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Diversification of Indonesian Palm Oil Exports for the 2017-2021 Period

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ABSTRACT: *The purpose of this study was to analyze the effect of palm oil production, the price of export palm oil, the GDP of the destination country, the population of the destination country, on Indonesian palm oil exports to the main destination countries. The data used is secondary data for the 2017-2021 timeframe for the main destination countries of India, China, Pakistan, the Netherlands, the United States, Spain, Egypt, Bangladesh, Italy, Singapore. The data analysis technique used in this study is Panel Data Regression. Data processing using E-views 10. Based on the results of data processing and simultaneous testing, Export Prices and Population of the main destination countries have a significant effect on Indonesian Palm Oil Exports. Export Prices and Population have a positive and significant effect.*

Keywords: *palm oil, production, price, GDP, population, Indonesian*

I. Introduction

International trade plays an important role in the economic growth of a country and modern economy. International trade and economic growth are the most popular concepts, where international trade allows countries to sell domestically produced goods and services to other countries. Economic growth helps increase the real income per capita of a country's population and can maintain it in the long term. The term international trade is used to denote the buying and selling of goods and services between countries to meet the needs of their population (Ahamad, 2016).

International trade creates free trade, and increasingly fierce competition. Commodity goods must be able to compete with similar products from other countries. International trade encourages innovation, discriminates technological progress through exposure to new goods and imports of high-tech inputs and efficient production (Daumal, 2010). So that price competition and commodity quality will be more open to various goods in the international market. International trade will bring many benefits to the country and society. International trade can accelerate development and economic development in a country. The process of international trade is divided into two, namely exports and imports. Exports occur when a country has abundant resources,

According to H. Banu Santoso (2003), Export is trading by removing goods from inside and outside the Indonesian customs area based on the applicable provisions. Export is the most important part of international trade. Usually the export process begins with an offer from a party accompanied by approval from another party through a sales contract process, in this case the exporter and importer. The process of paying for this shipment can be by letter of credit (L/C) or non-letter of credit, each method has its own risks and benefits. Exporting from Indonesia's point of view is the act of sending goods outside Indonesia. Export-import activities are based on the condition that no country is truly independent, they need each other,

Indonesia is one of the countries where the majority of the population works in agriculture, one of the few Indonesian agricultural products that has competitiveness in the global market is a product from the

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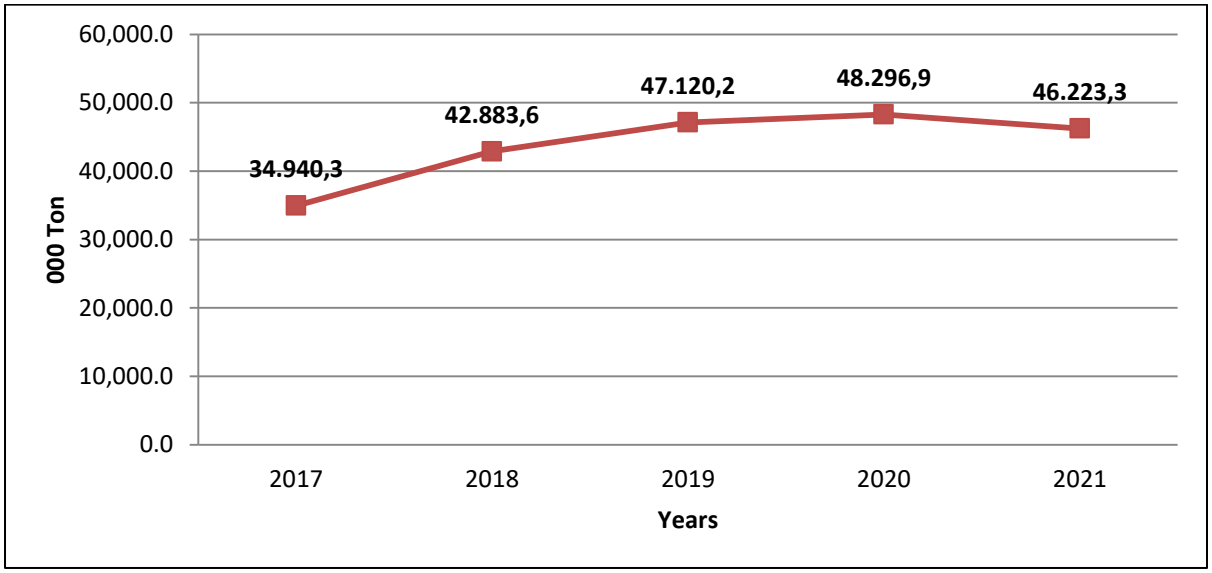
plantation subsector which is dominated by palm oil in the form of crude palm oil (CPO). Indonesia is a country rich in Natural Resources and Human Resources (Maygirtasari et al., 2015). Abundant natural resources serve as a source of food crops and export commodities. Plantation is one of the sub-sectors that has an important role in development. One of the plantation products that is exported and is a mainstay commodity in Indonesia is oil palm.

Plants whose main products are palm oil (CPO) and palm kernel oil (KPO) have high economic value and are one of the largest sources of foreign exchange compared to other plantation commodities. Until now, oil palm is cultivated in palm oil plantations and mills for its oil and derivative products. For Indonesia, oil palm plants have an important meaning for the development of national plantations. Besides being able to create jobs that bring social benefits, it is also a source of foreign exchange for the country. Since 2006, Indonesia has become the world's largest producer of palm oil which plays an important role in supplying and meeting the world's demand for vegetable oil. Indonesia is the largest producer of palm oil in the world with an area of 14,586,579 hectares of palm oil. The achievement of the average production of Indonesian palm oil in 2021 was recorded at 46.22 million tons or 56 percent of the total world palm oil production. According to Radifan (2014: 260) Indonesia's large CPO production makes Indonesia one of the largest CPO exporting countries. Indonesia is the world's largest CPO exporter compared to other CPO producing countries. In Figure below you can see a comparison of the amount of CPO production in Indonesia in 2017-2021.

Figure of Indonesia's CPO Production for 2017-2021



Source: Central Bureau of Statistics (processed)

The export of palm oil commodities has a large contribution among the exports of the food industry commodity group. During the five year period from 2017-2021 the contribution of the export value of palm oil commodities to the total export value of the food industry commodity group was an average of 60.91 percent. The highest contribution occurred in 2017 at 64.11 percent, while the lowest occurred in 2019 at 57.19 percent. A good country's economy is if the value of exports is higher when compared to the value of imports, because export activities will add to the country's foreign exchange reserves. Palm oil exports throughout 2021 reached US$ 28.61 billion, higher than in 2020 with a value of US$ 18.44 billion. Most of Indonesia's palm oil export production is absorbed by India with a total of 25.91 million tonnes in a five year period, from 2017-2021. In Table below it can be seen the countries which are the main destinations for Indonesian palm oil exports.

Table of Palm Oil Exports by Main Destination Countries, 2017-2021

Country of destination	Net Weight (Thousand Tonnes)					
	2017	2018	2019	2020	2021	Total
India	7325,1	6346,2	4576.6	4568.7	3088.7	25905,3
China	3601,1	4166,5	5791,1	4390.5	4703,1	22652,3
Pakistan	2193,8	2458,5	2215,9	2487	2674,3	12029,5
Dutch	1286,4	1161,1	914.9	682.8	567	4612,2
United States of America	1153,4	1112.8	1189	1123.7	1640,2	6219,1
Spanish	1367,9	1168.6	1078,8	1135.9	992.8	5744
Egypt	1201.4	936.9	1095,1	970.9	1035,3	5239.6
Bangladesh	1231.4	1402.3	1351.5	1026,6	1319,4	6331,2
Italy	1066.5	888.9	751.3	944.7	622.7	4274,1
Singapore	610.8	424.5	580.3	360.6	55,7	2031,9
Other	7732,5	9236,1	10003,4	9634.7	10290.8	46897.5
Amount	**28770.26**	**29302,4**	**29547,9**	**27326,1**	**26990**	**141936,7**

Source: Central Bureau of Statistics (processed)

Seen from Table above, there are 10 main export destination countries for palm oil in Indonesia, where India occupies the first position as a palm oil importer, followed by China with 22.65 million tons. Indonesia's palm oil exports, which are expected to increase from year to year, have in fact fluctuated from 2017-2021.

Table of Indonesian Palm Oil Export Prices, 2017-2021

	FOB Value (000 000 US$)					
	2017	2018	2019	2020	2021	Total
India	4901.2	3561.5	2252	2987,3	3337,8	36629,8
China	2651.8	2637,6	3019,7	2867.5	4825,9	27584.3
Pakistan	1474.7	1445.7	1169,1	1667,4	2794.3	14081.7
Dutch	936.6	711.6	480,2	460.2	615.7	8207.4
United States of America	938.7	756.8	658.6	784.5	1816,8	6912,5
Spanish	930	718.7	572	757.4	996.8	6643.9
Egypt	843.8	577.7	581.1	657.7	1119,2	6953,2
Bangladesh	827	846.7	705.2	697,2	1363,2	7700.8
Italy	708.2	544.8	410,2	626.6	622.7	6588,5
Singapore	403,2	240,1	274.7	234.4	63,6	4260.8
Other	5725.7	5857.6	5451.6	6703.8	11050	61558,6
Amount	**20340,856**	**17898,8**	**15574,4**	**18444**	**28606**	**187121.46**

Source: Central Bureau of Statistics (processed)

Seen from Table above, the export price of palm oil in Indonesia in 2017-2021 by main destination country. The highest export of palm oil occurred in 2019 amounting to 29.55 million tonnes with an export value of US$ 15.57 billion. Indonesia's palm oil exports tend to decline due to several factors that are believed to affect Indonesia's palm oil exports, including the slowdown in the world economy which has reduced global demand for palm oil, and the exchange rate against the US dollar which has also been a trigger for export activities.

The backbone of the economy is the level of national income or gross domestic product. The greater the income of a country, the greater the country's ability to conduct international trade. Gross Domestic Product (GDP) is a monetary value which is the market value of all the final goods and services produced in a

country in a year. Real GDP per capita (corrected for inflation) is often used as a core indicator to assess a country's economic performance over time or relative to other countries. This approach does not derive from any theory of GDP as a measure of social welfare, but over time it is useful. According to McEachern Gross Domestic Product (GDP) (2000:146) that: "Gross domestic product (GDP) means measuring the market value of the final goods and services produced by the resources located within a country during a certain period of time, usually one year. GDP can also be used to study an economy over time or to compare several economies at a time.". In Table below, you can see the GDP value of each country's main export destination for palm oil in Indonesia in 2017-2021.

Table of GDP Main Destination Countries for Indonesian Palm Oil, 2017-2021

Country of destination	GDP (000 000 US$)				
	2017	2018	2019	2020	2021
India	2,650,000	2,700,000	2,830,000	2,670,000	3,170,000
China	12,310,000	13,890,000	14,280,000	14,680,000	17,730,000
Pakistan	339,210	356,130	320,910	300,310	346,340
Dutch	833,870	914040	910190	913,870	1,020,000
United States of America	19,480,000	20,530,000	21,370,000	20,890,000	23,000,000
Spanish	1,310,000	1,420,000	1,390,000	1,280,000	1,430,000
Egypt	235,730	249,710	303,080	365,250	404,140
Bangladesh	293,750	321,380	351,240	373,900	416,260
Italy	1,960,000	2,090,000	2,010,000	1,890,000	2,100,000
Singapore	343,190	377,000	375,470	345,300	396,990

Source: World Bank (processed)

An increase in the population of a country will increase the number of goods purchased. According to Salvatore (2013), increasing population will increase consumption, which means increasing the country's domestic demand for a commodity. When the country cannot meet domestic demand, imports are carried out. This is certainly beneficial for exporting countries, because importing countries can absorb more offers from exporting countries.

II. Literature Review and Hypotheses Development

2.1. Export

Export is one of the international trade activities and plays an important role in the economy of a country. Export activities will play an important role as a driving force for the domestic economy in the coming decades. According to Tandjung (2011: 269) export is the release of goods from the Indonesian customs area to be sent abroad by following the applicable provisions, especially regarding customs regulations and carried out by an exporter or who has received special permission from the Directorate General of Foreign Trade, Ministry of Trade.

2.2. Production

In a country, the production of goods or services is very necessary, because if a country does not produce, the country will be left behind, starve, fail to develop, or even the country will become extinct due to non-existent production. This economic activity is usually represented by the production function. According to (Sugiarto, 2007), production is an activity that converts inputs into outputs. This economic activity is usually expressed in the production function.

2.3. Price

In economic theory it is stated that the price of goods or services in market competition is determined by market demand and supply. Price is the amount of money billed for a product or service or the amount of value exchanged by consumers to benefit from having or using a product or service (Kotler and Armstrong, 2008:345).

2.4. GDP (Growth Domestic Product)

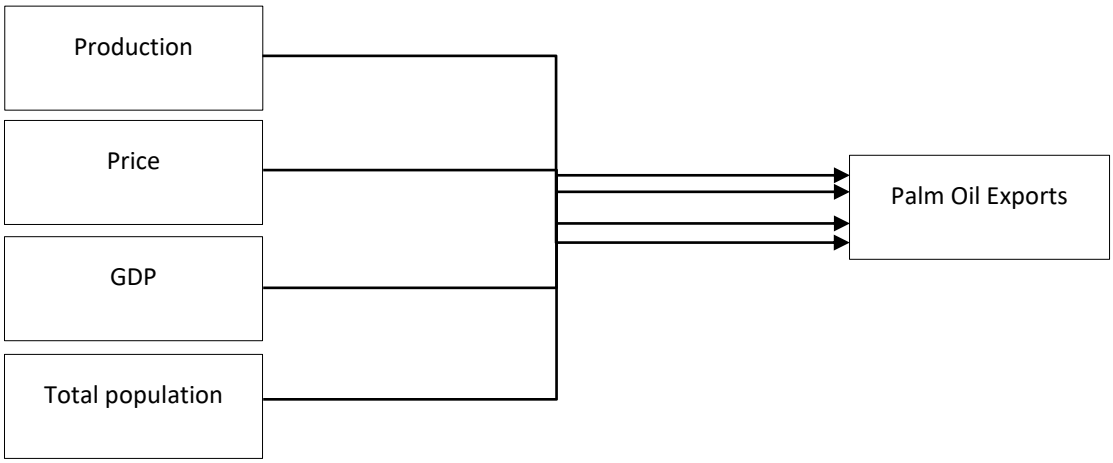
The increase in the GDP of the importing country causes an increase in the purchasing power and consumption of a commodity by the people in the importing country. An increase in exports due to an increase in the GDP of the importing country shows that the exporting country has the ability to compete in the international market. Gross Domestic Product or in English Gross Domestic Product (GDP) is the value of goods and services in a country produced by factors of production owned by citizens and foreign countries (Sukirno, 2013: 35)

2.5. Total population

The population is one of the important indicators in a country. Increasing population will increase consumption, which means increasing the country's domestic demand for a commodity (Salvatore, 2013).

III. Conceptual Framework

The following is a framework that shows the relationship between production, price, GDP, and population on palm oil exports in Indonesia.



IV. Methods

In this case the researchers analyzed the influence of palm oil production and other factors affecting palm oil exports in Indonesia. The data used in this study is secondary data obtained from the official website of the Central Statistics Agency (BPS), the Plantations Office, and the World Bank. Data was collected using panel data method, which is a combination of time series data and cross section data. The time series data used in this study is the period 2017-2021 (5 years), while the cross section data used in this study are the 10 main export destination countries for Indonesian palm oil (India, China, Pakistan, the Netherlands, the United States, Spain, Egypt, Bangladesh, Italy and Singapore). The variables used in this study are export volume, export production, export prices, GDP, and population, with a total number of observations of 50 data in this study. The equation model can be written as follows:

$$VE_{it} = \beta_0 + \beta_1 PI_{it} + \beta_2 HE_{it} + \beta_3 LOGGDP_{it} + \beta_4 LOGJP_{it} + e_{it}$$

V. Results

The estimation results are obtained from the Panel Data Regression analysis using the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches. The results of the analysis can be seen in Table below.

Table of Panel Data Regression Results

Variable	Regression Coefficient		
	CEM	FEM	BRAKE
C	-1941,733	152859.1	-1941,733
PI	-0.006833	0.013007	-0.006833
HE	1.163437	0.760736	1.163437
LOGGDP	-45.19805	-1389,747	-45.19805
LOGJP	174.4121	-7142.945	174.4121
R^2	0.878466	0.931589	0.878466
adjusted.R^2	0.867663	0.906885	0.867663
F statistics	81.31674	37.71029	81.31674
Prob. F statistics	0.000000	0.000000	0.000000

Source: processed data

Estimated Model Selection Test

The Chow test and Hausman test were used to select the best estimated model between CEM, FEM and REM. If in the Chow test the model chosen is FEM and in the Hausman test the model chosen is also REM, then the best estimated model is REM. Because the Hausman test determines the best model between FEM and REM.

Table of Chow Test Results

Effect Test	Statistics	df	Prob.
Cross-section F	3.106140	(9,36)	0.0073
Chi-square cross-sections	28.733241	9	0.0007

Source: data processed with E-views 10

Seen from the table above, the results of testing the Common Effect Model (CEM) and Fixed Effect Model (FEM) on the Chow Test obtained a probability value of 0.0073 <0.05 (α) which means it is significant because H_0it is rejected, so the best model that is feasible to use is the Fixed Effect Model (FEM), and needs to be continued to the Hausman Test in Table below.

Table of Hausman Test Results

Effect Test	Chi-Sq. Statistics	Chi-Sq. df	Prob.
Random cross-sections	0.000000	4	1.0000

Source: data processed with E-views 10

Judging from the table, the results of the Fixed Effect Model (FEM) and Random Effect Model (REM) tests on the Hausman Test obtained a probability value of 1.0000 > 0.10 (α) which means it is not significant because H_0 it is accepted, so the best model that is feasible to use is the Random Effect Model (REM). In Table below it can be seen that the selected model is the Random Effect Model (REM).

Table of Random Effect Model (REM) Estimation Results

VE_{it} = - 1941.733 - 0.0068 PI_{it} + 1.1634 HE_{it} - 45.1981 $LOGGDP_{it}$ + 174.4121 LOGJP_{it}
(0,6517) (0.0000)* (0,4479) (0,0279)**

R^2 = 0.8785 ; adj R^2 = 0.8677 ; F. Stat = 81.3167 ; Prob F-Stat = 0.0000

Source: data processed with E-views 10

Based on the test results in the table above, it shows that the coefficient of determination (R2) for Diversification of Palm Oil Exports in Indonesia for the 2017-2021 period is 0.8785, meaning that 87.85% of the

variation in the variable number of Export Volume can be explained by Indonesian Production, Export Prices, GDP, and Population and the remaining 12.25% is influenced by other variables not included in the research model.

Simultaneous significance test (F test) was conducted to find out the independent variables affect the dependent variable together (simultaneously). Based on Table 6, it can be seen that the p-value (p-value), probability, or empirical significance of the F Statistical Prob is 0.0000 < 0.05 (α) so H_0 it is rejected, with the conclusion that the model used exists.

Table of Influence Validity Test Results

Variable	t-statistics	Prob	Alpha	Conclusion
PI	-0.4544	0.6517	>0.10	No significant effect on α = 0.10
HE	11.2773	0.0000	< 0.01	Significant effect at α = 0.01
LOGGDP	-0.7656	0.4479	>0.10	No significant effect on α = 0.10
LOGJP	2.2717	0.0279	< 0.05	Has a significant effect on α = 0.05

Source: data processed with E-views 10

Based on the table above, the Indonesian production variable in the Random Effect Model (REM) has a negative and insignificant effect on export volume. The PI variable has a regression coefficient of -0.0068 with a prob value of 0.6517.

The Export Price Variable in the Random Effect Model (REM) has a positive and significant effect on Export Volume. The HE variable has a regression coefficient of 1.1634 with a prob value of 0.0000 which is statistically significant at α = 1% (0.01).

The GDP variable in the Random Effect Model (REM) has a negative and insignificant effect on export volume. The GDP variable has a regression coefficient of -45.1981 with a prob value of 0.4479.

The Population Variable in the Random Effect Model (REM) has a positive and significant effect on Export Volume. The JP variable has a regression coefficient of 174.4121 with a prob value of 0.0279 which is statistically significant at α = 5% (0.05).

VI. DISCUSSION

Indonesia's palm oil production in the long and short term is negligible just like India's palm oil exports to India. The long-term results are consistent with the hypotheses used in this study. However, the short term results are inconsistent with the hypothesis used. This is in accordance with Irawan's research (2018) that total palm oil production has a negative and insignificant effect on Indonesia's palm oil exports. This means that if the total production of palm oil increases, it will not increase the export volume of Indonesian palm oil. This may be due to an increase in household consumption. Expectations of an increase in the level of public consumption lead to an increase in public consumption of primary goods, one of which is palm oil. Not only that, another problem that caused an increase in total production but not followed by an increase in exports was due to weak demand from importing countries (India) and India's import regulations. Therefore, it is one of the factors causing total production growth, but cannot be followed by an increase in export volume. The export price of crude palm oil partially has a significant impact on the export of crude palm oil. This is because when the CPO price increases, the export volume decreases and vice versa when the CPO price decreases, the export volume increases, but cannot be followed by an increase in export volume.

In this study, GDP affects palm oil exports. GDP per capita which describes people's purchasing power in terms of goods and services in certain countries. The estimation results show that India's GDP per capita has a significant effect on the volume of palm oil exports from India to India at α = 5%. This is because the higher the income of citizens of importing countries, the more people who buy palm oil for their needs. In addition, the increase in palm oil production every year bodes well for the prospects for Indonesian palm oil products to meet domestic and global palm oil demand. With a significant increase in population, the production of palm oil has also increased, which can be used as a consumable in the production process of cooking oil, candles, soap, butter and some cans, can be used to export CPO (crude palm oil) or palm oil, palm oil and CPKO (crude

palm kernel oil). The increase in palm oil production has made Indonesia the largest producer and exporter of palm oil in the world.

VII. CONCLUSION

This research examines the effect of production, prices, GDP, and population on palm oil exports in Indonesia in 2017-2021. The results of the study prove that prices and population have a significant effect on exports of palm oil in Indonesia in 2017-2021. Meanwhile, production and GDP have no effect on exports of palm oil in Indonesia in 2017-2021.

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