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Response to Supply and Demand for Indonesian Palm Oil in International Markets: The Simultaneous Equation Model Approach

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Palm oil is one of the ten main export commodities in Indonesia. The purpose of this study was to analyse the magnitude of response factors regarding the supply and demand of Indonesian palm oil. The data used in this study is Time Series data from 1981-2016. It was obtained from various sources such as International Trade Statistics, FAO, United Nations Commodity Trade Statistics, BPS, and others. The data analysis method used is the Two Stages Least Squares (2 SLS) simultaneous equation model. Calculation of parameter estimation is done by using the computer program SAS/ETS version 9.4 (Statistical Analysis System Econometric Time Series). The results showed that the magnitude of the response factors regarding the supply and demand of Indonesian palm oil were (1) The supply of Indonesian domestic palm oil was influenced by the area containing Indonesian palm oil and the price of urea fertiliser, which were both responses to long-term elasticity. Malaysia is affected by the area used by Malaysian palm oil and does not respond in both the short-term and long-term. (2) Indonesia's palm oil exports are influenced by the Rupiah exchange rate against the USD. In response to long-term elasticity, Malaysian palm oil exports are influenced by domestic demand for Malaysian palm oil. (3) Indonesia's domestic palm oil demand is influenced by the price of Indonesian palm oil and Indonesia's GDP per capita. Both are responses to long-term elasticity. Demand for Malaysian domestic palm oil is influenced by the price of Malaysian palm oil, the response to long-term elasticity and the price of Malaysian palm oil. However, it does not respond to both short-term and long-term elasticity. (4) Regarding international demand for palm oil, Indian palm oil imports are influenced by the Indian GDP and response to long-term elasticity. China's palm oil imports lag

behind global palm oil prices and respond to long-term elasticity. Pakistan's palm oil imports are affected by global palm oil prices and Pakistan's GDP. Both are responses to long-term elasticity. (5) The price of Indonesian palm oil is influenced by global palm oil prices and the response to long-term elasticity. The price of Malaysian palm oil is influenced by the supply of Malaysian palm oil in response to long-term elasticity, lag in demand for Malaysian domestic palm oil and global palm oil prices. Furthermore, global palm oil prices are influenced by global soybean oil prices and global sunflower oil prices. Both of these responses to long-term elasticity.

Key words: *responsive, demand, supply, palm oil.*

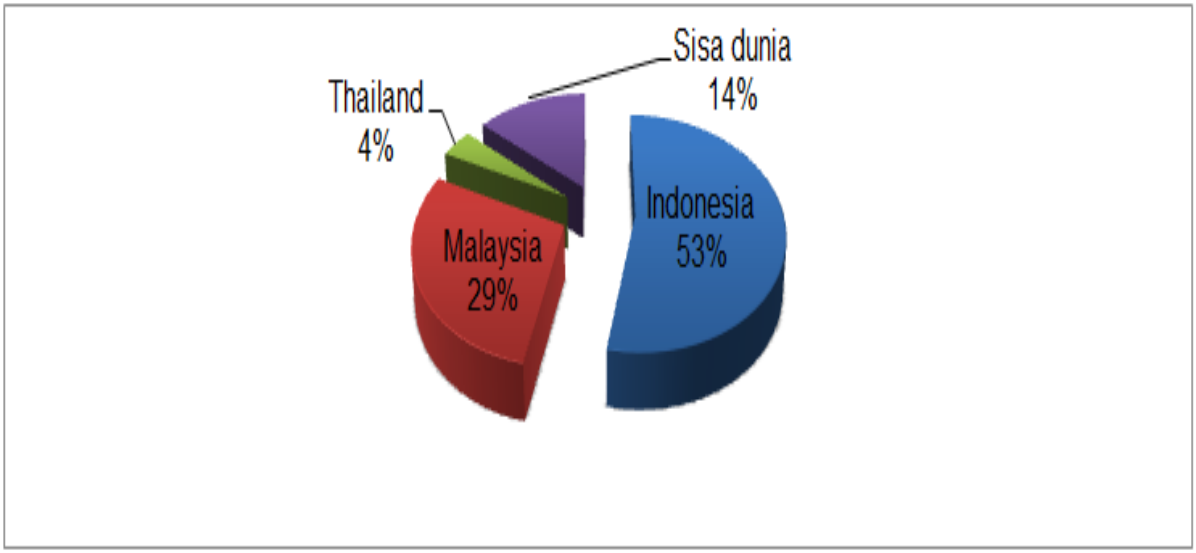
Introduction

Palm oil is one of the ten main export commodities in Indonesia. Indonesian palm oil is exported to India, The People's Republic of China, Pakistani, Spain, Bangladesh, Egypt, The Netherlands, Italy, The United States of America and the Malaysian People (Bank Indonesia, 2018).

Indonesia has an important role in meeting global palm oil needs. As much as 53 percent of global palm oil is produced by Indonesia. Countries that are Indonesia's competitors as the other main producers of palm oil are Malaysia and Thailand. In 2016, these three countries were able to produce 76 percent of global palm oil ("Statistics Trade 1980-2014", 2018). The share of palm oil production in major producing countries compared to total global production in 2016 can be seen in Figure 1.

Figure 1

Palm oil production share of major producing countries compared to total global production in 2016



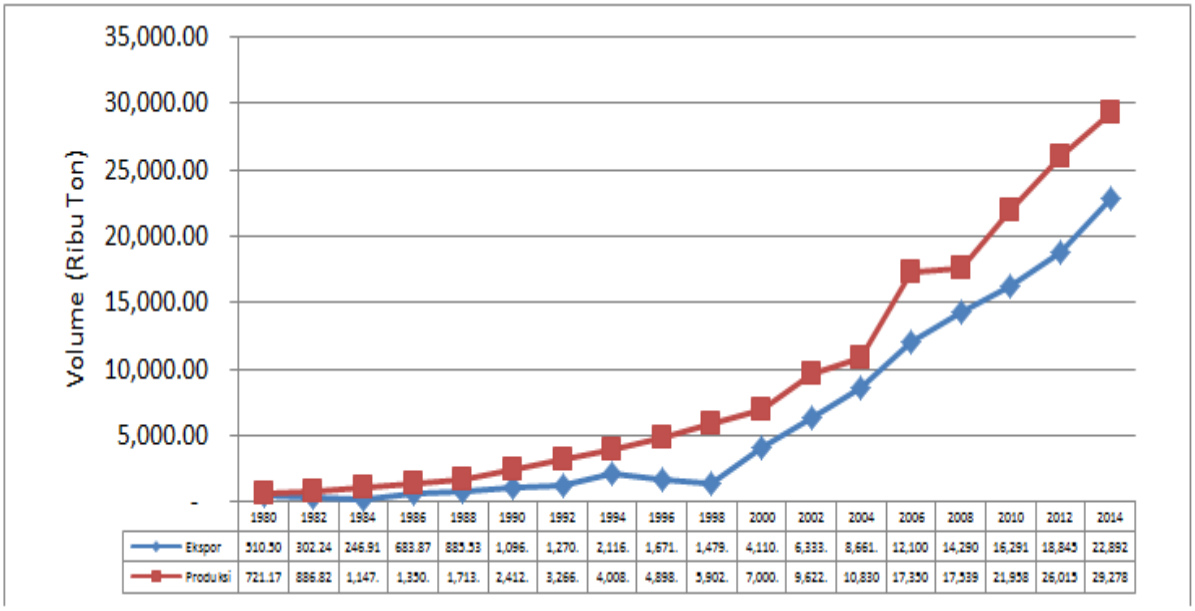
Source: FAO (2018).

Indonesian palm oil has a long history from the colonial period to the present. Oil palms have evolved from a mere collection of germplasm in the Bogor Botanical Gardens to ornamental plants, commercial plantation businesses and a modern industry ("Statistics Trade 1980-2014", 2018).

One of the developments of Indonesian palm oil is seen in production. Figure 2 presents the development of Indonesian palm oil production and export volumes in 1980-2014. Based on Figure 2, it can be seen that Indonesian palm oil has experienced very rapid development. The volume of Indonesia's palm oil production increased rapidly from 721,172 tons in 1980 to 29,278,200 tons in 2014.

Figure 2

Development of Indonesian palm oil production and export volume from 1980-2014



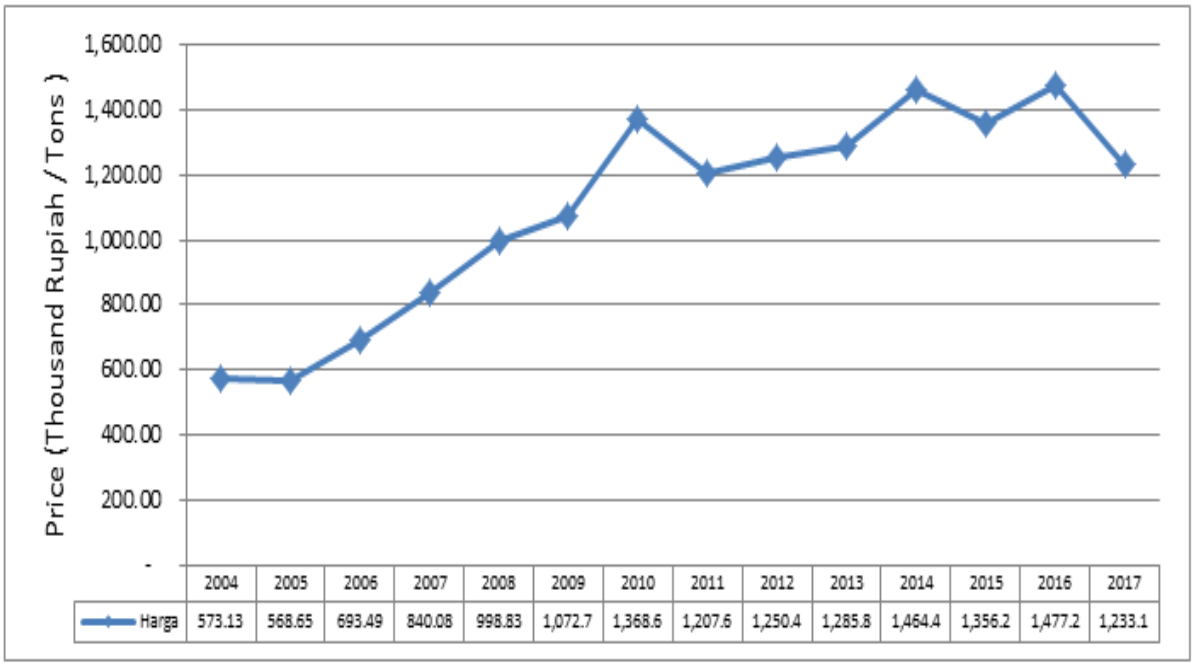
	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
Ekspor	510.50	302.24	246.91	683.87	885.53	1,096.	1,270.	2,116.	1,671.	1,479.	4,110.	6,333.	8,661.	12,100	14,290	16,291	18,845	22,892
Produksi	721.17	886.82	1,147.	1,350.	1,713.	2,412.	3,266.	4,008.	4,898.	5,902.	7,000.	9,622.	10,830	17,350	17,539	21,958	26,015	29,278

Source: FAO (2018).

In line with the development of production volume, the export volume of Indonesian palm oil also experienced positive growth. Indonesia first exported palm oil in the form of Crude Palm Oil (CPO) in 1919, with a volume of 567 tons ("Statistics Trade 1980-2014", 2018). This export volume continued to increase until now. In 2014, Indonesia's palm oil export volume reached 22,892,387 tons or 78.19 percent of Indonesia's total oil palm production (Figure 2).

The increase in the volume of production and exports of Indonesian palm oil is not in line with developments in the price of palm oil. From 2014 to 2017 the price of Indonesian palm oil fluctuated, despite an increasing trend. The price of Indonesian palm oil in 2004 was Rp. 573,127/ton. It then increased to Rp. 1,233,150/ton. The price of Indonesian palm oil had decreased in 2011, 2015 and 2017. The development of Indonesian palm oil prices in 2014-2017 is presented in Figure 3.

Figure 3:
Development of Indonesian palm oil prices in 2004-2017



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Harga	573.13	568.65	693.49	840.08	998.83	1,072.7	1,368.6	1,207.6	1,250.4	1,285.8	1,464.4	1,356.2	1,477.2	1,233.1

Source: FAO (2018).

The potential for oil palm development in Indonesia is evident from the absolute advantages possessed by Indonesia. These advantages include a climate conducive to oil palm cultivation; wide, available land; and availability of labour. Previous studies state that Indonesia's palm oil exports have performed well among other palm oil-producing countries. Indonesia's CPO exports have a competitive advantage. They have an ISP of 0.95 and a comparative advantage with an RCA of 0.85 (Anggit, 2012; Asrol & Heriyanto, 2018; Heriyanto, Karya, & Asrol, 2018, Asrol & Heriyanto, 2018; Heriyanto et al., 2018, 2019; Wahyudy, Khairizal, & Heriyanto, 2019).

The great potential of the development of the palm oil industry in Indonesia is followed by various problems. There are internal and external problems. The internal problems of oil palm development in Indonesia range from upstream to downstream. They include low productivity of oil palms and a number of community oil palm plantations that have not been properly cultivated. The latter is due to the low quality of oil palm farmers' human resources or due to lack of farmer capital. Problems with the use of seeds are unclear. The spacing of planting, use of fertilisers that do not match the dose, low quality of Indonesian palm oil products and the problem of oil palm policies that often change also play a role in low productivity.

In the midst of the era of globalisation, the threat to Indonesian palm oil is growing. Demand for Indonesian palm oil products is also increasing. This then becomes an external problem for the development of Indonesian palm oil. These external problems include black campaigns or negative campaigns against Indonesian palm oil products, the adoption of Indonesian palm oil product standards (palm oil products to be exported must have RSPO certificates) and the rejection of Indonesian palm oil.

Based on the background description and problems above, in general, the objective of this research is to analyse the response to demand and supply of Indonesian palm oil in the international market. Specifically, the purpose of this study is to Analyse the magnitude of response factors regarding the supply and demand of Indonesian palm oil.

Literature Review

Research related to supply and demand analysis has been carried out. Some of the research has been done by (Lipsey, 2013), (Adang & Sri, 2012; Agustian & Friyatno, 2014a, 2014b), (Vioryza, Balgies, Syafrial, & Suhartini, 2015), (Damanik, 2001), (Kusnadi & Rambe, 2018), (Kusnadi & Rambe, 2018), (Rumankova & Smutka, 2013), (Mankiw, 2015), (Agustian & Friyatno, 2014a), (Hutabarat & Jusmer, 2014), (Septi, Darwanto, & Mulyo, 2015), (Nyak & Karyasa, 2016), (Hermawan, I., & Adam, 2010), (Ratnaningsih, 2018), (Nashriq, 2013), (Rahma Sari Siregar, 2016), (Ramdani, 2012; Shavana, Darus, & Lubis, 2014).

Research Methods

The data used in this study is secondary data, namely time series data from 1981-2016. The data collected is data on the topics of Indonesian palm oil, palm oil production, the minimum wage of Indonesian labour, prices, palm oil export volume, the exchange rate against the dollar, producer price index, consumer price index, inflation, soybean oil prices, oil production from soybeans, palm oil imports and gross income (GDP). The data was collected from various sources, including BPS Indonesia, Bank Indonesia, FAO, and the Global Bank.

Data analysis

The simultaneous equation approach with the Two Stages Least Square (2SLS) analysis method was used to analyse the response to supply and demand for Indonesian palm oil in the international market. The data analysis process was carried out using the help of the Statistical Analysis System Econometric Time Series (SAS/ETS) program version 9.4.

The data analysis of this study was an analysis of econometrics. Simultaneous equations were carried out to answer the research objectives. Econometric analysis of simultaneous equations has procedures. These include the specification of the rubber farm household economic

model. Econometric models are special patterns in algebraic models. They are stochastic elements that include one or more disturbing variables (John, 2017; Intriligator, 1978). This model is an abstract diagram that represents a real phenomenon as a system or process (Verbeek, 2004; Gujarati, 2011; Koutsoyiannis, 1977a; Thomas, 1997; Verbeek, 2004). Therefore, the model can represent the actual phenomena expressed in the form of symbols. It can be formulated in the form of equations. Model specifications consist of interconnected equations that are grouped into five blocks. These are (1) supply, (2) exports, (3) domestic demand for palm oil, (4) international demand for palm oil, (5) the price of palm oil. The five blocks of the equation are interconnected to form a systemic equation.

After the model specifications are carried out and before the estimation of the model is done, it is necessary to first identify the model in each equation. Model identification is determined based on order conditions. Ranking requirements and conditions complement predetermined conditions. (Koutsoyiannis, 1977b) and (Gujarati, 2003, 2008, 2011) argue that predictable parameters in the simultaneous equation model must be identified. The model identification formula based on order condition is as follows:

$$(K - M) \geq (G - 1)$$

K = The total variables in the model (endogenous variables and predetermined variables).
M = The number of endogenous and exogenous variables put in a certain equation in the model.
G = The total equation (number of endogenous variables).

Criteria for identifying models using order conditions are stated as follows: (1) if K-M = G-1, then the equation in the model is declared exactly identified; (2) if K-M < G-1, then the equation in the model is said to be unidentified; and (3) if K-M > G-1, then the equation in the model is said to be excessively identified (overidentified) (Gujarati, 2003, 2008, 2011; Koutsoyiannis, 1977b; Pindyck & Rubinfeld, 1998, 2014; Verbeek, 2004).

Both statistical tests (F and t) are used in causality analysis. The statistical test F is used to test whether exogenous variables, together, have important effects on endogenous variables in each equation. Next, statistical tests are used to test whether each individual exogenous variable has an important effect on endogenous variables in each equation.

The effects and reactions of exogenous variables on endogenous variables can be measured in terms of elasticity. In the concept of elasticity, coefficient values can be generated. They can also be calculated to measure the response of variables to the factors that influence them. In short, elasticity is a measure of the sensitivity of endogenous variables in the equation to changes in exogenous or exogenous variables. Dynamic models can calculate short-term and

long-term elasticity. Both elasticity values can be calculated using the following formula (Gujarati, 2008; Pindyck & Rubinfeld, 2014; Sukirno, 2011):

$$E_{SR} = \frac{\partial Y_t}{\partial X_t} * \frac{\bar{X}}{\bar{Y}} = a\,\frac{\bar{X}}{\bar{Y}}$$

$$E_{LR} = \frac{E_{SR}}{1-b_{lag}}$$

E_{SR} = Short-term elasticity.
E_{LR} = Long-term elasticity.
a = The Presumptive parameters of exogenous variables.
b = The Parameters of the lag variable.
X = The average exogenous variables.
Y = The average endogenous variable.

Results and Discussions

The response to palm oil's supply and demand is discussed in this section. It is grouped into three broad sections. These are the supply of palm oil, demand for palm oil and the price of palm oil. The descriptions of each of these sections are explained as follows:

Domestic palm oil supply: Indonesian palm oil supply

Based on Table 1, it can be said that all variables entered into the model have the expected parameter mark. Of the four variables included in the model, the variables that had a significant influence were the area used by oil palm in the previous year and the price of urea fertiliser.

Table 1

Estimated results of the parameters and elasticity of Indonesian palm oil supply

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	0.9375	1.90	0.0677	-	-	Intercept
APPOIDR	0.0002	0.61	0.5479	-	-	PPOIDR addition
LAHID	2.8315	3.29	0.0026	0.6290	-1.2849	Area used by Indonesian palm oil
PURIDR	-0.0003	-1.45	0.1566	-0.1330	-2.0469	Price of urea fertiliser
LSID	0.5225	3.03	0.0050	-	-	SID Lag
R2 = 0.9958; F value = 1793.86; Pr > F = < 0.0001; dh = -						

The total area used by Indonesian palm oil has a positive influence on the supply of Indonesian palm oil and is significantly different at the 5 percent level. This is in line with the study (Lipsey, 2013; Adang & Sri, 2012; Damanik, 2001; Kusnadi & Rambe, 2018) indicating that the supply of Indonesian palm oil is influenced by prices. Based on the elasticity value, the oil palm area variable has an inelastic value in the short-term, whereas the oil palm area variable in this equation is elastic in the long run. This indicates that short-term land area changes only have a small impact on changes in Indonesia's palm oil supply. In the long run, the area variable has an elastic value, which is worth -1.2849. This indicates that if there is a 10 percent increase in the area used by palm oil in the previous year, then the supply of Indonesian palm oil will decrease by 12.849 percent. These results are in accordance with existing conditions in the field. Oil palm plants are said to be productive until they reach the age of 25 years. After passing the productive age, the productivity of oil palm plants will continue to decrease. Low productivity of palm oil plants will have an impact on the decline in production and supply of Indonesian palm oil.

The variable price of fertiliser has a negative and significant effect on Indonesia's palm oil supply. This is in line with the study (Vioryza, Balgies, et al., 2015). The parameter presumed that the fertiliser price variable is -0,0003. This means that if the fertiliser price increases by Rp. 1,000.00/kg, Indonesia's palm oil supply will decrease by 0.3 million tons. In the short-term, the change in fertiliser prices will only have a small impact on Indonesia's palm oil supply. This can be seen from the short-term elasticity value, which is inelastic. In the long-term, changes in fertiliser prices will have a major impact on Indonesia's palm oil supply. This can be seen in the long-term elasticity value of -2.0469. This indicates that if there is a 10 percent increase in the price of urea fertiliser , it will cause the supply of Indonesian palm oil to decrease by 20.469 percent.

Malaysian palm oil supply

Based on Table 2, it can be seen that the supply of Malaysian palm oil is influenced by the price of Malaysian palm oil in the previous year and the different variables involved with Malaysian palm oil supply. Of the three variables included in the Malaysian palm oil supply model, only one variable had a significant influence, namely the Malaysian area used by palm oil variable from the previous year.

Table 2

Estimated results of the parameters and elasticity of Malaysian palm oil supply

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	-0.4002	-0.47	0.6449	-	-	Intercept
LPPOMYR	0.0005	0.62	0.5395	-	-	PPOMYR Lag
LAHMY	0.9628	1.59	0.1225	0.2063	-0.9666	Lag area used by Malaysian palm oil
LSMY	0.8526	7.91	< 0.0001	-	-	SMY Lag
R2 = 0.9865; F value = 757.42; Pr > F = < 0.0001; dh = -2.42						

The estimated parameter of the previous year's area used by Malaysian palm oil (LAHMY) was 0.9628. This indicates that if the area used by palm oil in the previous year increased by one million hectares, then the supply of Malaysian palm oil will increase by 0.9628 million tons. Based on the elasticity of Malaysian palm oil supply, both the short-term and the long-term are inelastic. This indicates that in both the short-term and long-term, changes in the area used by Malaysian palm oil have no significant influence on the supply of Malaysian palm oil.

International palm oil supply: Indonesian palm oil exports

There are three variables that affect Table 3 (the equation of Indonesia's palm oil exports). These are the Rupiah exchange rate variable against the US Dollar, the variable increase in global palm oil prices and the different variables for Indonesia's palm oil exports. Of the three variables included in the Indonesian palm oil equation, the significant variable is the Rupiah exchange rate (ERIDRR) variable. This is in line with several studies (Yudoyono, 2004; (Hidayat, Musadieq, & Darmawan, 2017; Hall et al., 2010; Ratnaningsih, 2018; Marbun, 2017; Marbun, 2017). The Rupiah exchange rate has a positive relationship with Indonesia's palm oil supply. The estimated results of the ERIDRR variable's parameters have an value of 0,0005. Based on the prediction parameter's value, this indicates that if the Rupiah exchange rate increases (the Rupiah depreciates) by Rp. 1,000.00, then Indonesia's palm oil exports will increase by 0.5 million tons.

Table 3

Estimated results and parameters and elasticity of Indonesian palm oil exports

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	0.1277	0.32	0.7509	-	-	Intercept
ERIDRR	0.0005	2.54	0.0165	0.3314	-1.0268	Rupiah exchange rate
APPOWR	-0.0011	-1.08	0.2896	-	-	PPOWR addition
LXIDPO	0.7363	6.14	< 0.0001	-	-	XIDPO Lag
R2 = 0.9671; F value = 303.79; Pr > F = < 0.0001; dh = -0.45						

Based on the elasticity value, Indonesia's palm oil exports increase in relation to the rupiah exchange rate. In the long run they are responsive. In the short-term, the elasticity is not responsive. In the long-term, the elasticity of Indonesia's palm oil supply when added to the Rupiah exchange rate is valued at -1.0268. Based on this elasticity value, this indicates that if there is an increase in the exchange rate of the Rupiah against the US Dollar (depreciated Rupiah) of 10 percent, then Indonesia's palm oil exports will decrease by 10.268 percent.

Malaysian palm oil exports

Based on Table 4, it is known that of the four exogenous variables included in the equation, only one variable has a significant influence. This is the increase in domestic demand for Malaysian palm oil.

Table 4

Estimated results and parameters and elasticity of Malaysian palm oil exports

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	0.5567	0.44	0.6642	-	-	Intercept
ERMYRR	0.1804	0.58	0.5666	-	-	Ringgit exchange rate
PPOWR	-0.0003	-0.64	0.5289	-	-	The global price of palm oil
ADMY	-0.4069	-2.98	0.0057	-0.0166	-1.0546	Domestic demand for Malaysian palm oil
LXMYPO	0.9635	24.87	< 0.0001	-	-	XMYPO Lag
R2 = 0.9789; F value = 347.28; Pr > F = < 0.0001; dh = -3.19						

The variable increase in domestic demand for Malaysian palm oil has a negative relationship with Malaysian palm oil exports. The estimated parameter value of the variable increase in demand for Malaysian palm oil is -0.4069. This indicates that if the increase in domestic

demand for Malaysian palm oil increases by 1 million tons, then Malaysian palm oil exports will decrease by 0.4069 million tons.

Based on the elasticity value of Malaysian palm oil exports, the variable increase in domestic demand for Malaysian palm oil in the short-term is unresponsive. In the long run, the value of Malaysian palm oil export elasticity responds to domestic demand for Malaysian palm oil. The long-term elasticity value of the variable increase in domestic demand for Malaysian palm oil (DMY) is -1.054646. This means that if there is a 10 percent increase in DMY, the export of Malaysian palm oil will decrease by 10.546 percent.

Domestic palm oil demand: Demand for Indonesian palm oil

Based on Table 5, of the four variables included in the equation, there are two variables that have a significant effect. These are the variable price of Indonesian palm oil and Indonesia's Gross Domestic Product (GDP) per capita.

Table 5

Estimated results and parameters and elasticity of demand for Indonesian Palm Oil

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	2.1908	1.95	0.0603	-	-	Intercept
PPOIDR	-0.0009	-2.13	0.0411	-0.3171	-15.0729	Indonesian palm oil prices
GDPID	0.0025	4.52	< 0.0001	0.8677	-13.8881	Indonesian GDP
APSOWR	0.0014	1.24	0.226	-	-	PSOWR addition
LDID	0.0678	0.34	0.739	-	-	DID Lag
R2 = 0.8450; F value = 40.87; Pr > F = < 0.0001; dh = -						

At a level of 5 percent, the variable price of Indonesian palm oil has a significant effect on demand for Indonesian palm oil. The price of Indonesian palm oil (PPOIDR) has a negative relationship with demand for Indonesian palm oil. This can be seen in the mark on the estimated PPOIDR parameter value of -0,0009. This indicates that if the price of Indonesian palm oil rises by 10 USD/ton, demand for Indonesian palm oil will decrease by 9,000 tons. When viewed based on its elasticity, it can be said that changes in the price of palm oil, in the short-term, is not responsive to demand for Indonesian palm oil. In the long run, changes in the price of Indonesian palm oil are responsive to demand for Indonesian palm oil. The long-term elasticity value of the PPOIDR variable in the Indonesian palm oil demand equation is -15.0729. This indicates that if the price of Indonesian palm oil increases by 5 percent, demand for Indonesian palm oil will decrease by 75.3645 percent.

The Variable Gross Domestic Product (GDP) per capita of Indonesia (GDPID) has a relationship that is directly proportional to demand for Indonesian palm oil. This is in line with the study of (Marbun, 2017) and (Shavana et al., 2014). The estimated parameter of the GDPID variable is 0.0025. This indicates that if the per capita income of the Indonesian people increases by 10 USD, demand for Indonesian palm oil will increase by 0.025 million tons. Based on the elasticity value, in the short-term, the GDPID elasticity value is unresponsive. In the long run, the GDPID variable is responsive to demand for Indonesian palm oil. It can also be said that changes in income per capita of Indonesian people have a significant effect on demand for Indonesian palm oil. The long-term elasticity value of the GDPID variable is -13,8881. This indicates that if the GDPID increases by 5 percent, it will cause demand for Indonesian palm oil to decrease by 69.4405 percent.

Malaysian palm oil demand

Based on Table 6, of the four variables included in the equation, there are two variables that have a significant effect. These are the Malaysian palm oil price variable and the Malaysian coconut oil price va.

Table 6

Estimated results and parameters and elasticity of Malaysian palm oil demand

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	0.0940	0.13	0.8945	-	-	Intercept
PPOMYR	-0.0024	-1.52	0.1387	-0.3724	-1.4220	Malaysian palm oil prices
PCOMYR	0.0017	1.87	0.0714	0.3689	-0.6807	The price of Malaysia's coconuts
GDPMY	0.0001	0.79	0.4348	-	-	Malaysia GDP
LDMY	0.9527	6.02	< 0.0001	-	-	DMY Lag
R2 = 0.9235; F value = 90.55; Pr > F = < 0.0001; dh = -2.77						

The variable price of Malaysian palm oil has a negative influence on demand for Malaysian palm oil (PPOMYR). Based on the elasticity, it can be said that in the short-term, changes in the price of Malaysian palm oil have no significant effect on demand for Malaysian palm oil. Long-term changes in the price of Malaysian palm oil have a significant effect on demand for Malaysian palm oil. The PPOMYR variable-length's elasticity value is -1.4220. This indicates that if there is a 10 percent increase in the price of Malaysian palm oil, demand for Malaysian palm oil will decrease by 14,220 percent.

The variable price of Malaysian coconut oil (PCOMYR) has a positive influence on demand for Malaysian palm oil. Coconut oil is a product of palm oil, meaning that these two products can replace one another. The estimated parameters of the PCOMYR variable have a value of 0.0017. This indicates that if the price of Malaysian palm oil increases by 10 percent, demand for Malaysian palm oil will increase by 0.017 million tons. In terms of elasticity, it can be said that changes in the price of Malaysian palm oil have no significant effect on demand for Malaysian palm oil in both the short and long-term.

International palm oil demand: Indian palm oil imports

In Table 7, of the four exogenous variables included in the equation, only one variable has a significant effect on India's palm oil imports. It is the Indian GDP per capita (GDPIN) variable.

Table 7

Estimated results and parameters and elasticity of Indian palm oil imports

Variable	**Parameter Estimate**	**t value**	**Pr > |t|**	**Elasticity**		**Variable Name**
				E_{SR}	**E_{LR}**	
Intercept	0.2324	0.43	0.6691	-	-	Intercept
LGERINRR	-0.0178	-1.21	0.2370	-	-	ERINRR Growth Lag
PPOWR	-0.0002	-0.52	0.6076	-	-	The global price of palm oil
GDPIN	0.0025	3.06	0.0046	0.6165	-1.2010	India GDP
LMINPO	0.5502	3.58	0.0012	-	-	MINPO Lag
R2 = 0.9308; F value = 100.86; Pr > F = < 0.0001; dh = 0.67						

India's GDP per capita (GDPIN) has a positive effect on India's palm oil imports. The estimated parameter value of the GDPIN variable is 0.0025. This indicates that if India's GDP per capita increased by US $10, then Indian palm oil imports would increase by 0.025 million tons. From the elasticity value of the GDPIN variable, it can be said that in the short-term, the GDPIN variable is unresponsive. In the long run, the GDPIN variable is responsive to Indian palm oil imports. It can be said that changes in Indian GDP per capita have a significant effect on Indian palm oil imports. The long-term elasticity value of the GDPIN variable is -1.2010. This means that if India's GDP per capita increases by 10 percent, the import of Indian palm oil will decrease by 12,010 percent.

China's palm oil imports

Exogenous variables included in the Chinese palm oil import equation are the addition of the Chinese Renminbi exchange rate to the US Dollar, a 2-year lag in global palm oil prices and different Chinese palm oil imports. The exogenous variables included in the equation already

have the sign that is as expected. If viewed based on statistical criteria, the equation of China's palm oil imports can also be said to be quite good. The results of the estimated parameters and elasticity of Chinese palm oil imports are presented in Table 8.

Table 8

Estimated results and parameters and elasticity of Chinese palm oil imports

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	0.7085	2.23	0.0329	-	-	Intercept
AERCHYR	-0.0298	-0.21	0.8356	-	-	ERCHYR Addition
L2PPOWR	-0.0003	-1.71	0.0966	-0.1408	-1.2180	Lag2 global palm oil prices
LMCHPO	0.9283	20.41	< 0.0001	-	-	MCHPO Lag
R2 = 0.9588; F value = 240.59; Pr > F = < 0.0001; dh = -0.14						

Of the three exogenous variables included in the Chinese palm oil import equation, there is only one variable that has a significant effect. This is the 2-year lag variable regarding the global price of palm oil (L2PPOWR). Based on the elasticity, it can be said that in the short-term, the change in the 2-year lag variable regarding the global price of palm oil does not significantly influence China's palm oil imports. In the long-term, a 2-year lag change in global palm oil price significantly influences the import of Chinese palm oil. The long-term elasticity value of the L2PPOWR variable is -1.2189. This indicates that if L2PPOWR increases by 10 percent, it will cause China's palm oil imports to increase by 12,180 percent.

Pakistan's palm oil imports

Based on Table 9, of the four variables included in the equation, there are two variables that have a significant influence. These are the global palm oil price variable and Pakistan's per capita GDP.

Table 9

Estimated results and parameters and elasticity of Pakistan palm oil imports

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	0.0359	0.31	0.7588	-	-	Intercept
ERPARR	-0.0010	-0.6	0.5540	-	-	Rupee exchange rate
PPOWR	-0.0001	-2.23	0.0335	-0.1186	-1.7867	The global price of palm oil
GDPPA	0.0009	2.75	0.0100	0.5827	-1.0854	Pakistan GDP
LMPAPO	0.5995	4.7	< 0.0001	-	-	MPAPO Lag

R2 = 0.9802; F Value = 371.18; Pr > F = < 0.0001; dh = -0.43

Global palm oil prices have a negative effect on Pakistan's palm oil imports. This is consistent with the economic theory that when prices increase, demand for an item will decrease. The estimated parameter value of the global palm oil price variable is -0,0001, meaning that if the global price of palm oil rises by US $10 per ton, Pakistan's palm oil imports will decrease by 0.001 million tons. Based on the elasticity value, it can be said that changes in global palm oil prices, in the short-term, do not significantly influence Pakistan's palm oil imports. Conversely, in the long-run, changes in global palm oil prices have a significant effect on Pakistan's palm oil imports. The long-term elasticity value of the global palm oil price variable is -1.7867. This indicates that if the global price of palm oil rises by 10 percent, then imports of global palm oil will decrease by 17.867 percent.

Based on the GDP per capita variable, the people of Pakistan have a positive influence on Pakistan's palm oil imports. The short-term elasticity value of Pakistan's per capita GDP variable in the Pakistan palm oil import equation is unresponsive. Conversely, in the long run, the elasticity of the GDP per capita variable in Pakistan is responsive. It can be said that changes in Pakistan's GDP per capita, in the long run, have a significant effect on Pakistan's palm oil imports. The long-term elasticity of the GDP per capita variable in Pakistan shows that if its GDP per capita increases by 10 percent, it will cause Pakistan's palm oil imports to decrease by 10.854 percent.

The price of palm oil: Indonesian palm oil prices

Table 10's exogenous variables, included in the equation, note that there is only one variable that has a significant effect. It is the global price of palm oil.

Table 10

Estimated results and parameters and elasticity of Indonesian palm oil prices

Variable	**Parameter Estimate**	**t value**	**Pr > |t|**	**Elasticity**		**Variable Name**
				E_{SR}	**E_{LR}**	
Intercept	-57.2872	-0.24	0.8096	-	-	Intercept
ASID	-49.7498	-0.66	0.5129	-	-	SID addition
ADID	32.3421	0.97	0.3379	-	-	DID addition
PPOWR	0.4291	2.27	0.0306	0.2607	-1.0443	The global price of palm oil
LPPOIDR	0.7663	8.01	< 0.0001	-	-	PPOIDR Lag
R2 = 0.8812; F value = 55.65; Pr > F = < 0.0001; dh = 2.12						

The global price of palm oil has a positive effect on the price of Indonesian palm oil. This is in line with the studies of (Wayan & Setiawan, 2001) and (Muslih, Zakaria, & Kasymir,

2013). The estimated parameter value of the global palm oil price variable is 0.4291. This means that if the global price of palm oil rises by the US $10 per ton, it will cause the price of Indonesian palm oil to increase by 4.291 US dollars per ton. In the short-term, changes in global palm oil prices do not significantly influence the price of Indonesian palm oil. Conversely, in the long run, changes in global palm oil prices significantly influence the price of Indonesian palm oil. This is reflected in the long-term elasticity value of the global palm oil price variable. It is valued at -1.0443. This indicates that if the global price of palm oil rises by 10 percent, then the price of Indonesian palm oil will decrease by 10.443 percent.

Malaysian palm oil prices

Based on Table 11, it is known that there are three exogenous variables that have a significant effect on the price of Malaysian palm oil. These are the variable increase in the supply of Malaysian palm oil, domestic demand for Malaysian palm oil two years earlier and global palm oil price.

Table 11

Estimated results and parameters and elasticity of Malaysian palm oil prices

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	-124.4210	-2.06	0.0480	-	-	Intercept
ASMY	-28.4630	-2.13	0.0415	-0.0311	-34.0644	SMY addition
L2DMY	51.6898	7.27	< 0.0001	0.2789	-33.7544	DMY Lag2
PPOWR	0.6267	12.88	< 0.0001	0.8791	-33.4066	The global price of palm oil
LPPOMYR	0.0294	0.42	0.6806	-	-	PPOMYR Lag
R2 = 0.9127; F value = 78.41; Pr > F = < 0.0001; dh = 2.41						

The variable increase in the supply of Malaysian palm oil has a negative effect on the price of Malaysian palm oil. This condition is in accordance with the economic theory that states the greater the supply of an item, the greater the decrease in its price due to oversupply. The estimated parameter value of the variable increase in the supply of Malaysian palm oil is -28.4620. The increase in the supply of Malaysian palm oil is one million tons, so the price of Malaysian palm oil will decrease by 28.4630 US Dollars per ton. Based on Table 6.12, it is also known that the change in the addition to Malaysia's palm oil supply has no significant effect on the price of Malaysian palm oil. In the long-term, changes in the addition to Malaysia's palm oil supply have a significant effect on the price of Malaysian palm oil.

Variable lag of two years in domestic demand for Malaysian palm oil (L2DMY) has a positive effect on the price of Malaysian palm oil. These results are in accordance with the economic theory that states demand is directly proportional to price. If demand is higher, the

price will be higher. If examined based on its elasticity value, it can be said that in the short-term, the elasticity value of the L2DMY variable is unresponsive to the price of Malaysian palm oil. Conversely, in the long run, L2DMY changes have a significant effect on Malaysian palm oil prices. A 5 percent increase in L2DMY will cause the price of Malaysian palm oil to decrease by 168.772 percent.

The global price of palm oil has a similar relationship to L2DMY regarding the price of Malaysian palm oil. In the short-term, changes in global palm oil price does not significantly influence the price of Malaysian palm oil. Meanwhile, the long-term elasticity of the global palm oil price variable is -33.4066 which can be interpreted that if the global price of palm oil rises by 5 percent it will cause the price of Malaysian palm oil to decrease by 167.033 percent.

Global palm oil prices

The results of the estimated parameters and the elasticity of global palm oil prices are presented in Table 12. Exogenous variables included in the global price equation for palm oil are the addition of global soybean oil prices, sunflower oil prices, total global palm oil exports, total global palm oil imports and the variable global price of palm oil.

Table 12

Estimated results and parameters and elasticity of global palm oil prices

Variable	Parameter Estimate	t value	Pr > |t|	Elasticity		Variable Name
				E_{SR}	E_{LR}	
Intercept	127.4093	0.9	0.3772	-	-	Intercept
APSOWR	0.6497	3.88	0.0006	-0.0340	-1.8783	PSOWR addition
PSFWR	0.3066	1.65	0.1091	0.3761	-1.4682	The price of sunflower seed
TXWPO	-33.5182	-1.21	0.2366	-	-	Total palm oil exports
TMWPO	32.1758	1.17	0.2519	-	-	Total palm oil imports
LPPOWR	0.5422	3.27	0.0028	-	-	PPOWR Lag
R2 = 0.9393; F value = 89.75; Pr > F = < 0.0001; dh = 6.00						

Of the five exogenous variables included in the model, there are two variables that have a significant effect on the global price of palm oil. These are the increase in the global price of soybean oil and the global price of sunflower oil. Soybean oil and sunflower seed oil are products that substitute palm oil. These three products compete for first place in the global vegetable oil market. The parameter estimation results show that changes in soybean oil prices and changes in the price of sunflower oil have no significant effect on global palm oil

prices in the short-term. In the long run, the two variables have a negative and significant impact on global palm oil prices. A 10 percent increase in soybean oil prices will reduce global palm oil prices by 18.783 percent. On the other hand, a 10 percent increase in the global price of sunflower seed oil will cause the global price of palm oil to decrease by 14.682 percent.

Conclusion

Based on the results of the previous analysis and discussion, it can be concluded that the dominant factors affecting the supply and demand of Indonesian palm oil in the international market are:

1) Indonesia's domestic palm oil supply block, which is affected by the total area used by Indonesian palm oil and the price of urea fertiliser . Both of these are responses to long-term elasticity. Malaysia is affected by the area used by Malaysian palm oil and does not respond in both the short and long-term.
2) Indonesia's palm oil export bloc is affected by the Rupiah exchange rate against the USD and the response to long-term elasticity. Malaysian palm oil exports are influenced by domestic demand for Malaysian palm oil and the response to long-term elasticity.
3) Indonesia's domestic demand for palm oil is influenced by the price of Indonesian palm oil and Indonesia's GDP per capita. Both are responses to long-term elasticity. Demand for Malaysian domestic palm oil is influenced by the price of Malaysian palm oil. The response to long-term elasticity and the price of Malaysian palm oil, however, does not respond to both short-term and long-term elasticity.
4) International palm oil demand. India's palm oil import bloc is influenced by India's GDP and response to long-term elasticity. China's palm oil imports lag global palm oil prices and respond to long-term elasticity. Pakistan's palm oil imports are affected by global palm oil prices and Pakistan's GDP, both of which are responses to long-term elasticity.
5) Indonesia's palm oil price block is influenced by global palm oil prices and the response to long-term elasticity. The price of Malaysian palm oil is influenced by the supply of Malaysian palm oil in response to long-term elasticity, lag in demand for Malaysian domestic palm oil and global palm oil prices. Furthermore, global palm oil prices are influenced by global soybean oil prices and global sunflower oil prices. Both of these respond to long-term elasticity.

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REFERENCES

Adang, A., & Sri, H. (2012). Pendugaan Elastisitas Penawaran Output Dan Permintaan Input Usahatani Jagung. *Jurnal Ekonomi Pembangunan*, *13*(2), 247–259.

Adelman, I. (1984). Beyond export-led growth. *World Development*, *12*(9), 937–949. Retrieved from https://econpapers.repec.org/RePEc:eee:wdevel:v:12:y:1984:i:9:p:937-949

Agustian, A., & Friyatno, S. (2014a). Analisis Permintaan Dan Penawaran Komoditas Kedelai di Indonesia. *In Prosiding Seminar Nasional Teknologi Pertanian*, 455–473.

Agustian, A., & Friyatno, S. (2014b). Analisis Permintaan Dan Penawaran Komoditas Kedelai di Indonesia. In *In Prosiding Seminar Nasional Teknologi Pertanian* (pp. 455–473).

Anggit, R. (2012). Analisis Daya Saing Crude Palm Oil (CPO) Indonesia di Pasar Internasional. *Jurnal Fakultas Pertanian, Universitas UPN "Veteran,"* *9*(1), 125–133.

Asrol, A., & Heriyanto, H. (2018). Daya Saing Ekspor Pala Indonesia di Pasar Internasional. *Dinamika Pertanian*, *22*(2), 61–70. Retrieved from http://journal.uir.ac.id/index.php/dinamikapertanian/article/view/2193

Bank Indonesia. (2018). Laporan Perekonomian Indonesia Tahun 2017. *Bank Indonesia*. Jakarta.

Damanik, S. (2001). 2001_Analisis Penawaran Dan Permintaan Lada Indonesia Di Pasar Internasional.pdf. *Jurnal Penelitian Tanaman Industri*, *7*(4), 113–119.

Elinur, Asrol, & Heriyanto. (2017). Household Economic Behavior of Rice Farmers Rambah Samo in District of Rokan Hulu Riau Province. In *Proceeding International Conference on Science Engineering and Technology (ICoSET) and International Conference on Social Economic Education and Humaniora (ICoSEEH)* (pp. 197–2011). Pekanbaru: Universitas Islam Riau.

Gujarati, D. (2003). *Basic Econometrics, Fourth Edition*. New York: McGraw-Hill Companies,.

Gujarati, D. (2008). *Basic Econometrics*. New York: McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas.

Gujarati, D. (2011). *Econometric By Example*. New York: McGraw-Hill/Irwin, a Business Unit of The McGraw-Hill Companies.Avenue of the Americas.

Hall, Stephen, Hondroyiannis, G., Swamy, P. A. V. B., Tavlas, G., & Ulan, M. (2010). Exchange-rate volatility and export performance: Do emerging market economies resemble industrial countries or other developing countries? *Economic Modelling*, *27*(6), 1514–152. https://doi.org/https://doi.org/10.1016/j.econmod.2010.01.014

Heriyanto, H. (2017). Efficiency Of Rubber People Production In Kampar Regency Of Riau Province. In *Proceeding International Conference on Science Engineering and Technology (ICoSET) and International Conference on Social Economic Education and Humaniora (ICoSEEH)* (pp. 28–35). Pekanbaru: Universitas Islam Riau. Retrieved from http://proceeding.uir.ac.id/conference/index.php?kate=ICoSEET

Heriyanto, H., Karya, D., & Asrol, A. (2018). Indonesian Coconut Competitiveness in International Markets. In *Asia Proceedings of Social Sciences* (Vol. 1, pp. 1–4).

Heriyanto, H., Karya, D., Choanji, T., Asrol, A., Bakce, D., & Elinur, E. (2019). Regression Model in Transitional Geological Environment For Calculation Farming and Production of Oil Palm Dominant Factor in Indragiri Hilir Riau Province. *Journal of Geoscience, Engineering, Environment, and Technology*, *4*(1), 56. https://doi.org/10.25299/jgeet.2019.4.1.2600

Hermawan, I., & Adam, L. (2010). Analisis Faktor-Faktor yang Mempengaruhi Penawaran Dan Permintaan Serat Kapas di Indonesia. *Jurnal Ekonimi & Kebijakan Politiki & Kebijakan Politik*, *1*(1), 101–128. https://doi.org/10.22212/JEKP.V1I1.77

Hidayat, N. F., Musadieq, M. Al, & Darmawan, A. (2017). Pengaruh Foreign Direct Investment , Nilai Tukar Dan Pertumbuhan Ekonomi Terhadap Ekspor (Studi pada Nilai Ekspor Non Migas Indonesia Periode Tahun 2005-2015). *Jurnal Administrasi Bisnis*, *43*(1), 172–179.

Hutabarat, D. E. M., & Jusmer, S. (2014). Analisis Faktor-Faktor Yang Memengaruhi Permintaan Kopi Indonesia di Pasar Domestik. *Jurnal Ekonomi Dan Bisnis Nommensen Volume*, *V*(22), 40–48.

Intriligator, M. D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice Hall, Englewod Cliffs.

John, H. (2017). *An Econometric Model of the US Economy Structural Analysis in 56 Equations*. New York: Palgrave Macmillan. University at Albany-SUNY Albany.

Kausarian, H., Sri Sumantyo, J. T., Kuze, H., Aminuddin, J., & Waqar, M. M. (2017). Analysis of polarimetric decomposition, backscattering coefficient, and sample properties for identification and layer thickness estimation of silica sand distribution

using L-band synthetic aperture radar. *Canadian Journal of Remote Sensing*, *43*(2), 95-108.

Kausarian, H., Sumantyo, J. T. S., Kuze, H., Karya, D., & Panggabean, G. F. (2016). Silica Sand Identification using ALOS PALSAR Full Polarimetry on The Northern Coastline of Rupat Island, Indonesia. *International Journal on Advanced Science, Engineering and Information Technology*, *6*(5), 568-573.

Kausarian, H., Lei, S., Goh, T. L., & Cui, Y. (2019). A new geological map for formation distribution on southern part of south China sea: West Kalimantan, Indonesia. *International Journal of GEOMATE*, *17*(63), 249-254.

Koutsoyiannis, A. (1977a). *Theory of Econometrics: An Introductory Exposition of Econometric Methods. Second Edition*. London New York: The MacMillan Press Ltd.

Koutsoyiannis, A. (1977b). *Theory of Econometrics: An Introductory Exposition of Econometric Methods* (Second Edi). London New York: The MacMillan Press Ltd.

Kusnadi, N., & Rambe, K. R. (2018). Permintaan dan Penawaran Minyak Goreng Sawit Indonesia. *In Forum Agribisnis*, *8*(1), 61–80.

Lipsey, R. G. (2013). *Microeconomics, 14th Canadian Edition*. Canada: Pearson Education.

Mankiw, N. G. (2015). *Macroeconomics*. New York: Worth Publishers.

Marbun, S. (2017). Analisis Faktor-FaktorYang Mempengaruhi Ekspor Non Migas Indonesia Tahun 1970-2004. *Jurnal Ekonomi*, *6*(1), 31–42. Retrieved from http://ejournal.lmiimedan.net/index.php/je/article/view/18/18

Muslih, A. ., Zakaria, W. ., & Kasymir, E. (2013). Faktor-Faktor Yang Mempengaruhi Ekspor CPO Provinsi Lampung. *JIIA*, *1*(2), 92–97.

Nashriq, M. (2013). Faktor- Faktor Yang Mempengaruhi Penawaran dan Permintaan Industri Kecil Pakaian Jadi di Kota Semarang. *Media Ekonomi Dan Manajemen*, *27*(1), 1–11. Retrieved from https://nashnote.wordpress.com/2012/02/05/faktor-yang-mempengaruhi-penawaran/

Nyak, I. S. H., & Karyasa, K. (2016). Pendugaan Parameter dan Elastisitas Penawaran dan Permintaan Beberapa Jenis Daging di Indonesia. *Jurnal Agro Ekonomi*, *20*(2), 1–23. Retrieved from http://repository.pertanian.go.id/handle/123456789/290

Pindyck, R. S., & Rubinfeld, D. L. (1998). *Econometric Model and Econometric Forecasts. Fourth Edition*. New York: McGraw-Hill International Editions.

Pindyck, R. S., & Rubinfeld, D. L. (2014). *Microeconomics Eighth Edition*. London New York: Pearson Education Limited.

Poonyth, D, R. Hassan, J. F. K., & Calcaterra, M. (2001). Is Agricultural Sector Growth A Precondition for Economic Growth? The Case of South Africa. *Agrecon*, *40*(2), 269–279.

Rahma Sari Siregar. (2016). Faktor-Faktor Yang Mempengaruhi Permintaan Dan Penawaran Keranjang Anyaman Bambu (Studi Kasus: Pengrajin Keranjang Anyaman Bambu, Kelurahan Jati Utomo, Kecamatan Binjai Utara, Kota Binjai). *Jurnal Agrica*, *9*(1), 62–73.

Ramdani, I. (2012). Analisis Permintaan dan Penawaran. *Selasa, 06 November*, *4*(1), 15. Retrieved from https://irpantips4u.blogspot.co.id/2012/11/analisi

Ratnaningsih, H. (2018). Faktor-Faktor yang Mempengaruhi Permintaan Ekspor Crude Palm Oil (CPO) Indonesia ke Negeri Belanda. *Jurnal Widyaiswara Nasional 1(1):*, *1*(1), 1–13.

Romeo, M, B. (2000). Agriculture-Based Development: A SAM Perspective on Central Vietnam Institute. *TMD Discussion Paper*, (51).

Romeo, M, B. (2001). Agriculture-Based Development: A SAM Perspective on Central Vietnam. *The Developing Economies*, *39*(1), 112–132.

Rumankova, L., & Smutka, L. (2013). Global Sugar Market – the Analysis of Factors Influencing Supply and Demand, *LXI*(2), 463–471.

Septi, R. A., Darwanto, D. H., & Mulyo, J. H. (2015). Analisis Permintaan Kedelai di Indonesia. *Sepa*, *12*(1), 42–47.

Shavana, B. D., Darus, H. M. B., & Lubis, S. N. (2014). Faktor-Faktor Yang Mempengaruhi Permintaan dan Penawaran Minyak Goreng Curah di Kota Medan. *Shavana*, *3*(2). Retrieved from https://jurnal.usu.ac.id/index.php/ceress/article/view/8122/3503

Statistics Trade 1980-2014. (2018). *Food Agriculture Organization*. Retrieved from www.faostat.fao.org

Sukirno, S. (2011). *Pengantar Teori Ekonomi Makro* (Edisi Keti). Jakarta: PT. Rajawali Pers.

Thomas, R. . (1997). *Modern Econometrics an Introduction*. Addison Wesley: Harlow.

Verbeek, M. (2004). *Modern Econometrics* (2nd editio). John Wiley & Sons Ltd.

Vioryza, Balgies, P., Syafrial, & Suhartini. (2015). The Simulation of Corn Import Tarif Policy Toward The Productivity of Corn Economy In Indonesia. *Jurnal Habitat*, *26*(2), 100–107.

Wahyudy, H. A., Khairizal, K., & Heriyanto, H. (2019). Perkembangan Ekspor Karet Alam Indonesia. *DINAMIKA PERTANIAN*, *34*(2), 1–8. https://doi.org/10.25299/dp.2018.vol34(2).2642

Warr, P. G. (2006). Productivity Growth in Thailand and Indonesia: How Agriculture Contributes to Economic Growth. In *Working Papers in Economics and Development Studies*. Bandung.

Wayan, R. S., & Setiawan, I. D. (2001). Dampak Pajak Ekspor Cpo Terhadap Beberapa Aspek Industri Cpo Indonesia Simulasi Model Ekonometrik. *Warta Pusat Penelitian Kelapa Sawit*, *5*(2), 87–99.

Yudoyono, S. B. (2004). *Pembangunan Pertanian dan Pedesaan Sebagai Upaya Mengatasi Kemiskinan dan Pengangguran: Analisis Ekonomi- Politik Dasar Fiskal.* Bogor: Tesis PhD, Sekolah Pascasarjana Institut Pertanian Bogor.