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Selected Factors Influencing China's Palm Oil Import Demand from Malaysia

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ABSTRACT

The export of palm oil from Malaysia to China has declined since 2013, although the Malaysian Ringgit has depreciated. The Malaysian palm oil market has also struggled against the Indonesian palm oil and soy oil in China. Hence, this study aimed to identify the significant factors influencing China's demand for Malaysian palm oil by adopting the Auto-Regressive Distributed Lag (ARDL) analysis. The finding revealed that the currency rate of exchange, the foreign trade price of Malaysian palm oil to China, and the international soy oil price significantly influence Malaysian palm oil demand in China. Nevertheless, China's real GDP per capita showed a positive and significant influence only in the long run. The demand for Malaysian palm oil in China was not significantly impacted by the palm oil price offered by Indonesia, neither in the long run nor short run. Thus, the authorities related to this industry need to strategize the stock management system to control the price and currency stabilization to maintain its competitive power.

Keywords: ARDL; China's demand; Currency rate of exchange; Palm oil; International soy oil price

INTRODUCTION

China has a vast economic market and plays a major role in affecting the surrounding countries' economies. China has enjoyed explosive economic growth for the last 30 years since the 1979 free-market reformed policy in the country. After the market reform, China's Gross Domestic Product (GDP) grew, on average, by 10 percent per annum from 1979 to 2014 (Morrison, 2009). This economic expansion in the country has improved their households' disposable income and purchasing power. In 2001 China strengthened its international trade relation after joining the World Trade Organisation (WTO) and the ASEAN-China Free Trade Area (ACFTA) in 2005. Through these participations, China's import of palm oil grew from 2.1 million tons in 2001 to 3.2 million tons in 2005 as palm oil is highly demanded by various industries in the country due to its affordable price (Nambiappan et al., 2018).

China's economic development plan, such as China's road and belt initiative, has opened a trade opportunity for Asian countries, including Malaysia, which was known as one

of the important global palm oil exporters. China was the largest export destination for Malaysian palm oil in the last twelve years (2002–2013), which holds about 20 percent of the total exported Malaysian palm oil (Malaysian Palm Oil Board [MPOB], 2014). However, since 2009, China's demand for Malaysian palm oil has been unstable and significantly dropped by about 24.3 percent, 17.86 percent, and 21.74 percent in 2014, 2015, and 2016 (MPOB, 2018).

China is no longer considered Malaysia's largest palm oil export destination even though its economy is growing. Thus, this scenario had against the demand theory, which states that when the importing country's GDP grows, the local purchasing power increases and leads the palm oil demand to increase in the market (Awad, Arshad, Shamsudin, & Yusof, 2007), and macroeconomic stability will trigger a greater import demand as opposed to the downturn period (Arnade & Liefert, 2022). Hence, the GDP per capita is a vital representation of income with a positive relationship with the palm oil demand. The findings by Wong & Ahmad (2017); Wong, Shamsudin, Mohamed, & Sharifuddin (2014); and Zakaria & Salleh, Kamalrudin Mohamed Balu (2017) strongly supported this theory.

The exchange rate between the Malaysian Ringgit (MYR) to Chinese Yuan (CNY) was recorded as depreciated in 2012 however, it did not encourage China to demand more volume of Malaysian palm oil (MPOB, 2018) even though they can enjoy a larger volume of imported goods at a lower cost due to exporter country's depreciation. This is against the finding by Girsang, Sukiyono, & Asriani (2018) and Hameed & Arshad (2012), through their ECM model, which discovered that the increase in Indonesian CPO export volume is significantly driven by the Rupiah's devaluation against the U.S. Dollar and indirectly expands its market share. The currency appreciation will reduce the cost of purchasing intermediate goods, increasing output supply and reducing the export demand (Dincer & Kandil, 2011).

In addition, the Malaysian palm oil industry faces two main challenges in China. First is competing with Indonesian palm oil due to the major expansion of palm oil plantation areas of the country that allows them to become a dominant palm oil market player replacing Malaysia (Awalludin, Sulaiman, Hashim, & Nadhari, 2015). The second is the China edible oil demand behavior pattern which was switched to soy oil. Since 2014, Malaysia has faced intense competition with Indonesia when Malaysia started to lose its palm oil market share in China's market to Indonesia due to the lower price of Indonesian palm oil (MPOB, 2015). Indonesia has a cost advantage in its palm oil production since they have cheap labor costs and larger oil palm plantations than Malaysia (Ramadhani & Santoso, 2019). Rifin (2010) also mentioned that a significant market share gained by the Indonesian palm oil in Asia, Africa, and Europe, is due to its price which is cheaper than Malaysian palm oil. A country will import more Malaysian palm oil if Malaysia's price is lower than Indonesia's, and vice versa (Suherman, Suharno, & Harianto, 2016). This is due to the agri-food sector is more sensitive toward price than other sectors like manufacturing (Grübler, Ghodsi, & Stehrer, 2022). Thus, it seems to be important to study the influence of palm oil trade price from Indonesia on China's palm oil demand from Malaysia, hence, this study included this factor in the regression model to complement the past studies where this factor is found absent.

The demand for Malaysian palm oil in China has also been affected by the soybean crushing industry's expansion to fulfill the higher demand for soy-based animal feed. The byproducts from the process indirectly produce soy oil, which can be utilized as an edible oil for daily consumption and substitute palm oil (Gale, 2015). From 2014 to 2017, China increased its soybean import by about 20 percent and consequently caused a 10.3 percent decline in Malaysian palm oil imports (MPOB, 2018; United State Department of Agriculture [USDA], 2018). The demand for Malaysian palm oil in China was indirectly affected by their population consumption pattern. According to Awad et al. (2007); Bentivoglio, Finco, & Bucci (2018); and Othman & Alias (2000) in their study agreed that the price of soy oil positively determines the demand behavior of palm oil consumers within several markets, especially China. This is because palm oil in China is highly substitutable for soy oil (Zakaria et al., 2017). The higher price of palm oil will easily trigger China's households to shift their demand to soy oil (Hameed, Arshad, & Alias, 2016; Santeramo & Searle, 2018).

Hence, to attract more demand for Malaysian palm oil from China, policymakers must identify the control variables related to China's palm oil import demand. Thus, this study investigated the significant internal and external factors determining China's palm oil import decision from Malaysia. Besides, this study contributes ideas to the policymakers based on its outcomes in constructing a future-ready policy in uncertain market conditions.

RESEARCH METHOD

Source of the data

The sets of time series data were collected from different sources covering the year 1980 to 2017. Data on Malaysian palm oil export volume to China, the foreign trade price of Malaysian palm oil to China, and the international trade price of soy oil were gathered from the Malaysian Palm Oil Statistic book published by the Malaysian Palm Oil Board (MPOB). The international trade price of Indonesian palm oil was retrieved from the UN COMTRADE website (https://comtrade.un.org), China real GDP per capita based on the year 2010 compiled from the World Bank Development Indicator by World Bank (https://data.worldbank.org), and the exchange rate of Malaysian Ringgit per Chinese Yuan (RM/CNY) achieved from Bank Negara Malaysia Monthly Bulletin by Bank Negara Malaysia (http://www.bnm.gov.my).

Model specification

In this study, the demand theory is an appropriate reference theory to analyze China's palm oil market demand (Hameed et al., 2016; Suherman et al., 2016). The market demand theory was explained by the product price (P), disposable income (Y), and other related prices, such as complement and substitution prices. The expression of the theory of demand in a mathematical equation appears as Equation 1:

$$QD=f(P^{own}, Y, P^{other}) \quad (1)$$

As the study examined the export demand of Malaysian palm oil to China, a derived demand function was formed. This function was associated with China's demand pattern, where palm oil imported to the country was not consumed as final products but utilized as an intermediate product or input to produce other products. Thus, the derived demand function includes the quantity demand (QD) proxied by the Malaysian palm oil export volume to China *(EXPDC)* and the commodity's price, which was proxied by the foreign trade price of Malaysian palm oil to China (*MEXPR*). The substitute product's price was denoted by the international price of soy oil (*PSYBO*) and the Indonesian palm oil trade price (*IEXPR*), and the income is delegated by China's real GDP per capita (*RGDPC*). Additionally, the exchange rate of Malaysian Ringgit per Chinese Yuan (*EXRMY*) was also considered a "*price of complement*" for a trade product, when the country's currency appreciates, the export demand increases (Khalighi & Fadaei, 2017). This means the exchange rate can be the demand switcher that affects the import price in the destination market (Zhang, 2020). Hence, in general, the primary demand function for the export demand of Malaysian palm oil to China was expressed as a double-log regression and written as Equation 2:

$$lnEXPDC_t = \beta_0 + \beta_1 lnMEXPR_t + \beta_2 lnPSYBO_t + \beta_3 lnRGDPC_t + \beta_4 lnEXRMY_t + \beta_5 lnIEXPR_t + \mu_t \quad (2)$$

Model estimation methods

At the beginning of the analysis, the stationarity of the tested variables was checked by adopting the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) test procedures. The Auto-Regressive Distributed Lag (ARDL) model Bounds Cointegration Test was adopted for the cointegration testing. This procedure had its specialty in dealing with a small number of observations and irrespective integration order, such as I(0) or I(1), and variables with non-uniform optimal lags. It is also relevant to the case when the independent variable is dependent (Alam & Quazi, 2003). Therefore, the export demand model of Malaysian palm oil in China was adapted to the ARDL model as Equation 3:

$$\begin{aligned}\Delta lnEXPDC_t = c + \beta_1 lnEXPDC_{t-1} + \beta_2 lnMEXPR_{t-1} + \beta_3 lnPSYBO_{t-1} + \beta_4 lnRGDPC_{t-1} + \\ \beta_5 lnEXRMY_{t-1} + \beta_6 lnIEXPR_{t-1} + \sum_{i=1}^{p} \alpha_{1i} \Delta lnEXPDC_{t-i} + \\ \sum_{i=0}^{p} \alpha_{2i} \Delta lnMEXPR_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \Delta lnPSYBO_{t-i} + \sum_{i=0}^{p} \alpha_{4i} \Delta lnRGDPC_{t-i} + \\ \sum_{i=0}^{p} \alpha_{5i} \Delta lnEXRMY_{t-i} + \sum_{i=0}^{p} \alpha_{6i} \Delta lnIEXPR_{t-i} + \varepsilon_t \quad (3)\end{aligned}$$

Once the cointegration was established, the elasticity of the long run was estimated by adopting the ARDL model proposed by Pesaran, Shin, & Smith (2001) as Equation 4:

$$\begin{aligned}lnEXPDC_t = \hat{c}_1 + \sum_{i=1}^{p} \hat{\beta}_{1i} lnEXPDC_{t-i} + \sum_{j=0}^{q} \hat{\beta}_{2j} lnMEXPR_{t-j} + \sum_{k=0}^{r} \hat{\beta}_{3k} lnPSYBO_{t-k} + \\ \sum_{m=0}^{s} \hat{\beta}_{4m} lnRGDPC_{t-m} + \sum_{n=0}^{u} \hat{\beta}_{5n} lnEXRMY_{t-n} + \sum_{w=0}^{v} \hat{\beta}_{6w} lnIEXPR_{t-w} + \varepsilon_t \quad (4)\end{aligned}$$

where the coefficients of the tested variables represent the long-run elasticities. The lag selection criterion was based on a general to a specific Schwartz-Bayesian Criterion (SBC) approach. The expression of the short-run was as Equation 5:

$$\Delta lnEXPDC_t = c - \left(1-\hat{\beta}_{1j}\right) ECT_{t-1} + \sum_{i=1}^{p} \hat{\alpha}_{1i} \Delta lnEXPDC_{t-i} + \sum_{j=0}^{q} \hat{\alpha}_{2j} \Delta lnMEXPR_{t-j} + \sum_{k=0}^{r} \hat{\alpha}_{3k} \Delta lnPSYBO_{t-k} + \sum_{m=0}^{s} \hat{\alpha}_{4m} \Delta lnRGDPC_{t-m} + \sum_{n=0}^{u} \hat{\alpha}_{5n} \Delta lnEXRMY_{t-n} + \sum_{w}^{v} \hat{\alpha}_{6w} \Delta lnIEXPR_{t-w} + \varepsilon_t \quad (5)$$

where $\widehat{\alpha_1}$, $\widehat{\alpha_2}$, $\widehat{\alpha_3}$, $\widehat{\alpha_4}$, $\widehat{\alpha_5}$, and $\widehat{\alpha_6}$ symbolize the dynamic coefficients of the variables in the short run. Let $(1-\hat{\beta}_1) = \varphi$, which represents the speed of adjustment parameter.

RESULTS AND DISCUSSION

The outcomes from both cointegration tests are presented in Table 1. The entire series of variables were stationary at order one or I(1), and it had fulfilled the ARDL Bounds test pre-requirement where all of the series should be stationary at order below than two or I(2).

TABLE 1. SUMMARY OF THE RESULTS FOR UNIT-ROOT TESTS

Test	ADF		PP	
Variables	I(0)	I(1)	I(0)	I(1)
EXPDC	-1.292	-5.375***	-1.322	-5.307***
MEXPR	-2.318	-6.666***	-2.217	-8.324***
PSYBO	-1.743	-5.428***	-1.791	-8.774***
RGDPC	0.358	-3.569**	1.079	-3.569**
EXRMY	-2.650*	-5.553***	-2.666*	-5.582****
IEXPR	-2.156	-7.386***	-2.118	-7.615***

Notes: EXPDC = Malaysian palm oil export volume to China. MEXPR = Foreign trade price of Malaysian palm oil to China, PSYBO = International price of soy oil, RGDPC = China's real GDP per capita, EXRMY = Currency rate of exchange Malaysian Ringgit per Chinese Yuan, IEXPR = Indonesian palm oil trade price. The entire variables are transformed into a logarithmic form and *, ** and *** denotes 10 percent, 5 percent, and 1 percent significance level, respectively.

After the stationary of the tested variables was confirmed, the ARDL Bounds cointegration test was adopted to test for the long-run cointegration relationship between variables. The F-test statistics with a 5 percent significance level mean the independent and dependent variables were cointegrated in the long run (Table 2).

TABLE 2. ARDL BOUNDS COINTEGRATION TEST

Model: EXPDC = *f*(EXRMY, IEXPR, MEXPR, PSYBO, RGDPC) {1, 0, 0, 2, 0, 0, 0}		
F-statistic: 4.485**		
	Critical Level	
Significant level	Lower Bound	Upper Bound
1%	4.045	5.898
5%	2.962	4.338
10%	2.483	3.708

Notes: ** denotes significance at 5 percent significance levels. The critical values are referred to in table case III: Unrestricted intercept and no trend for without trend models (Narayan, 2005)

Since all the variables were proven to be cointegrated, the procedure continues with the long-run elasticity estimation. Based on the long-run regression, all the independent variables follow the prior expected signs in which the foreign trade price of Malaysian palm oil to China

(*MEXPR)* was the only variable holding a negative sign (Table 3). This finding was in parallel with Hassan, Mazlan, Kami, Salleh, & Chioma (2018) who found that the demand will drop significantly due to price hikes in the Netherlands.

TABLE 3. ARDL LONG-RUN ELASTICITY

Variables	Coefficient	Standard Error	p-value
C	17.069***	5.874	0.007
$MEXPR_t$	-7.075**	2.632	0.012
$PSYBO_t$	4.967**	2.356	0.044
$RGDPC_t$	0.819**	0.303	0.011
$EXRMY_t$	2.809***	0.682	0.000
$IEXPR_t$	0.267	0.687	0.700

Notes: MEXPR = Foreign trade price of Malaysian palm oil to China, PSYBO = International price of soy oil, RGDPC = China's real GDP per capita, EXRMY = Currency rate of exchange Malaysian Ringgit per Chinese Yuan, IEXPR = Indonesian palm oil trade price. The entire variables are transformed into a logarithmic form ** and *** denotes, 5 percent, and 1 percent significance level, respectively.

Based on the summarized estimation results, the coefficient of the *(ERMY)* was estimated at around 2.809, which indicated that the appreciation of the Malaysian Ringgit by 1 percent would cause China to reduce its demand for Malaysian palm oil by 2.809 percent without any changes on other factors. This finding was identical to Dewanta, Arfani, & Erfita (2016), who also found exchange rate and income positively influence the palm oil export demand in the long run. This finding somehow strengthened the exchange rate theory where the depreciation of the local currency against the foreign exchange will cause the export to rise as a result of the lower price of the commodity product in the international market (Alatas, 2015). Similar to the trade relationship between India and China, Bahmani-Oskooee & Saha (2021) found that the depreciation of Indian Rupee against Chinese Yuan will increase India's export to China.

The result revealed that the *(IEXPR)* was estimated at the magnitude of 0.267, which means when Indonesia increases its palm oil price by 1 percent, it will influence China to increase its demand for Malaysian palm oil by 0.267 percent, *ceteris paribus*. This finding was consistent with what has been found by Zheng, Saghaian, & Reed (2012) where the competitor's price positively influences the quantity demanded. However, this factor was found insignificant in this study, which means the trade price of Indonesian palm oil was an uncritical factor impacting the Malaysian palm oil demand in China. This means Malaysian palm oil was substitutable for Indonesian palm oil in China, but it did not give a significant trade challenge to Malaysian palm oil demand in the past. Yet, in the future, Indonesia may give a major influence on Malaysian palm oil demand in China. Unlike Malaysia, a minor palm oil exporter like Ghana, its palm oil export demand is majorly affected by the palm oil price from Indonesia (Kuwornu, Darko, Osei-Asare, & Egyir, 2009). Therefore, this study provided a new perspective to the palm oil trade study where the competitor's price will give a different impact based on the market being studied.

The *(MEXPR)* was estimated at -7.075, which was relatively high. It demonstrated that if the foreign trade price of Malaysian palm oil to China increases by 1 percent with no changes in other factors, the demand decreases by 7.075 percent. This was acceptable as Niemi (2001) also found that the Malaysian palm oil price determines the European Union's demand at the elasticity of -6.670 percent. This rate was relatively high, reflecting that the demand for Malaysian palm oil in China was susceptible to price changes. The results strongly agreed with Rifin (2010) who highlighted that the palm oil demand in Asia is receptive to the price changes of that commodity. Turner & Buongiorno (2004) through the pooled OLS method also revealed that country's import demand is highly elastic toward price changes. As referred to Malaysia's closest competitor which is Indonesia a unit increase in its palm oil export price will turn down the export demand by 0.33 percent (Jafari, Othman, Witzke, & Jusoh, 2017). Thus, it proves that export is highly elastic toward price changes (Hussain, Hussain, & Alam, 2020). The highly elastic value revealed the large composition of the China consumers' total expenditure on palm oil. The change in quantity demand for Malaysian palm oil in the country was influenced by the purchasing power which depends on the price changes. Moreover, there was a huge effect of substitution price, suggesting that goods to be consumed as an alternative to Malaysian imported palm oil in China were diverse.

The *(PSYBO)* was found to be elastic, where a 1 percent decrease in the international price of soy oil traded in the market will cause China to switch its demand toward soy oil rather than Malaysian palm oil at the elasticity rate of 4.967 percent, while other factors were constant. This means the changes in the demand for palm oil are sensitive to the changes in the soy oil price and it indicates that an increase in the soy oil price will result in a more than proportional increase in palm oil supply (Santeramo & Searle, 2018). It is shown that soy oil is a long-term competitor for palm oil, where an increment in its price will cause the consumer to switch to palm oil (Khalid, Hamidi, Thinagar, & Marwan, 2018).

Similarly, (Hameed et al., 2016) found that soy oil price influences Malaysian palm oil demand in China at an elasticity of 3.041 percent with a 1 percent significance level. Thus, the development in China's soybean crushing industry has affected the demand for Malaysian palm oil in the country. In addition, this study also aligns with a recent study by Asri, Rahman, & Janor (2020) who also found that the Malaysian crude palm oil (CPO) export demand is elastic to the changes in the international price of soy oil at the magnitude of 2.227 percent and it is significant at 10 percent significance level.

China's economic performance, which was proxied by its GDP per capita *(RGDPC)*, somehow influences its demand for Malaysian palm oil. It was found that with a 1 percent improvement in the GDP per capita, the demand alleviated by 0.819 percent, while other factors were considered unchanged. The positive and significant influence of income on demand has also been revealed by Ngoma (2020) through the adopted Gravity Model. The income coefficient is found to be more elastic in this study as compared to Zakaria et al. (2017) who show that China will increase the palm oil demand from Malaysia by 0.452 percent when the income increases by 1 percent and is significant at a 5 percent level. The significant influence of GDP on demand for Malaysian palm oil was also discovered by (Zakaria et al.,

2019) through the ARDL model in their study of Malaysian palm oil demand in Balkan countries. Thus, it is confirmed that trading partners' income significantly determines their demand for palm oil products (Nkang, Abang, Akpan, & Offem, 2007). It also agreed with the previous findings which disclose that the higher purchasing power will stimulate higher demand for Indonesian agriculture commodity exports to China (Purnomowati, Darwanto, Widodo, & Hartono, 2015; Riyani, Darsono, & Ferichani, 2018).

In the short-run analysis, the Error Correction Term lag one-year (ECT_{t-1}) coefficient was estimated at around -0.224, with a 5 percent significance level (Table 4), which directly means the variables were cointegrated in the short run. Subsequently, the market had a slow rate speed of adjustment where it takes approximately four years and a half (1/0.224) to eliminate the disequilibrium back to the equilibrium point.

TABLE 4. ARDL SHORT-RUN ELASTICITY

Variables	Coefficient	Standard Error	p-value
ECT_{t-1}	-0.224**	0.083	0.011
$\Delta MEXPR_t$	-0.986***	0.002	0.002
$\Delta MEXPR_{t-1}$	0.485**	0.175	0.010
$\Delta PSYBO_t$	1.114***	0.351	0.003
$\Delta RGDPC_t$	0.183	0.112	0.115
$\Delta EXRMY_t$	0.630**	0.301	0.046
$\Delta IEXPR_t$	0.059	0.156	0.704
R^2	0.985	-	-
Adjusted R^2	0.980	-	-
F-statistic	223.106***	-	0.000
Serial Correlation	0.893	-	0.639
Jarque-Bera	0.257	-	0.878
Breusch-Pagan Godfrey	10.647	-	0.222
RESET	1.688	-	0.205

Notes: MEXPR = Foreign trade price of Malaysian palm oil to China, PSYBO = International price of soy oil, RGDPC = China's real GDP per capita, EXRMY = Currency rate of exchange Malaysian Ringgit per Chinese Yuan, IEXPR = Indonesian palm oil trade price. The entire variables are transformed into a logarithmic form ** and *** denotes, 5 percent, and 1 percent significance level, respectively.

At the same time, the elasticities of the ($\Delta EXRMY$) and ($\Delta MEXPR_1$) were significant at a 5 percent level. The coefficient ($\Delta EXRMY$) which was estimated at around 0.630 means demand from China will increase by 0.630 percent as a result of the 1 percent depreciation of MYR against the CNY. The elasticity found in this study was closest to Matlasedi (2017) who discovered that the demand would be affected by 0.414 percent for every 1 percent appreciation or depreciation of the exporter's currency in the short term. The result also corresponded with the finding by Kuwornu et al. (2009) in their study of palm oil export in Ghana and it is consistent with Yazici (2012) who found there is a significant influence of exchange rate and price towards the agricultural export demand. The ($\Delta PSYBO$) and ($\Delta MEXPR$) were significant at a 1 percent level. It was in line with Hameed et al. (2016), who found that both palm oil and soy oil price are the two crucial factors determining the demand

for Malaysian palm oil in China in the short run, with both being significant at a 1 percent level. (Baiyegunhi & Sikhosana (2012) in their study on the African agriculture trade market had the same result which showed that the African wheat demand is responsive to price changes and it is significant in the short run.

The *(ΔIEXPR)* remained insignificant in the short run, which directly explains that the trade price of palm oil from Indonesia had no instant effect on the export demand for Malaysian palm oil in China. It matches with Putra & Sudirman (2014), who unveiled that the Indonesian palm oil export performance to China is not directly affected by the price, but it is significantly influenced by the changes in the export tariff set at 0% based on the ASEAN-China Free Trade Agreement (ACFTA) scheme 2001-2012. Consequently, other than the price factor, government policy in the competitor countries could be a significant factor that determines the demand. Furthermore, the (Δ*RGDPC)* was found insignificant in the short run after it was significant in the long run. Hence, income did not instantly impact the export demand for Malaysian palm oil to China. These findings clarified that a different factor could influence the export demand in a different period which is in the short term or long term. The insignificant relationship between the importer country's income and the palm oil demand in the short run has also been found by Dewanta et al. (2016) in their study. The insignificance of these two factors was still acceptable since both factors were shown to be less elastic in the short run when compared with the long run. It indicated that consumers need a longer time to respond and adapt to the new demand habit. Hence, the export price of Indonesian palm oil and China's income could be considered uncritical factors to influence the export demand for Malaysian palm oil in China in the short run.

The most elastic factor found in the short run was (Δ*PSYBO)* which was estimated to affect the demand at the magnitude of 1.114 percent. It reflects that China will increase its demand for soy oil by 1.114 percent to substitute palm oil from Malaysia which was priced higher by 1 percent in the short run. This finding was strongly supported by Egwuma, Shamsudin, Mohamed, Kamarulzaman, & Wong (2016) who found that the soy oil price brings more significant effects on China's palm oil demand in the short-term compared to its GDP.

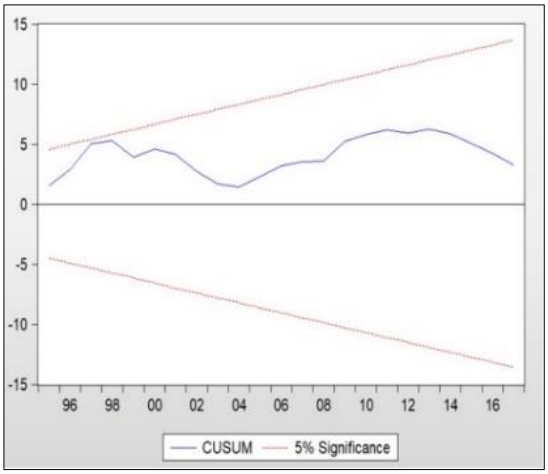

FIGURE 1. CUSUM TEST

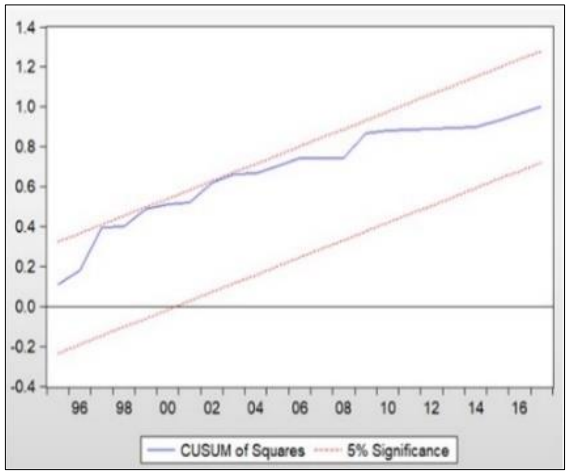

FIGURE 2. CUSUM SQ TEST

In verifying the freedom from the ARDL estimation bias, this study adopted some crucial diagnostic checking procedures, including R-squared. The estimated R-squared of this model showed high enough, with only 1.5 percent of the variation remaining unexplained in the estimated regression. Then, this regression was confirmed to be unbiased and stable by considering the results of the Jarque-Bera normality test, Auto-serial correlation test, heteroscedasticity (Breusch-Pagan Godfrey) test, Ramsey Regression Equation Specification Error Test (RESET) (Table 4), Cumulative Sum of Recursive Residuals (CUSUM) Test, and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) Test (Figure 1 and 2).

CONCLUSION

This study found that Malaysia's exchange rate was a significant and influential factor in determining China's palm oil demand from Malaysia. This signifies that the local palm oil industry players were advised to be more responsive toward the currency changes since it shows an elastic relationship with the demand. In addition, the price of palm oil exported from Malaysia to China showed a significant impact on China's demand for Malaysian palm oil, and it was highly elastic. It implied that the price reduction can boost its market share in the China. Besides that, the international price of soy oil and China's economic growth were important to determine its palm oil demand. The reduction in palm oil prices accompanied by a stable economic condition of the country will improve the palm oil demand. Indonesian palm oil trade prices in the market positively influence China's palm oil demand from Malaysia. Even though this factor was considered uncritical as tested in the past, this did not indicated that the local industry can ignore its rivals. The current policies need to be updated to prevent any effects from the competitor's price factor in the future and the monetary authorities need to impose an effective mechanism to stabilize the Malaysian Ringgit exchange rate. In terms of the price, the policymaker is advised to revise the export tax and trade policy as an instrument to control the price. A satisfying volume of stocks should be prepared during their steady-state economic condition and prepare the best for their economic downturn. Efficient stock control can ensure no surplus to avoid a severe price drop when the stocks are overproduced and flowing excessively into the market. Finally, extended and enriched findings covering this topic through the adoption of other theories such as the supply theory or complete market equilibrium theory were strongly recommended since fewer studies were covering the topics related to Malaysian palm oil trading in recent years.

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