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Master's Thesis of International Studies

**An Analysis of Trade Creation and
Trade Diversion Effects of the
ASEAN-China Free Trade Agreement:
The case after the liberalization of CLMV countries**

ASEAN-중국 자유무역협정의 효과로 인한 무역
창출과 무역 전환에 대한 분석:
CLMV 국가들의 자유화 이후의 사례

August 2020

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An Analysis of Trade Creation and
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Abstract

The research estimates the impact of the ASEAN-China Free Trade Agreement by focusing on trade volume effects on the ASEAN countries, China and other 30 non-member countries. The study aims to briefly explain about the different schedules of tariff reduction implemented in each member countries. We specifically describe the diversity of tariff rates to be liberalized in China, ASEAN6 and preferential tariffs for CLMV countries. Secondly, the study descriptively points out the major changing trade flows in ACFTA member countries before and after the ACFTA takes into effect by clarifying whether it is beneficial or harmful for member countries. The statistics give the interesting observation that ASEAN comparatively imports more from China rather than exporting which later results the growing trade deficit especially in ASEAN6 countries. In the meantime, CLMV countries are slightly improving its trade deficit after the fully liberalization under ACFTA in 2015.

Furthermore, the study carefully examines the trade creation effects of ACFTA on group of all 11 member countries, ASEAN, and sub-group of ASEAN (ASEAN6 and CLMV), thus analyzing the effects on each member countries in order to find the reasons behind the estimations and proving the arguments from previous literatures. We proceed the study with the quantitative method by obtaining Gravity Model with panel data of 41

countries in duration of 18 years (2001-2018). Taking into account the possible bias in Gravity model, the study uses 4 specifications to test the hypothesis for each member countries namely original pooled OLS estimation, time fixed effect, country fixed effects, and country-and-time fixed effects. Most results show that each individual country differently gains trade creation effect from ACFTA and they are likely to be more beneficial in terms of imports. Among eleven countries, regarding the imports, there are Vietnam, Malaysia and Thailand who significantly gain trade creation effects, while Singapore is the most negatively affected country by ACFTA. In terms of exports, there is no trade creation effects appeared in most countries, especially Cambodia, Thailand and Vietnam.

For results as a group, the study applies the country-pair with time-and-country fixed effect to estimate the hypothesis. The model reveals the significant evidences that ACFTA does not bring trade creation effects for both exports and imports to eleven member countries as a whole. Otherwise, ACFTA partially creates beneficial effects in terms of more imports for ASEAN and ASEAN6 group countries, but the result is insignificant to conclude. For trade diversion effects, the gravity results indicate that ACFTA does not worsen exports and imports of all member countries with the non-ACFTA member countries, thus giving the meaningful conclusion to the regional economic cooperation between China and ASEAN.

Keyword: ASEAN-China Free Trade Agreement; ASEAN6; CLMV; Trade creation effects; Trade diversion effects; Gravity Model

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List of Abbreviations

ACFTA	ASEAN-China Free Trade Agreement
AANZFTA	ASEAN-Australia-New Zealand Free Trade Agreement
AFTA	ASEAN Free Trade Area
AIFTA	ASEAN-India Free Trade Agreement
AJFTA	ASEAN-Japan Free Trade Agreement
AKFTA	ASEAN-Korea Free Trade Agreement
ASEAN	Association of Southeast Asian Nations
ASEAN6	Group of Indonesia, Malaysia, the Philippines, Thailand and Brunei Darussalam
CEPT	Common Effective Preferential Tariff Scheme
CLMV	Group of Cambodia, Lao PDR, Myanmar, Vietnam
EHP	Early Harvest Program
FTA	Free Trade Agreement
HDI	Human Development Index
HSL	Highly Sensitive Track List
MFN	Most favored nation
NT	Normal Track
ROO	Rules of Origin
SL	Sensitive Track List
WTO	World Trade Organization

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Chapter 1. Introduction

1.1. Background

The Association of Southeast Asian countries (ASEAN) is the regional intergovernmental organization, established on 8 August 1967 by first five countries including Indonesia, Malaysia, the Philippines, Singapore and Thailand, while Brunei Darussalam later joined in 1984 (ASEAN6). The newer comers such as Vietnam (1995), Lao PDR (1997), Myanmar (1997) and Cambodia (1999) joined respectively and so called CLMV. The aims and purposes of ASEAN are mainly to accelerate the economic growth, regional peace and stability, social progress and cultural development in the region, as well as promoting the collaboration and assistance on matters of common interests both on the ASEAN studies and international level (ASEAN, n.d.).

However, the problem of economic disparities between and within the so called two-tiered ASEAN (ASEAN6 and CLMV) has been the most concerned and crucial issue challenging the significant progress of several frameworks and development plans within region. Referencing to (Alavi & Ramadan, 2008), an unequal level of development in ASEAN can be divided into three perspectives: income gap, human development gap and digital gap. Comparing to ASEAN6, income distribution in CLMV countries significantly takes place in another tier as lower-income group

country while others are categorized in high and middle income country. Regarding the human development, according to (ASEAN Statistical Yearbook, 2018), CLMV's human development index¹ (HDI) from 2008-2016 indicates that Cambodia, Lao PDR and Myanmar had the lowest HDI under the rate of 0.6 level; Vietnam were in the higher range at “lower-medium human development” level, as same as Indonesia and Philippines while other ASEAN6 were categorized in the upper-medium and high level. Additionally, the literacy rate of adult population in CLM countries between 2008-2017 are between 75-90 percent, while Vietnam accounted more at 93-95 percent. Others in ASEAN6 are also in between 93-97.2 percent. For digital development, from 2008-2016, among ASEAN countries, Lao PDR, Cambodia and Myanmar still remain the least countries who can access to cellular/mobile phones, while Vietnam improves above Philippines. For internet access, at the time when Cambodia, Lao PDR and Myanmar are at below others' rate, Vietnam has enhanced their accessibility to be in similar level as Thailand and even above Indonesia, and Philippines in 2009. These statistical review of development gap consequently provide the observation that Vietnam is significantly different from other member countries in the sub-group (CLMV).

¹ See (The ASEAN Statistical Yearbook, 2018:259). The HDI index ranges from 0 to 1, dividing into 4 categories: low level (HDI < 0.6), lower-medium level ($0.6 \leq \text{HDI} < 0.7$), upper-medium level ($0.7 \leq \text{HDI} \leq 0.8$), and high level (HDI > 0.8)

Taking into account the disparities in the region, government has been putting efforts to narrowing down the economic gaps by assisting the less developed members in various ways, as well as putting the mechanism of preferential treatment into numerous frameworks and agreement. Specifically, the statement in the Declaration of the Sixth ASEAN Summit in Hanoi (1998) highlights to “narrow the development gap among Member Countries to reduce poverty and social-economic disparity in the region” as well as “facilitate economic integration of new ASEAN members”. Recently, with the efforts of eliminating the economic gap in the region, Vietnam and Cambodia are likely to be able to catch up with Indonesia and Philippines in terms of income level, while Lao PDR and Myanmar still lack behind (Furuoka, 2019).

In terms of ASEAN economic integration, in 1992, the government of 10 countries have agreed upon the ASEAN Free Trade Area (AFTA), aiming to improve regional competitiveness, and build ASEAN to be investment location and production base engaging in the global value chain. AFTA specifically facilitates the intra-regional trade through tariff reduction to between 0 to 5 percent under the mechanism so called the Common Effective Preferential Tariff scheme (CEPT), starting to take into force in 2002. According to CEPT, only the domestic products from ASEAN are qualified to tariff preference following the Rules of Origin² (ROO). The

² See (ASEAN, 2012). A product shall be wholly produced or obtained originating from ASEAN Member States, if not, at least 40% of its content must be

CEPT scheme also consider the basis of economic disparity between countries in ASEAN, thus providing the preferential treatment regarding the extension of timeframe to complete the tariff reduction for the group of recent ASEAN members (CLMV) in order to finish the country's commitments as well as gradually integrate the economies with other member countries. For instance, by 2005, Vietnam's products in Inclusion List (IL) will be subjected to eliminate the tariff rates to maximum 5 percent, by 2008 for Lao PDR and Myanmar, and by 2010 for Cambodia. Therefore, AFTA encourages the drastic growing intra-regional trade within ASEAN, outlining the strong economic ties of the region.

Alongside with intra-ASEAN trade, ASEAN has been prospering international relations with neighboring countries and other strategic partners. One of them is China, who becomes significant trade partner in the late 1990s and drastically increase after 2000. In the era where regionalism has been emerging, ASEAN and China has developed the economic cooperation from the earlier bilateral trade with individual countries to be multilateral level. In 2001, the leader of ASEAN countries as well as China officially signed the ASEAN-China Free Trade Agreement (ACFTA), following with the Agreement on Trade in Goods in 2004. Such agreements become the stepping stone for ACFTA member countries to eliminate its

originates from any Member States in order to be eligible for the Certificate of Origin and avail of the preferential tariff rates under AFTA

tariff of selective items for 90 percent under the promising timelines starting from 2005.

In the early stage of FTA implementation, since China and ASEAN both were considered as final goods exporters to global market, they were more likely to be competitor rather than the strategic partner (Wong & Chan, 2003). Despite of concern regarding the competition between ASEAN and China in the global market, the matter of numerous incoming products from China into ASEAN market also distress the decision of ACFTA (Chirathivat, 2002; Qiu, Yang, Huang, & Chen, 2007). However, China's booming market and economic size become the factor gaining interest from ASEAN countries to access the market under the low tariff concessions (Chiang, 2019). In the meantime, China also hold attention of the resource endowment, particularly energy and raw materials, in ASEAN which may fulfill the demand of economic development of China (Tongzon, 2005). Therefore, the ACFTA becomes the stage for ASEAN and China reaping opportunities and benefits under the preferential tariff rates thus developing economic linkage with each other.

Accordingly, the trade volumes between ASEAN and China accounted for USD36.2 billion in 2001 and reached USD368.1 billion in 2015. The trade share rises from 4 percent of ASEAN's total trades in 2000 to 15.2 percent in 2015. Currently, according to ASEAN statistics, China is ranked as the first trading partner of ASEAN. Several researchers studied the

reasons behind the sharply increasing happened in trade flow between ASEAN and China. Some of them show the influence of the ASEAN-China Free Trade Agreement (ACFTA) and the Agreement on Trade in Goods (Park, 2009; Nguyen, 2016; Yang & Martinez-Zarzoso, 2014), but some others presented the opposite opinion about the relation between the FTA and such phenomenon (Roberts, 2004).

Likewise, the big concerns regarding the economic dependency on China as a result of the vast increase in regional trade flows between China and ASEAN has been raised throughout the years. Such excessive economic ties could raise the consequential harmful effects especially if the industry in China is slackening, or the unexpected circumstances happen such as pandemic, economic lockdown, etc. Additionally, the strong bilateral economic cooperation has recently brought the effects that changed trade balance in the region. ASEAN is now facing the growing trade deficit with China especially after the liberalization in 2010, thus giving the fear to domestic business as well as economic stability within ASEAN.

Despite of various concerns, it is important to note that, as similar as AFTA-CEPT, ACFTA also provides different timelines for member countries to complete the liberalization. Firstly, the so called 'Early Harvest Program' (EHP) requires ASEAN6 and China to achieve tariff reductions on agricultural goods (HS 01-08) by 2005. Next is the Normal Track (NT)

and the Sensitive Track (SL). The Normal track requires the fully tariff elimination within 2010 for ASEAN6 and China, and 2015 for CLMV countries. Lastly, under the sensitive track, all member countries shall complete the liberalization within 2018. By looking at the different timelines, it somehow defines that the ACFTA would possibly bring the different results on the regional trade between China and ASEAN member countries throughout the timelines, thus, distinguishing the significant effects on ASEAN6 and CLMV countries where the development gaps are still existing.

1.2. Purpose of the research

Since there has been the phenomenon of the sharply increasing regional trades between China and ASEAN, especially after 2000, which was the same period that the ASEAN-China Free Trade Agreement was signed, it brought the interest to examine whether such stronger economic ties are the result of the implementation of the ACFTA. Notably, the effects of the ACFTA can be varying according to the time schedules and country's trade structure, factor and resource endowments as well as stages of economic development, according to (Wong & Chan, 2003), the aim of this research is to examine whether there is any contrast in terms of *Trade Creation* effects happening among China, ASEAN6 and CLMV over periods of

implementing the liberalization schedule. Besides, the research will study whether the increasing in trade volumes between the ACFTA member countries will worsen the trade share of other strategic partners or so called *Trade Diversion*, thus, further see whether ASEAN and China should improve regional trade in the way to minimize the gaps, build the closer relationship with CLMV and other non-ACFTA member countries, generate the mutual trust as well as to greater benefits for everyone.

The study is based on the research question: “Is there the trade creation effect on ASEAN and China as a result of the implementation of ACFTA, thus leading to the trade diversion effect to the ACFTA member countries and other strategic partners?”, by testing the following sub-hypothesizes:

Hypothesis 1: The ACFTA brings the significant increase of trade flows among ten ASEAN countries and China (trade creation effects), bringing the stronger economic ties in the region.

Hypothesis 1A: Regarding the two-tiered development existing in ASEAN, free trade agreement with China is expected to positively beneficial for the more advanced group (ASEAN6), while CLMV countries would comparatively gain less or negative effect from ACFTA.

Hypothesis 1B: Within the CLMV group countries, the recent emerging of manufacturing industry in Vietnam has gradually widened the differences between the country and other three

(Cambodia, Lao PDR and Myanmar). This characteristic may generate the distinctive trade creation effects of ACFTA in Vietnam's trade flows.

Hypothesis 2: Even ACFTA brings trade creation effects, it would not decrease the trade volumes between ACFTA member countries and other strategic trading partners.

1.3. The scope of the research

This research deals with the ASEAN-China Free Trade Agreement by mainly focuses on the Agreement on Trade in goods and its tariff reduction schedules. Firstly, the brief introduction of regional economic cooperation and its disparities will be opened up as the conceptual background of research. Next, chapter 2 will cover the specification of the ASEAN-China Free Trade Agreement (ACFTA). The differences in terms of tariff lines and commitments as well as the changes of bilateral trade between China, ASEAN6 and CLMV countries in different time periods before and after the ACFTA takes into force will be presented in this section. In Chapter 3, the existing theoretical background will be discussed which includes the interesting lessons about the effects of the FTA, the previous studies on trade volume effects resulting from the ASEAN-China Free Trade Agreement as well as the improvement of the Gravity Model throughout decades. Later, chapter 4 will focus on the methodology that will be used in

this research, which describes in details about data sources, processes of research and model specification. Likewise, Chapter 5 indicates the quantitative results of panel data analysis and discussions. Lastly, we conclude the study and provide recommendations in Chapter 6.

Chapter 2. Overview of ACFTA

2.1. Timeline of ASEAN-China Free Trade Agreement (ACFTA) and its commitment

Free Trade Agreement (FTA) is one of legal binding for member countries to agree on the reducing of trade barriers as well as promoting the better flow of goods and services within the FTA member countries. ASEAN-China Free Trade Agreement (ACFTA) is one of many FTAs that 10 ASEAN countries agreed on. It was signed on 4 November 2002, at Bandar Seri Begawan, Brunei Darussalam under the framework Agreement on Comprehensive Economic Cooperation (FACEC). Later in November 2004, the ASEAN-China Trade in Goods Agreement was signed in Vientiane, Lao PDR which stated the commitment for the Republic of China and the six ASEAN founder countries (ASEAN 6) to reduce the trade barriers especially the tariff elimination on the most possible products by reducing the bilateral tariffs on agricultural products, or so called “the Early Harvest Program”. Under the Article 6 of the agreement, the products include those in HS 01-08 such as meat, fish, seafood, milk, and products from animal, vegetables and fruits as well as the specific products that two trading countries specifically negotiated on, are expected to start implementing in 2005 and fully eliminated into zero percent tariff in 2010 (Ministry of Commerce, Thailand, 2009).

2.1.1. Tariff Reduction in China and ASEAN6

Apart from the Early Harvest Program, the tariff reduction between ASEAN 6 and China under ACFTA can be done under the two categories of goods according to Article 3(2) of the Agreement on Trade in Goods of the FACEC. The first category is the Normal Track (NT) which the tariff lines of the goods, that carry “more than 20 percent” tariff, shall be reduced to be 20 percent within January 2005, while other goods with “less than 20 percent” tariff shall be gradually reduced. Under the ACFTA, the tariff lines of all goods in Normal track must be fully eliminated to be zero within January 2010.

Table 1. ACFTA Preferential Tariff Rate of ASEAN 6 and China

X = Applied MFN Tariff Rates	ACFTA Preferential Tariff Rate (Not later than 1 January)			
	2005*	2007	2009	2010
$X \geq 20\%$	20	12	5	0
$15\% \leq X < 20\%$	15	8	5	0
$10\% \leq X < 15\%$	10	8	5	0
$5\% < X < 10\%$	5	5	0	0
$X \leq 5\%$	Standstill		0	0

*The first date of implementation shall be 1 July 2005.

Source: Annex 1 of the Agreement on Trade in Goods of the FACEC:

Modality for Tariff Reduction and Elimination for Tariff Lines placed in the Normal Track

The second category is the sensitive track (SL). According to Annex 2 (Modality for Tariff Reduction/Elimination for Tariff Lines placed in the Sensitive Track), the member countries can select the goods in the HS 6-

digit of not more than 400 lists, and 10 percent of the total import values. The tariff lines of the goods in the sensitive track must be reduced to be 20% in 2012. The maximum rate should be in between zero to 5% in 2018, while the highly sensitive track that was prior negotiated shall cover not more than 40% or 100 lists of all 400 goods in sensitive track.

According to the above timeline, some of the commitment were postponed to complete in 2012. China successfully implemented the tariff reduction and elimination on 7845 lists of goods in Normal Track, accounted 94.8% of the total 8277 lists. The remaining 5.2% are those of goods in Sensitive Track (SL) and Highly Sensitive Track (HSL), which the tariff lines under WTO are at 25–65% and 57-65% respectively (Ministry of Industry and Commerce, Lao PDR, 2017). Within 2018, the tariff rate of these goods in SL shall be liberalized to be lower than 5%, while HSL shall be at 50% or lower than that.

Table 2. China’s Tariff Reduction Rate

	Quantity	2012	2015	2018	Percentage
NT	7845	0%	0%	0%	94.8%
SL	286	≤ 20%	≤ 20%	≤ 5%	3.5%
HSL	146			≤ 50%	1.7%
Total	8277				100%

Source: Export Guide to China, Ministry of Industry and Commerce, Lao PDR (2017)

2.1.2. The Preferential Treatment for the Newer ASEAN member countries

While ASEAN 6 and China have the different tariff rates and commitments under the Early harvest program and the Normal Track (NT), the ACFTA provides numbers of preferential treatment and flexibility for the newer ASEAN member states namely Cambodia, Lao PDR, Myanmar and Vietnam (CLMV) especially the timeline for reducing the tariff rates to be zero within 2015.

(1) Normal Track

a. Vietnam

Table 3. Vietnam's Preferential Tariff Rate

X = Applied MFN Tariff Rates	ACFTA Preferential Tariff Rate (Not later than 1 January)							
	2005*	2006	2007	2008	2009	2011	2013	2015
$X \geq 60\%$	60	50	40	30	25	15	10	0
$45\% \leq X < 60\%$	40	35	35	30	25	15	10	0
$35\% \leq X < 45\%$	35	30	30	25	20	15	5	0
$30\% \leq X < 35\%$	30	25	25	20	17	10	5	0
$25\% \leq X < 30\%$	25	20	20	15	15	10	0-5	0
$20\% \leq X < 25\%$	20	20	20	15	15	10	0-5	0
$15\% \leq X < 20\%$	15	15	15	10	10	5	0-5	0
$10\% \leq X < 15\%$	10	10	10	10	8	5	0-5	0
$7\% \leq X < 10\%$	7	7	7	7	5	5	0-5	0
$5\% \leq X < 7\%$	5	5	5	5	5	5	0-5	0
$X < 5\%$	Standstill							0

*The first date of implementation shall be 1 July 2005.

Source: Annex 1 of the Agreement on Trade in Goods of the FACEC: Modality for Tariff Reduction and Elimination for Tariff Lines placed in the Normal Track

b. Cambodia, Lao PDR and Myanmar

Table 4. CLM's Preferential Tariff Rate

X = Applied MFN Tariff Rates	ACFTA Preferential Tariff Rate (Not later than 1 January)							
	2005*	2006	2007	2008	2009	2011	2013	2015
$X \geq 60\%$	60	50	40	30	25	15	10	0
$45\% \leq X < 60\%$	40	35	35	30	25	15	10	0
$35\% \leq X < 45\%$	35	35	30	30	20	15	5	0
$30\% \leq X < 35\%$	30	25	25	20	20	10	5	0
$25\% \leq X < 30\%$	25	25	25	20	20	10	0-5	0
$20\% \leq X < 25\%$	20	20	15	15	15	10	0-5	0
$15\% \leq X < 20\%$	15	15	15	15	15	5	0-5	0
$10\% \leq X < 15\%$	10	10	10	10	8	5	0-5	0
$7\% \leq X < 10\%$	7**	7**	7**	7**	7**	5	0-5	0
$5\% \leq X < 7\%$	5	5	5	5	5	5	0-5	0
$X < 5\%$	Standstill							0

*The first date of implementation shall be 1 July 2005.

**Myanmar shall be allowed to maintain ACFTA Rates at no more 7.5% until 2010.

Source: Annex 1 of the Agreement on Trade in Goods of the FACEC: Modality for Tariff Reduction and Elimination for Tariff Lines placed in the Normal Track

(2) Sensitive Track

Comparing to ASEAN 6 and China, CLMV countries can enjoy the preferential treatment in terms of the tariff lines in Sensitive and Highly Sensitive Track according to Annex 2 of the ASEAN-China Trade in Goods Agreement (2004). Despite of the 400 tariff lines that ASEAN 6 and China can select as the Sensitive Track, Cambodia, Lao PDR, Myanmar, and Vietnam can select up to 500 tariff lines at the HS 6-digit level, while Vietnam's ceiling of importation shall be determined no later than 31 December 2004³. For Highly Sensitive List, while ASEAN 6 and China can enjoy not more than 40 percent of the goods listed in the sensitive list or about 100 tariff lines as the Highly Sensitive List, Cambodia, Lao PDR, Myanmar and Vietnam can select 40% as same as ASEAN 6 and China. That means the goods listed as the Highly Sensitive List for CLMV countries accounted for 150 tariff lines in the total 500 sensitive lists. Likewise, Vietnam's Highly Sensitive lists shall be determined no later than 31 January 2004 as same as stated for the Sensitive Track⁴.

Regarding to the timelines for tariff reduction and elimination of goods listed in the sensitive and highly sensitive list, Article 3, Annex 2 of the ASEAN-China Trade in Goods Agreement (2004) stated that CLMV

³ Article 1, Annex 2 of the ASEAN-China Trade in Goods Agreement (2004), Modality for Tariff Reduction/Elimination for Tariff Lines Placed in the Sensitive Track

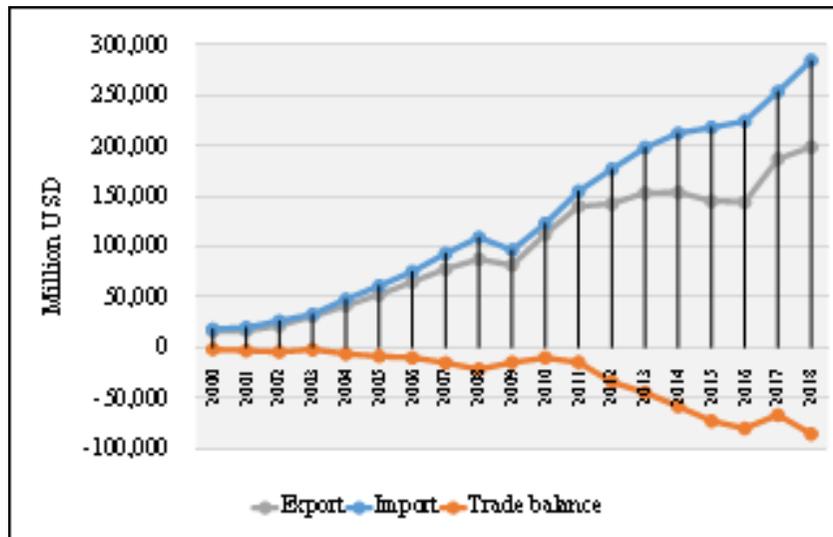
⁴ Article 2, Annex 2 of the ASEAN-China Trade in Goods Agreement (2004), Modality for Tariff Reduction/Elimination for Tariff Lines Placed in the Sensitive Track

countries shall reduce the tariff rates of the goods in sensitive track to 20% no later than 1 January 2015, thus, subsequently reduce to 0-5% within 1 January 2020. The tariff rates of the goods in Highly Sensitive track shall be reduced to not more than 50% by 1 January 2018.

2.2. Changes in trade volumes of ASEAN to China

The volume of exports and imports with China rapidly increase from the early 2000s. Within each 5 year terms, the number of multilateral trade between ASEAN and China continuously improves more than 150 percent. The exports of ASEAN account for USD16 billion in 2000 and surge to USD52 billion in 2005, USD112 billion in 2010, USD145 billion in 2015 and USD199 billion in 2018. Meanwhile, the imports from China to ASEAN more actively hike from USD18 billion in 2000 to USD61 billion in 2005, 122 billion in 2010, USD218 billion in 2015 and 284 billion in 2018.

Figure 1. Exports, imports and trade balance from ASEAN to China, from 2000-2018 (in million USD)



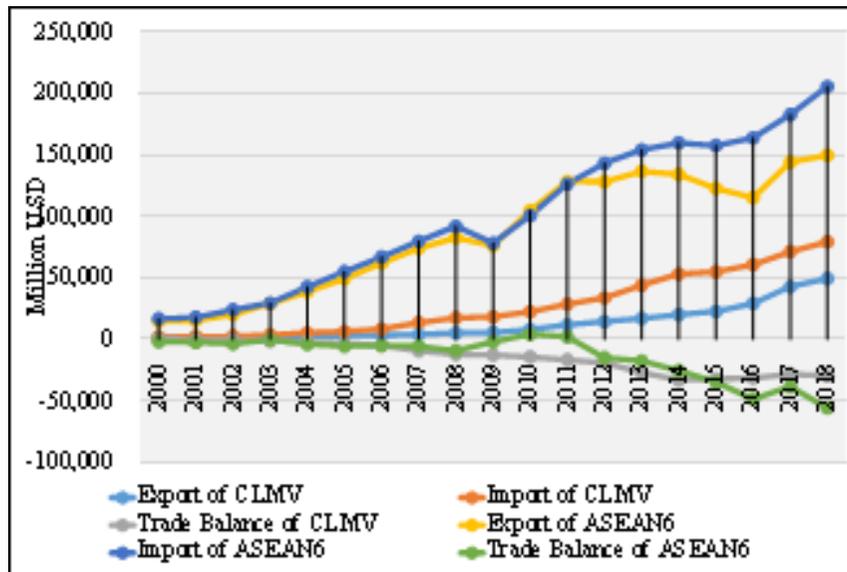
Source: Data derived from ASEAN Stats Data Portal on 2020/03/31

According to Figure 1, the trade volumes between ASEAN and China shows that ASEAN has been facing the trade deficit since 2000. Considering the structure of the exports and imports of ASEAN, degree of trade deficit is rapidly increasing especially after 2011. One of the reason would be because of the trade liberalization achievement of products in normal track under the ASEAN-China Free Trade Agreement starting to be in force in 2010 especially between ASEAN6 and China, which attracts more traffics of goods and services from China (Chiang, 2019). This makes China and its most important trading partners in ASEAN (Malaysia, Thailand and Singapore) can better interact in terms of both bilateral and multilateral trade. Likewise, the so called “ASEAN way” which acquires no

big power intervening would make China more comfortable to continuously cooperate in terms of economic with ASEAN (Kuik, 2005). In ASEAN perspective, the necessity of importation for supplying in the infrastructure development such as electrical machinery, steel and iron, daily basis products as well as the other intermediate materials for manufacturing the final goods and supplying into global value chain positively bring ASEAN's trade deficit to be more favorable rather than unfavorable balance of trade.

However, we should not solely see the improvement of multilateral trade between only the big group of 10 ASEAN countries and China, but also look at the changes in sub group of ASEAN6 and CLMV countries. Considering the fact of the development degree in each country within ASEAN, the newer ASEAN members namely Cambodia, Lao PDR, Myanmar and Vietnam (CLMV) would be differently beneficial from the agreement. It results the decision of the preferential treatment for such group of countries, aiming for the purpose of reducing the economic gap within the region, thus, providing more length of time to prepare the domestic sectors and related regulations for the upcoming liberalization.

Figure 2. Exports, Imports and Trade balance of ASEAN6 and CLMV to China, from 2000-2018 (in million USD)



Source: Data derived from ASEAN Stats Data Portal on 2020/03/31

Figure 2 explains the differences between the changes in trade volume between ASEAN6 and CLMV countries with China. From the figure 2, the export and import of both groups are similarly growing in the same way, even ASEAN6 conquers higher trade volumes than those newer ASEAN countries. For ASEAN6, the export to China after the establishment of ACFTA in 2005 significantly improved from USD15 billion in 2001 to USD61.8 billion in 2006. Due to the effect from the world economy in 2008, the export dropped from USD82.4 billion in 2008 to be USD76.1 billion in 2009, but quickly recovered and arose again to 10.4 billion in 2010, 12.2 billion in 2015 and 14.9 billion in 2018. While imports also change in the similar way accounting for USD17.6 billion in 2001 and went up to

USD66.8 billion in 2006 after one year of the implementation of ACFTA. Later, due to the crisis, it together fell with exports from USD91.9 billion in 2008 to 78.2 billion in 2009, but returned to rise at 15.7 billion in 2015 and 20.5 billion in 2018.

For CLMV countries, both exports and imports started at quite low numbers at USD2.7 billion and USD5.19 billion in 2004 and 2005 respectively. After the Early Harvest Program started in ASEAN6 and China, trade volumes of the CLMV region with China still remained low until 2008, which exports surged to be USD5 billion, at the same time, imports became USD17.2 billion. While the trade volumes of ASEAN6 with China experienced the down turn from the effect of the world economy in 2009, CLMV countries were likely to be less negatively affected showing the continuously growing in both exports and imports throughout 13 years of economic liberalization (2005-2018).

Another similar point is both sub groups of ASEAN are likely to import more goods from China rather than export, thus making both having the trade deficit especially the CLMV countries. For ASEAN6 and China, trade balance after two years of completing the normal-track product liberalization in 2010 changes from the surplus (4.09 billion in 2010 and 1.9 billion in 2011) to be deficit (-15.09 billion in 2012 and -17.6 billion in 2013). The trade deficit continuously broadens to even excess the deficit in

CLMV with China in 2015 at -34 billion and becomes -56 billion in 2018. While CLMV endures the deficit at -3.25 billion in 2005 and -14 billion in 2010, but starts to recover in 2015 at -32.2 billion after achieving the fully liberalization of the products in normal tracks under the ACFTA. CLMV maintains to better the balance of trade by outstripping the trade deficit of -31.6 billion (2016), -28.3 billion (2017) and -29.8 billion in 2018).

Despite of the similarity, we can still notice some differences in the fluctuation of trade flow in two sub groups (ASEAN 6 and CLMV). Both exports and imports of ASEAN6 are comparatively more fluctuating especially during the global economic crisis in 2008-2009, while CLMV is barely affected by such incident. Additionally, even though ASEAN6 can recover from the recession, but the exports to China since 2010 cannot catch up with the import values from China like ever before, resulting the bigger trade deficit of ASEAN6 with China.

The reason behind the increasing value of imports and exports while at the same time facing the growing trade deficit in ASEAN6 would be because of the upgraded domestic industries in China. Such upgrading economic policy enables the substitution of ICT imports from ASEAN6 with the domestic ICT products (Cheong, Wong, & Goh, 2016). Another reason would be the less-to-zero improvement in technology in ASEAN6, thus bringing to less comparative advantage in such products which once

used to be the main exporting items (Tham, Andrew Kam, & Abdul Aziz, 2016). However, in order to see the clearer picture of the effects of ACFTA on member country's trade flows, the next section presents the quantitative analysis to support and shed light to answer the hypothesis whether there is the trade creation resulting from the ASEAN-China Free Trade Agreement.

Chapter 3. Literature Review

3.1. Trade Creation and Trade Diversion Effects of FTA

The expansion of regionalism increases the numbers of FTAs thus bringing more studies with different thoughts and arguments mainly based on the effects of regional trade agreements on trade flows, covering both qualitative and quantitative approach. Most studies about the trade effects of FTA mainly investigate the concept, so called “trade creation” and “trade diversion” effect. Trade creation effect, according to the classic literature of (Viner, 1950), defines the increase in volumes of bilateral trade between the FTA member countries as a result of the lower-cost products. Otherwise, trade diversion effect refers the inversed impact on trade flows between the FTA member countries and the non-FTA member countries as FTAs would likely result the substitution of products previously importing from the non-member countries.

Under the qualitative methodology, the famous ‘Gravity Model’ and ‘Indicator of international trade’, for instance intra or inter regional trade share, and trade intensity are seemingly the most widely used to examine the correlation between the trade flows and the presence of FTAs. The results of study are various according to the parameter values and initial economic structure (Burfisher, Robinson, & Thierfelder, 2001). Some indicate that FTA is beneficial for member countries, while some argue that

FTA is somehow harmful not only for the member countries but also negatively affect other countries outside the agreements.

In 1970s, the effect of regional trade agreements in Europe (EEC and EFTA) was firstly examined by applying the traditional specifications of Gravity model (Aitken, 1973). The result bringing the evidence that there are the trade creation and trade diversion effects appearing between the members and non-members of trading blocs. (Frankel, 1997) also studied and compared the impact of various FTAs by extending the method of gravity model. His study confirmed that the preferential trade in the Andean group, MERCOSUR, and ASEAN significantly increase the trade volume for the member countries. Later, there are more studies investigate and compare the same effects on trade flows but taking more variety of FTAs existing in the world. (Musila, 2005) also applied gravity model to compare the effects of COMESA, ECCAS and ECOWAS. The study suggested that the intensity of trade creation effect in ECOWAS is comparatively higher than COMESA, while such effect is not significantly correlated with the group of ECCAS. For trade diversion effect, the magnitude is likely small for all three FTAs. (Mukhopadhyay, Thomassin, & Chakraborty, 2012) adopted the Global Computation General Equilibrium Model (CGE) to forecast the impact of the economic integration between Latin American countries and India (LAC-India) as well as LAC-EU. The findings show that the member countries of both agreements gain benefits from the

integrations, while it will unfavorably diverse the trade with the non-members of trading blocs. However, they further examine the effects in short and long run for both groups which resulted the different evidence that LAC-India is comparatively beneficial for members in the long run than LAC-EU.

The more studies found out to support that the effect of FTA are variety based on the different FTAs, products and methods that the researchers adopted. (Urata & Okabe, 2007) attempted to develop the Gravity model approach by adding more samples together with the trade indicator of intra-FTA independence to capture the trade creation and trade diversion. The results revealed that trade effects of EU, NAFTA and MERCOSUR are diverse depending on the products, but not in the case of AFTA. (Mölders & Volz, 2011) tested the hypothesis regarding the trade creation of various FTAs in East Asia by obtaining several tools such as traditional pooled OLS, generalized least squares with random effects, fixed effect, Tobit regression, Poisson and negative binomial. They confirmed that the results of each specification are various leading to different conclusions. However, after comparing all methods and numerous FTAs, they implied that the trade creation effects of bilateral agreements are more likely to be larger and more significant, while the difficulty and complication in negotiating during the application of multilateral trade agreements led to the insignificantly negative effects on trade flows.

3.2. Existing Studies about Effects of ASEAN-China FTA

Related to the topic of our research about the ASEAN-China Free Trade Agreement (ACFTA), the researchers mainly explain the trade effect of ACFTA descriptively and quantitatively by applying various specifications of the gravity model and the Global Computation General Equilibrium Model (CGE).

(Chirathivat, 2002) applied the CGE model to examine the effect of ACFTA and found that the member countries would be beneficial from implementing the FTA. In particular, China will gain more imports of rice, sugar and vegetable oil, while also seemingly exports more of fruits. (Park, 2009) used both qualitative and quantitative method to analyze the effect of ASEAN-China Free Trade Agreement on welfare and output gains of the member countries. Under the quantitative methodology, the study also adopted CGE approach to examine numbers of producers, consumers and trading partners. The result of CGE estimation provided the evidence that ACFTA would lead to trade creation and trade diversion effects among member countries with non-member countries. After that, they further compare the ACFTA with other ASEAN relating FTAs especially ASEAN+3 including ASEAN-Korea Free Trade Agreement (AKFTA) and ASEAN-Japan Free Trade Agreement (AJFTA) by maintaining the same approach (Estrada, Park, Park, & Park, 2011). They found that the size of

FTA determines the effect of it. More specifically, ASEAN is likely to gain the most in terms of welfare and substantial outputs from ASEAN+3 FTA. China, due to its status of regional production networks, will comparatively maintain the gains from FTA, while Japan's technology and Korea's manufacturing exports will be the factors making the similar trade creation effects from ASEAN+3 FTAs.

On the other hands, there are more studies on the trade creation and trade diversion effects of ASEAN-China Free Trade Agreement that obtain the Gravity Model. (Robert, 2004) used the traditional OLS method to examine the Linder Hypothesis in ACFTA together with the preliminary data from 1996-2000 and proposed that Gravity Model is the most suitable methodology for analyzing the effects of ACFTA. However, his results of trade creation as well as GDP per capita appeared to be statistically insignificant. (Sheng, Tang, & Xu, 2012) applied the extended Gravity Model (country-specific fixed effects) with 117 country data from 1980-2008 to assess the impact of ACFTA on ASEAN and China's trade flows and trade patterns. The study suggested that ACFTA provides the large impact on bilateral trade on final goods and parts and components between ASEAN countries and China, however, trade creation effects outshined trade diversion effects. (Yang & Martinez-Zarzoso, 2014) obtained several approaches of Gravity Model: pooled OLS, random effects, time-and-country fixed effect and country-and-time effects with country-paired

effects of to investigate the panel dataset of 31 countries from 1995-2010. They found that the last method of country-paired fixed effect with the control of time and country bring the most appropriated result as positive trade effect among member countries as well as extra-bloc members. Then, they further examined each category of trading products: agricultural goods, manufactured goods, chemical goods, and machinery and transport equipment. The result shows that trade creation effects can be significantly found in manufactured goods, machinery and transport equipment, and chemical products respectively, while the effect in agricultural goods is not significant.

Apart from the studies that found positive effects of ACFTA, there are also numbers of literatures which applied Gravity model but found the negative results. For instance, (Tham & Andrew Kam, 2014) used standard Gravity model to examine the effects of trade in parts and components and non-parts and components between ASEAN5 and China in 1992-2011. The results are different between 2 sectors: P&C is not significant, but final goods are positive and significant. (Nguyen, 2016) also applied the similar specifications of country-and-time fixed effect together with country-pair on panel data of member countries with other 172 trading partners from 1995-2014. He specifically divided the group of ASEAN out of China, and also CLMV out of ASEAN. He concluded the study with the different result according to the specifications that under pooled OLS estimation, ACFTA

brings the increase in trade flows to member countries. However, after applying the time-and-country fixed effect, the effects of ACFTA on ASEAN and China become negative. For individual countries, the trade creation effects are various, hence it is hard to conclude with one result as negative or positive.

Taking into account the few studies on ACFTA that specifically examine the effects on individual countries and sub-country such as ASEAN-6 and CLMV, therefore, our study will further develop the analysis of the trade effects of ACFTA on those particular by applying the specifications of Gravity Model.

3.3. Empirical literature on Gravity Model

Gravity Model has been widely used to analyze the effect of cross-country trade flows for more than decades. The first pioneer literature in economics that attempted to apply gravity model to examine the effects of international trade is (Tinbergen, 1962). His study follows the similar pattern with Newton's "Law of Universal Gravitation" as the bilateral trade between A and B will be "proportional to the gross national products of those countries and inversely proportional to the distance between them".

$$X_{AB} = \frac{(GDP_A)(GDP_B)}{(Dist_{AB})}$$

Since then, there are several studies been using, criticizing and modifying the gravity model to examine the effects to trade flows bringing important evidence on international trade. (Anderson, 1979) is also considered to be one of the most important theoretical foundation to criticize the application of gravity model to explain the linkage of trade flows and distance in international trade theory. The model was applied together with commodities by differentiating goods according to country of origin, while taking into account the factor of distance, market-clearing condition, and consumer's preferential point of view over products. The study confirmed the significant result that large economic countries tend to export and import more. The longer distance creates more transportation costs, thus reducing the trade between countries. The similar results of the effect of trade flows and distance variable were derived in the studies of (Krugman, 1980) explaining how trade flows proportionally correlates to the size of economic, and inversely proportional to trade barrier and distance in general. However, the precise reasons explaining the relation between the volume of trade and distance are still in doubt.

Therefore, many researchers developed the gravity model with numerous instruments to better analyze the trade flow effects of various regional and bilateral trade agreements. The studies further included dummy variables which differently take value of 1 according to the status of particular countries if they belong to the same agreement. Furthermore,

other treatment effects that are assumed to affect the changing in exports and imports are also added such as number of population, GDP per capita, income level, exchange rate, migration flow, foreign direct investment, as well as the conditions within country: whether the country is landlocked, sharing border, having common language, common colonized background, democratic level, etc. (Frankel, 1997) assessed both economic and political aspects to capture the characteristics of regional trading blocs which found the positive effect in the group of MERCOSUR and AFTA but not in EU and NAFTA, thus proposing the basic formula of gravity model:

$$\ln(T_{ij}) = \alpha + \beta_1 \ln(G_i G_j) + \beta_2 \ln(Gpc_i Gpc_j) + \beta_3 \ln(D_{ij}) + \beta_4 A_{ij} + \beta_5 L_{ij} + \beta_6 PTA_{ij} + u_{ij}$$

Where T_{ij} denotes trade flows between country i and j ; G_i and G_j are national income of country i and j respectively, measuring by GNP according to (Frankel, 1997); Gpc_i and Gpc_j denote income per capita; D_{ij} is distance between country i and j ; A_{ij} refers adjacency variable which take value of 1 if both countries share the border, and take value of 0 if not; L_{ij} measures whether both have common language which take value of 1 if there is, and take zero if there is none; PTA_{ij} is dummy variable, referring value of 1 if the countries are involved in the same preferential trade agreement, and zero otherwise. The formula provides significant method to

deal with the zero bilateral trade by including logarithm $\ln(T_{ij})$ as the zero value will be dropped from the analysis. Otherwise, his basic formula cannot capture the existing problem before the modification.

(Anderson & Wincoop, 2003) developed the answer for puzzle of gravity model by incorporating multilateral resistance variables as effects in trade costs thus becoming one of strong contributions in geographic border effect on trade flows. The study shows that the barriers of trade cost such as distance, landlocked, common language and adjacency is not the only determinant that reduces the sized-adjusted trade. The so-called “multilateral resistance”, which refers the average weight of trade cost in particular partner country relative to the same average trade costs appearing in all other trading partners, also influences the impact of bilateral trade. Thus yielding the equation:

$$X_{ij} = \frac{Y_i Y_j}{Y^W} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma}$$

Where X_{ij} denotes exports from country i to j ; Y_i and Y_j refer gross domestic production in country i and j ; Y^W is world nominal income which $Y^W = \sum_j Y_j$; t_{ij} refers trade cost factor between i and j ; P_i and P_j are price of trade barrier in country i 's and j 's exports and imports, changing in accordance with trade costs from distance (multilateral resistance terms);

And $\sigma > 1$ denotes elasticity of substitution between all commodities. According to the study, in order to minimize the bias in preference, it is recommended to include the multilateral resistance variables into the future implication of gravity model in various contexts that focus on aspects of trade barriers.

3.3.1. Dealing with Endogeneity Bias Issue

Even though the gravity model has been developed over decades by several researchers, the limitations of it are still existing. More specifically, the studies found that the standard log-linearized equations estimated by using ordinary least square (OLS) are likely to severely exaggerate the result of FTA effects. The reason is because there is the presence of unobserved error terms bringing the endogeneity biased estimates. (Magee C., 2003) attempted to derive the unbiased coefficient for the effects of preferential trade agreements on trade flows by treating trade flows and PTA as endogenous variable and use 2SLS to test the result. He added more factors, following (Baier & Bergstrand, On the Endogeneity of International Trade Flows and Free Trade Agreements, 2002) that are believed to correlate with the formation of PTA such as capital-labor ratios, democracy dummy, GDP difference, GDP per capita difference, level of trade surplus, intra-industry trade share, as well as the specific parameter of the waterways and airports. The result is, however, sensitive due to the technique of cross-sectional regressions.

Later, as suggested by various scholars regarding methods to overcome omitted variable bias of analysis⁵, (Anderson & Wincoop, 2004) employs the fixed effect to control country of exporter and importer which partially solve the endogeneity bias in result of effect on trade flows, thus not much improving the econometric problem appearing in coefficient estimation by the ordinary least squares. (Santos Silva & Tenreyro, 2006) criticized the problem presenting in gravity estimation on the effect of FTA by the standard OLS as well as in (Anderson & Wincoop, 2003) estimations that under the presence of heteroscedasticity, the value of coefficient resulted by OLS is significantly bias. Additionally, when trade data is zero, the study has to deal with possible error by including logarithm and drop numbers of zero-trade pair, or running OLS on $\ln(1+T_{ij})$, or using non-linear specification as dependent variable. Thus, in order to avoid the endogeneity bias due to the unobserved data, the Poisson pseudo-maximum-likelihood (PML) estimator is suggested as substitution of the basic OLS in country-pair analysis.

According to the previous studies, one of the biggest difficulties of estimating the effects of FTA by obtaining both standard OLS or fixed effect is the time and country-selecting process. The endogeneity problem tends to

⁵ See (Matyas, 1997; Matyas, 1998; Hummels, 1999). The studies separately suggest the fixed parameters of time, and country in estimation to capture bias result due to the non-observed random variables, but could not sustancially control the multilateral resistance on the same basis as (Anderson & Wincoop, 2003).

be resulted from the unobserved heterogeneity. Hence, in order to effectively address the endogeneity problem of FTAs, (Baier & Bergstrand, 2007) provides the strong evidence by suggesting the use of country-fixed effect together with panel data as extension of time-varying fixed effect of (Anderson & Wincoop, 2003) while also remaining the paring-country dummy variables. After testing the equations with the panel approach, the country-and-time fixed effect result can capture the unbiased estimates of the FTA effects on trade flows, likewise being able to control multilateral resistance terms. (Magee C. , 2008) also examines the effect of FTA on trade flows by adopting country-pair instrument with importer-year, and exporter-year fixed effects. The new measurement indicates the significant result as the time-varying multilateral resistance variables (for instance distance, adjacency, same language) that traditional measurement cannot describe, can be effectively controlled. Furthermore, coefficient values of the FTA impact under country-pair fixed effect become less than the estimates by OLS and other separated fixed effects. Correspondingly, (Head & Mayer, 2014) further confirmed that the new gravity measurement by applying both country-pair together with country-and-time fixed effect to panel data is the most suitable approach to evaluate the effect of FTAs. Therefore, this paper will substantially apply this approach of specification to examine the hypothesis.

3.3.2. Dealing with Zero Trade Data Issue

The most common problem in estimating the effects of regional trade agreement on trade flows, especially when there is the inclusion of the developing and least developing country pairs, is the lack of data issue. The zero trade problem becomes the limitation for numbers of study bringing the biased results after generating the logarithm for variables which later leads to the disappearance of numerous data sets. Accordingly, despite of solving the endogeneity problem, researchers have been attempted to handle the crucial puzzle over decades. In particular, some adopted the method of data substitution, while some employed the censored regression model (Tobit model), thus could not effectively determine the result. (Linders & Groot, 2006) suggested the sample selection model to tackle down the zero flows. The study selectively observed only the potential trade data which may generate the profitability of trade. (Helpman, Melitz, & Rubinstein, 2008) also proposed the selection for trade partners as the first step and following with the selection of only positive trade flows as second step. However, the difficulty of exclusion the numerous variables are still in concern. Another distribution is the study of (Santos Silva & Tenreyro, 2006) introducing the use of Poisson pseudo-maximum-likelihood (PML) estimator which allows the use of zero trade flows and the error terms. After decade, (Head & Mayer, 2014) nominated the combining method between the Multi-nominal Poisson and the Ek-Tobit. Where the Multi-nominal

Poisson method applies the market-share as dependent variable instead of the pure trade flow while also adding the country-fixed effect. In contrast, the Ek-Tobit approach allows the substitution of zero data with the minimum value of that particular trade flows but under the new Tobit-typed dependent variable. He suggested to use the multi-nominal poisson method when regression estimates the poisson errors results, and obtain the Ek-Tobit approach when the estimation is normal. The main critic about this combination is still the imperfection occurring from the substitution of data which may lead to the changes of magnitudes of effects of FTAs on trade flows.

By reviewing the previous literatures, it is possible to imply that there is still non perfect solution for tackling down the zero trade data issue. Therefore, our study will carefully equip the selective method for partner countries and further employ Poisson approach.

Chapter 4. Methodology

4.1. Data

In this study, I use the descriptive and quantitative method to analyze the trade creation and trade diversion effects of the specific Free Trade Agreement. The collections of panel data are all secondary data. The study includes the export and import values of the eleven ACFTA member countries (ten ASEAN countries and China) and other thirty non-ACFTA members from 2001 to 2018. The thirty non-FTA member countries are selected according to the top thirty trading partners of ASEAN in 2005, making the available data is sufficient for analyzing the results. However, there are some less developed ASEAN countries that trade flow data in the early 2000s are still missing, for instance, Lao PDR, Myanmar, Brunei Darussalam and Cambodia, thus, becoming the limitation of the study.

I gather the collection of data to analyze the chosen topic from various sources. Firstly, the trade flow data both exports (*exp*) and imports (*imp*) between the FTA members and 30 non-FTA members are mainly obtained from the UNcomtrade. For the unavailable and zero trade flow data, I overcome the problem of missing trade flow data of ASEAN countries by substituting the data obtained from ASEAN Stats Data Portal.

Secondly, the data in the independent variables: values of Gross Domestic Products (*gdp*), and Population (*pop*) are from World Bank. Distance (*dist*), Adjacency (*adj*) and Common Language (*comlang*) are derived from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) database. Lastly, the dummy variables of ACFTA member indicate the starting year of FTA implementation as 2005, according to the ASEAN-China Free Trade Agreement itself.

The research consists of 29,520 country pairs covering 41 countries (11 FTA member countries and other 30 non-FTA member countries) in 18-year time frame from 2001-2018. This time period allows us to see the effect of FTA on each member country before the implementation of early-harvest program (2001-2005), during the implementation of early-harvest program (2006-2010), the preferential treatment for the newer ASEAN member countries (2011-2015) and after the liberalization (after 2015).

4.2. Methodology

The previous studies about the effects of the ASEAN-China Free Trade Agreement mostly obtained the cross-sectional or panel data of only some FTA member countries, while ignoring the late FTA implemented countries. The trade flow of the ASEAN6 and China were widely analyzed under the

chosen topic by using different methods including Gravity Model, Computable General Equilibrium Model (CGE) and others.

In this study, I include both descriptive and quantitative analysis to find the result of the research. The descriptive part explains the general information and analysis according to the fact of the trade flow within ACFTA member countries during 2001-2018. The quantitative analysis gathers the secondary data to analyze the effect of the ACFTA by obtaining the econometric equation of export and import values between the FTA member countries and other 30 important trading partners.

I use the gravity model to examine the trade creation effects of ACFTA on China and ten ASEAN countries. Firstly, the Ordinary Least Square Method (OLS) was applied together with 6 independent variables: GDP, population, distance, adjacency, common language and FTA as dummy variable. Furthermore, in order to minimize the possible endogeneity bias causing by unobserved variables in traditional OLS estimation, I take gravity model with time fixed effect, country fixed effect and both country-and-time fixed effect to analyze the panel data to find the effect of the ACFTA on each member countries.

Then, I carefully adopt the country-pair and time fixed effect model to test the effect on the group of ASEAN, hence separately examine the group of ASEAN6 and the CLMV countries. Furthermore, the result of the overall

ACFTA effects on eleven member countries by using the same model of country-pair and testing with all four specifications are shown under different columns separating by exports and imports. By examining the result in a group, it can shed light to see the clearer overall impact of ACFTA on specific group as a whole.

In terms of extensions, I compare the effects of ACFTA with other five ASEAN's external FTAs namely ASEAN-Korea FTA (AKFTA), ASEAN-Japan FTA (AJFTA), ASEAN-Australia-New Zealand FTA (AANZFTA) and ASEAN-India FTA (AIFTA). I created new dummy variables for each FTA according to the year when the FTA entered into force. By evaluating each FTA, I can derive the results showing the clearer picture regarding the magnitude of the ACFTA effects on trade flows. Lastly, the study moves to investigate the trade diversion effects of ACFTA on member countries' trade flows. I constructed the total trade variables for the purpose of testing its specific effects whether the trade between ASEAN and China diverges the benefits away from other non-member countries.

4.3. Model Specifications

In order to find the answer of the Hypothesis, the study applied the quantitative analysis by using the gravity model under the following equation:

$$\ln export_{ijt} \text{ or } \ln import_{ijt} = \beta_0 + \beta_1 FTA1_{ijt} + \beta_2 FTA2_{ijt} + \beta_3 FTA3_{ijt} + \beta_4 \ln GDP_{it} + \beta_5 \ln GDP_{jt} + \beta_6 \ln POP_{it} + \beta_7 \ln POP_{jt} + \beta_8 \ln Dist_{ij} + \beta_9 Adj_{ij} + \beta_{10} comlang_{ij} + \varepsilon_{ijt} \quad (1)$$

This paper focuses on the effects of the trade creation resulting from the implementation of the ASEAN-China FTA on the member country's trade flows. The author takes the trade values by separating exports and imports of China and other ten ASEAN countries as the dependent variables, while having FTA, gross domestic products of the paired countries, population, bilateral distance, adjacency, and common language as the treatment.

Table 5. Data in the estimation

Data name	Abbreviation	Unit	Status
Export, total	exp	1,000 USD	Dependent Variables
Import, total	imp	1,000 USD	Dependent Variables
Total trade	total	1,000 USD	Dependent Variables
ASEAN-China Free Trade Agreement (ACFTA) members	fta1	Binary	Independent Variables
ASEAN-China Free Trade Agreement (ACFTA) and non- ACFTA members	fta2	Binary	Independent Variables
Non-ACFTA and ASEAN-China Free Trade Agreement (ACFTA) members	fta3	Binary	Independent Variables

ASEAN-Korea Free Trade Agreement	AKFTA	Binary	Independent Variables
ASEAN-Japan Free Trade Agreement	AJFTA	Binary	Independent Variables
ASEAN-Australia-New Zealand FTA	AANZFTA	Binary	Independent Variables
ASEAN-India Free Trade Agreement	AIFTA	Binary	Independent Variables
Gross Domestic Product of country (i), total	gdp_{it}	Current USD	Independent Variables
Gross Domestic Product of country (j), total	gdp_{jt}	Current USD	Independent Variables
Population of country (i), total	pop_{it}	person	Independent Variables
Population of country (j), total	pop_{jt}	person	Independent Variables
Bilateral distance	$dist_{ij}$	Kilometres	Independent Variables
Adjacency	adj_{ij}	Binary	Independent Variables
Common Language	$comlang_{ij}$	Binary	Independent Variables

❖ Basic hypothesis

For $\frac{\partial EXP}{\partial GDP} > 0$ or $\frac{\partial IMP}{\partial GDP} > 0$ meaning, the export or import between two countries and the Gross Domestic Product (*gdp*) had a relation in the same direction, following the prediction of the gravity model that the bigger economies can lead to the larger trades. So, the study expected GDP variable to be positive.

For $\frac{\partial \text{EXP}}{\partial \text{POP}} > 0$ or $\frac{\partial \text{IMP}}{\partial \text{POP}} > 0$ meaning, the export or import between two countries and the population (*pop*) had a relation in the same direction, following the prediction of the gravity model that the economies which have more population tend to have the larger trades. So, the study expected POP variable to be positive.

For $\frac{\partial \text{EXP}}{\partial \text{Dist}} > 0$ or $\frac{\partial \text{IMP}}{\partial \text{Dist}} > 0$ meaning, the export or import between two countries and the bilateral distance between them (*dist*) had a relation in the same direction, following the prediction of the gravity model that the economies, which are closer to each other, tend to have the larger trades than the one that is far away. So, the study expected DIST variable to be positive.

For $\frac{\partial \text{EXP}}{\partial \text{adj}} > 0$ or $\frac{\partial \text{IMP}}{\partial \text{adj}} > 0$ meaning, the export or import between two countries and the contiguous border between them (*adj*) had a relation in the same direction, following the prediction of the gravity model that the economies, which share the same border, tend to have the bigger trades than the one that does not. So, the study expected CONTIG variable to be positive.

For $\frac{\partial \text{EXP}}{\partial \text{comlang}} > 0$ or $\frac{\partial \text{IMP}}{\partial \text{comlang}} > 0$ meaning, the export or import between two countries and the common language between them (*comlang*) had a relation in the same direction, following the prediction of the gravity model

that the economies, which have the similar language, will trade more than others. So, the study expected *comlang* variable to be positive.

For *fta1* meaning, the binary variable capturing only the ACFTA intra-regional trade. It is assumed to have value 1 if two countries are ACFTA members in year t , and value 0 if they are not. According to the hypothesis, the ACFTA will lead the export and import between the ASEAN countries and China to be larger. That means the study expected *fta1* variable to be positive ($fta1 > 0$).

For *fta2* meaning, the binary variable is assumed to have value 1 if country (i) is the ACFTA member and country (j) is not the ACFTA member country in year t . The variable values 0 if vice versa or both of them are neither the ACFTA members. According to the hypothesis, even the ACFTA will increase the intra-regional trade (trade creation effect), but it will not lead to the trade diversion with the non-FTA member countries. That mean the study expects the *fta2* variables to be positive ($fta2 > 0$).

For *fta3* meaning, the binary variable is assumed to have value 1 if country (i) is not the ACFTA member and country (j) is the ACFTA member country in year t . The variable values 0 if vice versa or both of them are neither the ACFTA members. According to the hypothesis, even the ACFTA will increase the intra-regional trade (trade creation effect), but it will not

lead to the trade diversion with the non-FTA member countries. That mean the study expects the *fta3* variables to be positive ($fta3 > 0$).

All FTA variables will be presented under the dummy variable (*fta1*, *fta2*, *fta3*). For ACFTA, it is considered to value 1 starting from 2005 when the agreement was firstly implemented) and value 0 otherwise.

However, according to the previous studies, the traditional gravity model could likely be bias if we ignore the specific control in the model (Magee C. S., 2008; Baier & Bergstrand, 2007). In order to appropriately reduce such limitation, it is necessary to further estimate the model according to specification such as the time fixed effects and country fixed effects to tackle down the possible endogeneity bias of the gravity equation. Therefore, this study will be taking the similar step to solve the endogeneity problem that would occur by applying the fixed effect.

Firstly, I include the time fixed effect and country fixed effect to estimate the coefficient of the ACFTA dummy variable. I together consider both overtime changeable and unchangeable conditions that can differently affect the trade flow according to the situations happened in different member countries within 18 years (2001-2018). Those variables include GDP, population and common language, border sharing, and distance. The control of time fixed effect can bring the gravity model specification as following:

$$\ln export_{ijt} \text{ or } \ln import_{ijt} = \beta_0 + \beta_1 FTA1_{ijt} + \beta_2 FTA2_{ijt} + \beta_3 FTA3_{ijt} + \beta_4 \ln GDP_{jt} + \beta_5 \ln POP_{jt} + \beta_6 \ln Dist_{ij} + \beta_7 Adj_{ij} + \beta_8 comlang_{ij} + \sum_{t=1}^{18} year + \varepsilon_{ijt} \quad (2)$$

While the controlling gravity model for the country fixed effect is:

$$\ln export_{ijt} \text{ or } \ln import_{ijt} = \beta_0 + \beta_1 FTA1_{ijt} + \beta_2 FTA2_{ijt} + \beta_3 FTA3_{ijt} + \beta_4 \ln GDP_{jt} + \beta_5 \ln POP_{jt} + \beta_6 \ln Dist_{ij} + \beta_7 Adj_{ij} + \beta_8 comlang_{ij} + \sum_{i=1}^{41} country + \varepsilon_{ijt} \quad (3)$$

However, there are still the limitation when separately using the time fixed effect and the country fixed effect (Equation 2 and 3). Mainly, the time fixed effect cannot clearly account the endogeneity of the ACFTA. If the time period is fixed, the solely country fixed effect reintroduces the inconsistency that there will always be the positive results coinciding with the positive change of the dependent variable over time, thus resulting the bias estimations (Nickell, 1981). Finally, the study chooses to further examine the effect of the ACFTA by applying the more complete version of the estimation. By combining both time and country fixed effect, the equation becomes:

$$\ln export_{ijt} \text{ or } \ln import_{ijt} = \beta_0 + \beta_1 FTA1_{ijt} + \beta_2 FTA2_{ijt} + \beta_3 FTA3_{ijt} + \beta_4 \ln GDP_{jt} + \beta_5 \ln POP_{jt} + \beta_6 \ln Dist_{ij} + \beta_7 Adj_{ij} + \beta_8 comlang_{ij} + \sum_{t=1}^{18} year + \sum_{i=1}^{41} country + \varepsilon_{ijt} \quad (4)$$

The method of applying both time and country fixed effect (Equation 4) solved the omitted variable bias problem. The biased coefficient estimation finally got minimized. Therefore, to clearly emphasizing the most important

result of the study, I mainly analyze and compare only the results using Equation (1) and (4) to show the effect of the ACFTA on each member countries.

Lastly, for a group analysis, the country-pair and time fixed effect will be obtained following the suggestion of (Baier & Bergstrand, 2007) and (Magee C. S., 2008) regarding the endogeneity bias as well as the control of time-varying variables in gravity model. I specifically generate the dummy variable to pair the exporting country and importing country, which can bring about 29,520 (40x41x18) pairs for ACFTA member country estimation, 7200 pairs for group of ASEAN, 4320 pairs for group of ASEAN6, and 2880 country pairs for group of CLMV. By using this model with our panel data, the result appropriately presents the estimated coefficient of ACFTA on the group country's trade flows.

Chapter 5. Result and Analysis

5.1. Trade creation effects

In this section, I applied the Gravity model to estimate the effect of trade creation taking place within the group of ACFTA member countries and each individual. The study takes into account the possible bias due to the omitted variables, thus, employed 4 different Gravity equations: (1) basic pooled OLS estimation, (2) Time fixed effect, (3) Country fixed effect and (4) both time-country fixed effect to capture the endogeneity bias.

5.1.1. The effects of ACFTA on all member countries

In this section, I run regression to see the overall effect of the ACFTA on 11 member countries. In order to minimize the endogenous bias, I applied the country-pair and time-and-country fixed effect, following the suggestions of previous literatures on gravity model, to estimate the regression results. Dummy variable for pairing each country was used to control the time-varying variables. In order to the more completing estimation on large panel dataset, I included more independent variables for exporters. Table 6 shows the Gravity estimation results of the ACFTA on all member countries, which column (1) presents the result by the standard Pooled OLS, column (2) indicates the result by time fixed effect, column (3) describes the result by country fixed effect and column (4) shows the result

by country-and-time fixed effect with country-pair effect. Table 7 presents the gravity estimation on imports under the same methods.

Table 6. Result of Gravity estimation of ACFTA's trade creation effects on exports

	(1)	(2)	(3)	(4)
	Pooled OLS	Time FE	Country-Paired FE	Time + Country FE With Country Pair
	(Exports)	(Exports)	(Exports)	(Exports)
ftal	0.986*** (0.0629)	1.275*** (0.0631)	-0.105* (0.0476)	-0.131** (0.0481)
lngdpi	0.886*** (0.00992)	0.941*** (0.0106)	0.618*** (0.0179)	0.769*** (0.0226)
lngdpj	0.969*** (0.00909)	1.027*** (0.00946)	0.621*** (0.0173)	0.765*** (0.0218)
lnpopi	0.124*** (0.00952)	0.0928*** (0.0095)	1.130*** (0.0506)	1.095*** (0.0516)
lnpopj	-0.0328*** (0.00829)	-0.0615*** (0.0082)	-0.126** (0.049)	-0.159** (0.0498)
lndist	-0.937*** (0.0129)	-0.928*** (0.0127)		
adj	0.311*** (0.0611)	0.311*** (0.0604)		
comlang	0.612*** (0.0304)	0.571*** (0.0295)		
_cons	-30.21*** (0.325)	-31.68*** (0.345)	-32.92 (17.86)	-39.66* (17.81)
N	28613	28613	28613	28613
R-sq	0.607	0.615	0.389	0.393
adj. R-sq	0.607	0.614	0.351	0.356
rmse	1.902	1.885	0.771	0.768

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

The overall results in table 6, under the most appropriate method suggested by existing literatures, reveal the explanation opposing our research hypothesis. Under the standard pooled OLS and time fixed effect, the treatment effect of *ftal* or ACFTA are both significantly positive at .001 level. Even though the coefficient value on column (2) is higher, but the r-square is comparatively higher accounted for 0.615, while the r-square of pooled OLS method is 0.607.

However, the coefficients of ACFTA changed to be negative after applying the country fixed effect method and time-and-country fixed effect with country-pair controls. Comparing results in column (3) and (4), the treatment effect of ACFTA under column (4) can be better captured as the coefficient is more significant and the r-square value is comparatively higher. According column (4) of country-pair with time-and-country fixed effect method, the result presents the statistically significant evidence at .01 level that ACFTA provides no trade creation to the member countries. The coefficient is negative at -0.131 point, which means when other variables are constant, all member countries will negatively lose the export values at around -0.131 point. Otherwise, the results in other variables on column (4) are mostly significant and follow our basic hypothesis, except *pop* of importer which is negative and statistically significant at .01 level. Therefore, it can explain that ACFTA statistically creates no trade creation effects on member countries' exports.

Table 7. Result of Gravity estimation of ACFTA's trade creation effects on imports

	(1)	(2)	(3)	(4)
	Pooled OLS	Time FE	Country- Paired FE	Time + Country FE with country- pair
	(Imports)	(Imports)	(Imports)	(Imports)
ftal	0.817*** (0.0676)	1.119*** (0.0675)	-0.147*** (0.0421)	-0.199*** (0.0424)
lngdpi	0.866*** (0.01)	0.927*** (0.0105)	0.768*** (0.0159)	0.969*** (0.0201)
lngdpj	1.042*** (0.0083)	1.103*** (0.00862)	0.550*** (0.0155)	0.744*** (0.0195)
lnpopi	-0.0297*** (0.00851)	-0.0620*** (0.00843)	-0.177*** (0.0445)	-0.173*** (0.0452)
lnpopj	0.0216* (0.00916)	-0.00825 (0.00895)	0.703*** (0.0442)	0.720*** (0.0449)
lndist	-0.836*** (0.0124)	-0.828*** (0.0124)		
adj	0.253*** (0.0606)	0.251*** (0.0598)		
comlang	0.502*** (0.0278)	0.459*** (0.0268)		
_cons	-30.47*** (0.327)	-32.11*** (0.345)	47.52** (16.13)	37.83* (16.05)
N	28673	28673	28673	28673
R-sq	0.636	0.644	0.436	0.443
adj. R-sq	0.636	0.643	0.402	0.409
rmse	1.783	1.764	0.696	0.692

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Concerning the trade creation effects on imports, Table 7 indicates the similar result with exports in Table 6 but showing more significant evidence

that ACFTA dummy variable is negatively related to the imports. Under column (4) the coefficient comparatively accounted the smallest value at -0.199 point and being significant in statistical way at .001 level. Hence, ACFTA neither provides no trade creation effects on member countries' imports. Besides, under country-pair with time-and-country fixed effect method, other independent variables are mostly significant thus rejecting the null hypothesis.

According to these result, the negative coefficient in both exports and imports report the important contradicting answer to our thesis as ACFTA provides no trade creation on member country's trade flows.

The overall results would leave the further curiosity on the reasons why there is no significant trade creation appearing among ACFTA member countries after the liberalization. Therefore, I further examine the trade creation effects on each member country within each sub-group in order to find the reason why there is the negative effects opposing our hypothesis.

5.1.2. The effects of ACFTA in China

The following table (Table 8) shows the preliminary result of the Gravity estimation for the trade creation effect on export volumes in China (*ftal*). Firstly, the study applied the Pooled OLS technique without any control on either time nor specific country to prove the effect of the

ASEAN-China Free Trade Agreement on the exports of China (column 1). Then, column (2) provides the further analysis by considering the time fixed effect, and whilst the country fixed effect model is separately presented in the column (3). The last model (column 4) indicates the result of ACFTA effects on China under both time-varying and country-paired fixed effect. Compared to column (2), the last two columns (3) and (4) cannot estimate the coefficient of the variables which is not divergent over times. In other words, it absorbs all time-invariant variables including distance, adjacency, and common language. The panel data was used together with all four estimations.

Table 8. Result of Gravity estimation for exports in China on exports

	(1)	(2)	(3)	(4)
	Pooled OLS	Time FE	Country FE	Country + Time FE
<i>ftal</i>	0.909*** (0.0756)	0.363*** (0.0716)	-0.0563 (0.0736)	-0.0675 (0.0529)
<i>lngdpj</i>	1.028*** (0.0272)	0.835*** (0.0228)	1.775*** (0.0442)	0.865*** (0.046)
<i>lnpopj</i>	-0.00849 (0.0298)	0.0985*** (0.0254)	0.330* (0.14)	0.197* (0.098)
<i>lndist</i>	-0.616*** (0.041)	-0.582*** (0.0266)		
<i>adj</i>	0.649*** (0.0965)	0.415*** (0.0877)		
<i>comlang</i>	1.267*** (0.108)	1.453*** (0.109)		
<i>_cons</i>	-6.295*** (0.66)	-4.172*** (0.555)	-36.90*** (1.848)	- 11.43*** (1.617)
N	720	720	720	720
R-sq	0.817	0.872	0.857	0.934
adj. R-sq	0.815	0.868	0.848	0.928
rmse	0.75	0.633	0.348	0.239

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

From the result on the first regression analyses using the basic Pooled OLS estimation (column 1), it shows the positive coefficients of ACFTA (*ftal*) with the statistical significance. That means the ASEAN-China Free Trade Agreement affects the increase in exports within China. In table 6, R-squared = 0.817 demonstrates that the independent variables can explain

81.7% of the variance in export values. In column (1), we can see that coefficient of the ACFTA (*ftal*) is equal to 0.909, while T-test value is 0.075. When we determined other variables are constant, the ACFTA (*ftal*) and the export values have been related in the same direction with statistically significance at .001 level that means when China becomes the member of ACFTA, the value of exports will positively increase by 0.909 points. Additionally, column (1) indicates most independent variables test our basic hypothesis with significance at .001 level except the population in partner country (*lnpopj*) variable, which shows the negative coefficient against the hypothesis with statically insignificance.

In column (2), the estimation with time control decreases the coefficient values in most independent variables including the *ftal* variable. The effect of ACFTA on the exports of China reduces from 0.909 to 0.363, but still maintains positive and significant at .001 level. GDP, distance, adjacency, common language variable also follows the same pattern with less effect and statically significant. While the treatment effect of population in the time fixed effect changes from negative to be positive and significant at .001 level as others, hence rejecting our null hypothesis. From the result in column (2), we can see that OLS estimation cannot fully capture the effect on the exports in China, therefore, the time fixed effect can be more accounted for the study. Therefore, both estimation give the result in the

same way of our research hypothesis, saying that ACFTA would positively create the effect of trade creation in export values in China.

Taking into account that solely running time fixed effect is still likely not able to encounter the biased results. I further test the hypothesis by using only country fixed effect. The outcome in column (3) presents the totally opposite coefficient values with both estimations in Pooled OLS method (column 1) and Time fixed effect (column 2). The treatment effect of ACFTA on China's export under the country-fixed effect becomes negative which accounted for 0.0563 with no significance in statistical.

According to the existing studies, there are many suggestions regarding the methods to minimize the omitted variable bias in estimating the effect the trade agreement including the application of both country-and-time fixed effect suggested by (Baier & Bergstrand, 2007). Column (4) utilizes both country-and-time fixed effect to examine the relation between ACFTA and the exports of China to ASEAN countries. The result similarly pursues the one in column (3) with smaller coefficient at negative 0.0675 and insignificant in statistical way. While other variables (*gdp* and *pop*) maintain positive with also lower coefficient values than column (3) and statistically significant at .001 level and .01 level respectively, thus rejecting the null hypothesis. It shows that engaging the country-and-time fixed effect allows us to better capture the unobserved bias than the solely use of time fixed

effect or country fixed effect. Hence, both numbers in column (3) and (4) refer the meaningful interpretation: the ACFTA (*fta1*) has no longer positive effect on the China's exports, and consequently denying the research hypothesis that ACFTA creates trade creation effect in export volumes of China to ASEAN.

Table 9. Result of Gravity estimation for exports in China on imports

	(1) Pooled OLS	(2) Time FE	(3) Country FE	(4) Country + Time FE
<i>fta1</i>	1.078*** (0.104)	0.801*** (0.123)	-0.221* (0.0942)	-0.14 (0.0887)
<i>lngdpj</i>	1.219*** (0.0416)	1.111*** (0.0475)	1.644*** (0.0566)	0.927*** (0.0772)
<i>lnpopj</i>	-0.228*** (0.041)	-0.169*** (0.0438)	0.713*** (0.179)	0.564*** (0.164)
<i>lndist</i>	-0.685*** (0.0637)	-0.661*** (0.0627)		
<i>adj</i>	0.175 (0.121)	0.0443 (0.132)		
<i>comlang</i>	1.161*** (0.11)	1.261*** (0.112)		
<i>_cons</i>	-7.292*** (0.866)	-6.090*** (0.932)	-40.35*** (2.366)	-19.41*** (2.712)
N	720	720	720	720
R-sq	0.771	0.792	0.768	0.817
adj. R-sq	0.77	0.785	0.754	0.8
rmse	0.921	0.889	0.445	0.401

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Despite of regression on exports, Table 9 explains the result of the similar 4 gravity estimations on China's imports. Comparing to the estimation of ACFTA effect on exports, the R-square value in imports accounted less at only around 0.771 (Pooled OLS) but not more than 0.817 (country-and-time fixed effect) which demonstrates that the independent variables can explain the changing in import values according to the equation at about 77.1 percent. According to Table 9, the coefficient of the ACFTA (*ftal*) under the Pooled OLS regression and time-fixed effect resulted in positive way and statistically significant as same as the result showing in exports. When other variables are constant, the ACFTA (*ftal*) and the import values correlated in the same direction at .001 level statistically significance. That means when China joins ACFTA, the value of imports from ASEAN will positively increase. However, in column (3) and (4), the country fixed effect and the country-and-time fixed effect model show the negative result in treatment effect of ACFTA on China's imports with significance at .05 level, which contradict the hypothesis of our research as similar as Table 8 of China's exports while other variables all answer the test at .001 level statistically significance.

Among the four models above, if we considered the most reliable method that can capture the possible bias results (country-and-time fixed effect), we can see that China gains negative impact on both exports and imports from joining ACFTA. Even though China achieves greater exports

to ASEAN, but the negative coefficient would be explained by the comparatively small margin of tariff preference used by Chinese firms when they perform the exportation. One of the limitation would be the high documentary procedures stipulated by agreement such as rules of origin (ROO) which possibly increases the compliance costs thus reducing the incentive to utilize the tariff preference provided by the FTA (Tham & Andrew Kam, 2014). In addition, (Hiratsuka, Hayakawa, Shino, & Sukegawa, 2009) gave the interesting reason that many ASEAN countries provide incentive strategy, for instance tariff reductions, on importing parts and components. This diverges the firms to employ the benefits of tariff preference under the ACFTA. Moreover, (Wang & Tong, 2010) further found that only one-fourth of Chinese firms trading with ASEAN employ preferential tariff benefit from ACFTA. By these given reasons, it proves the above quantitative result of the negative coefficient on the ACFTA effect on China's exports to ASEAN.

Along with exports, the rapid decrease of importation on electrical machinery in medium-high technology from the advanced countries in ASEAN due to the technological gap in the region would be the reason why China's imports receive negative result from ACFTA. China speedily improves its comparative advantages in various sectors, for instance manufacturing production, construction, telecommunications and information services, exceeding capacity of some advanced ASEAN

countries in productivity and exportation to China, hence greater exports back to those countries. According to (Cheong, Wong, & Goh, 2016), China's recent policies for upgrading to be advanced industrialization gives rise to China to gradually substitute the importing electrical machinery from ASEAN. Afterward, such greater comparative advantages in China would appear to be the main reason why ACFTA creates no trade creation effect on China's importation from ASEAN countries.

5.1.3. The effects of ACFTA in ASEAN

Despite of China, the effect of ACFTA differently affect the group of ASEAN. In order to examine the trade creation effect on 10 ASEAN member countries, I further generate the dummy variable for country-pair between ASEAN countries and other partners, bringing about 400 pair countries. The country-pair and time fixed effect are together utilized with panel data to answer the hypothesis in this section. Table 10 shows the regression result of exports and imports of ASEAN under the country-pair and time fixed effect.

**Table 10. Result of Gravity estimation in ASEAN using
Country-pair with Time and Country Fixed Effect**

	(1) Country-pair + Time and Country FE (Exports)	(2) Country-pair + Time and Country FE (Imports)
ftal	-0.220** (0.08)	0.0139 (0.0631)
lngdpj	0.644*** (0.0645)	0.511*** (0.0514)
lnpopj	-0.286* (0.146)	0.595*** (0.117)
_cons	-0.751 (2.458)	-12.32*** (1.981)
N	6721	6838
R-sq	0.299	0.404
adj. R-sq	0.252	0.365
rmse	1.024	0.832

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

The result above on table 10 introduces the interpretation regarding the trade creation effect of ACFTA on ASEAN member countries as a group. Column (1) indicates the regression result on ASEAN's exports, while column (2) indicates of the imports. According to column (1), the value of R-squared is comparatively small at 0.299, which means independent variables can describe about 29.9 percent in the variance of the dependent variable. Firstly, GDP variable gains the highest significance at .001 level

with the positive coefficient in the same way as we expected. However, the coefficient of *fta1* accounted in the negative way at 0.220, that means if the pair countries (ASEAN country and partners) are both included in the ACFTA, the exports are estimated to negatively affect at 0.22 point. Likewise, the estimation provides statistically significant at .01 level. Therefore, this result of ACFTA statistically contradicts our research hypothesis about trade creation effect on ASEAN's exports.

In terms of imports, the gravity estimation provides no statistically significant result. Even though R-squared value is comparatively higher than the one of exports (0.404), but the insignificant evidence provides the positive coefficient at 0.013, rejecting the null hypothesis. Likewise, GDP and Population variables are also rejecting the null hypothesis with the positive result at the .001 level significance.

For ASEAN, the country-pair and time fixed effect model introduces the totally different results on its exports and imports. Referring to our research hypothesis, the above coefficient significantly explains no trade creation effect from ACFTA in terms of exports appearing in ASEAN as a group. Otherwise, ASEAN tends to gain benefit from the liberalization under this FTA in terms of imports, even though the evidence is insignificant enough. Accordingly, we should further examine further results in each sub group and each member countries.

5.1.4. The effects of ACFTA in ASEAN6

In order to clearly see the effect of the ASEAN-China Free Trade Agreement in every member country, I exclude 10 ASEAN countries out from China, thus, breaking off 6 more advanced ASEAN countries who early joined the agreement and other 4 countries who later implement the liberalization according to the different ACFTA timeline. For ASEAN6, I combined the separated results (exports and imports) of group country including Indonesia, Malaysia, Philippines, Singapore, Thailand and Brunei Darussalam and later divided into each country to see the clearer picture of the trade creation effect resulting from ACFTA.

**Table 11. Result of Gravity estimation in ASEAN6 using
Country-pair with Time and Country Fixed Effect**

	(1) Country-pair + Time and Country FE (Exports)	(2) Country-pair + Time and Country FE (Imports)
fta1	-0.0621 (0.0765)	0.0405 (0.0574)
lngdpj	0.745*** (0.0629)	0.644*** (0.0475)
lnpopj	-0.204 (0.138)	0.498*** (0.104)
_cons	-3.948 (2.317)	-13.40*** (1.756)
N	4234	4300
R-sq	0.257	0.446
adj. R-sq	0.208	0.41
rmse	0.813	0.624

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 11 presents the result of the country-pair with time-and-country fixed effect model applying with ASEAN6 as a group. The results on table 11 of ASEAN6 group imitate the gravity model results of ASEAN group on table 10, as negative coefficient on exports and positive coefficient on imports. However, table 11 provide no statistically significant evidence that ACFTA provide trade creation effect on ASEAN6 group.

For further analysis, we should see the effect in each individual country. Table 12 shows the regression results of each ASEAN6's exports using Pooled OLS estimation (column 1) and country-and-time fixed effect (column 2), while table 13 presents the same method of result on imports.

Table 12. Result of Gravity estimation for exports in each ASEAN6

	(1) Pooled OLS (Exports)	(2) Country + Time FE (Exports)
Indonesia	-0.453*** (0.105)	0.112 (0.0631)
Malaysia	-0.358** (0.115)	-0.0441 (0.0577)
Philippines	0.277 (0.146)	-0.11 (0.103)
Singapore	-0.243* (0.107)	-0.125 (0.0723)
Thailand	0.374*** (0.0885)	-0.202*** (0.0568)
Brunei Darussalam	-0.621 (0.36)	-0.118 (0.519)

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

According to table 12, we can see the different effect of ACFTA on individual country in ASEAN6. Under the Pooled OLS regression, when

Thailand statistically gains benefit in terms of exports from ACFTA at .001 level significance, and Philippines is also positively, but not significant, affected by ACFTA, other countries such as Indonesia, Malaysia, Singapore and Brunei face the negative effect of the ACFTA with significance at 0.001, 0.01, 0.05 level and no significant level respectively. However, Pooled OLS may not be able to completely reflect the impact of the FTA.

Column (2) employs the country-and-time fixed effect, thus showing results which almost all against our hypothesis about trade creation effect in member countries. Among all ASEAN6, there is only Indonesia's exports gaining the positive coefficient on ACFTA variable but not statistically significant. While coefficient of ACFTA in Thailand's export is statistically significant at .001 level but changes to be negative (-0.202). Malaysia, Philippines, Singapore, and Brunei all negatively endure the trade creation effect of ACFTA in exportation to member countries with insignificance in statistic.

Table 13. Result of Gravity estimation for imports in each ASEAN6

	(1)	(2)
	Pooled OLS	Country + Time FE
	(Imports)	(Imports)
Indonesia	0.122 (0.162)	0.0752 (0.125)
Malaysia	0.123 (0.18)	0.230* (0.107)
Philippines	0.166 (0.208)	0.246 (0.148)
Singapore	-0.644*** (0.179)	-0.433*** (0.0837)
Thailand	0.701*** (0.135)	0.175* (0.077)
Brunei Darussalam	-0.165 (0.23)	-0.0624 (0.231)

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

For imports, the result partially answers the hypothesis that there is the effect of trade creation resulting from joining ACFTA. Under the pooled OLS estimation in column (1), Singapore significantly gains the negative coefficient in ACFTA variable at .001 level (-0.644***), Brunei also attains the negative but insignificant result from the FTA (-0.165). Otherwise, the rest in ASEAN6 all positively achieve more imports from the ACFTA, especially Thailand with the highly significant in statistical at .001 level. When applying the country-and-time fixed effect, column (2) shows the similar result as column (1) with more significance in treatment effects of

ACFTA on Malaysia's imports (.05 level), but less significant in Thailand's import values (from .001 level to be .01 level under column 2).

Both tables notably give us the answer that the effect of trade creation happening among the original ACFTA member countries in ASEAN or so called ASEAN6 is various according to each countries. This would be explained by the economic dissimilarity as well as the development in terms of population numbers and other factors (see the appendix for the detailed effects of economic distance on each country). Importantly, the interesting observation we can see is the positive impact of ACFTA is more likely to associate with imports from member countries rather than exports. In other words, ASEAN6 presumably imports more from the ACFTA member countries than exports. As same as earlier mentioned reason, the increasing comparative advantage in China on medium-high technology products leads to the capability to substitute and diminish the importation from the ASEAN6, while further exporting back to the ASEAN6 countries. This makes ASEAN6's main exporting products to China lessen rather before, meanwhile importing more of the same products from China. According to (Tham, Andrew Kam, & Abdul Aziz, 2016), the little or no improvement in manufacturing export products especially parts and components in the major ASEAN4 countries (Malaysia, Singapore, Thailand and the Philippines) to China after 2005 enables the fall in export values from the advanced group countries in ASEAN. Another reason may be the exports

from ASEAN6 are mostly under the low or zero tariff according to the duty free regulation from the free-trade zone as well as the rules of World Trade Organization, thus making exports of ASEAN6 to China under ACFTA diverted (Tham & Andrew Kam, 2014).

Despite of more imports of electrical equipment from China, the growing in manufacturing industry within the major advanced ASEAN countries, except Singapore, requires more imports of supply, for instance parts and components, from China. The different result of ACFTA in Singapore's imports would be explained by the reason that Singapore is considered to be at the frontier stage of technology development, which focuses more on planning and R&D rather than product assembly operations, while the rest of ASEAN6 are still in the learning and catching up stage, reflecting the negative impact of ACFTA on Singapore's importation of parts and components from China and member countries. Therefore, these reasons shed lights to answer that ACFTA create the trade creation especially in imports of ASEAN6 from China, but not really in terms of exports.

5.1.5. The effects of ACFTA in CLMV countries

According to (Wong & Chan, 2003), the ACFTA would differently affect the member countries depending on the industrial and trade structures,

factors and resource endowments, as well as stages of economic development of each country. With such consideration together with the different timing of the ACFTA implementation in the later ASEAN member countries (CLMV): Cambodia, Lao PDR, Myanmar and Vietnam, I additionally examine the effect of the ACFTA on the trade volumes in this group countries.

Table 14. Result of Gravity estimation in CLMV countries using Country-pair with Time and Country Fixed Effect

	(1) Country-pair + Time and Country FE (Exports)	(2) Country-pair + Time and Country FE (Imports)
ftal	-0.645*** (0.162)	-0.0958 (0.137)
lngdpj	0.524*** (0.125)	0.302** (0.108)
lnpopj	-0.258 (0.303)	0.984*** (0.267)
_cons	0.12 (5.142)	-14.83** (4.576)
N	2487	2538
R-sq	0.481	0.469
adj. R-sq	0.441	0.428
rmse	1.151	1.019

Standard errors in parentheses
 * p<0.05, ** p<0.01, *** p<0.001

Table 14 explains the Gravity model result of ACFTA on CLMV's trade flow by obtaining the country-pair with time and country fixed effect. The R-squared value of both columns accounted at around 0.4 point meaning that treatment effect of independent variables can describe about 40 percent in the variance of exports and imports. Regarding the CLMV's exports, column (1) provides the highly significant evidence at .001 level. However, the coefficient result contradicts the expectation as the point estimate is negative at -0.645. For imports, the coefficient is also negative, thus insignificant. Both columns interpret that CLMV statistically gains no trade creation effect on exports, nor imports, thus contradicting our research hypothesis.

For further analysis, Table 15 will explain the gravity equation estimating result of ACFTA on each CLMV's exports, while table 16 will be of the imports.

Table 15. Result of Gravity estimation for exports in each CLMV country

	(1)	(2)
	Pooled OLS	Country + Time FE
	(Exports)	(Exports)
Cambodia	0.287 (0.262)	-1.134*** (0.205)
Lao PDR	-0.0438 (0.341)	-0.0525 (0.814)
Myanmar	0.0286 (0.252)	-0.104 (0.497)
Vietnam	0.699*** (0.14)	-0.567*** (0.105)

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

As in individual country, under the regression with the basic Pooled OLS estimation (column 1), the result indicates that ACFTA has insignificant positive impact on exports in Cambodia and Myanmar, while being both positive as well as statistically significant in Vietnam at the .001 level. But only Lao PDR's exports endure the insignificantly negative effect from ACFTA. Column (2) shows the contradictory results under the country-and-time fixed effect which every country in CLMV gains the negative coefficient of ACFTA. Lao PDR and Myanmar has negative and still loses significance in *ftal* variable. Under country-and-time fixed effect,

however, Cambodia and Vietnam obtain the significant coefficient at the .001 level, but no longer positive. The above estimation results give us the clear explanation that ACFTA does not provide the trade creation effects on the export values of CLMV countries as we expected, thus contradicting the hypothesis.

Table 16. Result of Gravity estimation for imports in each CLMV country

	(1) Pooled OLS (Imports)	(2) Country + Time FE (Imports)
Cambodia	-0.800*** (0.231)	-0.546* (0.218)
Lao PDR	0.437 (0.29)	-0.524 (0.579)
Myanmar	0.630** (0.224)	-0.313 (0.34)
Vietnam	0.775*** (0.168)	0.595*** (0.144)

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Despite of exports, table 16 provides the regression result on imports of CLMV. For the Pooled OLS technique, column (1) shows the coefficient of ACFTA variables in most CLMV countries, excluding Lao PDR, are

statistically significant. ACFTA has the negative impact only in Cambodia's imports with 1 percent level significance. Myanmar and Vietnam achieve the positive and significant result at .01 and .001 level respectively. On the other hand, the results considering the method of country-and-time fixed effect, presented in column (2), bring negative and insignificant coefficient in ACFTA on Lao PDR and Myanmar's importation from the member countries. While Cambodia also obtains the negative regression result, but statistically significant at .001 level. However, among all 4 CLMV countries, Vietnam is the only member who maintains the positive and highly significant in statistical way at .001 level from the ACFTA in both techniques that this study uses to control the possible bias and examine the final result.

Therefore, ACFTA does not only provide no trade creation impact on CLMV's exports but, except Vietnam, neither result of trade creation happens in the imports of Cambodia, Lao PDR and Myanmar. Despite of the economic dissimilarities within the group (see the appendix for the detailed effects of economic distance on each country), this may be due to the less comparative advantage in terms of technology and productivity within these countries, therefore, making these three countries likely to export less and import less compared to other member countries. Another reason would be these countries trade more with each other and the rest of ASEAN countries by applying the preferential tariffs under the ASEAN

Free Trade Area (AFTA) instead of the ACFTA. For instance, based on the market share, the main trading partner countries of Lao PDR are Thailand and Vietnam (Sayavong, 2015). Such conditions resulted the negative outcome of ACFTA on most CLMV countries, and consequently negates our hypothesis.

On the other hand, under the liberalization, there is only Vietnam who seems to be gaining benefit in terms of importation from ACFTA members. This would be explained by the rapid growth in Vietnam's imports of intermediate goods (electrical machinery, as well as iron and steel) from China to supply domestic industry especially for manufacturing and assembling ICT products such as computers, electrical components, phones and its spare parts, and later ultimately exporting to many destinations. According to (Chiang, 2019) about Vietnam's contribution to the growing trade surplus in China, Vietnam was considered as China's second largest export destination for iron and steel (after South Korea) in 2015, and electrical machinery (after Singapore) in 2016. Due to this recent China's rising labor wage, it brought foreign manufacturing companies shifting to the lower-cost production site. Especially for Asian firms, the cheaper labor force, nearby geographical location, similar work ethics, sharing cultural values (Confucianism) as well as common history made Vietnam become alternative to China (Chaponniere, Cling, & Zhou, 2010). In this regard, Vietnam appears to be beneficial in terms of imports from the ACFTA

member countries, thus proving our hypothesis, while the rest still contradicts the hypothesis.

5.1.6. Comparing the trade creation effects of ACFTA with other ASEAN's external FTAs: AKFTA, AJFTA, AANZFTA, and AIFTA

ASEAN has been developing its economic cooperation with various countries. Among all partners, until now, ASEAN finished the negotiation and started to implement the FTAs with 6 countries including China, Korea, Japan, Australia, New Zealand and India. In this section, in order to see the clearer picture of magnitude of the effects of ACFTA, I obtain the similar methodology to compare the trade creation effects of ACFTA and other ASEAN's external FTAs with its strategic partners including ASEAN-Korea Free Trade Agreement (AKFTA), ASEAN-Japan Free Trade Agreement (AJFTA), ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) and ASEAN-India Free Trade Agreement (AIFTA) as shown in Table 17.

Table 17. ASEAN's external FTAs with 6 strategic partners

Lists of FTAs	Year of Signature	Entry into force
ACFTA	2002	2005
AKFTA	2006	2007
AJFTA	2008	2008
AANZFTA	2009	2010
AIFTA	2009	2010

Source: (1) Data in “Year of signature” are derived from website of Ministry of International Trade and Industry of Malaysia.

(2) Data in “Entry into force” are derived from website of ASEAN.org

I constructed 5 new dummy variables for AKFTA, AJFTA, AANZFTA, and AIFTA according to the year when the agreement was entered into force (following Table 17). I applied only country-pair and time-and-country-fixed effect method for examining the estimations. Therefore, Table 18 and Table 19 will demonstrate the gravity result comparing 6 ASEAN’s FTAs on member countries’ exports and imports respectively.

Table 18. Gravity Estimation of the effects of each ASEAN's external FTAs on exports under the country-pair with time-and-country fixed effect

	ACFTA	AKFTA	AJFTA	AANZFTA	AIFTA
	(Exports)	(Exports)	(Exports)	(Exports)	(Exports)
FTA	-0.131** (0.0481)	-0.105* (0.0412)	-0.122** (0.0394)	-0.251*** (0.0354)	0.0459 (0.0386)
lngdpi	0.769*** (0.0226)	0.768*** (0.0226)	0.770*** (0.0226)	0.791*** (0.0228)	0.765*** (0.0228)
lngdpj	0.765*** (0.0218)	0.764*** (0.0217)	0.766*** (0.0217)	0.786*** (0.0219)	0.761*** (0.0219)
lnpopi	1.095*** (0.0516)	1.095*** (0.0516)	1.093*** (0.0516)	1.077*** (0.0516)	1.100*** (0.0517)
lnpopj	-0.159** (0.0498)	-0.159** (0.0499)	-0.162** (0.0499)	-0.178*** (0.0498)	-0.154** (0.0499)
Indist	-0.494 (2.053)	-0.492 (2.053)	-0.493 (2.053)	-0.506 (2.052)	-0.487 (2.054)
_cons	-39.66* (17.81)	-39.65* (17.81)	-39.63* (17.81)	-40.06* (17.8)	-39.69* (17.81)
N	28613	28613	28613	28613	28613
R-sq	0.393	0.393	0.394	0.394	0.393
adj. R-sq	0.356	0.356	0.356	0.357	0.356
rmse	0.768	0.768	0.768	0.767	0.768

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 18 shows the regression result of each ASEAN's external FTAs with China, Korea, Japan, Australia and New-Zealand and India under the country-pair with the control of time and country fixed effect. The estimations indicate that most FTAs, except ASEAN-India FTA, provide the negative and significant correlation with the exports of its member countries. Among all FTAs, ASEAN-Australia-New Zealand FTA gains the highest significant and negative coefficient at .001 level, accounted at -0.251 point. While the treatment effects of ASEAN-China FTA negatively accounted at -0.131 with statistically significance at .01 level as same as ASEAN-Japan FTA (-0.122). ASEAN-Korea FTA comparatively gains less significant effects at .05 level with the coefficient value of -0.105, while ASEAN-India FTA estimation is also negative but insignificant. Accordingly, Table 13 indicates that there is no trade creation effects resulting from all ASEAN's external FTAs. Related to our topic, the effects of ACFTA is comparatively more powerful than the one of AKFTA and AJFTA, but less than AANZFTA.

Table 19. Gravity Estimation of the effects of each ASEAN's FTAs on imports under the country-pair with time-and-country fixed effect

	ACFTA (Imports)	AKFTA (Imports)	AJFTA (Imports)	AANZFTA A (Imports)	AIFTA (Imports)
FTA	-0.199*** (0.0424)	-0.135*** (0.0365)	- 0.143*** (0.0351)	-0.224*** (0.0317)	-0.0449 (0.0345)
lngdpi	0.969*** (0.0201)	0.965*** (0.0201)	0.966*** (0.02)	0.982*** (0.0202)	0.959*** (0.0203)
lngdpj	0.744*** (0.0195)	0.740*** (0.0195)	0.741*** (0.0195)	0.756*** (0.0196)	0.734*** (0.0196)
lnpopi	-0.173*** (0.0452)	-0.169*** (0.0452)	- 0.171*** (0.0452)	-0.182*** (0.0452)	- 0.161*** (0.0453)
lnpopj	0.720*** (0.0449)	0.723*** (0.0449)	0.721*** (0.0449)	0.710*** (0.0449)	0.731*** (0.0449)
Indist	-9.180*** (1.85)	-9.174*** (1.85)	- 9.175*** (1.85)	-9.183*** (1.849)	- 9.167*** (1.851)
_cons	37.83* (16.05)	37.84* (16.05)	37.87* (16.05)	37.51* (16.04)	37.81* (16.05)
N	28673	28673	28673	28673	28673
R-sq	0.443	0.443	0.443	0.444	0.443
adj. R-sq	0.409	0.409	0.409	0.41	0.409
rmse	0.692	0.692	0.692	0.692	0.692

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Regarding the imports, Table 19 presents the result of the effects of six ASEAN's external FTAs on imports of its members. The results show the similar conclusion that there is neither no trade creation effects of any FTAs on imports. Comparing to the estimation on exports in Table 18, the results

on imports are more significantly negative. Four out of five FTAs achieve the significant coefficients at .001 level, while there is only AIFTA effect that is insignificant. Among all four significant results, the treatment effect of AANZFTA again gains the value of -0.224 point. Next is ACFTA with the coefficient of -0.199, AJFTA (-0.143) and AKFTA (-0.135). That means ASEAN-Australia-New Zealand FTA (AANZFTA) strongly determines the member countries' imports the most. In the meantime, ASEAN-China FTA (ACFTA) influences the changes in imports more than ASEAN-Japan FTA (AJFTA) and ASEAN-Korea FTA (AKFTA) respectively.

Table 20. The overall Gravity estimation of the trade creation effects of ASEAN's FTAs under the country-pair with time-and-country fixed effect

	(1) (Exports)	(2) (Imports)
fta1	-0.0719 (0.0587)	-0.147** (0.0521)
AKFTA	0.0116 (0.0608)	0.000764 (0.0544)
AJFTA	-0.0414 (0.0596)	-0.0561 (0.0535)
AANZFTA	-0.420*** (0.0508)	-0.357*** (0.0456)
AIFTA	0.314*** (0.0585)	0.304*** (0.0525)
lngdpi	0.782*** (0.0229)	0.978*** (0.0204)
lngdpj	0.778*** (0.0221)	0.753*** (0.0197)
lnpopi	1.083*** (0.0517)	-0.182*** (0.0453)
lnpopj	-0.173*** (0.0499)	0.710*** (0.045)
Indist	-0.499 (2.051)	-9.183*** (1.848)
_cons	-39.85* (17.79)	37.73* (16.03)
N	28613	28673
R-sq	0.395	0.445
adj. R-sq	0.358	0.411
rmse	0.767	0.691

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

I further run regression by combining all ASEAN's external FTAs: ACFTA (*fta1*), AKFTA, AJFTA, AANZFTA, and AIFTA to see the overall effects of them on exports and imports (as shown in Table 20). The results confirm that ACFTA significantly creates no trade creation effects especially on imports at the significant level of .01. However, the ACFTA effects on trade flows are still weaker than AANZFTA which yields both significant and negative result on exports (-0.42) and imports (-0.357) at .001 level. For ASEAN-India FTA, even the coefficient estimates of its individual effects on Table 18 and 19 are insignificant, but the results after combining AIFTA with other FTA variables become strongly significant at .001 level and positive on both exports and imports at 0.314 and 0.304 respectively. This can give the interpretation that the trade creation effects of ACFTA on member countries' trade flows are negatively limited but more robust than AJFTA and AKFTA, however, still less than AANZFTA.

5.2. Trade diversion effects

Despite of the trade creation effects of ASEAN-China Free Trade Agreement (ACFTA), the study also applies the panel data to examine whether ACFTA diverges the value of exports and imports of member countries away from other non-member countries. The results on Table 21 will describe the gravity estimates of trade diversion effects on total trade under the country-pair effect with time-and-country fixed effect.

Table 21. Gravity estimation on trade diversion effects of ACFTA on total trade under Pooled OLS method and country-pair with time-and-country fixed effect

	(1) Pooled OLS	(2) Country pair + Time and Country FE
<i>fta2</i>	0.142*** (0.0317)	0.0545* (0.0224)
<i>fta3</i>	0.0882** (0.0286)	0.0392 (0.0218)
<i>lngdpi</i>	0.819*** (0.00919)	0.825*** (0.0168)
<i>lngdpj</i>	0.963*** (0.00773)	0.707*** (0.0165)
<i>lnpopi</i>	0.0290*** (0.00792)	0.227*** (0.0371)
<i>lnpopj</i>	-0.0198** (0.00757)	0.286*** (0.0369)
<i>lndist</i>	-0.921*** (0.0106)	-1.005 (1.519)
<i>adj</i>	0.343*** (0.0597)	
<i>comlang</i>	0.436*** (0.0258)	
<i>_cons</i>	-25.80*** (0.293)	-26.76* (13.17)
N	28927	28927
R-sq	0.683	0.529
adj. R-sq	0.683	0.5
rmse	1.535	0.568

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

In terms of trade diversion effects, the coefficient values of *fta2* and *fta3* variables under both Pooled OLS and country pair with Time-and-

country fixed effect indicate that there is no trade diversion effect appear as a result of ACFTA.

According to export diversion effects, *fta2* presents the exports from ACFTA member countries to the non-member countries. Both methods show the significant and positive coefficient results. Under Pooled OLS, export diversion effects of ACFTA is highly significant at .001 level, while the result of *fta2* under country pair with Time-and-country fixed effect is less significant at .05 level and positively accounted at 0.0547 point. That means the total trade within ACFTA does not negatively diverge the ACFTA member countries' exports away from other non-member countries, thus supporting our hypothesis.

Regarding the import diversion effects, *fta3* presents the imports of ACFTA member countries from the non-member countries. Comparing to the export diversion effects (*fta2*), the variable of *fta3* shows less significant results both in Pooled OLS and country pair with Time-and-country fixed effect. Even though, the estimates of import diversion effects (*fta3*) are positive, but there is only the effect under Pooled OLS method that is statistically significant (at .01 level) for analyzing. To be more specific, the *fta3* treatment result under the more preferable method of the country pair with Time-and-country fixed effect are positive but insignificant. Hence, Table 21 reveals the important evidence supporting our hypothesis that

ACFTA provides no trade diversion effects both on exports and imports with the non-ACFTA member countries.

Chapter 6. Conclusion

ASEAN-China Free Trade Agreement (ACFTA) is considered as one of the ASEAN's biggest FTAs with its strategic trading partners which includes diversity of millions populations within FTA. It comprises of various timelines depending on the different date of countries entering to be ASEAN members as well as considering the disparities of economic development. For instance, China and ASEAN6 started to implement the liberalization of most products (listed in normal track) in 2005 and completed in 2010, while CLMV countries' tariff rates began to be reduced in 2010 and completed in 2015. Accordingly, after establishment of ACFTA, the volumes of regional trade within ASEAN and China gradually hike up to the high levels, thus the trade balance has been changed. In particular, trade deficit of China with ASEAN turned to be surplus, while ASEAN6's trade balance got reversed to be highly trade deficit after 2012. In the meantime, CLMV's trade deficit over decades with China started to be better after 2015. This changes in terms of trades provided the important explanation that the effect of ACFTA may be various according to characteristics of each countries or sub-group of members.

Therefore, numbers of scholars have been showing concerns about the powerful impacts of ACFTA on member countries' economics, by putting efforts to analyze both qualitatively and quantitatively about this regional

integration. Likewise, our study examines the trade creation and trade diversion effects of the ACFTA on the member countries' trade flows including both exports and imports. I obtain the Gravity model by taking into account the endogeneity bias problem from the omitted variables. Four specifications are included to test the panel data of 41 countries which divided to be 11 ACFTA member countries and other 30 ASEAN's top trading partners. The analysis covers 18-year time from 2001 to 2018.

The Gravity estimation provided the meaningful results differing according to the specification that was used. In terms of trade creation effects, under the standard pooled OLS and time fixed effect estimation, ACFTA provides the statistically significant and positive effects on member countries' trade flows. But after applying country fixed effect as well as the time-and-country fixed effect, the trade creation effects of ACFTA reversed to be negative and statistically significant both in exports and imports thus contradicting the first hypothesis.

Furthermore, when I separated the analysis into sub-group and individual country, the results of panel data regression reveal that each member countries differently gain effects from this regional economic integration. According to the time-and-country fixed effect, the agreement significantly provides no trade creation effects on ASEAN's exports, but not significantly positive in imports. For ASEAN6, the effects of ACFTA are

negative in exports, and positive in imports but both statistically insignificant. Regarding CLMV, the trade creation effects are both negative while significant in exports, but not significant in imports. Hence, it may not be able to confirm the hypothesis that ASEAN6 are more beneficial from the ACFTA than the group of CLMV.

As a result, in order to find the reason to explain the different effects of ACFTA on the member countries, the study breaks the analysis into individual countries. The estimations show that each of member countries gains and losses differently according to the specifications of Gravity model as well as the characteristics in terms of economic cooperation of that country. Among 11 members, the results of all 4 specifications reveal that China, Thailand, and Vietnam would comparatively gain more the trade creation effects from the implementation of ACFTA. As these emerging in the regional productions and economic development, China provided the large amount of ICT equipment, electrical machinery and other substances (steels, etc.) supporting the development of infrastructures and manufacturing sectors in ASEAN. Thailand and Vietnam are also beneficial especially in terms of imports of parts and components from China to supply the manufacturing activities as emerging production base of the region. However, the negative results in most other member countries would be concluded by several reasons such as the different timelines that they started and completed the liberalization, the characteristics of

economic developments within each country (the different stages of technological development, capability in manufacturing, etc.), as well as the less incentive of firms to obtain the preference of tariff reductions from the ACFTA since other existing incentives (duty free policy for special economic zones, each ASEAN country's investment promotion regulations, etc.) provides the less complicated procedures which makes the margin of preference (MOP) comparatively larger than ACFTA.

Although ACFTA partially provides trade creation effects for some countries, but it does not create trade diversion effects with other non-member countries. The panel data analysis with 30 non-member countries presents the positive and significant results for both pooled OLS and the extended specification (time-and-country fixed effect with country pair). This may confirm that the tariff reductions among ASEAN and China does not negatively affect other trading partners. Instead, it promotes the international trade growth as member countries actively participate in the global production chains.

However, this multilateral cooperation still needs the further improvement in the way to reduce and eliminate the development gap existing between China, ASEAN's older and newer member countries. ASEAN countries should better diversify its exporting products to China. CLMV countries should also improve its technology and effectively adopt it

into the production activities in order to boost up their comparative advantage in exports. Additionally, ASEAN-China should continue building mutual benefits and trust within the bloc and the rest of the world, thus facilitating the larger and deeper regional economic integration in the near future.

Appendix

Table A1. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Brunei Darussalam's trade flows under the time and country fixed effect

	(1)	(2)
Brunei	export	import
fta1	-0.118 (0.519)	-0.0624 (0.231)
lngdpj	0.566 (0.416)	0.535** (0.192)
lnpopj	-0.29 (0.925)	0.466 (0.44)
_cons	-3.92 (15.85)	-14.56 (7.537)
N	638	707
R-sq	0.118	0.251
adj. R-sq	0.028	0.182
rmse	1.918	1.01

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A2. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Cambodia's trade flows under the time and country fixed effect

Cambodia	(1) export	(2) import
fta1	-1.134*** (0.205)	-0.546* (0.218)
lngdpj	0.689*** (0.172)	0.446* (0.184)
lnpopj	-0.247 (0.383)	2.785*** (0.457)
_cons	-6.463 (6.514)	-51.79*** (7.952)
N	715	709
R-sq	0.641	0.489
adj. R-sq	0.609	0.442
rmse	0.914	0.969

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A3. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Indonesia's trade flows under the time and country fixed effect

Indonesia	(1) export	(2) import
fta1	0.112 (0.0631)	0.0752 (0.125)
lngdpj	0.826*** (0.0529)	1.042*** (0.105)
lnpopj	-0.734*** (0.115)	0.640** (0.227)
_cons	4.036* (1.925)	-25.88*** (3.81)
N	719	719
R-sq	0.774	0.664
adj. R-sq	0.754	0.634
rmse	0.284	0.562

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A4. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Lao PDR's trade flows under the time and country fixed effect

Lao PDR	(1) export	(2) import
fta1	-0.0525 (0.814)	-0.524 (0.579)
lngdpj	0.0866 (0.491)	0.541 (0.343)
lnpopj	1.404 (2.713)	-2.001 (1.658)
_cons	-16.34 (45.46)	33.77 (28.25)
N	472	508
R-sq	0.549	0.413
adj. R-sq	0.488	0.341
rmse	1.6	1.287

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A5. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Malaysia's trade flows under the time and country fixed effect

Malaysia	(1) export	(2) import
fta1	-0.0441 (0.0577)	0.230* (0.107)
lngdpj	0.763*** (0.0476)	0.504*** (0.0883)
lnpopj	-0.0917 (0.104)	1.637*** (0.193)
_cons	-4.941** (1.744)	-28.37*** (3.235)
N	719	719
R-sq	0.747	0.589
adj. R-sq	0.724	0.553
rmse	0.257	0.476

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A6. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Myanmar's trade flows under the time and country fixed effect

Myanmar	(1) export	(2) import
fta1	-0.104 (0.497)	-0.313 (0.34)
lngdpj	0.239 (0.287)	0.605* (0.247)
lnpopj	-2.536** (0.864)	0.331 (0.6)
_cons	46.26** (15.24)	-12.69 (10.59)
N	580	601
R-sq	0.304	0.541
adj. R-sq	0.23	0.493
rmse	1.186	1.057

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A7. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Philippines's trade flows under the time and country fixed effect

Philippines	(1) export	(2) import
fta1	-0.11 (0.103)	0.246 (0.148)
lngdpj	0.789*** (0.0851)	0.739*** (0.123)
lnpopj	-0.0172 (0.185)	0.135 (0.264)
_cons	-8.735** (3.11)	-9.559* (4.436)
N	720	717
R-sq	0.464	0.403
adj. R-sq	0.416	0.349
rmse	0.458	0.652

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A8. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Singapore's trade flows under the time and country fixed effect

Singapore	(1) export	(2) import
fta1	-0.125 (0.0723)	-0.433*** (0.0837)
lngdpj	0.577*** (0.0589)	0.540*** (0.0681)
lnpopj	-0.0338 (0.129)	-0.117 (0.149)
_cons	-0.632 (2.165)	1.578 (2.504)
N	718	718
R-sq	0.631	0.619
adj. R-sq	0.597	0.585
rmse	0.318	0.367

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A9. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Thailand's trade flows under the time and country fixed effect

Thailand	(1) export	(2) import
fta1	-0.202*** (0.0568)	0.175* (0.077)
lngdpj	1.024*** (0.047)	0.524*** (0.0637)
lnpopj	-0.0444 (0.103)	0.217 (0.139)
_cons	-12.52*** (1.726)	-4.12 (2.341)
N	720	720
R-sq	0.848	0.713
adj. R-sq	0.834	0.687
rmse	0.254	0.344

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table A10. Gravity estimation of the trade creation effects of ACFTA and the effects of economic dissimilarity on Thailand's trade flows under the time and country fixed effect

Vietnam	(1) export	(2) import
fta1	-0.567*** (0.105)	0.595*** (0.144)
lngdpj	0.719*** (0.0884)	-0.0838 (0.122)
lnpopj	0.853*** (0.191)	0.561* (0.263)
_cons	-21.97*** (3.202)	3.868 (4.409)
N	720	720
R-sq	0.846	0.661
adj. R-sq	0.832	0.631
rmse	0.472	0.65

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

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국문초록

이 연구는 ASEAN 회원국 및 중국 그리고 여타 30 개의 비아세안 국가의 무역량에 대한 효과에 집중하여 'ASEAN-중국 자유무역협정'의 효과를 분석한다. 이 연구는 각 ASEAN 회원국의 서로 다른 관세 낮춤 스케줄을 간략하게 설명함을 목표로 한다. 특히, 중국, ASEAN6 국가, CLMV 국가들의 다양한 관세율에 주목하였다. 두 번째로, 이 연구는 ACFTA 가 회원국에게 득이 되었는지, 실이 되었는지를 분석하므로써 ACFTA 의 성립 이전 이후의 무역 흐름 변화를 강조하고 있다. 통계는 흥미롭게도 ASEAN6 국가들이 중국으로부터 수입하는 양이 중국에게 수출하는 양보다 비교적 많았으며, 이는 향후 무역 적자를 유발했다. 반면, CLMV 국가는 2015 에 ACFTA 에 의해 이루어진 완전 자율화 이후 무역적자를 점차 개선했다.

추가적으로, 이 연구는 ACFTA 회원인 11 개국과 ASEAN, 그리고 ASEAN 의 부가적 그룹(ASEAN6 & CLMV)의 무역창출효과를 조심스럽게 분석함을 통해 예측에 대한 원인을 찾고, 기존 논문으로 부터의 주장을 증명하기 위하여 각 국가에 끼친 효과를 분석하였다.

우리는 18 년 동안의(2001-2018) 41 개국의 패널 데이터를 중력 모델을 통해 분석하는 양적 평가방법을 통해 연구를 진행하였다. 중력 모델의 오차 가능성을 인정하고 연구는 가설을 입증하고자 Original pooled OLS estimation, time fixed effect, country fixed effect, country-and-time fixed

effect 의 4 가지 specification 을 활용하였다. 대부분의 결과는 각 국가가 서로 다른 형태의 무역 창출 효과를 갖게 되며 특히 수입의 측면에서 이득을 얻게 됨을 보였다. 수입의 측면에서 볼 때, 11 개국 중에서, ACFTA 를 통하여 가장 큰 무역 창출 효과를 본 국가는 베트남, 말레이시아, 태국이며, 싱가포르의 경우 가장 부정적인 결과를 낸 국가였다. 수출의 측면에서 볼 때, 대부분의 국가에서 눈에 띄는 무역창출효과는 없었으며 특히 캄보디아, 태국, 베트남이 그러했다. 그룹으로서의 결과를 보면, 연구는 가설의 결과를 예측하기 위하여 Country-pair 와 time-and-country fixed 효과를 적용하였다. 이 모델은 ACFTA 가 전체적인 측면에서 볼 때는 수입, 수출 어느 측면에서도 확연한 무역창출효과를 발생시키지는 못함을 보여준다. 비록, ACFTA 가 부분적으로 ASEAN 국가와 ASEAN6 국가의 수입측면에서의 이득을 발생시켰다고 할 수는 있으나 단정짓기에는 그 정도가 미미하다. 무역전환효과에 대하여는, 중력 모델의 결과는 ACFTA 가 ACFTA 회원국의 비회원국을 대상으로 한 수입,수출에 적어도 부정적인 영향을 끼치지 않는다는 것을 입증하였고, 이는 중국과 ASEAN 의 관계 속 지역경제협력에 의미 있는 결과를 제공했다고 볼 수 있다.

주제어: ASEAN-중국 자유무역협정; ASEAN6; CLMV; 무역창출효과, 무역전환효과; 중력 모델.

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