
ASEAN-FTA IMPACT ON RUBBER AND CRUDE PALM OIL EXPORT: AN EMPIRICAL EVIDENCE FROM IMT COUNTRIES

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This study uses a gravity model to explore whether the formation and agreement of the ASEAN Free Trade Area (AFTA) has an impact on increasing trade exports of rubber and crude palm oil commodities in the case of ASEAN member countries, namely Indonesia-Malaysia-Thailand (IMT). Using time series data sourced from the United Nations Comtrade database, first for Indonesia using the 1996-2017 period with 21 trading partner countries for crude palm oil (CPO) commodities and 22 countries for rubber commodities. Second, the Malaysian CPO export model uses data for 1997-2017 with 23 trading partner countries. Third, the Thai rubber export model uses the 1999-2017 period with 16 trading partner countries. We find that the implementation of AFTA has had an insignificant impact on Indonesia's rubber and CPO exports, this implies that AFTA has not been fully profitable for Indonesian exports due to a slowdown in trade liberalization. Meanwhile, AFTA has had a positive and significant impact on Thailand's rubber exports and Malaysian CPO, both countries are still relatively slightly better off due to the AFTA agreement. The results of this study also show that the three countries trade these two commodities more intensely to non-ASEAN countries.

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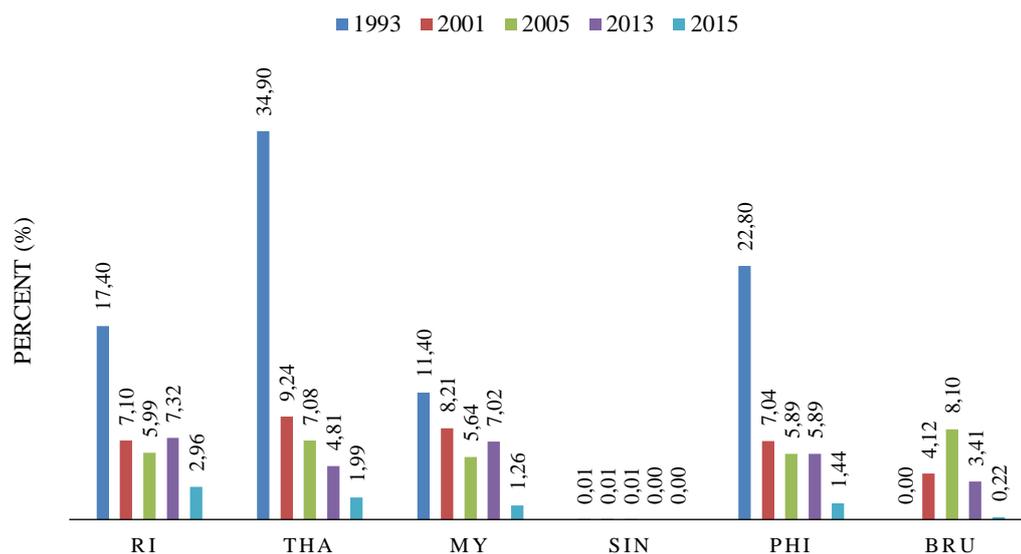
1. Introduction

The last few decades, one of the international economic trends is the increase of regional trade agreements (RTA). The trend increase also applies to the free trade agreement (FTA). According to the World Trade Organization (WTO) which gathered data from all over the world reports from 1990 to 1994, there are 34 FTA, and from 2001 to 2005, there are as many as 100 new RTAs formed. In early April 2015 the number of this type of agreement has increased by 19.8 percent or become 612 RTAs, and 406 of which are running. At present time every country on the planet at least has two RTAs (Wong et al., 2017). Globalization and trade liberalization, with the increase of trade agreement activities amongst some countries, have presented disagreement and contradiction opinions amongst economists (Bradford & Chilton, 2019; Rodrik, 2018). One party says that trade liberalization such as FTA can increase trade in goods and services (trade creation) and create employment opportunities between member countries because of a significant tariff reduction (Owen, 2017). On the other hand, it said that FTA will shift trades into non-member countries (trade diversion [TD]). In this case, the member countries that belong to RTA will shift imports from non-member countries into member countries. Consequently, TD will give benefits to members but is unclear for non-members. Trade diversion creates a negative welfare effect because imports are not sourced from the most efficient supplier country. In contrast, the PTA could also induce trade creation when a member country substitutes its domestic production with imports from member countries (Mattoo et al., 2022).

On the other side, the FTA would divert trade to other countries that are not a member of the trade agreement. In this case, the member countries which join the RTA will shift the source of imports from non-members to member countries. Thus, the TD can be useful for members, but not necessarily for a member of the RTA. An evaluation of the impact of AFTA needs to be done to assess the success of AFTA because the implementation of AFTA has been running for more than five years (Okabe & Urata, 2014). Assessing the Impact of FTA needs to be done to know whether the purpose of FTA has been achieved (Harrison et al., 2019). AFTA was founded in 1992 and came into effect for ASEAN-6 namely Indonesia, Malaysia, Singapore, Thailand, Philippines, and Brunei Darussalam agreed to make tariff changes and reductions for each of the members of ASEAN. AFTA charter was signed on 28 of January 1992 in Singapore. Later, Vietnam joined in 1995, followed by Laos and Myanmar in 1997 and Cambodia in 1999. Currently, AFTA has ten ASEAN members. All four newcomers i.e. Cambodia Laos Myanmar Vietnam (CLMV) are asked to sign AFTA agreement to join ASEAN but they are given a longer time frame to fulfill the obligation of tariff reduction up to 2020 (The ASEAN Secretariat, 2015). It is intriguing to assess the impact and benefit of AFTA for the members. One of the important indicators to assess the impact of an FTA is national income. The national income is one of the three indicators to calculate the impact of an FTA on a country from their activity in international trade (Lloyd & Maclaren, 2004). Meanwhile, one of the components of the national income in the Keynesian model four sectors is the contribution of exports (Dühaupt & Hein, 2019; Stockhammer & Kohler, 2022).



The average tariff level that is graphed in Figure 1 is simple, calculated based on all traded and most preferred goods interested by other countries. This tariff limits data is based on the Standard International Trade Classification (SITC). Singapore has long applied "zero tariffs", while other five ASEAN countries, Indonesia, Malaysia, Thailand, Philippines, and Brunei Darussalam are gradually and consistently are lowering their tariffs. At the beginning of the AFTA agreement, as seen in Figure 1, in 1993 tariffs ranged from 11.4 percent to 34.9 percent. Latest year, in 2015 tariffs of all commodities significantly decline to between 0.22 percent and 2.96 percent. Significant reductions in tariffs were also recorded for imports from the ASEAN FTA Partners over the past decade. The average Intra-ASEAN tariffs have fallen to below two percent in the ASEAN-6 Member States.



This figure shows the tariff average establishment for all commodities in ASEAN-6 in period of 1993, 2001, 2006, 2013, and 2015 in percentages. RI denotes Indonesia; THA denotes Thailand; MY denotes Malaysia; SIN denotes Singapore; PHI denotes Philippines; and BRU denotes Brunei Darussalam.

Source: The ASEAN Secretariat (2017)

Figure 1. The tariff average for all commodities in ASEAN-6

The main purpose of AFTA is trying to improve the competitiveness of ASEAN as a production base in the world market through the elimination of tariffs and non-tariff barriers to attract more foreign direct investment into ASEAN. The main mechanism to achieve that goal is the scheme Common Effective Preferential Tariffs (CEPT), which is scheduled to gradually start in 1992, to increase the competitive advantages of the region as a production base which is intended for the world market. Some ASEAN countries have the same commodities that will compete in the international market, like rubber, crude palm oil (CPO), coffee, fish, electronic products, and other commodities. Long before AFTA takes into effect, some ASEAN member countries have already had serious trade relations with the old trading partners. It is interesting to study in-depth whether ASEAN member countries' best commodities are affected by the enactment of AFTA in 1993.



The study conducted by Chen & Lombaerde (2019); Del Gatto (2018); Pomfret & Sourdin (2018) finds that, just before the Asian financial crisis, trade in parts and components accounted for about one-fifth of East Asian manufacturing trade growing much faster than the preceding decade for other product groups. Additionally, study by Ando (2006); Cortinhas (2009) find that intra-ASEAN exports among four ASEAN countries (Indonesia, Malaysia, Philippines, and Thailand) as a share of world trade were 3.6 percent, 4.1 percent, and 7.5 percent in 1981, 1991, and 2001 respectively. The empirical study conducted by Okabe & Urata (2014), also find that the impact of AFTA for the new member such as Cambodia, Myanmar, and Vietnam indicate that the effect of AFTA in tariff reduction under the CEPT scheme is relatively small and limited to a small number of products. Furthermore, (Baier & Bergstrand, 2007; Hur & Park, 2012; Jin et al., 2006; Stoyanov, 2012), reveals that FTA stimulates trade between member countries through TC and TD. Urata (2020) find that for bilateral trade between the United States and China, and it is evident that China shifts imports of high-tech products from the United States to Japan and South Korea under the FTA.

An also empirical study conducted by Hamid & Aslam (2017); Hayakawa (2022); Ishikawa (2021); Lai et al. (2019); Siah (2009), finds and proves that the regulation of preferential tariff in AFTA is important and common to increase intra-ASEAN trade. There is a similar finding by Hamid & Aslam (2017); Karemera & Koo (2015); Saleh & Suprayitno (2010); Zolin & Uprasen, (2018) which reveals that the ASEAN economic integration does not produce trade creation in Indonesia that produces imports from ASEAN countries. According to Clark et al. (2013); Hejazi et al. (2017); Susanto et al. (2007), tariff reduction affects US imports of agricultural commodities from Mexico. Furthermore, NAFTA has more impact on TC than TD. A slightly different result from Setiawan et al. (2016); and S. Setiawan (2012) study shows that Indonesia has not utilized the ACFTA scheme optimally so that Indonesia has lesser benefit than China.

Further study will be more interesting if the role of AFTA in trade creation and trade diversion could be researched comprehensively. This study applies the gravity model that will test whether the formation of the ASEAN Free Trade Area causes trade creation between member countries and trade diversion from 1996 to 2017. The specific contribution of this paper is as follows. First, it is to contribute to the importance of using the spatial econometric modelling of the flow of commodity trading after AFTA on mainstay commodities in trade ASEAN. Second, it is to fill in the gaps in the literature about the role of the flow of trade in AFTA and to provide a broad assessment of the impact of AFTA on the flow of trade. The results of this research will provide useful information about the accuracy of the study of the impact of AFTA on mainstay commodities trade and help policymakers in decision-making with better information about the role of AFTA in the future.

2. Literature Review

This section describes the theoretical framework and previous studies that are relevant to this study. Figure 2 illustrates demand and supply of a certain commodity in a domestic market of countries that intend to join FTA. The countries act as importing countries (host countries). Member countries of the FTA act as



trading partners and non-member countries are foreign countries. Let's suppose that importing countries could not affect foreign prices, therefore the line P_{NM} horizontally or constant. Before the approval of the FTA, importing countries apply a certain tariff for all commodities without distinguishing where the source is coming from. The type of tariff could be considered as a specific tariff, namely the amount of money per unit of import or maybe based on the percentage of import prices.

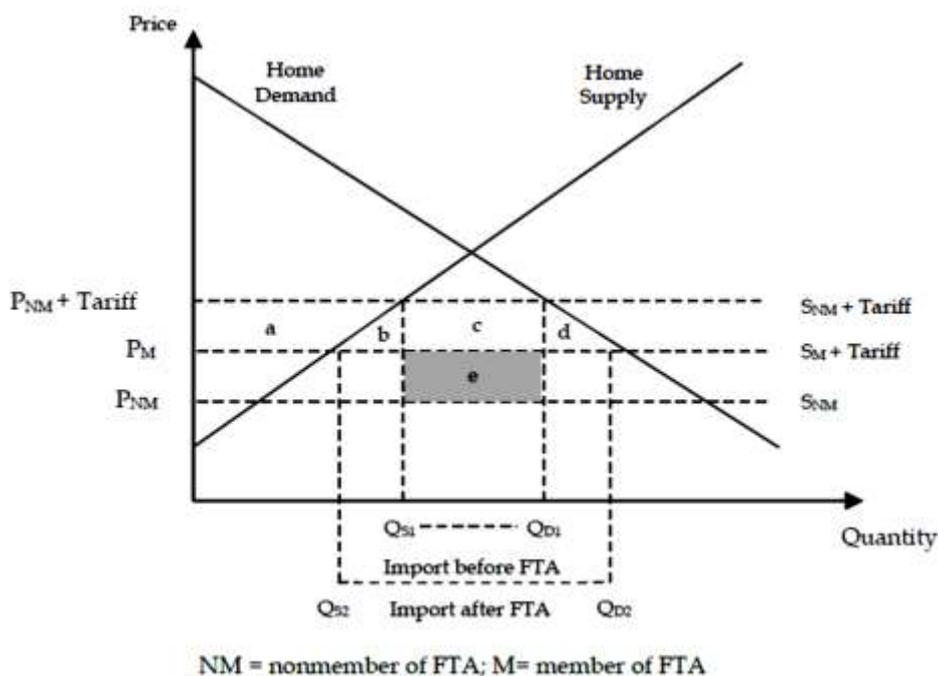


Figure 2. Viner's Model of Free Trade Area

Source: Viner (1950)

Furthermore, from Figure 2 it can be shown that; firstly, after FTA, there is trade creation because of changes in the import of $Q_{D2} - Q_{S2}$ reduced $Q_{D1} - Q_{S1}$, which changes the amount of production and consumption after the agreement FTA. Secondly, FTA also affects trade diversion. This amount is the number of the production and the consumption of the effects of FTA because import is previously sourced from outside, amounting $= Q_{D1} - Q_{S1}$, which redirected due to imports from the partner country. Thirdly, of course, state income decreases because tariff on revenue is abolished. Fourthly, the effect of the creation of trade (trade creation effect), as defined by Viner (1950), is the decrease in domestic production, which now is filled by more efficient imports amounting, $Q_{S1} - Q_{S2}$. Fifthly, FTA also causes the decrease in domestic price that impact on the increase in the consumption of $Q_{D2} - Q_{D1}$, and the country is flooded with imported goods.

Relevant studies include, namely Okabe & Urata (2014), find that Then, it is stated that the impact of AFTA for the new member such as Cambodia, Myanmar, and Vietnam indicate that the effect of AFTA in tariff reduction under the CEPT scheme is relatively small and limited to a small number of products. Furthermore, (Baier

& Bergstrand, 2007; Hur & Park, 2012; Jin et al., 2006; Stoyanov, 2012), reveals that FTA stimulates trade between member countries through TC and TD. There is a significant trade shift from high technology manufacturing goods amongst member countries and Rest of the world (ROW), including the United States and the European Union. This applies particularly to bilateral trade between the United States and China (Urata, 2020). China shifts high technology product imports from the United States to Japan and South Korea under the FTA (Urata, 2020).

An also empirical study conducted by Hamid & Aslam (2017); Hayakawa (2022); Ishikawa (2021); Lai et al. (2019); Siah (2009), finds and proves that the regulation of preferential tariff in AFTA is important and common to increase intra-ASEAN trade. However, not all ASEAN countries will benefit from the establishment of AFTA. There is a similar finding by Hamid & Aslam (2017); Karemera & Koo (2015); Saleh & Suprayitno (2010); Zolin & Uprasen, (2018) which reveals that the ASEAN economic integration does not produce trade creation in Indonesia that produces imports from ASEAN countries. According to Clark et al. (2013); Hejazi et al. (2017); Susanto et al. (2007), tariff reduction affects US imports of agricultural commodities from Mexico. Furthermore, NAFTA has more impact on TC than TD. A slightly different result from Setiawan et al. (2016); and S. Setiawan (2012) find that Indonesia has not utilized the ACFTA scheme optimally so that Indonesia has lesser benefit than China. The effect of the TC for the new members of ASEAN FTA is relatively small compared to that of old members. Okabe & Urata (2014) find that AFTA has been successful in promoting intra-AFTA trade. Pholphirul (2010) finds that there is a high degree of similarity in the structure of the trade between Thailand and AFTA.

3. Research Methods

Data and source

To achieve the aim of this study, we use a non-linear gravity model mainly for export. To estimate the export function, a data panel is used from 1996 to 2017. First, the exports model for rubber and crude palm oil for Indonesia is estimated, then the same model for Malaysia and Thailand is estimated as well. The study for Indonesia uses time-series data from 1996 to 2017, with trading partners as many as 21 countries for CPO commodity and 22 countries for rubber commodity from 1996 to 2017 years. Secondly, the CPO model for Malaysia is estimated using time series data for during 1997-2017 with 23 trading partners. Thirdly, the rubber model for Thailand is estimated using time series data from 1999 to 2017 with 16 trading partners. All the trading partners have an export market share in the top 70 percent on average. The data are obtained from the international trade statistics database in United Nations Comtrade and the world development indicator database 2018 in World Bank.

The Gravity Model

Generally, the gravity model used in estimating trade between country i and country j has a positive relationship in driving the economy while having a negative relationship to the distance, a proxy for transportation costs between countries. Furthermore, the number of bilateral factors that encourage or inhibit trade are usually included as explanatory variables. Therefore, adding a time dimension can be specified as:



$$X_{ijt} = f (Y_{it}, POP_{i,t}, XR_{it}, RES_{ijt}, DIST_{ij}, AFTA_{kijt}) \dots\dots\dots (1)$$

The gravity model has been applied to many empirical studies. This model refers to the study by Akhmadi (2017); Okabe & Urata (2014); Pholphirul (2010); Wong et al. (2017). We see that one of the main issues is analyzing the specific effects of AFTA as trade policies which are measured using dummy variables, to indicate the existence of a regional trade agreement between countries *i* and *j*. The gravity model specifications in this study are then transformed in the natural logarithm presented in the following equation:

$$\ln X_{ijt} = \alpha_0 + \beta_1 \ln Y_{ij} + \beta_2 \ln POP_{ij,t} + \beta_3 \ln XR_{i,t} + \beta_4 \ln RES_{ij,t} + \beta_5 \ln DIST_{ij,t} + \beta_6 AFTA_{ij} + \varepsilon_{ijt} \dots\dots\dots (2)$$

Where: X_{ij} is rubber exports and crude palm oil for Indonesia-Malaysia-Thailand (IMT), and trade partner country *j* (current US\$); Y_{ij} is the gross domestic product of Indonesia-Malaysia-Thailand and trade partner country *j* (current US\$) both of exporter and importer; POP_{ij} is the population for Indonesia-Malaysia-Thailand and trade partner country *j* both of exporter and importer; $XR_{i,t}$ is exchange rates of Indonesia-Malaysia-Thailand (terms US\$); RES_{ij} is foreign exchange reserves of trade partner country *j* (term US\$); $DIST_{ij}$ is the geographical distance between Indonesia-Malaysia-Thailand and trade partner country *j* both of exporter and importer; and $AFTA_{ij}$ is other bilateral factors, the variable measured with dummy variable aim to obtain unbiased estimates for the AFTA.

Table 1. The variable and data source

| Variable | Descriptions | Units | Source |
|----------|--|--------------------|--------------------------|
| X | Rubber exports and crude palm oil for Indonesia-Malaysia-Thailand (IMT), and trade partner country <i>j</i> | Current US\$, 2010 | UN-Comtrade |
| Y | Gross Domestic Product of Indonesia-Malaysia-Thailand and trade partner country <i>j</i> both of exporter and importer | Current US\$, 2010 | WDI |
| XR | Exchange rates of Indonesia-Malaysia-Thailand (terms US\$) | Term in US\$ | WDI |
| POP | Population for Indonesia-Malaysia-Thailand and trade partner country <i>j</i> both of exporter and importer | Total number | WDI |
| RES | Foreign exchange reserves of trade partner country <i>j</i> | Term in US\$ | WDI |
| DIST | The geographical distance between Indonesia-Malaysia-Thailand and trade partner country <i>j</i> both of exporter and importer | Km | Distance from Google map |
| AFTA | Bilateral factors, a variable measured with dummy variable aim to obtain unbiased estimates for the AFTA, the value of 1 when countries <i>i</i> and <i>j</i> are members of the AFTA in year <i>t</i> , zero otherwise. | Dummy | - |

Source: Authors compilation



4. Results and Discussion

Descriptive statistics

In this section, we report on the descriptive statistics presented in Table 2. These results indicate that the standard deviation is still in a relatively low condition, which means that the proximity of the statistical sample to the mean of the data distribution has been met.

Table 2. The Results of Descriptive Statistics

| Descriptive | lnX | lnY | lnXR | lnPOP | lnRES | lnDIST |
|-------------|-------|-------|-------|-------|-------|--------|
| Mean | 6.486 | 4.438 | 7.450 | 5.438 | 5.638 | 7.561 |
| Median | 6.142 | 4.617 | 7.181 | 5.282 | 5.757 | 7.580 |
| Maximum | 7.276 | 6.284 | 8.923 | 7.393 | 7.250 | 8.435 |
| Minimum | 5.355 | 2.397 | 6.904 | 5.245 | 3.605 | 6.539 |
| Std. Dev. | 0.679 | 1.580 | 0.292 | 0.629 | 0.589 | 0.425 |
| Jarque-Bera | 5.748 | 6.363 | 3.518 | 3.643 | 5.563 | 3.583 |
| Probability | 0.231 | 0.292 | 0.196 | 0.267 | 0.392 | 0.198 |

Source: Authors calculation

Table 2 also reports the results of the correlation between independent variables that can still be tolerated in statistical rules. We also report that all variables in this study indicate that the distribution of data on the variables used is normally distributed, it can be seen in the Jarque-Bera value which shows that the probability value is lower than the critical value of 5 percent. We also report the results of the stationary tests which are presented in Table 3.

Table 3. The Result of Unit Root test

| Variables | Critical value | Level | | First differences | |
|-----------|----------------|--------|----------|-------------------|-----------|
| | | t-stat | ADF-test | t-stat | ADF-test |
| lnX | 1% | -3.457 | -0.321 | -3.581 | -4.626*** |
| | 5% | -2.545 | | -2.983 | |
| | 10% | -2.421 | | -2.624 | |
| lnY | 1% | -3.357 | -0.325 | -3.529 | -4.250*** |
| | 5% | -2.665 | | -2.859 | |
| | 10% | -2.435 | | -2.561 | |
| lnXR | 1% | -3.577 | -0.143 | -3.451 | -5.738*** |
| | 5% | -2.647 | | -2.857 | |
| | 10% | -2.547 | | -2.535 | |
| lnPOP | 1% | -2.858 | -0.364 | -3.674 | -4.576*** |
| | 5% | -2.543 | | -2.867 | |
| | 10% | -2.478 | | -2.566 | |
| lnRES | 1% | -2.983 | -0.243 | -3.573 | -4.670*** |
| | 5% | -2.639 | | -2.859 | |
| | 10% | -3.373 | | -2.433 | |
| lnDIST | 1% | -2.825 | -0.457 | -3.678 | -5.275*** |
| | 5% | -2.560 | | -2.834 | |
| | 10% | -2.457 | | -2.463 | |

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

Source: Authors calculation



We report the results of the unit root test in Table 3 which shows that all variables used contain unit roots at the level, but after the first differentiation test, it shows that all variables are independent of unit roots, meaning that the mean and variance values do not change significantly. systematically over time or in other words, the mean and variance are constant.

Empirical result of Indonesian and Thailand rubber export

Table 4 reports the Hausman test, the null hypothesis is rejected thus the best model in this study is the fixed effect model. Likewise, the Chow test shows that the rejection of this null hypothesis indicates that the fixed effect model is relatively more appropriate than the common effect model. We found interesting results because in the equation of the Indonesian and Thailand rubber export model, statistically, only the fixed effect model is consistent for the rubber export model in Indonesia and Thailand. We also report that the estimation results used are free from violations of classical assumptions such as autocorrelation and heteroscedasticity.

Table 4. The empirical results of the rubber export model

| <i>Dependent variable: ln X_{ijt}</i> | | |
|---|---------------------|---------------------|
| <i>Variables</i> | Indonesia | Thailand |
| | <i>Fixed Effect</i> | <i>Fixed Effect</i> |
| <i>Constant</i> | -18.308*** | -13.190** |
| <i>ln (Y)_{it}</i> | 0.205*** | 0.487*** |
| <i>ln (Pop)_{it}</i> | 0.560*** | 0.076** |
| <i>ln (Xr)_{it}</i> | -0.005 | -0.083*** |
| <i>ln (Res)_{ijt}</i> | 0.612*** | 0.152*** |
| <i>ln (Dist)_{ijt}</i> | -0.295*** | -1.146*** |
| <i>AFTA_{ijt}</i> | 0.048 | 0.331** |
| <i>Summary</i> | | |
| <i>Obs.</i> | 462 | 288 |
| <i>Adj. R²</i> | 0.689 | 0.830 |
| <i>SSR</i> | 429.103 | 83.448 |
| <i>F-test</i> | 174.366*** | 203.037*** |
| <i>Chow test</i> | 43.554*** | 23.343*** |
| <i>Hausman test</i> | 10.569*** | 13.425*** |
| <i>Diagnostic tests</i> | F-stat | |
| <i>Serial correlation</i> | 3.733 (0.562) | 2.421 (0.673) |
| <i>Heteroscedasticity</i> | 4.353 (0.482) | 3.534 (0.547) |

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

Source: Author's Calculations

Table 4 reports the summary estimation of regression indicated that the determination coefficient of 0.6893, it can be concluded that the independent variables on the model i.e., gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA able to explain the variation of the dependent variable namely Indonesia rubber exports of 68.93 percent. Meanwhile, with the determination coefficient of 0.830 in the Thailand rubber export model, it can be concluded that the independent variables on the



model i.e., gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA able to explain the variation of the dependent variable namely Thailand rubber exports of 83.03 percent. Further, the statistical results of the F-test hypothesis testing on the Indonesian and Thailand rubber export models are respectively 429.103 and 83.448 at the significance level of 5 percent, it can be concluded that statistically indicates that jointly the variable of gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA have a significant effect on the Indonesian and Thailand rubber export models.

The estimation of the regression coefficient using a fixed effect method is following the hypothesis. Statistically, gross domestic product, the population, and foreign exchange reserves of each country have positive signs and a significant effect on the rubber export between Indonesian and trade partner countries. However, exchange rates have no significant effect, but the exchange rate coefficient sign is following the hypothesis which indicated that the change in the exchange rate affects the contraction of the Indonesian rubber export. These findings are in line and support the study results by Akhmadi (2017). While the distance coefficient sign is consistent with the hypothesis because it shows a negative sign. The distance variable is a proxy of transportation costs, it's indicated that if the distance further, then rubber export between Indonesian and trade partner countries will decrease significantly. These findings are in line and support the study results by Wong et al. (2017). On the other side, contrary to the study results by Akhmadi (2017). Based on the existing data, Indonesian rubber export is destined relatively more to the countries outside of ASEAN compared to the ASEAN member country. The sign of the ASEAN Free Trade Agreement coefficient is following the hypothesis which indicated that the AFTA has a positive impact but the insignificant on Indonesian rubber export. These findings are contrary to the study results by Akhmadi (2017). This implies that the slowdown in liberalization of rubber commodity due to the exclusion of rubber commodity from reduced tariffs in the FTA agreement, the reduction of rubber commodity tariffs often takes longer than other commodities. Trade liberalization in AFTA, even the AFTA agreement has been in effect since 1993, but the rubber commodity is not included in the reduced tariffs in the AFTA agreement. Trade liberalization started on 1 January 2003 for ASEAN-6 (Indonesia, Malaysia, Singapore, Thailand, Philippines and Brunei) and finished on 1 January 2010 for all member countries.

Meanwhile, the prediction result for Thailand's rubber export with trade partner countries is presented in Table 4. The estimation is relatively different from the estimation result of the Indonesian rubber export model. Using estimation of fixed effect model, it shows that variable coefficient such as; GDP, total population, exchange rate, reserve, and distance have a coefficient in line with the hypothesis, and the results of t-test indicated there is evidence impact on rubber export of Thailand between trade partner countries significantly in the level of 5 percent. However, as Indonesia results, the coefficient of AFTA has a positive sign and significant effect on Thailand's rubber export. This finding indicated that the AFTA agreement has fully benefited Thailand's rubber export. These findings are in line and support the study result by Pholphirul (2010). This implies that the



liberalization of rubber commodities in Thailand is growing faster in order to increase the smooth flow of rubber commodity exports destined for trading partner countries.

Empirical result of Indonesian and Malaysian palm oil export

Table 5 reports the Hausman test result shows the null hypothesis is rejected thus the best model in this study is the fixed effect model. Likewise, the Chow test shows that the rejection of this null hypothesis indicates that the fixed effect model is relatively more appropriate than the common effect model. We found interesting results because in the equation of the Indonesian and Thailand rubber export model, statistically, only the fixed effect model is consistent for the crude palm oil export model in Indonesia and Malaysia. We also report that the estimation results used are free from violations of classical assumptions such as autocorrelation and heteroscedasticity.

Table 5. The empirical results of the crude palm oil export model

| <i>Dependent variable: $\ln (X)_{ijt}$</i> | | |
|---|---------------------|---------------------|
| <i>Variables</i> | Indonesia | Malaysia |
| | <i>Fixed Effect</i> | <i>Fixed Effect</i> |
| <i>Intercept</i> | -21.548*** | 5.786*** |
| $\ln (Y)_{i,t}$ | 0.065 | 0.329 |
| $\ln (Pop)_{it}$ | 0.494*** | 0.114** |
| $\ln (Xr)_{it}$ | -0.157*** | -0.031 |
| $\ln (Res)_{ijt}$ | 0.406** | 0.054 |
| $\ln (Dist)_{ijt}$ | -0.571 | -1.318*** |
| <i>AFTA</i> $_{ijt}$ | 0.040 | 2.925*** |
| Summary | | |
| <i>Obs.</i> | 441 | 460 |
| <i>Adj. R²</i> | 0.578 | 0.783 |
| <i>SSR</i> | 2790.542 | 709.135 |
| <i>F-test</i> | 23.645*** | 59.672*** |
| <i>Hausman test</i> | 23.584*** | 18.421*** |
| <i>Chow test</i> | 9.469*** | 14.622*** |
| Diagnostic tests | | |
| <i>Serial correlation</i> | 3.821 (0.342) | 2.443 (0.482) |
| <i>Heteroscedasticity</i> | 3.354 (0.269) | 2.574 (0.493) |

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

Source: Author's Calculations

The summary estimation of the Indonesian crude palm oil export model indicated that the adjusted determination coefficient of 0.578, it can be concluded that the independent variables on the model i.e., gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA able to explain the variation of the dependent variable namely rubber exports of 57.88 percent (Table 5). Meanwhile, with the determination coefficient of 0.783 in the Malaysian crude palm oil export model, it can be concluded that the independent variables on the model i.e., gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA able to explain



the variation of the dependent variable namely Malaysian crude palm oil export of 78.31 percent. Further, the results of the F-test statistical hypothesis testing on the Indonesian and Malaysian crude palm oil export models are respectively 429.103 and 83.448 at the significance level of 5 percent, it can be concluded that statistically indicates that jointly the variable of gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA have a significant effect on the Indonesian and Malaysian crude palm oil export models.

Table 5 reports the estimation results of the Indonesian crude palm oil export model are relatively quite interesting using a fixed effect method, it shows that the variable coefficient of population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA is following the hypothesis, although the t-test result indicated that statistically gross domestic product, distance, and dummy variable of AFTA is insignificant effect on Indonesian crude palm oil export. Furthermore, the results of the estimation of the dummy variable coefficient of AFTA are consistent with the hypotheses, it shows positive signs (Pichler, 2015; Pramudya et al., 2017). It tells that AFTA which has been agreed for almost two decades by six ASEAN countries has not fully given benefits for Indonesian palm oil export (Hameed et al., 2016; Pangestu et al., 2015). These findings contrast with the study results Akhmadi (2017). This implies that there is a slowdown in the liberalization of CPO commodities in Indonesia so that the flow of exports of CPO commodities to trading partner countries is slightly slower.

The estimation results of the Malaysian crude palm oil export model with the fixed effect method indicated that gross domestic product, population, exchange rate, foreign exchange reserves, distance, and dummy variable of AFTA are following the hypotheses. Although the t-test result indicated that statistically gross domestic product, exchange rate, and foreign exchange reserves are no significant effect on Malaysian crude palm oil export. We also found evidence that looks slightly better on the distance variable and dummy of AFTA, both variables present results that significant effect on Malaysian crude palm oil export. These findings indicated that AFTA which has been agreed for almost two decades by six ASEAN countries has fully given benefits for Malaysian palm oil export. These findings are in line and support the study result by Hameed et al. (2016); Pangestu et al. (2015); Wong et al. (2017). This implies that the liberalization of CPO commodities in Malaysia is growing faster to increase the smooth flow of exports of rubber commodities destined for trading partner countries.

5. Conclusion and Suggestion

Conclusion

The results of this study are quite surprising because for almost more than two decades the agreement of AFTA, ASEAN member countries have not been fully benefited from the enactment of the AFTA, especially on the export of Indonesia's main commodities such as rubber and crude palm oil which destined for trading partner countries. As for the export of Thailand rubber and Malaysian crude palm oil, both countries are still relatively slightly better because the AFTA agreement has fully benefited. In addition, ASEAN countries must be prepared to face the



ASEAN Economic Community (AEC), which has been implemented five years ahead of schedule based on the ASEAN-6 agreement. It appears with the nuance as this time, the result may not differ significantly from that of before the agreement of AEC. There is a need to study the appropriate measures and policies to formulate what should be done for the foreseeable future to achieve the benefits of trade tariff reduction agreements and the benefit of the economic integration of ASEAN member countries.

Suggestion

The policies offered can be in the form of an agreement to determine the structure of reducing trade tariffs and the benefits of economic integration among ASEAN member countries. Government interventions of each country in increasing the competitiveness of Palm Oil, namely the Sustainable Palm Oil revamping program, the PTA ratification process with export destination countries, and demand creation of CPO markets such as Biodiesel and Green diesel programs in the local market continue to be improved.

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