

Demand for Indonesian cocoa beans in a dilemma: Case study Malaysian market

Awan Setya Dewanta

Department of Economics, Universitas Islam Indonesia, Yogyakarta, Indonesia

Corresponding author: adewanta@uui.ac.id

Article Info

Article history:

Received : 25 March 2019

Accepted : 15 May 2019

Published : 23 May 2019

Keywords:

Import Demand, Demand price elasticity, export tax policy

JEL Classification:

F10, Q10, Q17

DOI:[10.20885/ejem.vol11.iss1.art6](https://doi.org/10.20885/ejem.vol11.iss1.art6)

Abstract

Indonesian cocoa industry has been transforming into a processed cocoa exporter by imposing export taxes. The policy has managed to increase exports of processed cocoa and decreased cocoa bean exports. However, overall export value of cocoa commodities (cacao bean and processed cocoa) has a declining trend, where an increase in the export value of processed cocoa has not been able to offset the decline in the export value of cocoa beans. This study evaluates the impact of the cocoa bean export-tax policy on demand for Indonesian cocoa in the Malaysian market using elasticity and ARDL model. **Findings/Originality:** This study finds that the demand for Indonesian cocoa is short-term in nature, and the volume of Malaysian demand for Indonesian cocoa is rapidly decreasing because cocoa beans is a complement for other cocoa suppliers. These conditions indicate that the quality of Indonesian cocoa does not meet the standard. That is also indicated by the increase in imports of cocoa beans to meet the processing needs of cocoa in Indonesia.

Introduction

Indonesia produces around 15% of the world's cocoa beans and ranks third in terms of international production behind Ghana and Côte d'Ivoire. Indonesian cocoa production reached 350,000 tons between October 2015 and September 2016, with 1.7 million ha of land dedicated to plants, and export of cocoa beans at 24,083 tons (2017). The export volume of cocoa beans is the lowest volume since the government implemented a cocoa bean export tax through the Minister of Finance Regulation No. 67/PMK.011/2010.

West Africa, Southeast Asia, and South America are the primary producers of commercial cocoa. Vietnam and China are developing new cocoa production. China has planted cocoa trees in the southern region of China's Hainan province, with the quality of cocoa beans similar to Indonesian cocoa beans (Gu et al., 2013). In the processing, cocoa mills usually mix unfermented seeds, and some are fermented with fermented seeds to get the desired flavor characteristics and to reduce astringency and excessive bitterness. The characteristics of cocoa are determined by various factors, including genotype factors, soil conditions, climate and harvest, and processes, such as fermentation, drying, and roasting (Gu et al., 2013).

In 2017, Indonesian cocoa bean exports went to the Asian market (92.46%) North America (4.95%) and Europe (2.54%), with an export value of \$ 112 Million. In the Asian market, Indonesia exports cocoa beans to Malaysia 57.26% and Singapore (31.88%), and Malaysia gets supplies of cocoa beans from Ghana (19.21%), Cote d'Ivoire (17.71%), Papua New Guinea (12.13%), Indonesia (10.64%), Ecuador (10.13%), Cameroon (9.64%). Malaysia, as the primary importer of Indonesian cocoa bean, produces processed cocoa, such as cocoa liquor, powder and cocoa butter production.

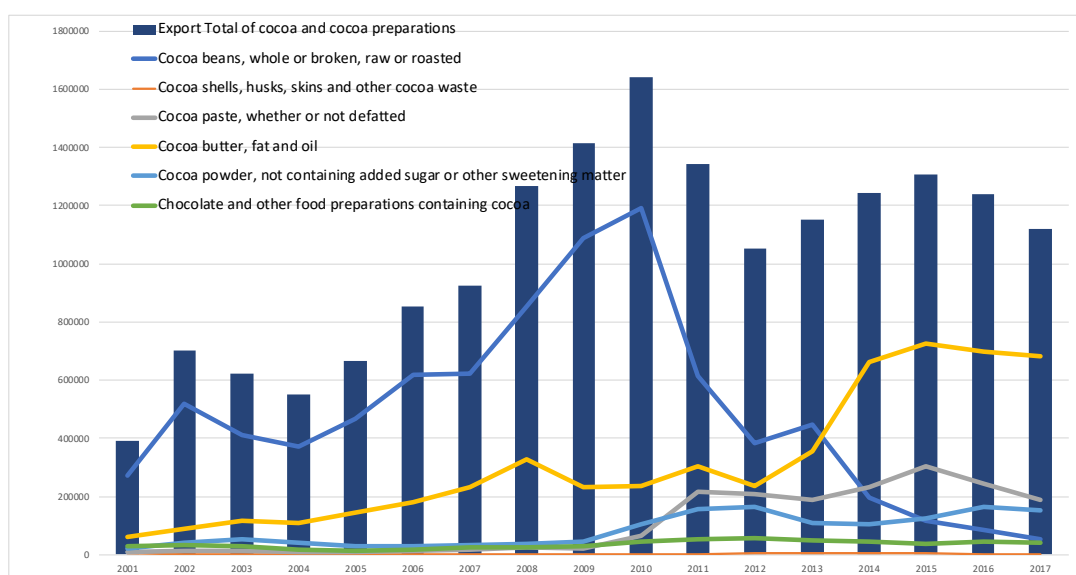
The imposition of export tax on raw cocoa beans aims to increase the value of cocoa exports and to ensure that the local industry does not lack raw materials at competitive prices. However, the policy of imposing the Indonesian cocoa bean export tax will have an impact on prices. In the theory of demand, an increase in prices will result in consumers reducing the demand for goods and substituting goods that have lower prices. The demand theory also applies to the cocoa market in Malaysia. With the imposition of the Indonesian cocoa bean export tax, does the import demand for Indonesian cocoa beans persists or has been replaced by another supplier of cocoa beans in the Malaysian market? This research will answer this problem.

Ghana also imposes cocoa taxes. The effect of the Ghana tax on cocoa gives the impact of a 1 percent increase in cocoa export tax leads to a 1.3 percent increase in cocoa exports (Eric, Eduardo, & Gertrude, 2018). How does the export tax affect the export of Indonesian cocoa beans? Several studies on the impact of the export tax on cocoa have been carried out. Rifin and Naully (2013) said that the adoption of Indonesian cocoa export tariffs had caused a shift in the composition of cocoa export products from cocoa beans to processed cocoa, but there was a decline in market share and also imply declining competitiveness. Akbar (2015) proves that the imposition of export taxes has affected the demand for Indonesian cocoa beans. Permani (2013), which uses data from 1970-2011, said that the imposition of export taxes was above the optimal level. These conditions raised concerns about the possibility of Indonesia becoming an importer of cocoa in the future.

Meanwhile, in 2012, the Indonesian Cocoa Industry Association estimated that the local processing industry had absorbed 80 percent of the production of cocoa beans, and there was an increase in production by 35 percent. Pardomuan and Taylor (2012) stated that the National Cocoa Movement (Gerakan Kakao Nasional) had not shown successful results. Many cocoa farmers have responded to export taxes by turning production into corn, rubber and palm oil Permani (2013). Market constraints and technical assistance to farmers can provide better opportunities for farmers compared to blunt trade policies, which are likely to prevent producers from exporting cocoa products (Permani, 2011).

In the Indonesian cocoa bean export data, the composition of the trade value of cocoa exported to the world has changed (Figure 1). After 2010, the export value of Indonesian cocoa beans to the World market experienced a dramatic decline, and exports of cocoa butter and other processed cocoa have not been able to replace the decline in the value of exports of cocoa beans. The decrease in cocoa bean exports has direct implications for domestic producers, namely cocoa farmers. Rifin (2015) has a different opinion. Exporter bears the burden of Indonesia's cocoa export tax by lowering the marketing margin because cocoa farmers have a higher bargaining position. The farmers have the independence to sell cocoa beans to institutions that offer better prices (Rifin, 2015). Meanwhile, Yudyanto and Hastiadi (2017) stated that the imposition of export taxes on Indonesian processed cocoa significantly affected the increase in the export volume of Indonesian processed cocoa in the long term. Meanwhile, for Malaysia, the imposition of export taxes on Indonesian cocoa beans does not significantly affect the decline in the volume of processed cocoa exports to Malaysia in the long run (Yudyanto & Hastiadi, 2017).

Trade theory states that countries specialize in the production and export of products that have factors abundance or competitive advantages. Therefore, tropical countries that have the benefit of weather and availability of land suitable for cocoa cultivation, the state will produce and export cocoa bean and cocoa processed. Côte d'Ivoire has taken advantage of being the world's largest producer and exporter of cocoa beans and is the primary source of foreign exchange for Côte d'Ivoire. Cocoa production, domestic cocoa consumption, and rainfall influence the performance of Côte d'Ivoire cocoa exports (Amoro & Shen, 2013), while Verter (2016) argues that cocoa bean production, world prices, trade openness, and effective real exchange rate influenced the performance of Côte d'Ivoire cocoa exports.



Source: International Trade Center, 2019

Figure 1. Value of Indonesian Cocoa Exports to the World Market in the US Dollar Thousand, 2001-2017

The driving factor for the performance of other producing countries' cocoa exports is not too different. The performance of domestic cocoa production affects the export of Nigerian cocoa (Ebi & Ape, 2014; Nwachukwu, 2014; Nwachukwu, Agwu, Nwaru, & Imonikhe. G, 2010). Olakojo and Folawewo (2013) state that the relative price between last year's cocoa price and negative inelastic oil prices affect the performance of Nigerian cocoa exports. Verter and Becvarova (2014) argue that trade liberalization, global cocoa bean prices, and exchange rates affect the performance of cocoa exports in Nigeria. Meanwhile, Nwachukwu (2014) shows that export costs and rainfall influence the supply of Nigerian cocoa exports in the long run while the output factor and production costs affect in the short term.

The effects of cocoa trade and production also determine Ghana and Indonesia cocoa exports (Verter & Becvarova, 2014b), while domestic cocoa consumption negatively affects Côte d'Ivoire, Nigeria and Ghana cocoa exports (Amoro & Shen, 2013; Verter & Becvarova, 2014a, 2014b). Olaiya (2016) reveals that Nigerian cocoa production is determined by controlling economic and ecological variables, such as exchange rate management, utilization of weather control mechanisms for annual rainfall, pest control, and liberalization policies.

In 2017, Ghana was the main supplier of cocoa beans in the Malaysian cocoa market. Apart from exporting cocoa beans, Ghana is very competitive in the export of cocoa beans, processed cocoa and aggregate cocoa exports (Boansi, 2013). The driving factor for the export of Ghana cocoa bean is last year's cocoa production (Boansi, 2013; Darkwah & Verter, 2014). Depreciation of the value of domestic currencies, real producer prices and real world prices on the price ratio of real cocoa producers affect the performance of Ghana's cocoa exports (Boansi, 2013). In addition to the domestic prices of the country of Ghana, Côte d'Ivoire cocoa prices effect to Ghana's cocoa bean exports. When there was an increase in the real price of Côte d'Ivoire cocoa producers, Ghana's cocoa exports declined. Likewise, when world cocoa prices experienced an increase, Ghana's cocoa exports also declined (Darkwah & Verter, 2014). In the long run, Darkwah and Verter (2014) found that Ghanaian export cocoa received a long-term positive boost from annual yields, cocoa harvested area, and real gross domestic product per capita. Improvement of infrastructure, exporters' credit schemes and government policies encourage an increase in Cameroon's cocoa exports (Gbetnkom & Khan, 2002).

For Malaysia, in the upstream sector (cocoa bean production) Malaysia has a competitive loss position (Jeffery, 2014), due to pest and disease problems, unstable prices, low productivity, but still profitable compared to oil palm agriculture and other non-cocoa (Arshad & Abdulla, 2015). In the semi-finished cocoa processing sector, Malaysia is one of the cocoa grinders or the semi-finished cocoa processing industry is very competitive because of its ability to expand and maintain market share in the international market (Idris, Hameed, Niti, & Arshad, 2011; Jeffery, 2014). Exports of semi-finished cocoa products such as cocoa butter, cocoa powder, and cocoa paste have been replacing the export of Malaysian cocoa beans, even though Malaysia faces increasingly high import prices of cocoa beans (Idris et al., 2011). For domestic demand, Malaysia's industrial production index and prices of domestic cocoa beans are the main determinants of domestic demand for Malaysian cocoa beans (Hameed et al., 2009).

In the comparison of competitiveness, Nigeria has a comparative advantage in cocoa exports (Nwachukwu et al., 2010), while Indonesian Cocoa has relatively less competitiveness compared to major global cocoa producers, such as Côte d'Ivoire, Ghana, and Nigeria (Rifin, 2013). Verter and Becvarova (2014b, 2014a) argue that Cote d'Ivoire, Indonesia, and Nigeria have a comparative advantage in the production and export of cocoa beans mainly due to tropical climate conditions that provide the benefits of cocoa cultivation. Jambor, Toth, and Koroshegyi (2017) stated that the Côte d'Ivoire, Ghana, and Indonesia obtained the highest comparative advantage in 1992-2015. Malaysia (1991 - 2005) has a comparative advantage in cocoa butter, and cocoa powder derived from competitive effects and market sizes effect (Idris et al., 2011; Jeffery, 2014).

In the micro study, cocoa farmers still faced many obstacles. Onoja (Onoja, Deedam, & Achike, 2012) and Nmadu (Nmadu, Sallawu, & Omojeso, 2015), which use cocoa farmer level data in Ondo State, Nigeria, show that cocoa farmers pay high input prices, lack of access to funds, lack of supporting inputs, the scarcity of complementary inputs, the problem of diseases. Pests as the most severe obstacles faced by cocoa farmers. Government agency gives training to farmers through increasing the involvement of agricultural extension agents to teach them the most efficient production methods to ensure sustainable cocoa production in Nigeria. Adoption of technology is low because 72.5% of farmers have primary education, the average size of cocoa farms of 6.32 hectares, and 65.0% of cocoa plantation operators are men (Dormon, Van Huis, Leeuwis, Obeng-Ofori, & Sakyi-Dawson, 2004). Also, producers also bear tax costs and additional inefficiencies compared to the cocoa bean processing industry and export companies. The cocoa farmers also bear poor price transmission between export markets and production levels. Producers face disincentives even though international cocoa prices increase. These conditions have an impact on the quality of products and prices (Cadoni, 2013). On the other hand, the production rate of cocoa bean on farmer Ghana relies on cocoa income and paid labor, while the number of times of mass spraying and farm size variables is statistically insignificant (Sarkodie, Yusif, & Boachie, 2017). Possible government policies for increase producer prices of cocoa are through adequate institutional support (Lawrence, 2011), market constraints and technical assistance to farmers (Permani, 2011), adoption of cocoa certification (Aidoo & Fromm, 2015), and the role of ICT in agriculture (Nabhani, Daryanto, Yassin, & Rifin, 2015).

For this reason, this study will examine whether the imposition of Indonesian cocoa bean export tax affects the demand for imports of Indonesian cocoa beans and other suppliers of cocoa beans in the Malaysian market? This research is essential because the export tax on cocoa can cost of Indonesia cocoa beans and benefits suppliers of competing for cocoa beans in the Malaysian market, and provide opportunities for new suppliers of cocoa beans. In addition to China, Vietnam will become a newcomer to become a cocoa exporter and immediately prepare to enter the international cocoa market. The Vietnamese government has increased technical assistance to cocoa farmers to increase productivity and improve post-harvest processing. Furthermore, Cargill (a major global processor) invests in technology transfer centers in Vietnam (CBI, 2016).

Methods

The principal objective of the study is to investigate the effect of export taxes on the demand for imports of Indonesian cocoa beans in the Malaysian market, and competition between suppliers of cocoa beans in meeting the demand for cocoa beans in the Malaysian market. Malaysian cocoa suppliers are 32 countries in 2017, with the country's seven largest suppliers of Ghana, Côte d'Ivoire, Ecuador, Indonesia, Cameroon, Nigeria, and Papua New Guinea (ITC, 2019). However, countries that supply cocoa that have a long record data in the Malaysian cocoa market are Ghana, Côte d'Ivoire, Indonesia, and Papua New Guinea. This study will examine the demand for cocoa beans in four countries. The research takes data from the International Trade Center (ITC), UN Comtrade and World Bank, which began from 1989 to 2017.

The study uses the concept of demand elasticity, using the double log model. Econometrics provides a double log model to measure or estimate the price elasticity of demand. The double log model notation is

$$\text{Log } Y(t) = \alpha + \beta \text{Log } X(t) \quad (1)$$

In the double-log model, since $\Delta \ln Y / \Delta \ln X$ is an approximation of $\partial \ln Y / \partial \ln X$ and a change in the log of a number is a relative or proportional change: $\Delta \ln Y = \Delta Y / Y$, $\Delta \ln X = \Delta X / X$.

$$\beta = \frac{\delta \log Y}{\delta \log X} = \frac{\Delta \log Y}{\Delta \log X} = \frac{\frac{\Delta Y}{Y}}{\frac{\Delta X}{X}} \quad (2)$$

Thus, if Y represents the quantity of cocoa demanded and X represents its unit price of cocoa, β measures the price elasticity of demand. Actually, in general, elasticity is equal to the slope times the ratio of X/Y :

$$E_d = \frac{\% \text{ change in quantity demanded of product cocoa}}{\% \text{ change in the price of product cocoa}} = \frac{\Delta Y / Y}{\Delta X / X} = \beta \quad (3)$$

In addition to price elasticity, there are two computations of elasticity, namely cross elasticity and income elasticity. Cross-elasticity of demand is a measurement of responsive level in quantity requested from one unit when there is a change in the price of another good. The relationship can be a substitute or complementary. When cross elasticity is negative, then the relationship between the two units is complementary, whereas when the value of cross elasticity is positive, the relationship between the two units is a substitution. Meanwhile, income elasticity is a percentage change in demand for goods against the percentage change in income.

The research uses two double log models. Model 1 is to estimate the impact of the export tax on cocoa beans on demand for Indonesian cocoa beans in the Malaysian Market. The cocoa bean export tax came into effect on April 1, 2010. Therefore, this study uses two dummy variables, which have a value of 0 and 1, for proxy variables the implementation of export taxes. Variables DUMM is the dummy variable for constant, and variable DUMM_IDNPRC is the dummy variables for the beans cocoa price of Indonesia. The model 1 formulation is:

$$\log(\text{IDN_VOL}) = \rho_0 + \rho_1 \log(\text{IDN_PRC}) + \rho_3 \log(\text{WLD_PRC}) + \rho_4 \log(\text{GDP_CAP_\$}) + \rho_5(\text{DUMM}) + \rho_5(\text{DUMM_IDNPRC}) \quad (4)$$

Model 2 is a comparison of demand from four suppliers for Malaysian cocoa markets. The comparison of the own price elasticity, cross elasticity, and income elasticity from the supplier of cocoa is:

Indonesian cocoa import demand:

$$\log(IDN_VOL) = \alpha_0 + \alpha_1 \log(IDN_PRC) + \alpha_2 \log(CIV_PRC) + \alpha_3 \log(GHA_PRC) + \alpha_4 \log(PNG_PRC) + \alpha_5(WLD_PRC) + \alpha_6(GDP_CAP_\$) \quad (5)$$

Côte d'Ivoire import demand for cocoa:

$$\log(CIV_VOL) = \beta_0 + \beta_1 \log(IDN_PRC) + \beta_2 \log(CIV_PRC) + \beta_3 \log(GHA_PRC) + \beta_4 \log(PNG_PRC) + \beta_5(WLD_PRC) + \beta_6(GDP_CAP_\$) \quad (6)$$

Ghana cocoa import demand:

$$\log(GHA_VOL) = \gamma_0 + \gamma_1 \log(IDN_PRC) + \gamma_2 \log(CIV_PRC) + \gamma_3 \log(GHA_PRC) + \gamma_4 \log(PNG_PRC) + \gamma_5(WLD_PRC) + \gamma_6(GDP_CAP_\$) \quad (7)$$

Papua New Guinea cocoa import demand:

$$\log(PNG_VOL) = \delta_0 + \delta_1 \log(IDN_PRC) + \delta_2 \log(CIV_PRC) + \delta_3 \log(GHA_PRC) + \delta_4 \log(PNG_PRC) + \delta_5(WLD_PRC) + \delta_6(GDP_CAP_\$) \quad (8)$$

The data, used in this study, are explained as follows:

Explanatory Variables	Description	Source of Data
$\log(IDN_VOL)$	Log of the volume of Malaysian cacao bean imports from Indonesia (Tons)	ITC and UN Comtrade Base data
$\log(CIV_VOL)$	Log of the volume of Malaysian cacao bean imports from Côte d'Ivoire (Tons)	ITC and UN Comtrade Base data
$\log(GHA_VOL)$	Log of the volume of Malaysian cacao bean imports from Ghana (Tons)	ITC and UN Comtrade Base data
$\log(PNG_VOL)$	Log of the volume of Malaysian cacao bean imports from Papua New Guinea (Tons)	ITC and UN Comtrade Base data
$\log(IDN_PRC)$	Log of the price of Malaysian cacao bean imports from Indonesia (Dollar/Ton)	ITC and UN Comtrade Base data
$\log(CIV_PRC)$	Log of the price of Malaysian cacao bean imports from Côte d'Ivoire (Dollar/Ton)	ITC and UN Comtrade Base data
$\log(GHA_PRC)$	Log of the price of Malaysian cacao bean imports from Ghana (Dollar/Ton)	ITC and UN Comtrade Base data
$\log(PNG_PRC)$	Log of the volume of Malaysian cacao bean imports from Papua New Guinea (Dollar/Ton)	ITC and UN Comtrade Base data
$\log(WLD_PRC)$	Log of the price of Malaysian cacao bean imports from World (Dollar/Ton)	ITC and UN Comtrade Base data
$\log(GDP_CAP_\$)$	Log of per capita GDP of Malaysian (constant 2010 US\$)	World Bank Data

Results and Discussion

Time series regression requires stationary tests so that the estimation results of time series regression are not spurious regression. The stationarity test results, which use the Augmented Dickey-Fuller test, show that all variables are not stationary at the level. The test continues to the first difference and produces all stationary variables except the variable of the volume of Indonesian cocoa imports to Malaysia. Based on stationary tests, the regression model uses the ARDL (Autoregressive Distributed Lag) approach. The use of the ARDL regression model approach needs to do a Bount test for testing long-term relationships (Pesaran, Shin, & Smith, 2001). The Bount test, heteroscedasticity test, and autocorrelation test results accompany the ARDL regression estimation table.

Table 1. Unit Root Test

Variables	ADF Test for Level	Decision	ADF Test for First Difference	Decision
LOG(IDN_VOL)	-1.449	Not Stationary	-0.821	Not Stationary
LOG(IDN_PRC)	-1.810	Not Stationary	-4.133 ***	Stationary
LOG(CIV_VOL)	-1.392	Not Stationary	-5.744 ***	Stationary
LOG(CIV_PRC)	-1.947	Not Stationary	-6.623 ***	Stationary
LOG(GHA_VOL)	-2.028	Not Stationary	-5.097 ***	Stationary
LOG(GHA_PRC)	-1.798	Not Stationary	-7.364 ***	Stationary
LOG(PNG_VOL)	-1.498	Not Stationary	-4.261 ***	Stationary
LOG(PNG_PRC)	-1.380	Not Stationary	-5.148 ***	Stationary
LOG(WLD_PRC)	-1.446	Not Stationary	-8.951 ***	Stationary
LOG(GDP_CAP_\$)	-1.645	Not Stationary	-3.904 ***	Stationary

Note: *** indicate significant at 1% level.

The ARDL regression model 1 has passed the classical assumption (autocorrelation and heteroscedasticity) and Bound Test. Table 2 and 3 are the result of the ARDL regression for model 1.

Based on the results of model 1 estimation, the imposition of export taxes resulted in a change in demand for imports of Indonesian cocoa beans in the Malaysian market. The dummy variable coefficient shows significantly. That is means that there has been a change in the demand for imports of Indonesian cocoa beans in terms of both constants and slopes of model 1 regression estimates. Overall, import demand also shows a downward trend of 0.087% during the study period. The short term in model 1, the elastic cocoa price is elasticity. The increases in cocoa prices will reduce 2.41% of Indonesia's cocoa bean import volume in lag 2 (two years ago) in the Malaysian cocoa market. Indonesian cocoa bean producers still benefit when there is an increase in world cocoa prices, as a proxy for the price of substitute goods for Indonesian cocoa. The rise in world cocoa prices will increase the volume of Indonesian cocoa imports by 2.60% in lag 2. On the other hand, Indonesian cocoa producers need to observe that elastic income shows a decline from 9.00% to 4.42% in lag 1. This condition is necessary to get attention because there is a tendency to reduce in demand for imported Indonesian cocoa beans.

In the long run, the demand for imported cocoa beans shows a downward trend. The role of the factor of Indonesian cocoa prices, world cocoa prices, and Malaysian per capita income does not affect the demand for Indonesian cocoa imports in the Malaysian market in the long run. This condition shows that Indonesia needs a concrete action from policymaking in the plantation and cocoa trade because the Malaysian market no longer demanded Indonesian cocoa beans in the long run. On the other hand, increasing in the processing industry, which is not accompanied by an increase in productivity and quality of smallholder plantations (Pardomuan & Taylor, 2012; Permani, 2011, 2013), will become the dependence of the cocoa processing industry on imported cocoa beans. Based on the results of the long-term estimation of model 1, Indonesian cocoa producers still have the opportunity to improve cocoa productivity and quality immediately. The chance to develop is still available, by looking at the long-term constant value from 0.86 to 4.11, which is the sum of 3.25 and 0.86. This increase in constants means that there is a minimal increase in the volume of imported cocoa. However, this opportunity will immediately decline, because there is a change in the slope of 0.001% and an acceleration of a decline of 0.048%.

Table 2. ARDL Estimator of Short Run Import Demand Indonesia Cocoa Bean at The Malaysian Market

Variables	Coefficient	t-Statistic
DLOG(IDN_VOL(-1))	0.531*	2.140
DLOG(IDN_VOL(-2))	-0.468**	-2.732
DLOG(IDN_PRC)	-0.948	-1.296
DLOG(IDN_PRC(-1))	-0.028	-0.036
DLOG(IDN_PRC(-2))	-2.411***	-3.663
DLOG(WLD_PRC)	1.849	1.847
DLOG(WLD_PRC(-1))	0.262	0.301
DLOG(WLD_PRC(-2))	2.599**	3.139
DLOG(GDP_CAP_\$\$)	9.009***	5.154
DLOG(GDP_CAP_\$\$(-1))	4.418*	1.907
D(DUMM)	5.947***	3.518
D(DUMM_IDNPRC)	-0.002***	-3.965
D(@TREND)	-0.087***	-4.746
CointEq(-1)	-1.829***	-5.079
		p-value
Observations	29	
R-squared	0.961	
F-statistic	10.013***	0.002
Durbin-Watson stat	2.413	
F-statistic of Breusch-Godfrey Serial Correlation LM Test:	0.377	0.562
F-statistic of Breusch-Pagan-Godfrey Heteroskedasticity Test:	3.327	0.056
F-statistic of ARDL Bounds Test:	11.489***	

Note: *, **, *** significant at 10%, 5%, and 1%

Table 3. ARDL Estimator of Indonesia Long Run Import Demand Cocoa Bean at the Malaysian Market

Variables	Coefficient	t-Statistic
D(LOG(IDN_PRC))	0.374	0.307
D(LOG(WLD_PRC))	0.442	0.316
D(LOG(GDP_CAP_\$\$))	0.145	0.064
DUMM	3.252**	2.489
DUMM_IDNPRC	-0.001**	-2.707
C	0.863***	5.339
@TREND	-0.048***	-5.024

Note: ** and *** significant at 5%, and 1%

In model 2 is the comparison of the demand for imports of the major cocoa beans in the Malaysian market. After conducting the standard classical assumption test and bound test, table 4 and 5 are the ARDL regression estimation results for the four primary Malaysian cocoa import demand, namely Ghana, Cote d'Ivoire, Indonesia, and Papua New Guinea.

Table 4. Comparison of Short Run Import Demand Indonesia Cocoa Bean at the Malaysian Market

Regressors	Dependent Variables: Volume of Import from					
	Indonesia	Ghana	Côte d'Ivoire	Papua New Guinea		
DLOG(IDN_VOL(-1))	-0.964 *** (-4.190)					
DLOG(IDN_VOL(-2))	-1.135 *** (-5.369)					
DLOG(GHA_VOL(-1))		0.892 ** (3.186)				
DLOG(GHA_VOL(-2))		0.790 ** (3.262)				
DLOG(PNG_VOL(-1))				0.332 *** (2.967)		
DLOG(IDN_PRC)	3.392 ** (2.513)	-12.844 *** (-5.157)	-4.279 * (-1.967)	0.569 (0.366)		
DLOG(IDN_PRC(-1))		15.018 *** (5.239)		1.931 *** (4.515)		
DLOG(CIV_PRC)	-4.104 *** (-3.321)	0.111 (0.061)	-3.714 ** (-2.172)	1.874 (1.374)		
DLOG(GHA_PRC)	1.869 (1.479)	-2.552 (-1.010)	4.547 ** (2.644)	-7.993 *** (-4.271)		
DLOG(GHA_PRC(-1))		-2.131 (-1.429)		1.117 (1.177)		
DLOG(PNG_PRC)	3.785 *** (3.232)	-0.352 (-0.124)	-4.605 *** (-3.282)	5.888 *** (4.521)		
DLOG(PNG_PRC(-1))		6.485 *** (3.990)		-4.359 *** (-4.857)		
DLOG(WLD_PRC)	-6.009 *** (-3.379)	14.128 ** (3.607)	6.963 ** (2.614)	-1.302 (-0.696)		
DLOG(WLD_PRC(-1))		-18.611 *** (-4.868)				
DLOG(GDP_CAP_\$\$)	5.842 * (2.026)	4.676 (0.969)	11.360 *** (2.771)	-4.513 (-1.377)		
D(@TREND)		-0.077 *** (-3.743)				
CointEq(-1)	-0.030 (-0.125)	-2.238 *** (-6.696)	-0.954 *** (-4.896)	-1.553 *** (-9.156)		
		p-value	p-value	p-value	p-value	
Observation	29		29		29	
R-squared	0.761		0.945		0.712	
F-statistic	3.773	0.013	4.487	0.052	3.965	0.007
Durbin-Watson stat	1.857		2.270		1.460	
F-Statistic of Breusch-Godfrey Serial Correlation LM Test:	0.059	0.943	0.171	0.850	1.319	0.299
F-Statistic of Breusch-Pagan- Godfrey Heteroskedasticity Test:	1.826	0.150	0.953	0.582	0.848	0.594
F-Statistic of ARDL Bounds Test	1.320		11.109	***	6.263	***
		Not Co-integrated	Co-Integrated	Co-Integrated	Co-Integrated	

Note: The value in parentheses is t-statistics; *, **, *** significant at 10%, 5%, and 1%

In general, the sign of the coefficients of demand for short-term Malaysian cocoa imports matched with the theory of demand, which is negative on own price, positive on income per capita, and negative on other commodities prices. However, some signs of coefficients are not by the

general theory of commodity demand because the demand for imported Malaysian cocoa is not all intended for the domestic consumption of Malaysian, but to meet the international market. Malaysia has a trade balance surplus in the trade of cocoa bean and processed cocoa since 2009, with an increase in the export contribution of cocoa powder, cocoa paste, chocolate and chocolate-containing foods (ITC, 2019). In comparison, trade in cocoa beans and Indonesian processed cocoa also experienced a trade surplus, but since 2010 there has been a decline in trade surpluses until the year of the study. On the good side, Indonesia's export composition for cocoa butter, cocoa paste and cocoa powder shows encouraging growth (ITC, 2019).

In the short run, Indonesian cocoa bean importers have correlative to Malaysia's per capita income. It means Malaysia indicate import Indonesian cocoa beans to cocoa processed for domestic consumption. However, the import of Indonesian cocoa bean showed a downward trend of 0.96% on lag one (last year) and 1.13% on lag two (two years ago). Compared to the prices of cocoa beans in other countries, the importers of Indonesian cocoa beans have negative cross elasticity towards the cocoa bean of Côte d'Ivoire and the World. It indicates that world cocoa bean and Côte d'Ivoire are complementary to Indonesian cocoa beans. Meanwhile, the Papua New Guinea cacao bean is a substitute for importing Indonesian cocoa beans. The elasticity of its prices are positive, which means that the increase in the price of Indonesian cocoa increases the volume of imports, but the Malaysian market imports cocoa beans in declining import volumes.

The importer of Ghana cocoa is not related to Malaysian per capita income and also shows a downward trend. In estimation, the decrease in trend indicated that a reduction of the price volume elasticity of imports from 0.85% in lag 1 to 1.072% in lag 2. In lag 2 (two years ago), a 1% increase in prices will reduce import volume by 0.72 %, while last year (lag 1), there was a decline in the number of imports that were higher. Malaysian importers, who buy Ghana cocoa bean, combine with Indonesian cocoa bean (as a complementing material) and cocoa bean Papua New Guinea (as a substitute material). The Malaysian importer, who buys Côte d'Ivoire cocoa, also makes Indonesian cocoa and Papua New Guinea as complementary ingredients while Ghana and world cocoa are substitutes. Likewise, the Papua New Guinea cocoa importer makes Indonesian and world cacao as a substitute and Ghana cocoa as complementary material. Indonesian cocoa beans, Papua New Guinea and also Malaysia, which are cultivated in Asia, replace each other, while Ghana Cocoa Beans, Côte d'Ivoire, is grown in Africa, and as well South American cocoa is complimentary for Malaysian processed cocoa.

In the long run, the demand for imports of Indonesian cocoa beans in the Malaysian cocoa market does not have co-integrated. The demand for the imported cocoa bean in Indonesia in the Malaysian market is short-term. This condition supports the opinion of (Permani, 2013) who said that the imposition of export tax on cocoa beans, which exceeds the optimal point, would threaten the sustainability of domestic cocoa production. In other words, cocoa buyers in the Malaysian market will also respond to the purchase of Indonesian cocoa beans in the short term. This condition is a warning for cocoa business stakeholders seriously to fix and upgrade smallholders as the beginning of improving the cocoa business in Indonesia as a whole. The semi-finished cocoa processing industry in Malaysia prefers to use Ghana cocoa beans and Papua New Guinea.

The processed cocoa industry, which imports Ghana beans, will carry out a mixture of Ghana, and Indonesian cocoa beans. Negative of cross elasticity shows the import of cocoa beans from Indonesia into complementary materials to enrich the processed cocoa flavor. The increase in prices of Indonesian cocoa beans will result in a reduction in imports of cocoa beans and find to substitute with other countries' cocoa on the international market. For users of the cocoa bean from Papua New Guinea, the Malaysian cocoa processing industry will reduce Indonesian and Ghana cocoa imports (which are indicated by negative cross elasticity) and increase Papua New Guinea's cocoa imports.

Table 5. Comparison of Indonesia Long Run Import Demand Cocoa Bean at Malaysia Market

Regressors	Dependent Variables			
	Volume of Import from Indonesia	Volume of Import from Côte d'Ivoire	Volume of Import from Ghana	Volume of Import from Papua New Guinea
D(LOG(IDN_PRC))	112.906 (0.124)	-4.486 (-1.873)	-11.712*** (-5.807)	-2.292* (-1.901)
D(LOG(CIV_PRC))	-190.692 (-0.124)	1.452 (0.529)	0.049 (0.061)	1.207 (1.482)
D(LOG(GHA_PRC))	120.940 (0.123)	-1.662 (-0.604)	-3.644* (-2.105)	-9.368*** (-6.646)
D(LOG(PNG_PRC))	125.972 (0.124)	-4.828* (-2.318)	-3.019 (-1.280)	12.273*** (7.343)
D(LOG(WLD_PRC))	-200.006 (-0.124)	7.300* (2.320)	17.781*** (4.418)	-0.838 (-0.696)
D(LOG(GDP_CAP_\$))	194.435 (0.124)	4.534 (0.713)	-3.530 (-0.894)	-2.905 (-1.394)
C	-7.649 (-0.122)	0.202 (0.814)	0.927*** (6.238)	0.102 (1.309)
@TREND			-0.034*** (-4.160)	

Note: The value in parentheses is t-statistics; *, **, *** significant at 10%, 5%, and 1%

Meanwhile, users of cocoa bean Côte d'Ivoire will import from Papua New Guinea cocoa beans into additional ingredients and made the substitution of imported cocoa beans on the market international. Thus, the demand for the Malaysian cocoa market indicates the main component of processed cocoa not use Indonesian cocoa imports. Malaysian importers import cocoa bean Indonesia for complementary materials of cocoa processing in Malaysia.

Conclusion

The Indonesian cocoa farming industry is at a cross road. Do the government and institutions involved continue to encourage the export of cocoa beans but not increase added value in the long term? Alternatively, do the government and institutions involved promote the development of cocoa processing with an increase in dependence on imported cocoa? Difficult choice. The demand for Malaysian cocoa beans that is still available is the demand for short-term cocoa beans. This condition forced the cocoa business players to immediately push the progress of the domestic cocoa bean processing industry while increasing the quality and productivity of domestic cocoa production. The most challenging thing is big work and not easy because it requires significant capital and non-capital investments.

The own price factor, substitution cacao price, Malaysia's per capita income does not significantly affect the demand for long-term Indonesian cocoa beans. The demand for Indonesian cocoa beans still to occur, when Malaysian importers import Ghana cocoa beans. Indonesian cocoa beans are a complementary material for processing Ghana cacao. Likewise, Indonesian cocoa beans are a substitute for processing Papuan cocoa.

Decision makers in the cocoa sector immediately undertook a review or reduction of export taxes to become the optimum, as Parmani (2013) argued, and took steps to improve and rehabilitate people's cocoa plantations to increase the productivity and quality of cocoa beans. For a while waiting for the process of recovery of the cocoa plantation finished, the domestic cocoa processing industry allows to import cocoa beans at minimum economic of scale. It requires various incentives to prevent the transfer of cocoa land and reduce the rate of growth of cocoa imports. The

International Trade Center data (ITC, 2019) has shown that the average growth of imported cocoa bean imports has increased sharply from 16.26% (2001-2009) to 57.88% (2010-2017).

References

- Aidoo, R., & Fromm, I. (2015). Willingness to adopt certifications and sustainable production methods among small-scale cocoa farmers in the Ashanti Region of Ghana. *Journal of Sustainable Development*, 8(1), 33–43.
- Akbar, F. (2015). Trade policy analysis of Indonesia cocoa industry. <https://doi.org/10.13140/RG.2.1.2619.4645>
- Amoro, G., & Shen, Y. (2013). The determinants of agricultural export: Cocoa and rubber in cote d'ivoire. *International Journal of Economics and Finance*, 5(1), 228–233.
- Arshad, F. M., & Abdulla, I. (2015). Malaysia's cocoa beans decline: A prognosis. *International Journal of Agriculture, Forestry, and Plantation*, 1(1), 1–14.
- Boansi, D. (2013). Competitiveness and determinants of cocoa exports from Ghana. *International Journal of Agricultural Policy and Research*, 1(9), 236–254.
- Cadoni, P. (2013). *Analysis of incentives and disincentives for cocoa in Nigeria*. Rome.
- CBI. (2016). *Trade statistics: Cocoa in Europe*.
- Darkwah, S. A., & Verter, N. (2014). An empirical analysis of cocoa bean production in Ghana. *European Scientific Journal*, 10(16), 295–306.
- Dormon, E., Van Huis, A., Leeuwis, C., Obeng-Ofori, D., & Sakyi-Dawson, O. (2004). Causes of low productivity of cocoa in Ghana: Farmers' perspectives and insights from research and the socio-political establishment. *NJAS - Wageningen Journal of Life Sciences*, 52(3–4), 237–259. [https://doi.org/10.1016/s1573-5214\(04\)80016-2](https://doi.org/10.1016/s1573-5214(04)80016-2).
- Ebi, B. O., & Ape, A. S. (2014). Supply response of selected agricultural export commodities in Nigeria. *Journal of Economics and Sustainable Development*, 5(5), 47–57.
- Eric, A., Eduardo, S., & Gertrude, N. (2018). Cocoa export tax, producer price of cocoa and exports of Ghana's Cocoa, 1990-2011. *African Journal of Development and Agricultural Economics*, 2(3), 103–109.
- Gbetnkom, D., & Khan, S. A. (2002). *Determinants of agricultural exports: The case of Cameroon* (AERC Research Paper). Nairobi.
- Gu, F., Tan, L., Wu, H., Fang, Y., Xu, F., Chu, Z., & Wang, Q. (2013). Comparison of cocoa beans from China, Indonesia, and Papua New Guinea. *Foods (Basel, Switzerland)*, 2(2), 183–197. <https://doi.org/10.3390/foods2020183>
- Hameed, A. A. A., Hasanov, A., Idris, N., Abdullah, A. M., Arshad, F. M., & Shamsudin M. N. (2009). *Supply and demand model for the Malaysian cocoa market* (MPRA Paper).
- Idris, N., Hameed, A. A. H., Niti, M. A., & Arshad, F. M. (2011). Export performance and trade competitiveness of the Malaysian cocoa products. *African Journal of Business Management*, 5(31), 12291–12308.
- ITC. (2019). *International trade statistics 2001-2019*.
- Jambor, A., Toth, A. T., & Koroshegyi, D. (2017). The export competitiveness of global cocoa traders. *AGRIS On-Line Papers in Economics and Informatics*, 9(3), 27–37.

- Jeffery, F. S. (2014). *Competitiveness analysis of the Malaysian cocoa industry*. Universiti Putra Malaysia.
- Lawrence, B. O. (2011). Determinants of managerial abilities of small scale cocoa farmers: Akinyele lga of oyo state of Nigeria. *ARPIN (Asian Research Publishing Network) – Journal of Agricultural and Biological Science*, 6(10), 17–25.
- Nabhani, I., Daryanto, A., Yassin, M., & Rifin, A. (2015). Can Indonesia cocoa farmers get benefit on global value chain inclusion? A Literature Review. *Asian Social Science*, 11(18), 288–294.
- Nmadu, J. N., Sallawu, H., & Omojeso, B. V. (2015). Socio-economic factor affecting adoption of innovations by cocoa farmers in Ondo State, Nigeria. *European Journal Of Business, Economics And Accountancy*, 3(2), 58–66.
- Nwachukwu. (2014). Dynamics of agricultural exports in Sub-Sahara Africa: An empirical study of rubber and cocoa from Nigeria. *International Journal of Food and Agricultural Economics*, 2(3), 91–104.
- Nwachukwu, I. N., Agwu, N., Nwaru, J., & Imonikhe. G. (2010). Competitiveness and determinants of cocoa export from Nigeria. *Report and Opinion*, 2(7), 51–54.
- Olaiya, T. A. (2016). Examining the political-economy of cocoa exports in Nigeria. *International Journal of Applied Economics and Finance*, 10(1–3), 1–13. <https://doi.org/10.3923/ijaef.2016.1.13>
- Olakojo, S. A., & Folawewo, A. O. (2013). An error correction analysis of determinants of agricultural export: The case of Nigeria. *IJE*, 7(2), 161–180.
- Onoja, A. O., Deedam, N. J., & Achike, A. I. (2012). Profitability and yield determinants in Nigerian cocoa farms: Evidence from Ondo State. *Journal of Sustainable Development in Africa*, 14(4), 172–182.
- Pardomuan, L., & Taylor, M. (2012). Indonesia's "frankentrees" turn cocoa dream into a nightmare. *Reuters*. Retrieved from <https://www.reuters.com/article/us-cocoa-indonesia/indonesias-frankentrees-turn-cocoa-dream-into-nightmare-idUSBRE89E1DA20121015?feedType=RSS&feedName=environmentNews>
- Permani, R. (2011). The impacts of trade liberalisation and technological change on GDP growth in Indonesia: A Meta-Regression Analysis. *Global Economy Journal*, 11(4), 1–28.
- Permani, R. (2013). Optimal export tax rates of cocoa beans: A vector error correction model approach. *Australian Journal of Agricultural and Resource Economics*, 57(4), 10.1111/1467--8489.12011.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326. <https://doi.org/10.1002/jae.616>
- Rifin, A. (2013). Competitiveness of Indonesia's cocoa beans export in the world market. *International Journal of Trade, Economics, and Finance*, 4(5), 279–281.
- Rifin, A. (2015). The impact of export tax policy on cocoa farmers and supply chain. *International Trade Journal*, 29(1), 39–62.
- Rifin, A., & Naully, D. (2013). The effect of export tax on Indonesia's cocoa export competitiveness. In *The 57th AARES Annual Conference*. Sydney, New South Wales: AARES.
- Sarkodie, E. E., Yusif, H. M., & Boachie, W. K. (2017). Determinants of cocoa production in the

- Ashanti region. *Direct Research Journal of Agriculture and Food Science*, 5(1), 21–25.
- Verter, N. (2016). Cocoa export performance in the world's largest producer. *Bulgarian Journal of Agricultural Science*, 22(5), 713–721.
- Verter, N., & Becvarova, V. (2014a). Analysis of some drivers of cocoa export in Nigeria in the era of trade liberalization. *Agris On-Line Papers in Economics and Informatics*, 6(4), 208–218.
- Verter, N., & Becvarova, V. (2014b). Drivers of cocoa export in Ghana in the era of free trade. *World Applied Sciences Journal*, 32(8), 1710–1716.
- Yudyanto, H., & Hastiadi, F. F. (2017). Analysis of the imposition of export tax on Indonesian cocoa beans: Impact on the processed cocoa export indonesia and Malaysia. *International Journal of Economics and Financial Issues*, 7(5), 552–560.