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# THE EFFECTS OF ASEAN-CHINA FREE TRADE AGREEMENT ON BILATERAL TRADES

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## Abstract

This article adopts the augmented versions of Gravity Model to examine the effects of the signing of ASEAN-China Free Trade Agreement (ACFTA) on the bilateral aggregate trades. Specifically, ACFTA dummy variables are incorporated in the basic model to estimate the direction and magnitude of the ACFTA effects. A total of 79 trading partners of ASEAN member countries plus China were examined in this article. The study finds that the Gross Domestic Product, population, natural endowment, distance and common language are the main determining factors of the bilateral trade for ASEAN member countries and its trading partners. Estimated results from this Augmented Gravity Model showed that ACFTA have increased the bilateral aggregate trades not only between intra-bloc member countries, but also between intra-bloc and extra-bloc countries. With this positive finding, ASEAN and China could consider to expand their free trade area to a broader regional perspective, to enhance economic growth and to reduce regional inequality.

**Keywords:** ASEAN–China Free Trade Area (ACFTA), Gravity Model, Total aggregate trades

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## **I. INTRODUCTION**

The Association of Southeast Asian Nations, or ASEAN, was founded on August 8, 1967 in Bangkok, Thailand, when the ASEAN Founding Fathers, namely Indonesia, Malaysia, Philippines, Singapore and Thailand signed the ASEAN Declaration (Bangkok Declaration). The bloc progressively developed and expanded as Brunei Darussalam joined on January 7, 1984, Vietnam on July 28, 1995, Lao PDR and Myanmar on July 23, 1997, and Cambodia on April 30, 1999, in which it makes up ten ASEAN member countries.

During the Fifth ASEAN-China Summit on November 2001, China and ASEAN countries agreed the formation of an ASEAN- China Free Trade Area (ACFTA), to launch the FTA in ten years as well as to support exceptional and differential treatment and flexibility for developing ASEAN countries, namely Cambodia, Lao PDR, Myanmar, and Vietnam (CLMV). One year after declaring their intention to form a free trade area, all the eleven-member countries signed a Framework Agreement on a Comprehensive Economic Cooperation during the seventh ASEAN- China Summit in November 2002.

Generally, China has been trading with ASEAN countries for more than thirty years. Nonetheless, the trade between these regions has significantly grown-up since the signing of ACFTA. The imports of China from ASEAN have developed significantly and ASEAN has turned out to be one of the main import sources for China. Overall, China has gradually turned out to be a dominant participant in the production networks that include the machinery and electronics & electrical manufacture, as well as to obtain the capital products and components from these countries.

The flows of bilateral trade between ASEAN and China, which is maintained by the zero-tariff schemes under ACFTA, showed some rapid increasing movements in 2010. At this point in time, China has turned out to be the major trading partner of ASEAN member countries whereas ASEAN member countries remained as the fourth major trading partners of China. On the whole, ASEAN has gained from trade surplus with China. Nevertheless, the trade surplus might have derived from the trade triangle where China imports the resources and technology from its neighbouring countries while obtaining the raw materials and intermediate products from Southeast Asian countries and assembles them for the purpose of exporting the final products to the rest of the world.

As indicated by Ministry of Commerce of China, the bilateral trade volume between ASEAN countries and China amounted to US\$514.8 billion in 2017. The exports of China to ASEAN countries reached US\$279.1 billion at the same time as its imports attained US\$235.7 billion in 2017. In 2017, China had recorded a trade surplus of US\$43.4 billion with ASEAN member countries. On the whole, the top trading partners of China within the ASEAN region were Malaysia, Thailand and Vietnam, in which Vietnam was the primary export destination of China whereas China imported more products from Malaysia.

Table 1.

Intra-Regional Trade Shares (Merchandise Trade), 1980 -2014 (%)

Region	1980s	1990s	2000s	2010-2014
ASEAN	18.6	22.5	24.4	25.3
RCEP	30.0	34.9	38.9	41.2
EU	61.6	66.5	67.1	62.2
MERCOSUR	6.9	17.1	13.4	14.1
NAFTA	39.5	47.9	53.3	49.2
SAARC	3.9	4.5	5.8	6.1

Notes: ASEAN=Association of Southeast Nations, EU=European Union, MERCOSUR=Southern Common Market, NAFTA=North American Free Trade Agreement, RCEP=Regional Comprehensive Economic Partnership, SAARC=South Asian Association for Regional Cooperation.

Source: Authors' calculation based on data from United Nation COMTRADE database

Overall, the intra-ASEAN trade expanded throughout the 1990s and 2000s. As presented in Table 1, the intra-ASEAN trade includes a quarter of total trade of ASEAN member countries. The share of intra-ASEAN merchandise trade is higher than the trade in MERCOSUR or SAARC. Nonetheless, it has got to be emphasized that the relatively lower intra-regional trade share in ASEAN does not reveal the non-achievement of ASEAN's regional integration forces. Nevertheless, it indicates that the robust growth of intra-ASEAN merchandise trade goes together with by robust trade expansion with China, Japan, the Republic of Korea, and India. This indicates the pursuit of 'open regionalism' in ASEAN, which shows that the trade discriminatory policies for intra-ASEAN have been minimalized, and therefore granting the comprehensive implementation of comparative advantage in ASEAN [1]. Likewise, a large share of intra-ASEAN trade can be found in parts and components that are exported as intermediate products to the rest of East Asia and the world. Thus, the strength of trade within ASEAN also involves the strength of trade with non-ASEAN member countries, particularly China.

There has been a substantial development in intra-regional trade shares in commodity groups such as vehicles, except the railway and tramway (primarily cars and motorcycles), in which it exaggerated to some extent by the emergence of Thailand and Indonesia as the major export hub of ASEAN for automotive products for ASEAN regions and the rest of the world.

At the same time, the electronics and electrical equipment parts and components account for the largest share of intra-ASEAN commodity trade, and there is an apparent geographic relocation as part of dynamic adjustments in the regional production networks in East Asia. For instance, Table 2 reveals the shares of China and ASEAN in the exports and imports of parts and components for electrical and electronic goods in 1995, 2003, and 2015 for the major ASEAN member countries in the sector. The table shows the substantial expansion in exports and imports from China throughout the period for the majority of ASEAN member countries. While most of the trade expansion with China is reallocate from Japan, the

EU, and Taiwan, the substantial expansion in the share of exports and imports from China is accompanied by substantial reductions in the share of exports and imports from ASEAN in Malaysia, Singapore, Thailand, Indonesia, and Vietnam.

Hence, the important research issue is whether the ACFTA agreement signing have helped to stimulate the aggregate trades between the ASEAN countries and its trading partners? The objective of this study is to explore whether ACFTA has any trade creation or diversification impacts on the ASEAN's bilateral trade flows between ASEAN member countries and their trading partners. Both intra-ASEAN (between ASEAN member countries), and extra-ASEAN trade flows (with non-member trading partners) are analyzed in this study.

Table 2.

Shares of China and ASEAN in ASEAN Member States' Trades of Parts and Components for Electrical and Electronic Goods (%)

Country	Partner	1995	2003	2015
		<b>Exports</b>		
Indonesia	China	0.04	2.64	4.65
	ASEAN	58.51	53.97	47.15
Malaysia	China	0.32	6.09	17.22
	ASEAN	32.57	28.64	25.04
Philippines	China	0.11	5.71	9.39
	ASEAN	16.22	23.54	21.4
Singapore	China	1.14	6.08	18.99
	ASEAN	31.47	33.09	21.46
Thailand	China	0.4	8.12	13.59
	ASEAN	34.37	26.57	22.05
Vietnam	China	0.03	6.08	11.94
	ASEAN	67.56	42.14	12.7
		<b>Imports</b>		
Indonesia	China	1.87	5.04	31.18
	ASEAN	17.02	58.19	34.25
Malaysia	China	0.78	9.13	21.32
	ASEAN	21.86	23.05	24.91
Philippines	China	0.56	2.29	11.22
	ASEAN	9.41	13.95	20.33
Singapore	China	1.43	9.07	19.72
	ASEAN	29.68	38.49	23.57
Thailand	China	1.43	12.56	31.74
	ASEAN	24.21	27.92	25.17
Vietnam	China	0.81	5.51	42.51
	ASEAN	23.96	17.94	14.82

Source: Authors' calculation based on data from United Nation COMTRADE.

[2] had attempted to address question using panel data analysis involving 31 countries over the 1995 to 2010 period. This study differentiates itself with [2], by employing a relatively more recent sample period, and engaging more trading partners in the analysis. In particular, the panel data for estimation includes a more recent period of 16 years (1999-2015) and the top 79 importer partners of ASEAN countries, which account for 95% of ASEAN's exports are included for analysis. As such, this article therefore provides a more recent and a more comprehensive evidence on the effects of ACFTA on aggregate bilateral trades.

## II. PAST STUDIES ON ACFTA AND TRADE EFFECTS

Several researches had been conducted to study the effects of ACFTA on bilateral trades. Among others, [2] documented that ACFTA led to significant trade creation effects. This finding was obtained from a panel data analysis involving 31 countries over the 1995 to 2010 period. They also found that the trade agreements between ASEAN and China yield an overall positive trade effect. The positive and significant estimated results for the aggregate data established that reducing and removing tariff barriers in ACFTA promotes total trade volumes between intra-bloc member countries, intra-bloc and extra-bloc countries. There are significant trade creation effects in terms of exports of manufactured goods and chemical products, even if the trade creation and diversion impacts for agricultural raw materials, as well as machinery and transport equipment, are not significant. [3] investigated the trade-related effects of the free trade agreement for the People's Republic of China (PRC) and ASEAN countries and they concluded that ACFTA holds a significantly greater outcome on the bilateral trade flows between PRC and ASEAN countries, given the strong global production linkages and high trade ratio in parts and components within the region.

Studying the impact of ACFTA on international agricultural trade, [4] uncovered that the implementation of ACFTA lead to substantial trade creation impacts for the exports and imports of dairy products. In the case for combined group of dairy products, the trade creation effect is predominant on the imports, but it is surpassed by the trade diversion effect in terms of exports. On the other perspectives by focusing on individual countries, [5] found that ACFTA holds substantial positive impact on Indonesia's exports to the ASEAN countries and China. In line with the trade liberalization where the ACFTA is one form of trade liberalization that the reduction and elimination of tariffs will enhance the export flows. On the other hand, [6] reported that ACFTA diverted the trade of fresh bananas for Philippines from Japan to ASEAN member countries as well as to China. Results of the competitiveness analysis revealed that the Philippines' fresh banana exports to China are not price and quality competitive. However, there are some other export markets for the Philippines' fresh banana such as the Middle East, Southeast Asia, New Zealand, and United States.

### III. PANEL DATA AND MODEL SPECIFICATIONS

The panel data for estimation includes a period of 16 years (1999-2015) and takes in China and ten ASEAN member countries as exporter countries: Malaysia, Indonesia, Singapore, the Philippines, Thailand, Brunei Darussalam, Lao People's Democratic Republic, Myanmar, Vietnam and Cambodia. There are 79 selected importer countries, from other parts of Asia together with some developed and developing countries. The selected import countries are the top 79 importer countries of ASEAN countries, which account for 95% of ASEAN's exports.

This study follows the Vinerian specification of integration effects with an addition of two different groups of FTA dummy variables that explain the trade creation and diversion impacts in terms of export and import flows, as recommended by [7], [8], [9], [10] and [11] to establish whether the formation of ACFTA has accelerated the trade among the ASEAN member countries and non-ASEAN member countries.

The basic form of Gravity Model explains the bilateral export volumes from exporting country  $i$  to importing country  $j$ . In its basic form, the bilateral trade ( $X_{ijt}$ ) (from country  $i$  to country  $j$  is determined by Gross Domestic Product ( $Y$ ), populations ( $Pop$ ) and distance ( $Dist$ ). Moreover, binary dummies including common border ( $border$ ), language ( $Lang$ ), landlocked ( $llocked$ ) and island countries are commonly treated as part of the basic Gravity Model. This study estimates the following equation, in which the basic Gravity Model is augmented with  $ACFTA$  dummy variables to estimate the impact of the commencement of  $ACFTA$  on intra-ASEAN trade flows:

$$\begin{aligned} \ln X_{ijt} = & \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \beta_5 \ln Dist_{ij} + \beta_6 Lang_{ij} \\ & + \beta_7 border_{ij} + \beta_8 llocked_{it} + \beta_9 llocked_{jt} + \beta_{10} island_{it} + \beta_{10} island_{jt} \\ & + \varphi_1 ACFTA\_1_{ijt} + \varphi_2 ACFTA\_2_{ijt} + \varphi_3 ACFTA\_3_{ijt} + \varepsilon_{ijt} \end{aligned} \quad (1)$$

Each binary dummy variable takes the value of 1 if the condition is met, and zero if otherwise. Meanwhile  $\ln$ ,  $t$  and  $e$  refer to time period (in year) and error terms respectively. Variables in  $\ln$  are analyzed in their logarithmic form.

The dummy variable  $ACFTA\_1$  represents the binary variable that takes the value of 1 when countries  $i$  and  $j$  are the ACFTA member countries in year  $t$ , zero if otherwise. A positive (negative) coefficient of  $ACFTA\_1_{ijt}$  represents the trade creation impacts and implies that intra-regional trade has been maintained by the free trade agreements and it is higher (lower) than the normal trade levels.

$ACFTA\_2_{ijt}$  takes a value of one if exporter country  $i$  belongs to the ACFTA member countries in year  $t$  and destination country  $j$  does not belong to the ACFTA countries and zero otherwise. A statistically significant and positive coefficient is categorized as the export creation effect and it implies that regional trade integration leads to export substitutions from ACFTA member countries to non-

ACFTA countries. However, negative coefficient indicates the export reduction from member countries to non-member countries and it is known as the export diversion effect.

$ACFTA\_3_{ijt}$  takes a value of one if exporter  $i$  is a non-member country of ACFTA in year  $t$  and destination country  $j$  belongs to the ACFTA member countries and zero otherwise. Essentially, a statistically significant positive coefficient of  $ACFTA\_3_{ijt}$  is classified as the import creation effects and it shows the expanded imports from the non-member countries to member countries. In contrary, a negative coefficient indicates the import diversion effects.

The augmented Gravity Model as depicted in Equation (1) is estimated using Pooled-OLS (denoted as Model 1) and Panel Random Effect (Model 2) modeling techniques. Breusch-Pagan LM test is then conducted to see which of the two models is a better-fitted model. If the null hypothesis is not rejected, the pooled regression model is the appropriate estimation model. However, if random effect has been established, the Hausman test statistic is in turn applied to determine if the Fixed Effect Model (Model 3) is preferred over the Random Effect Model. In the Fixed Effect Model, the time-fixed effects are considered and so time-invariant factors, such as distance, adjacency, common border or any other economic, political and cultural aspects. Hence,  $Dist_{ij}$ ,  $Lang_{ij}$ ,  $border_{ij}$ ,  $llocked_{it}$ ,  $llocked_{jt}$ ,  $island_{it}$  and  $island_{jt}$  are omitted as they are fixed over time. Subsequently, the Gravity Model (Model 3) is represented as:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Pop_{it} + \beta_4 \ln Pop_{jt} + \varphi_1 ACFTA\_1_{ijt} + \varphi_2 ACFTA\_2_{ijt} + \varphi_3 ACFTA\_3_{ijt} + \pi_{ij} + \delta_t + \mu_{ijt} \quad (2)$$

#### IV. EMPIRICAL RESULTS AND DISCUSSION

The estimated Augmented Gravity Models of different specifications are summarized in Tables 3, 4 and 5. This study first estimates the panel data by applying a pooled OLS method and the result as shown in Table 3 reveals that all variables considered have significant effects on bilateral trades, including the ACFTA dummies. In particular, Gross Domestic Product, population and common language significantly enhance bilateral trades, while distance, border and landlocked conditions hinder bilateral trade significantly. On the other hand, island countries favour bilateral trades most probably due to the convenience of ports. significant impact natural endowment, distance and common language are the main determining factors. However, Breusch-Pagan LM test result shows that Pooled OLS Model can be rejected in favour of Random Effect Model and the estimated Model 2 is presented in Table 4. Based on the Hausman test result, random effect in Model 2 is in turn rejected in favour of fixed effect, and hence Model 3 is estimated and the result is reported in Table 5.



Table 3.

Pooled OLS Estimation (Model 1)

Variable	Coefficient [t-statistic]
$\ln Y_{it}$	1.2331 [84.17]***
$\ln Y_{jt}$	0.6115 [42.66]***
$\ln POP_{it}$	0.4534 [23.72]***
$\ln POP_{jt}$	0.4826 [26.01]***
$\ln DIST_{ij}$	-0.8798 [-16.88]***
$LANG_{ij}$	2.2143 [16.99]***
$BORDER_{ij}$	-0.5120 [-2.80]***
$LLOCKED_i$	-2.818 [-28.17]***
$LLOCKED_j$	-1.7032 [-17.03]***
$ISLAND_i$	1.0830 [14.90]***
$ISLAND_j$	0.6987 [9.69]***
$ACFTA\_1_{ijt} (\varphi_1)$	-0.9240 [-4.39]***
$ACFTA\_2_{ijt} (\varphi_2)$	-0.7840 [-9.35]***
$ACFTA\_3_{ijt} (\varphi_3)$	-0.4309 [-61.63]***
Constant	43.6249 [61.63]***
Breusch-Pagan LM test	2200000 [0.000]***
AIC	
$N$	27676
$R$ -squared	0.5034
Adj $R$ -Squared	0.5031
$RMSE$	4.4604
Wald Test for the exclusion of:	$\chi^2$ [p-value]
ACFTA	16.59 [0.000]

Note: Robust and clustered standard errors used to compute  $t$ -values, which are reported below each coefficient. Estimation uses White's heteroskedasticity-consistent covariance matrix estimator. Asterisks \*, \* and \*\*\* denote statistically significant at 10, 5 and 1 percent level respectively.

From the estimated Model 3 shown in Table 5, the bilateral trade flows are significantly and positively affected by the GDP of importing countries. Specifically, a one percent increase (decrease) in GDP can be associated to a 0.72 percent increase (decrease) in aggregate trade flowing from the exporting countries to their importing counter countries. In line with the finding of [12], populations of exporting and importing countries to positive impacts on bilateral trade. The significantly positive coefficients of population variables imply that a one percent increase (decrease) in populations can be associated to a 1.77 and 0.43 percent increase (decrease) in the bilateral aggregate trade respectively for exporting and importing countries. Importantly, it is revealed by the positive coefficients of  $ACFTA\_1$  and  $ACFTA\_2$  dummies, that ACFTA has generated pure trade creation effect in terms of exports (see Table 4). Moreover, from the positive coefficient of  $ACFTA\_1$  but negative coefficient of  $ACFTA\_3$ , it can be concluded that

ACFTA has resulted in pure trade creation effect in terms of exports. Note that the ACFTA variables have individual and overall significance by the  $t$  test and the Wald test for the exclusion of ACTFA variables.

Table 4.

Random Effect Model Estimation (Model 2)

Variable	Coefficient [t-statistic]
$\ln Y_{it}$	-0.013 [-0.87]
$\ln Y_{jt}$	0.6424 [62.20]***
$\ln POP_{it}$	1.7650 [6.25]***
$\ln POP_{jt}$	0.4633 [35.41]***
$\ln DIST_{ij}$	-0.6032 [-12.35]***
$LANG_{ij}$	1.1502 [11.80]***
$BORDER_{ij}$	0.3907 [3.00]***
$LLOCKED_i$	0.4427 [0.57]
$LLOCKED_j$	-1.7472 [-24.97]***
$ISLAND_i$	-1.0022 [-1.26]
$ISLAND_j$	-0.8086 [16.00]***
$ACFTA\_1_{ijt} (\varphi_1)$	1.2782 [6.51]***
$ACFTA\_2_{ijt} (\varphi_2)$	1.4810 [1067]***
$ACFTA\_3_{ijt} (\varphi_3)$	1.0979 [7.89]***
Constant	-43.0474 [-8.74]***
Breusch-Pagan LM test	17.23 [0.000]***
Hausman test	0.000 [0.000]***
AIC	142079.9
$N$	27676
$R$ -squared	0.7584
Adj $R$ -Squared	0.7574
$RMSE$	3.1166
Wald Test for the exclusion of: ACFTA	34.38 [0.000]

Note: See Footnote to Table 3 for symbols.

Table 5.

Fixed Effect Model Estimation (Model 3)

Variable	Coefficient [t-statistic]
$\ln Y_{it}$	-0.0096 [-0.63]
$\ln Y_{jt}$	0.7169 [69.80]***
$\ln POP_{it}$	1.7677 [6.08]***
$\ln POP_{jt}$	0.4293 [34.53]***
$ACFTA\_1_{ijt} (\varphi_1)$	1.1873 [5.88]***
$ACFTA\_2_{ijt} (\varphi_2)$	1.3137 [9.21]***
$ACFTA\_3_{ijt} (\varphi_3)$	0.9041 [6.33]***
Constant	-50.7777 [-10.07]***
AIC	141520.9

<i>N</i>	27676
<i>R</i> -squared	0.7444
Adj <i>R</i> -Squared	0.7434
<i>RMSE</i>	3.2051
Wald Test for the exclusion of:	
ACFTA	194.43 [0.000]

Note: See Footnote to Table 3 for symbols.

Table 6.

#### Outcomes of Trade Effects of ACFTA

	<i>ACFTA_1<sub>ijt</sub></i> ( $\varphi_1 > 0$ )
<i>ACFTA_2<sub>ijt</sub></i> ( $\varphi_2 > 0$ )	Pure TC (X)
<i>ACFTA_3<sub>ijt</sub></i> ( $\varphi_3 > 0$ )	Pure TC (M)

Note: TC (X) and TC (M) represent the trade creation in terms of exports and trade creation in terms of imports respectively (see, [2]).

## V. CONCLUSION

This study examines the effect of agreements signing of ACFTA on aggregate trades among all ASEAN countries plus and China together with their trading partners throughout the period of 1999 and 2015. Some 79 trading partners have been included in this study to cover 95% of ASEAN plus China bilateral trade volumes with them. To serve the purpose of this study, the Augmented Gravity Model is estimated by both Pool OLS and Panel Random Effect estimation techniques. Gross Domestic Product, population, natural endowment, distance and common language are found to be the basic determining factors for bilateral trade for ASEAN member countries and its trading partners. One advantage of ACFTA dummy variables which are incorporated in the Basic Gravity Model is that, it enables us to estimate the direction and magnitude of the ACFTA effects. In this respect, the results obtained from this study reveal that ACFTA enhances bilateral trades from both the perspective of exports and imports creation, among ASEAN countries and their 79 trading partners. This finding is in line with the recent study of [13], which reported that the ACFTA resulted in more sustainable trade from ASEAN members towards China, at both the industry and country levels. In addition, the estimated results showed that ACFTA have increased the bilateral aggregate trades not only between intra-bloc member countries, but also between intra-bloc and extra-bloc countries. The results of this study also showed some of the benefits that the ACFTA agreement generated for ASEAN member countries.

Overall, the agreement allows the producers to take advantage of the lower production expenses and thus making the product distributions to the rest of the world to be more efficient. The intra-industry trade within ACFTA has generated significant relationship and they improve the production-chain with ASEAN countries. The development and harmonization of product standards is one of the main factor which contribute towards the expansion of an international production value-chain in the ASEAN region and this helps to make best use of the benefits of regional free trade agreements. One implication of this positive finding is that, ASEAN and China could consider to expand their free trade area to a broader regional perspective, to enhance economic growth and to reduce regional inequality.

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