) The rupiah exchange rate per US dollar per se shows a negative and significant influence on the CPO export volume growth in both short-term and long-term. Of course, it is a logic condition because it matches with the theoretical mechanisms. However, it is also a signal that

Indonesian rupiah not too significant as the strategic tool to increase the competitiveness of Indonesian CPO export product in the world market.

8) The variable ECT (as a residual variable) shows a negative sign and considered significantly influence on the volume of Indonesian CPO export. Nevertheless, the sign negative of ECT coefficient implies relatively slow rate of adjustment process in the short term to return to an equilibrium condition in the long term.

Recommendation

1. For the purpose of increasing the quality of Indonesian CPO export performance, it requires government policy intervention, particularly in case of to facilitate and stimulate the growth of FFB-CPO and its derivative products for export. The expectation is that in one day Indonesian producers and exporters of FFB and CPO can be as price maker in the world market

2. This research only using the data within 26 years with 104 observations during the period of 1990Q1- 2015Q4. Regression estimation with only three variables independents. If more variable independents are used, it might improve this research results. Those variables are such as product quality, marketing strategy, the availability of plantation land, the government specific policies, including the demand factors come from the importer country, etc. Therefore, for the further research in the future, is important to extend the duration of data observations as well as the number of independent variables in regression estimation model, and operated by using the simultaneous equation approach.

3. The future research must be designed properly. For that, deeper study should be done in the framework of analyzing the industrial system of FFB products. The next study must analyze deeply the product development process in the integrated system (primary –secondary-tertiary). The competitiveness of FFB's derivative products can increase significantly if the development of those products at primary level is integrated with secondary and tertiary level at the same time.

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