

THE IMPACT OF ASEAN FREE TRADE AREA ON INTRA-ASEAN MANUFACTURING TRADE

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ABSTRACT

This study investigates the effects of ASEAN Free Trade Area (AFTA) agreement on the bilateral manufacturing trade between the 10 member countries of ASEAN and 39 of their trading partners. The period of study covers 1995 to 2014. Results obtained from panel data analysis of the gravity model with random effects show that the economic sizes, populations, relative endowments, common language and geographical factors like distance, island, landlocked and neighbour are significant determinants of the bilateral manufacturing trade for ASEAN member countries. Moreover, results obtained from the fixed effects model in this study suggests that AFTA has generated pure trade creation effects in terms of exports. On top of that, AFTA has resulted in larger magnitude of trade creation effects in imports than import diversion effects. Overall, AFTA promotes trades among ASEAN member countries through the elimination of tariff and non-tariff barriers, for bringing about pure trade creation effects in terms of exports as well as imports and also trade diversion effects in terms of imports. In sum, this study with more recent data set covering more ASEAN trading partners shows empirical evidence to justify the success of AFTA arrangement.

Keywords: ASEAN Free Trade Area (AFTA); Trade Creation; Trade Diversion; Manufacturing Trade.

1. INTRODUCTION

In January 1992, the leaders of the Association of Southeast Asian Nations (ASEAN) decided to bring their trade liberalization movements to a more privileged stage. Thus, the ASEAN Free Trade Area (AFTA) was established as a trade bloc in upholding the regional manufacturing in ASEAN. The main goal of AFTA formation is to develop ASEAN's competitive edge as the production base in the world market through the exclusion of tariffs and non-tariff barriers within ASEAN region, as well as to attract more foreign direct investments to the ASEAN member countries.

Under the Common Effective Preferential Tariff (CEPT) scheme, AFTA does not implement the common external tariff on the imported products. However, ASEAN countries might apply tariffs on the products inflowing from outside the association based on the nationwide schemes. Basically, the ASEAN members had applied a tariff rate of 0 to 5% for all products which originate from within

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ASEAN while additional time were given to the newer member countries, namely Cambodia, Laos, Myanmar and Vietnam (CMLV) to implement the reduced tariff rates. In addition, the quantitative restrictions and other non-tariff barriers are listed to be excluded under the CEPT Scheme.

The formation of AFTA creates possibilities and challenges to ASEAN member countries. AFTA is supposed to generate bigger internal market that is able to provide low-price charges, attract more investments into the countries as well as to make allowance for the production specialization together with the economies of scale. The reduction of high tariffs, will smoothen the progress of the trade for intermediate products within the ASEAN manufacturing production industries. Nevertheless, the impact of AFTA on trade can be ambiguous. AFTA generates trade as the high-cost domestic producers are counter-productive to compete with cost-effective suppliers from other member countries. In another words, trade creation occurs if reduction of tariffs shifts ASEAN countries import to substitute less-cost efficient domestic production. On the other hand, AFTA diverts trade if reduction of tariffs enables suppliers outside the agreement to be replaced by the possibly less cost-efficient suppliers within the same regions. In this case, trade shifts from low-cost extra-ASEAN countries to higher-cost intra-ASEAN partners. However, the possibility of trade diversion is lower if AFTA member countries are previously competitive with those countries outside the ATFA. In this case, the diverting force of AFTA on trade flows is likely to be insignificant, and it will be further counterbalancing by developments related with AFTA in ASEAN, thus producing additional import demands from countries outside the region.

From the prior studies, the collaboration through economic integration, with the formation of the free trade areas or the ratification of preferential trade agreements, would help in stimulating an expansion in trade capability as well as to get hold of more strategic resource exploitation to further enhance the intra-regional trade of ASEAN countries. However, the formation of AFTA has led to the adjournment in stimulating the internal realization even if it has achieved the agreement as it takes in diverse economic backgrounds. It appears that each country is individualistic rather than collective or paired with one another within the existing AFTA agenda. This non-collective development and approaches between the ASEAN members has increased the possibilities of trade deflection to hold up¹. With the progression of this unanticipated movement, this will make ASEAN incapable in gaining considerably and even worse-off as a whole than before. Whether the ASEAN member countries are able to gain benefits from the AFTA growth or not remains an open issue. This paper seeks to explore the effects of AFTA on the manufacturing exports between ASEAN countries and its trading partners by applying the gravity model.

The rest of the paper is organized as follows. Section 2 reviews the empirical literature on AFTA. Section 3 explains the gravity model of trade employed in this study. Section 4 presents the empirical results. Finally, Section 5 concludes this study.

2. REVIEW OF THE EMPIRICAL LITERATURE

The impacts of regional trade arrangements for instance North American Free Trade Agreement (NAFTA) and AFTA have been a commonly research international trade issue for the past two and

¹Trade deflection refers to the import penetration of ASEAN markets by non-ASEAN member countries through country that holds the lowest tariff rate, and for subsequent re-exports to the rest of the ASEAN countries via applying the AFTA Common Effective Preferential Tariff (CEPT).

a half decade or so. Ramasamy (1994) examined the trade creation impact of AFTA agreement for Indonesia's imports and demonstrated that Indonesia's imports from other ASEAN partners would increase by 6%. Elliott and Ikemoto (2004) examined the impact of AFTA agreement for the data covering the period 1982 to 1999. They found that in the years immediately following the signing of the AFTA agreement, the intra-ASEAN and extra-ASEAN bilateral trade flows are insignificantly affected. Similar finding is also reported in Kien (2009). On the other hand, Hapsari and Mangunsong (2006) reported that the reduction of tariff had significantly increase the bilateral exports of the five original ASEAN member countries. In addition, using data from these ASEAN countries with 14 trading partners that covers 1993 to 2003, Hapsari and Mangunsong (2006) found that AFTA shifted trade from extra-ASEAN countries to possibly less efficient intra-ASEAN countries. Further analysis in the study revealed that over the time, intra-ASEAN countries become more complimentary to one another in terms of exports and imports, and thus increasing the potential of intra-ASEAN trade flows. In a different attempt, Yong and Tan (2007) examined the impact of AFTA on the trade relations between Japan and ASEAN-5 countries. They found AFTA has resulted in the trade creation for the trade flows between Japan and ASEAN-5 countries but the ASEAN-5 was dependent on Japan and not the vice-versa.

In addition, Calvo-Pardo et al. (2009) reported an increasing trend in the share of imports among six ASEAN countries over the 13 year since 1993, while no obvious trend was observed for 13 years before 1993. Meanwhile AFTA also increased the imports from non-ASEAN countries also increased although at a slower pace compared to intra-ASEAN trade. The authors concluded that AFTA were effective in affecting trade patterns of ASEAN countries, and that AFTA had resulted in trade creation effect but not trade diversion effect. Similarly, by examining whether AFTA formation led to the occurrence of trade creation or diversion between its member countries, Ho (2010) concluded that AFTA has no trade diversion considering that its member countries trade more with non-member countries from 1988 to 2004.

In product level analysis, Garrucho (1994) discussed possible the implications of AFTA on the intra-ASEAN trade for the battery industry. He opined that with AFTA, the ASEAN market is larger and that would benefit efficient companies. Using agricultural trade data, Koo et al. (2006) provided evidence that AFTA had expanded intra- and extra-ASEAN trade. By investigating the impact of AFTA on the food security of its member countries, Herath et al. (2014) found that per capita income, agricultural land and the level of foreign reserves had significantly affected the food security of individual ASEAN countries. They also found that the political stability of the countries holds substantial effects on the food security of ASEAN countries. In a study that involved more products, Okabe and Urata (2014) revealed significant trade creation effects of AFTA upon the elimination of tariff in a wide range of products, for both the imports and exports. Apart from that, the elasticity of tariff reduction on imports was greater than the one on export flows. Moreover, old member countries received more trade creation effects than new members. Recently, based on manufacturing trade data for eight ASEAN countries (Laos and Myanmar were excluded due to insufficient data) with 120 trading partners over the period 1990 to 2012, Bary (2015) showed that AFTA had immediate trade creation effect. However, the effect decreased as the gradual increase of trade diversion effect over time.

3. METHODOLOGY

The Newton's physical Law of Gravity has been commonly used to test the effectiveness of free trade agreements (Baier and Bergstrand, 2007; Head and Mayer, 2015). This so called Gravity Model was

first applied to international trade flows including free trade agreement by Tinbergen (1962). Since then the gravity model has been widely adopted in the study of international trade, and previous literature has presented evidence of substantial empirical robustness and explanatory power in explaining trade flows. Note that majority of the literature reviewed in the previous section are adopting various versions of gravity model to analyse the impact of AFTA on trade flows. Interested readers may refer to, for instance, Kabir et al. (2017) for recent developments on econometrics issues surrounding gravity model and empirical evidences on trade flows and free trade agreements.

The basic gravity equation explains the volume of bilateral exports from country *i* to country *j*. In this form of gravity equation, the bilateral exports from country *i* to country *j* are determined by their economic sizes (GDP), populations, geographical variables such as distance, border, landlocked and island countries. In order to determine the impact of implementation of AFTA on trade, AFTA dummy variables can be augmented in the basic model, as follows:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \beta_5 \ln Dist_{ij} + \beta_6 Lang_{ij} \\ + \beta_7 border_{ij} + \beta_8 llocked_i + \beta_9 llocked_j + \beta_{10} island_i + \beta_{11} island_j \\ + \phi_1 AFTA_{1ijt} + \phi_2 AFTA_{2ijt} + \phi_3 AFTA_{3ijt} + \varepsilon_{ij} \quad (1)$$

where,

- \ln = natural logarithm;
- X_{ijt} = Total manufacturing exports from country *i* to country *j* at time period *t*;
- Y_{it} and Y_{jt} = GDP of the exporting (*i*) and importing (*j*) countries respectively at time period *t*;
- Pop_{it} and Pop_{jt} = Populations of the exporting (*i*) and importing (*j*) countries at time period *t*;
- $Dist_{ij}$ = Geographical distance between the exporting (*i*) and importing (*j*) countries;
- $Lang_{ij}$ = Dummy variable that takes the value of 1 if exporting (*i*) and importing (*j*) countries share the same language, either as official or commercial language, and zero if otherwise;
- $border_{ij}$ = Dummy variable that takes the value of 1 if the exporting (*i*) and importing (*j*) countries share the same border line and zero if otherwise;
- $llocked_i$ and $llocked_j$ = Dummy variables that take the value of 1 if the exporting (*i*) and importing (*j*) countries are the landlocked countries and zero if otherwise;
- $island_i$ and $island_j$ = Dummy variables that take the value of 1 if the exporting (*i*) and importing (*j*) countries are the island countries and zero if otherwise;
- $AFTA_{1ijt}$ = Dummy variable that takes the value of 1 when exporting (*i*) and importing (*j*) countries are members of the AFTA in year *t*, zero otherwise;
- $AFTA_{2ijt}$ = Dummy variable that takes the value of 1 when exporting country *i* is a member of the AFTA and importing country *j* is not in year *t*, zero otherwise;
- $AFTA_{3ijt}$ = Dummy variable which takes the value of 1 if the exporting country (*i*) is non-AFTA member and importing country (*j*) is a member in year *t*, zero otherwise; and
- ε_{ij} = the error terms.

A high income level in the exporting nation shows a high level of production which increases availability of goods for exports and this nation is more likely to achieve economies of scale. Also, it possesses large domestic markets which are capable of absorbing more import (Riaz and Mohd, 2012). Generally, GDP serves as a proxy for the two countries' economic sizes. Hence, an increase in the product of the two country's GDPs is expected to increase trade volumes. At the same time, the exporter's and importer's populations also possess significant positive effects on total bilateral trade owing to economies of scale and market-size effects in international trade models, as indicated by Martinez-Zarzoso et al. (2009).

According to Riaz and Mohd (2012), distance is a proxy of trade costs and it is more well-known between all other transaction costs, as transport costs increase together with an increase in the distance between regions, the greater the transaction costs, the lower the supply of goods to foreign markets. Generally, common language is expected to reduce transaction costs as speaking the same language helps in facilitating the trade negotiations, the trading partners will have more knowledge of each other's culture and will find it easier to communicate and share information. Hence, it is likely that it will have a positive effect on trade volume.

At the same time, the extent of trade flows between countries might increase if countries share a land border. A great deal of trades may take place from people crossing the border to make purchases on a daily basis. Thus, the sign of the corresponding coefficient is expected to be positive. For landlocked dummy, the variable generally captures the transport cost margins in trade and ultimately cross-country productivity differences. Land and air transport of bulk goods is often more expensive than water transport (Frankel, 1993). Countries pairs with a large shared surface area and a landlocked economy incur high transportation costs at the same time as island nations incur lower transportation costs. Generally, the negative coefficient on the landlocked dummy can be interpreted as an indication of ocean transportation is significantly cheaper (Riaz and Mohd, 2012).

The estimated positive ϕ_k ($k=1, 2, 3$) coefficient can be interpreted as trade creation in which it shows that the exporting (i) and importing (j) countries trade more between each other. Hence, the extent and statistical significance of ϕ_1 coefficient proposes the existence of intra-bloc trade. On the other hand, negatively significant coefficient implies trade reduction as they trade less with each other (see for instance, Ghosh and Yamarik, 2004). As stated by Carrère (2006) and Martínez-Zarzoso et al. (2009), merely observation of intra-bloc trade (ϕ_1) is inadequate for validating whether there is net trade creation taken place due to FTA. In particular, in the case of AFTA, we need to look at the magnitude and direction of trade between member and non-member ASEAN countries (i.e. ϕ_2, ϕ_3). For instance, $\phi_2 > 0$ indicates that trade creation is associated with an increase in exports from intra-bloc countries to extra-bloc countries. Thus a positive ϕ_1 and a positive ϕ_2 can be identified as pure trade creation in the AFTA in terms of exports. However, a positive ϕ_1 associated with a negative coefficient of ϕ_2 indicates a combination of trade creation and export diversion effects. At this point, if $\phi_1 > \phi_2$, we can conclude that trade creation still prevails even with trade creation effects being offset to a certain level by the export diversion effects. On the other hand, the case of $\phi_1 < \phi_2$ indicates a leading export diversion effect which further denotes a welfare loss for member countries. Such possible trade effects of AFTA in our study are summarized in Table 1 below (adopted from Yang and Martinez-Zarzoso, 2014).

Table 1: Possible Outcomes of Trade Effects in an AFTA

Condition	Export effects		Import effects	
	$\phi_2 > 0$	$\phi_2 < 0$	$\phi_3 > 0$	$\phi_3 < 0$
$\phi_1 > 0$	Pure TC (X)	TC + XD ($\phi_1 > \phi_2$) or XD ($\phi_1 < \phi_2$)	Pure TC (M)	TC + MD ($\phi_1 > \phi_3$) or MD ($\phi_1 < \phi_3$)
$\phi_1 < 0$	XE	XD+XC	ME	MD + MC

Notes: ϕ_1 is the coefficient of $AFTA_{1ijt}$ which denotes exports among member countries. ϕ_2 is the coefficient of $AFTA_{2ijt}$ which denotes exports from ASEAN member countries to non-member countries. ϕ_3 is the coefficient of $AFTA_{3ijt}$ which denotes exports from non-member ASEAN countries to member countries. TC (X) and TC (M) denote trade creation in terms of exports and trade creation in terms of imports, respectively. XD and MD denote export diversion and import diversion, respectively. XE and ME denote expansion of extra-ASEAN exports and expansion of extra-ASEAN imports, respectively. XC and MC denote contraction of intra-ASEAN exports and contraction of intra-ASEAN imports, respectively. Source: Yang and Martinez-Zarzoso (2014).

Our second specification includes a model with the fixed effects (FE) estimation:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \phi_1 AFTA_{1ijt} + \phi_2 AFTA_{2ijt} + \phi_3 AFTA_{3ijt} + \delta_t + \pi_{ij} + \mu_{ijt}, \tag{2}$$

where

- δ_t = time fixed effect;
- π_{ij} = country-pair fixed effect; and
- μ_{ijt} = error term.

The time fixed effect is also included in in Equation (2) the study to control for the macroeconomic effects. Meanwhile, bilateral time-invariant determinants ($Dist_{ij}$, $Lang_{ij}$, $border_{ij}$, $llocked_i$, $llocked_j$, $island_i$ and $island_j$) are eliminated from the estimations as the variables are fixed over time. In addition, the country-pair fixed effect is included in Equation (2) to capture the two trading countries specific effects such as bilateral trade resistances, political, cultural and institutional differences.

4. EMPIRICAL RESULTS

This study utilizes panel data set covering 10 ASEAN member countries and 39 ASEAN’s trading partners over the period 1995 to 2014. Manufacturing sector exports (in thousand US\$) are extracted from United Nation (2016) database. The GDP and the population data are acquired from World Bank (2016a, b). Common language, common border, island or landlocked countries and distance measures are taken from *Centre D’Etudes Prospectives Et D’Informations Internationales* (CEPII, 2016a, b).

4.1. Time and dyadic random effects

Panel data analysis is applied to estimate Equation (1) with time and dyadic random effects (RE). The results are presented in Table 2. It is obvious from Table 2 that all partial slope coefficients are statistically significant at 1 to 10% level. This means the key proxies for economic sizes of the trading pair, populations and trade costs ($Dist_{ij}$, $Lang_{ij}$, $border_{ij}$, $llocked_i$, $llocked_j$, $island_i$ and $island_j$) exert significant effects on the trade flows. All these variables are shown to create trade except for $Dist_{ij}$ and $llocked_i$. It is found that the shorter distance between the exporter and

importer countries promote trade while longer distance reduces trade. Besides, exporter that is surrounded by land exports less than exporter that is accessible by sea-route.

The estimated coefficients (β_1 and β_2) are 0.27 and 0.03 respectively for exporter and importer's GDPs. This implies that a one percent increase (decrease) in GDP will result in 0.27 and 0.03 percent increase (decrease) in the total bilateral exports for exporting and importing countries respectively, by holding other variables constant. This result is consistent with the basic hypothesis of the gravity model that the trade volumes will increase together with an increase in economic sizes. The estimated β_3 and β_4 are 0.65 and 0.97 respectively for exporter's and importer's populations. This indicates that a one percent increase (decrease) in populations will give rise to an increase (decrease) in the total bilateral exports of 0.65 and 0.41 percent respectively for exporting and importing countries, holding other variables constant.

The estimated coefficient β_5 on the geographical distances is -1.31. As such, total exports of a country to a trading partner are lowered by 1.3 percent for a trading partner that is situated farther away than another trading partner by 1 percent in distance.

The estimated coefficients, β_6 and β_7 , on the language and border dummies are 0.80 and 0.41 correspondingly. Given that the exports are shown in logarithmic form, the coefficient on these dummies will be interpreted by taking the exponent. This shows that two countries that share a common language and border are likely to increase the bilateral exports by 2.23 and 1.51 percent, respectively. The coefficients of β_8 and β_9 are -1.00 and 1.74 respectively. That means exporting countries that are enclosed by land exports 2.72 percent lesser than those accessible by sea-route. In contrast, importer countries that are bounded by land imports 5.70 percent more than those with seaports. On the contrary, the island dummies β_{10} and β_{11} are estimated at 0.82 and 1.87 respectively. It indicates that island countries trade 2.27 (exporter) and 6.49 (importer) percent more than those non-island countries.

Turning to the main research issue, the coefficients of AFTA dummies are all significant at conventional significance levels. Moreover, the Wald test of exclusion result indicates that all AFTA dummies should be included in the model. The coefficient of $AFTA_{1ijt}$ is positive ($\phi_1 = 0.405$), which indicates that the AFTA has increased the exports among member countries. So, there is a trade creation effect attributable to the AFTA agreement compared to normal trade levels. Meanwhile, the coefficient of $AFTA_{2ijt}$ ($\phi_2 = -0.342$) which is negative and significant indicates that a significant reduction in the exports from AFTA member to non-AFTA member countries, compared to normal trade levels. This is known as the trade diversion effect in terms of exports (Martínez-Zarzoso et al., 2009, Yang and Martínez-Zarzoso, 2014). Collectively, $\phi_1 > 0$ and $\phi_2 < 0$ reveal that AFTA agreement has resulted in trade creation and trade diversion in terms of exports of manufactured products in aggregate.

The positive and significant coefficient of $AFTA_{3ijt}$ ($\phi_3 = 0.735$) suggests that non-AFTA countries significantly increased their exports to member countries, compared to normal trade levels. Since $\phi_3 > 0$ given that $\phi_1 > 0$, it is identified that AFTA agreement has generated pure trade creation for the imports of manufactured products in aggregate.

It is noted that the coefficients of AFTA dummies are likely to be biased by not taking into account the unobserved time-invariant heterogeneity and bilateral resistance terms given that the time-invariant fixed effects are ineffective in capturing the unobservable elements in gravity equations

(Baier & Bergstran, 2007). Hence, Equation (2) is estimated with dyadic fixed effects and the results are shown in Table 3.

Table 2: Results of Panel Data Analysis with Random Time and Dyadic Effects

Variable	Estimate Coefficient	t-value
$\ln Y_{it}$	0.269	61.73***
$\ln Y_{jt}$	0.031	3.53***
$\ln POP_{it}$	0.651	55.70***
$\ln POP_{jt}$	0.968	2.04**
$\ln DIST_{ij}$	-1.313	-51.52***
$LANG_{ij}$	0.802	12.65***
$BORDER_{ij}$	0.408	3.82***
$LLOCKED_i$	-1.002	-11.77***
$LLOCKED_j$	1.739	2.91***
$ISLAND_i$	0.832	20.12***
$ISLAND_j$	1.873	3.70***
$AFTA_{1ijt}(\phi_1)$	0.405	1.89*
$AFTA_{2ijt}(\phi_2)$	-0.342	-4.40***
$AFTA_{3ijt}(\phi_3)$	0.735	3.91***
Constant	-11.227	-1.40
N	29640	
R-squared	0.5291	
Adj R-Squared	0.5279	
RMSE	3.0697	
Wald Test for the exclusion of:	χ^2	p-value
AFTA	460.36	0.000

Notes: The estimator of White's heteroskedasticity-consistent covariance matrix is applied in the estimation of Equation (1). *, ** and *** indicate significance at 10.5 and 1% level respectively.

4.2. Time and dyadic fixed effects

From Table 3, it is observed that all the estimated slope coefficients are positive and significant at conventional level. The estimated β_1 and β_2 coefficients are 0.01 and 0.03 respectively. Meanwhile, the estimated β_3 and β_4 coefficients are 4.07 and 1.08 respectively. This revealed that populations of the exporter and importer countries have substantially higher impact on trade flows as compared to their GDPs. The estimated values of ϕ_1 , ϕ_2 and ϕ_3 show the effects of AFTA on international trade flows. The coefficients for the AFTA dummies are all positive and significance at 1% level. Moreover, the Wald test of exclusion results indicate that all AFTA dummies should be included in the model. Table 3 reports that the coefficients of $AFTA_{1ijt}(\phi_1)$ and $AFTA_{2ijt}(\phi_2)$ are 2.17 and 0.62 respectively and both of them are statistically significant at 1% level. The positive coefficient of $AFTA_{1ijt}$ indicates that AFTA has trade creation effects among ASEAN member countries. Besides, the positive coefficients of $AFTA_{2ijt}$ denotes that AFTA has trade creation effects in terms of exports from ASEAN member countries to non-member countries. Taking together the positive sign of both ϕ_1 and ϕ_2 , AFTA is said to have created a pure trade creation effect in terms of exports. Meanwhile, $AFTA_{3ijt}(\phi_3)$ is -0.846 and it is statistically significant. The negative coefficient of $AFTA_{3ijt}$ indicates that AFTA has import diversion effects, in the sense that non-member ASEAN countries exports significantly less to member countries. On another perspective, it means ASEAN-member countries import less from non-member countries compared to normal trade level. Taken together

with the finding of positive ϕ_1 , AFTA has trade creation effects in imports as well as import diversion effects. Nevertheless, as $\phi_1 > \phi_3$, the import creation effect still prevail.

Table 3: Results of Panel Data Analysis with Fixed Time and Dyadic Effects

Variable	Estimate Coefficient	t-value
$\ln Y_{it}$	0.012	1.83*
$\ln Y_{jt}$	0.026	3.94***
$\ln POP_{it}$	4.071	11.18***
$\ln POP_{jt}$	1.083	3.02***
$AFTA_{1ijt}(\phi_1)$	2.172	11.53***
$AFTA_{2ijt}(\phi_2)$	0.623	4.16***
$AFTA_{3ijt}(\phi_3)$	-0.846	-5.68***
Constant	-75.178	-8.52***
<i>N</i>	29640	
<i>R</i> -squared	0.4651	
Adj <i>R</i> -Squared	0.4639	
<i>RMSE</i>	3.2713	
Wald Test for the exclusion of:	χ^2	<i>p</i> -value
AFTA	531.16	0.000

Notes: The estimator of White's heteroskedasticity-consistent covariance matrix is applied in the estimation of Equation (2). *, ** and *** indicate significance at 10.5 and 1% level respectively.

5. CONCLUSIONS

The ASEAN Free Trade Area (AFTA) agreement was signed on 28 January 1992 in Singapore by the original ASEAN member countries at that time: Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand. Later, Vietnam (in 1995), Laos and Myanmar (1997) and Cambodia (1999) joined AFTA when they became new ASEAN members. One of the two goals of AFTA is to seek to increase ASEAN's competitive edge as a production base in the world market, while the other is to attract more foreign direct investment to ASEAN. In this conjunction, it is anticipated through the elimination of tariffs and non-tariff barriers, AFTA would bring about trade creation effects such that ASEAN member countries would expand bilateral trade among themselves, as well as expanding exports to non-ASEAN member countries. Nevertheless, over the pass, the recognition of economic integration under AFTA has been less inspiring. There are reliable justifications on the arguments where ASEAN were supposed to speed up its economic integration.

This study investigates the effects of AFTA agreement on the bilateral manufacturing trade between the 10 member countries of ASEAN and 39 of their trading partners. More recent data period of study covering 1995 to 2014 is utilised in this study. Results obtained from panel data analysis of the gravity model with random effect show that the economic sizes, populations, relative endowments, distance and common languages are significant determinants of the bilateral manufacturing trade for ASEAN member countries. Bilateral international trade is found to exhibit positively relationship with economic sizes and population sizes of exporter and importer countries.

Besides, trading partners with common language trade significant more than those with different language, while island countries have significantly higher trade volumes than non-island countries. Exporter countries that are surrounded entirely by land export significantly less than those accessible

by sea, while countries bounded by land tend to import substantially more. It is also found that the distant between trading partners have negative effects on bilateral trade flows, while neighbouring countries trade more than those non-neighbouring trading partners.

Moreover, the estimated AFTA dummies coefficients revealed a significant higher volume of exports among member countries, compared to non-AFTA member countries. So, there is a trade creation effect attributable to the AFTA agreement compared to normal trade levels. Meanwhile, there is a significant lower volume of the exports from AFTA member to non-AFTA member countries, compared to normal trade levels. This is known as the trade diversion effect in terms of exports (Martinez-Zarzoso et al., 2009, Yang and Martinez-Zarzoso, 2014). On the other hand, non-AFTA countries has significantly increased their exports to member countries. Thus, AFTA agreement has resulted in trade creation for exports and trade diversion for both exports and imports in the manufactured products.

Note that most international trade researchers prefer to use fixed effect model over the random effect model since the former yield more robust results while the latter produce bias results. Results obtained from the fixed effects model in this study suggests that AFTA has created pure trade creation effects in terms of exports. This means AFTA promotes increased exports from ASEAN member countries to not only member countries, but also to non-member countries. In addition, AFTA also has resulted in ASEAN member countries importing less from non-member countries. By importing less from non-member countries, while importing more from member countries, AFTA diverted the flow of imports. Nevertheless, AFTA has resulted in larger magnitude of trade creation effects in imports than import diversion effects. Overall, AFTA promotes trades among ASEAN member countries through the elimination of tariff and non-tariff barriers, for bringing about pure trade creation effects in terms of exports as well as imports and also trade diversion effects in terms of imports. In sum, this study with more recent data set covering more ASEAN trading partners shows empirical evidence to justify the success of AFTA arrangement.

REFERENCES

- Baier, S. L., & Bergstrand, J. H. (2007). Do Free Trade Agreements Actually Increase Members' International Trade? *Journal of International Economics*, 71(1), 72-95.
- Bary, P. (2015). The Time-Varying Impact of Regional Trade Agreement: Evidence from ASEAN. *Asian Economic and Financial Review*, 5(9), 1061-1075.
- Calvo-Pardo, H., Freund, C., & Ornelas, E. (2009). *The ASEAN Free Trade Agreement: Impact on Trade Flows and External Trade Barriers*. Centre for Economic Performance Discussion Paper No.930.
- Carrère, C. (2006). Revisiting the Effects of Regional Trade Agreements on Trade Flows With Proper Specification of The Gravity Model. *European Economic Review*, 50(2), 223-247.
- Centre d'Etudes Prospectives et d'Informations Internationales (2016a). *Geographical variables*. Retrieved from http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6.
- Centre d'Etudes Prospectives et d'Informations Internationales (2016b). *Languages*. Retrieved from http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=19
- Elliott, R. J. R & Ikemoto, K. (2004). AFTA and the Asian Crisis: Help or Hindrance to ASEAN Intra-Regional Trade? *Asian Economic Journal*, 18(1), 1-23
- Frankel, J. A. (1993). Sterilization of money inflows: Difficult (Calvo) or Easy (Reisen)? *Latin American Macroeconomic Network*, 24(2), 263-285.

- Garrucho, P. D. (1994). The ASEAN Free-Trade Area and Its Implications on the Battery Industry. *Journal of Power Sources*, 48(1-2), 7-15.
- Ghosh, S., & Yamarik, S. (2004). Are Preferential Trade Agreements Trade Creating? An Application of Extreme Bounds Analysis. *Journal of International Economics*, 63, 369-395.
- Hapsari, I. M., & Mangunsong, C. (2006). *Determinants of AFTA Members' Trade Flows and Potential for Trade Diversion*. Asia-Pacific Research and Training Network on Trade Working Paper Series No. 21.
- Head, K., & Mayer, T. (2015). Gravity Equations: Workhorse, Toolkit, And Cookbook. In G. Gopinath, E. Helpman & K. Rogoff (Eds.), *Handbook of International Economics* (pp. 131-195). Amsterdam: Elsevier-North Holland.
- Herath, H. M. S. P., Coa, L., & Cheng, Y. B. (2014). Impact of ASEAN Free Trade Agreement (AFTA) on Agrifood Trade Creation and Trade Diversion. *International Journal of Applied Research in Business Administration & Economics*, 3(1), 45 – 53.
- Ho, S. Y. (2010). *Trade Creation and Diversion Effects of ASEAN Free Trade Area (AFTA)* (Bachelor Project Paper). Hong Kong Baptist University, Hong Kong.
- Kabir, M., Salim, R., & Al-Mawali, N. (2017) The gravity model and trade flows: Recent developments in econometric modeling and empirical evidence. *Economic Analysis and Policy*, 56(December), 60 – 71.
- Kien, N. T. (2009). Gravity Model by Panel Data Approach:n Empirical Application with Implications for the ASEAN Free Trade Area. *ASEAN Economic Bulletin*, 26(3), 266–277.
- Koo, W. W., Kennedy, L. P., & Skripnitchenko, A. (2006). Regional Preferential Trade Agreements: Trade Creation and Diversion Effects. *Review of Agricultural Economics*, 28(3), 408-415.
- Martínez-Zarzoso, I., Nowak-Lehmann, D. F., & Horsewood, N. (2009). Are regional trading agreements beneficial? Static and dynamic panel gravity models. *North American Journal of Economics and Finance*, 20(1), 46-65.
- Okabe, M., & Urata, S. (2014). The Impact of AFTA On Intra-AFTA Trade. *Journal of Asian Economics*, 35(December), 12 – 31.
- Ramasamy, B. (1994). The ASEAN Free Trade Area: Implications for Indonesia's Imports. *Bulletin of Indonesian Economic Studies*, 30(2), 149-157.
- Riaz, M., & Mohd, S. (2012). Export Nexus of Pakistan. *International Journal of Business, Economics and Law*, 1, 16 – 25.
- The United Nation. (2016). *Commodity Trade Statistics Database*. Retrieved from <http://comtrade.un.org/db/>
- The World Bank (2016a). *World Development Indicators GDP (current US\$)*. Retrieved from <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD>
- The World Bank. (2016b). *Population, total*. Retrieved from <http://data.worldbank.org/indicator/SP.POP.TOTL>
- Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: The Twentieth Century Fund.
- Urata, S., & Okabe, M. (2014). Trade Creation and Diversion Effects of Regional Trade Agreements: A Product-Level Analysis. *The World Economy*, 37(2), 267-289.
- Yang, S., & Martinez-Zarzoso, I. (2014). A Panel Data Analysis of Trade Creation and Trade Diversion Effects: The case of ASEAN–China Free Trade Area. *China Economic Review*, 29(c), 138–151.
- Yong, C. C., & Tan, H. B. (2007). The Impact of AFTA on Japan-ASEAN Trade Flows. *Jurnal Ekonomi Malaysia*, 41, 91-109.