

Assessing Impacts of FTA in Thailand with Special Emphasis on Trade Creation and
Trade Diversion



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วิเคราะห์ผลกระทบของข้อตกลงทางการค้าเสรีในประเทศไทยโดยเน้นความสำคัญกับผลการสร้าง
เสริมการค้าและการเปลี่ยนวิถีการค้า



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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งานวิจัยนี้ใช้การวิเคราะห์แบบจำลองแรงดึงดูดในการศึกษาย้อนหลังเพื่อศึกษาข้อตกลงการค้าเสรีทั้ง
12 ฉบับที่มีผลบังคับใช้ของไทยว่าก่อให้เกิดผลการสร้างเสริมการค้าหรือการเปลี่ยนวิถีการค้าหรือไม่ กลุ่มตัวอย่าง
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การหาค่าผลการสร้างเสริมและการเปลี่ยนวิถีการค้าได้ถูกคำนวณโดยใช้โมเดลที่มีตัวแปรหุ่นสามตัว
เพื่อแทนค่าการค้าภายในและภายนอกกลุ่มข้อตกลงการค้าเสรี เป้าหมายคือการหาค่าตัวแปรหุ่นที่มีความเอน
เอียงน้อยที่สุด การวิจัยนี้สามารถวิเคราะห์ผลทางการค้าของข้อตกลงการค้าเสรีได้ 7 ข้อตกลงจากทั้งหมด 12
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ผลของการศึกษาแสดงให้เห็นว่าข้อตกลงการค้าเสรีอาเซียนก่อให้เกิดผลการสร้างเสริมการค้าต่อ
การค้าระหว่างประเทศของไทย และมีผลการเปลี่ยนวิถีการค้าเล็กน้อยในด้านการส่งออก การศึกษาพบว่า
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ให้เห็นว่าข้อตกลงการค้าเสรีแบบทวิภาคีมีผลต่อการค้าที่หลากหลาย ข้อตกลงการค้าเสรีไทย-เปรูมีผลการสร้าง
เสริมการค้าโดยข้อตกลงการค้า แต่ข้อตกลงการค้าเสรีไทย-อินเดียก่อให้เกิดผลการเปลี่ยนวิถีการค้า ส่วนข้อตกลง
การค้าเสรีไทย-ญี่ปุ่นและข้อตกลงการค้าเสรีไทย-ซิลิปรากกว่าสร้างผลหดตัวทางการค้า นำมาซึ่งการลดปริมาณ
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ข้อเสนอแนะทางนโยบายที่ได้จากผลการศึกษาระบุว่าประเทศไทยควรสร้างข้อตกลงการค้าเสรีกับ
ต่างประเทศมากขึ้นและทำการเจรจาข้อตกลงในนามของอาเซียนในรูปแบบพหุภาคีซึ่งสามารถสร้างประโยชน์ต่อ
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This paper uses ex-post gravity analysis to examine whether Thailand's 12 effective free trade agreements cause trade creation or trade diversion effect. The sample of the study covers 43 countries over the period of 1991-2016.

The model is specified with the aim to obtain unbiased estimates of three FTA dummy variables, representing trades within and outside the trade blocs. This study is able to analyze only 7 out of 12 total FTAs due to multicollinearity problem.

The results of this study show that AFTA has trade creation effects on international trade of Thailand with little diversion effects on exports. We found pure trade creation in exports and mild import diversion from ACFTA and AJCEP. In general, ASEAN-plus-one agreements have caused trade creation effects to Thailand's exports and some or little import diversion. On the other hand, the results suggest that bilateral free trade agreements have different trade effects. TPCEP causes pure trade creation effects on Thailand's overall trade. Results obtained from ITFTA indicate that the higher trade level from the agreement come from trade diversion effects. Regressions on JTEPA and TCFTA indicate trade contraction effects.

Therefore, this study supports the notion of trade liberalization for Thailand. The policy recommendation to Thai policy maker is that negotiations on further FTAs should be focusing on ASEAN plurilateral agreements, which tend to provide benefits to intra-bloc and extra-bloc countries.

Field of Study: International Economics and Finance Student's Signature

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Chapter I

Introduction

1.1 Overview

Free trade agreement (FTA) is an agreement made between countries to lower tariff rates as well as non-tariff barriers that would lead to trade liberalization of goods, services, and investment within the group. Ultimately, the creation of FTA aims to stimulate more trade between member countries. The number of FTAs has increased in number in both developed and developing countries.

In the past decades, international trade and investment of Thailand play a major role in driving the economy forward, improving the quality of life of its citizens, distributing wealth, and enhancing competitiveness in many sectors. At the same time, there is an increasing trend and progress in bilateral and regional integration. Only 34 new RTAs between 1990 and 1994 were notified to World Trade Organization. Later on, it doubled to 68 between 1995 and 2001. Now, there are 287 RTAs were in force and notified to WTO.

As for Thailand, the country has 23 FTAs in total (Asia Regional Integration Center), both regional and bilateral ones. According to World Trade Organization, there are 13 notified FTAs in force. However, the list include the Global System of Trade Preferences among Developing

Countries (GSTP) and Lao People's Democratic Republic – Thailand FTAs which are no longer valid. Therefore, Thailand currently has 11 WTO-notified FTAs in force: ASEAN Free Trade Area (AFTA), ASEAN–Australia–New Zealand Free Trade Area (AANZFTA), ASEAN–India Free Trade Agreement (AIFTA), ASEAN–Japan Comprehensive Economic Partnership (AJCEP), ASEAN–China Free Trade Agreement (ACFTA), ASEAN–Korea Free Trade Agreement (AKFTA), Japan–Thailand Economic Partnership Agreement (JTEPA), Thailand–Australia Free Trade Agreement (TAFTA), Thailand–Chile Free Trade Agreement (TCFTA), Thailand–New Zealand Closer Economic Partnership (TNZCEP), and India–Thailand Free Trade Area (ITFTA). In addition, there is Thailand–Peru Closer Economic Partnership Agreement (TPCEP), which is already in force but not notified to WTO yet. In total, these 12 FTAs involve 18 countries including Thailand. Those countries are Thailand, Indonesia, Malaysia, Philippines, Singapore, Brunei, Cambodia, Laos, Myanmar, Vietnam, Australia, New Zealand, India, Japan, South Korea, Chile, India, and Peru.

1.2 Objective

With a considerably amount of FTAs Thailand has, it raises the question of how the enforced FTAs have affected Thailand's bilateral trade with other countries. The objective of this paper is to find the effects of trade creation and trade diversion which are concepts introduced by Viner (1950).

If the tariff reduction from FTAs causes a member country to import more from the group and produce less domestic output, then we consider it to be ‘trade creation’. On the other hand, it is ‘trade diversion’ if FTAs causes a member to import more from another member in the group with the cost of a decrease in import from non-member countries. Trade creation presumably leads to positive welfare effects, as there is a better resource allocation, while trade diversion results in a welfare loss.

1.3 Scope of the Study

The scope of this study covers Thailand’s 11 WTO-notified FTAs in force plus Thailand-Peru FTA, hence, 12 FTAs in total. Instead of using a signed date for each FTA, the effective date is used because it indicates the period of when the actual practice of tariff reduction starts. The data is taken from World Trade Organization and Asia Regional Integration Center.

Table 1: List of effective free trade agreements of Thailand

<u>Free trade agreement</u>	<u>Date of entry into force</u>
ASEAN Free Trade Area (AFTA)	01-Jan-1993
India–Thailand Free Trade Area (ITFTA)	01-Sep-2004
Thailand–Australia Free Trade Agreement (TAFTA)	01-Jan-2005
Thailand–New Zealand Closer Economic Partnership (TNZCEP)	01-Jul-2005
ASEAN–China Free Trade Agreement (ACFTA)	01-Jan-2005
Japan–Thailand Economic Partnership Agreement (JTEPA)	01-Nov-2007
ASEAN–Japan Comprehensive Economic Partnership (AJCEP)	01-Dec-2008
Agreement Establishing the ASEAN–Australia–New Zealand Free Trade Area (AANZFTA)	01-Jan-2010
ASEAN–INDIA Free Trade Agreement (AIFTA)	01-Jan-2010
ASEAN–Korea Free Trade Agreement (AKFTA)	01-Jan-2010
Thailand–Peru Closer Economic Partnership Agreement (TPCEP)	31-Dec-2011
Thailand–Chile Free Trade Agreement (TCFTA)	05-Nov-2015

We will use ex-post analysis to find whether these 12 FTAs induce trade creation or trade diversion effect. Following the recent development in model specifications, we will obtain unbiased estimations by including multilateral resistance terms (MRTs), proposed by Anderson and

van Wincoop (2003), and controlling for unobserved heterogeneity by including country-and time effects and country-pair fixed effects, proposed by Baier and Bergstrand (2007). Policy implementation will be addressed referring to the results obtained by the estimations.

1.4 Contributions

This study provides some new aspects to the literature. First, it is the first attempt to estimate trade creation and trade diversion effects in the context of only one country's international trade after entering free trade agreements. To the best of our knowledge, previous studies only analyzed these effects from the whole trade-bloc perspective: how all intra-bloc members' trade with intra-bloc and extra-bloc countries are effected by free trade agreements. Although several researchers did analysis on some certain agreements covered by this paper, the estimation results will have different interpretation. Second, the scope of the study covers all effective free trade agreements Thailand currently has. These agreements will go through estimation process individually and collectively. By doing so, it will give us better picture without leaving behind effects from other agreements.

The structure of this paper is organized as follows. Chapter II provides brief introduction of the free trade agreements in this study. Chapter III explains the conceptual framework in details as well as literature review. Chapter IV discusses on research methodology, estimation model, and

data sources. The empirical results obtained from estimation model are presented and discussed in Chapter V. Finally, Chapter VI concludes and provides policy implementation.

Chapter II

Background of the Free Trade Agreements

2.1 Plurilateral Agreements

2.1.1 ASEAN Free Trade Area (AFTA)

The member countries of the Association of Southeast Asian Nations (ASEAN) initiated the formation of a free trade agreement (FTA) under the name of ASEAN Free Trade Area (AFTA) in 1993. With the establishment and implementation of AFTA, there are several reasons behind the agreement. First, an expansion of intra-ASEAN trade resulted by the agreement would promote economic development of the ASEAN countries. In particular, the expansion of market size through AFTA would allow producers to adopt economies of scale production. Second, a rising world trend of economic integration, especially FTAs, put pressure on ASEAN members to form an FTA, to counter the potential discrimination in their exports. Additionally, the decreasing trend of plurilateral trade negotiations occurred in the Uruguay Round has led many countries to pay more attention to regional trade agreements. Third, the Asian financial crisis in the late 1990s increased

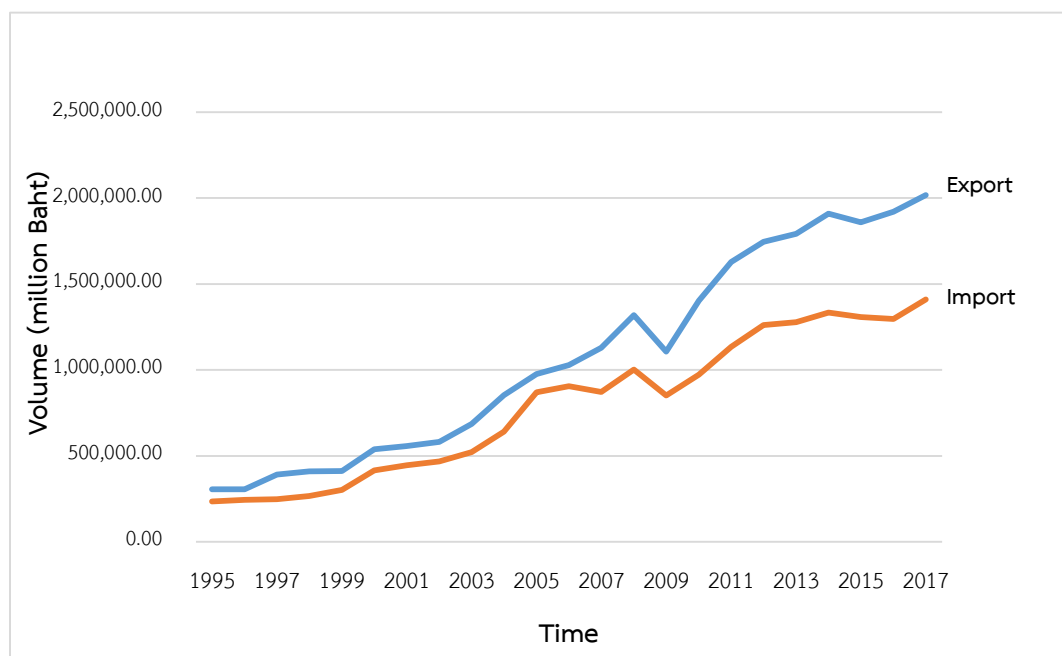
the likeliness to have economic cooperation in this region. Tariff elimination under AFTA was part of the incentive to help ease the economic instability and attract more FDI. AFTA began with six ASEAN members, namely Thailand, Indonesia, Malaysia, Brunei, the Philippines, and Singapore. Later on, Vietnam joined in 1995, Lao PDR and Myanmar in 1997, and Cambodia in 1999.

Trade liberalization under AFTA was driven by the Common Effective Preferential Tariff (CEPT) Scheme, which was set to eliminate tariffs on intra-AFTA trade. The CEPT have been in effect since January 1993. The CEPT agreement was then revised tremendously by the ASEAN Trade in Goods Agreement (ATIGA) signed in December 2008. More than 99% of the tariff lines in the CEPT Inclusion List had been eliminated in the six original AFTA members in 2010. For the new members, around 95-99% of the tariff lines had been brought down to the 0-5 percentage.

ASEAN has been a major export and import market for Thailand. In 2017, ASEAN accounts for 18.63 percent of Thailand's total imports with the growth of 13.59 percent from the previous year and 25.21 percent of total exports with 8.92 percent growth¹.

¹ http://www.ops3.moc.go.th/infor/menucomth/stru1_export/export_market/default.asp#

Figure 1: Thailand's Trade with ASEAN



Source: Bank of Thailand

2.1.2 ASEAN–China Free Trade Agreement (ACFTA)

After its great economic reform and liberalization, China has become one of the fastest growing economies in the world. China's nominal GDP reached USD 7.3 trillion in 2011. In the same year, China's export value overtook Germany in the world ranking with the total value of 3 trillion US Dollars. China also became interested in regional economic cooperation. Before the 1990s, China only had few official bilateral agreements with ASEAN members. In 2002, China and ASEAN started the negotiation to have free trade agreements with each other. In 2004, the parties launched the Early Harvest Program (EHP), which mainly reduces tariffs on agricultural goods. Later

on, the agreement on goods was signed in November 2004 and entered into force in January 2005.

According to the Asian Development Bank (ADB) 2010 report, bilateral trade between China and

ASEAN increased more than ten times between 1995 and 2008 from 20 to 223 billion US dollars.

As stated in the agreements, China and ASEAN considered having a transitory period between 2002

and 2009. The process of tariff reduction on goods traded between China and ASEAN would be

gradually undertaken. For instance, tariff reduction started in July 2005 and aimed to bring down

the tariff to zero by 2010 on about four thousand types of goods for the six original ASEAN members

(i.e. Thailand, Indonesia, Malaysia, the Philippines, Brunei and Singapore), and to five percent by

2015 for the rest of ASEAN countries (i.e. Myanmar, Cambodia, Laos and Vietnam).

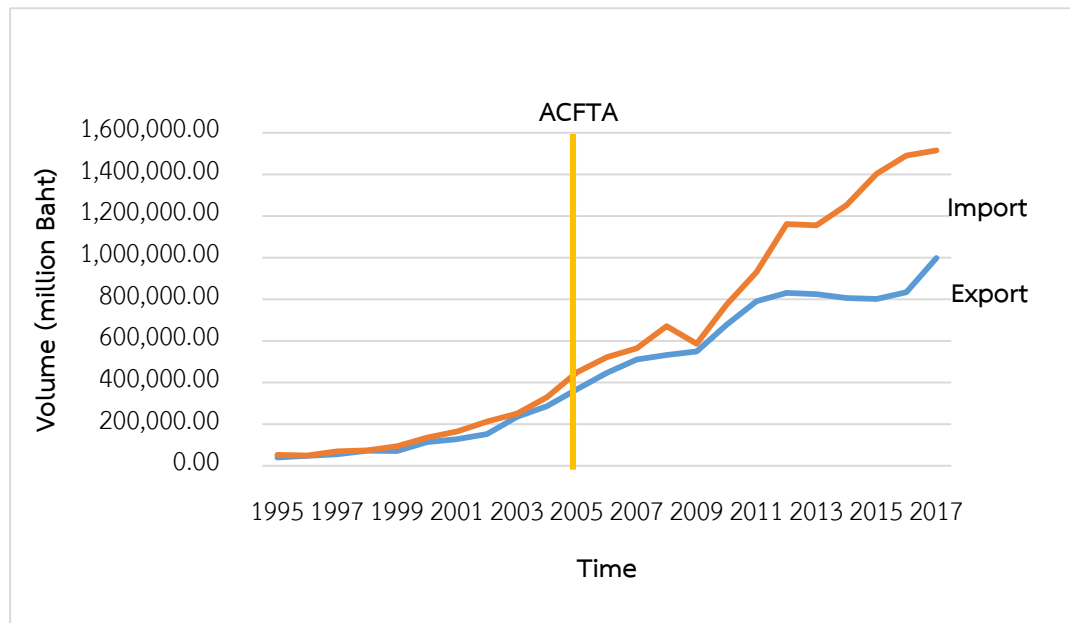
China is now one of the major markets for Thailand, as the country is ranked number one

in the list of Thailand's top trading countries with the trade value of 2,510,462 million Baht in

2017². In addition, there is large inflows of Chinese FDI and tourists coming to Thailand each year.

² <http://www2.ops3.moc.go.th/>

Figure 2: Thailand's Trade with China



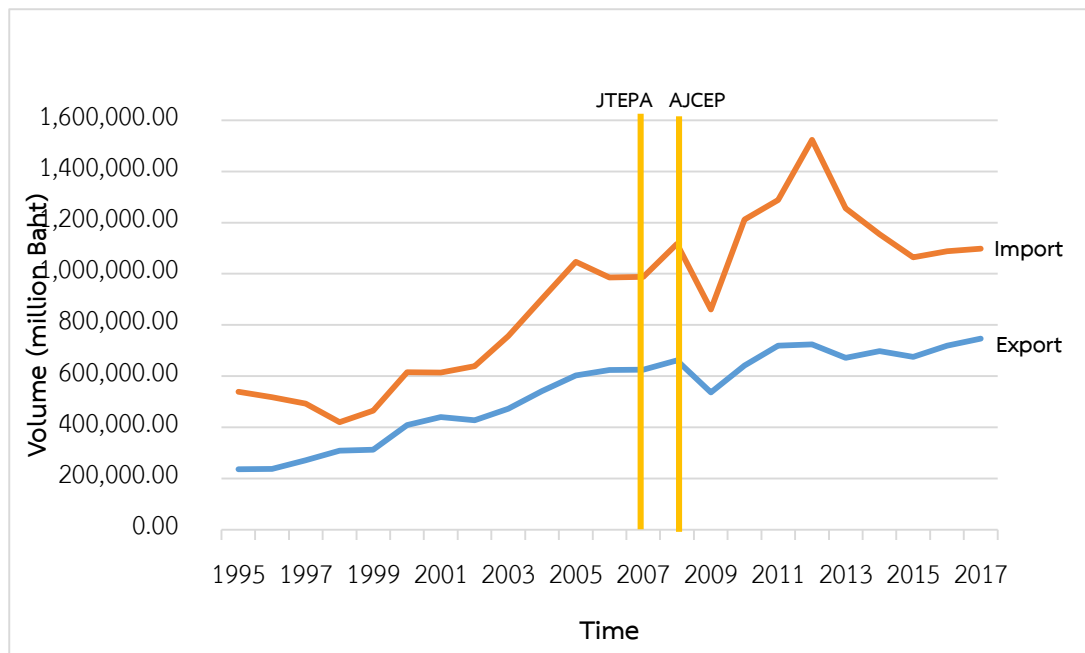
Source: Bank of Thailand

2.1.3 ASEAN–Japan Comprehensive Economic Partnership (AJCEP)

The ASEAN-Japan Comprehensive Economic Partnership (AJCEP) was implemented in December 2008. The agreement consists of trade in goods and services, investment, and economic cooperation. The duties of 87 percent of all tariff lines has been eliminated by this FTA. AJCEP is the first plurilateral agreement of Japan. Japan is known for the country with some of the most-advanced technologies in the world. Japan is the third largest economy in the world. AJCEP is the first plurilateral agreement of Japan. When combining the market with ASEAN, the number goes

beyond 700 million in size and 8 trillion USD in value³. In 2011, bilateral trade between ASEAN and Japan is valued at 273 billion USD, second only to trade volume between ASEAN and China.

Figure 3: Thailand's Trade with Japan



Source: Bank of Thailand

2.1.4 Agreement Establishing the ASEAN-Australia-New Zealand Free Trade Area (AANZFTA)

The ASEAN-Australia-New Zealand Free Trade Area (AANZFTA) is the FTA made between Australia, New Zealand and ten ASEAN member countries. In November 2004, leaders from ASEAN countries, Australia and New Zealand were gathered in Vientiane, Laos for the ASEAN, Australia and

³ <http://investasean.asean.org/index.php/page/view/free-trade-areas/view/734/newsid/775/asean-japan-comprehensive-economic-partnership.html>

New Zealand Commemorative Summit. The leaders agreed to launch negotiations for a Free Trade Agreement at the summit. The FTA was agreed by the leaders that it would be comprehensive, covering trade in goods, services and investment. The negotiation first started in 2005 and concluded in August 2008 after 16 rounds of negotiations. The agreement was signed in February 2009. The AANZFTA came into force on 1 January 2010 regarding Australia, New Zealand, Myanmar, Malaysia, the Philippines, Singapore and Vietnam. On March 2010, it came into effect in relation to Thailand. Later on in 2011, Cambodia and Laos came into effect on 4 January and 1 January. Then, Indonesia joined on 10 January 2012.⁴

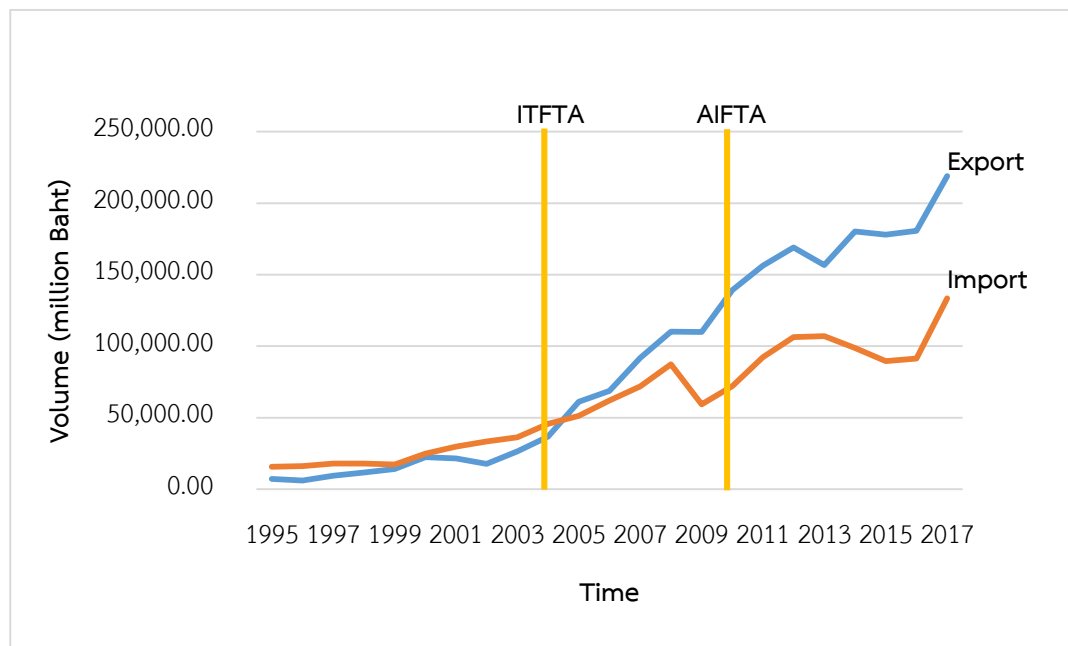
2.1.5 ASEAN-INDIA Free Trade Agreement (AIFTA)

The relations between ASEAN and India in trade and investment can be traced from 1992 when India became a sectorial dialogue partner of ASEAN in 1992, full dialogue partner in 1996, and summit-level partner in 2002. Despite the fact that there have been the consistent efforts toward the formation of an FTA, the agreement of ASEAN India Free Trade Agreement (AIFTA) was materialized only in 2009 and further implemented on January 1, 2010. In 2015, all members signed the agreement on services and investment. Trade between India and ASEAN was prospering with

⁴ <https://aanzfta.asean.org/?page=faq-on-signing-entry-into-force>

an annual growth rate of 22% in the decade until 2011-2012 until it became stagnated in 2014-2015 with value approximately 76.53 billion USD⁵.

Figure 4: Thailand's Trade with India



Source: Bank of Thailand

2.1.6 ASEAN–Korea Free Trade Agreement (AKFTA)

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ASEAN Member States and the Republic of Korea signed the ASEAN-Korea Trade in Goods

Agreement with the main objective of, which is to eliminate tariffs on products being traded, on 24

August 2006 and became effective in June 2007. Later, the ASEAN-Korea Trade in Services

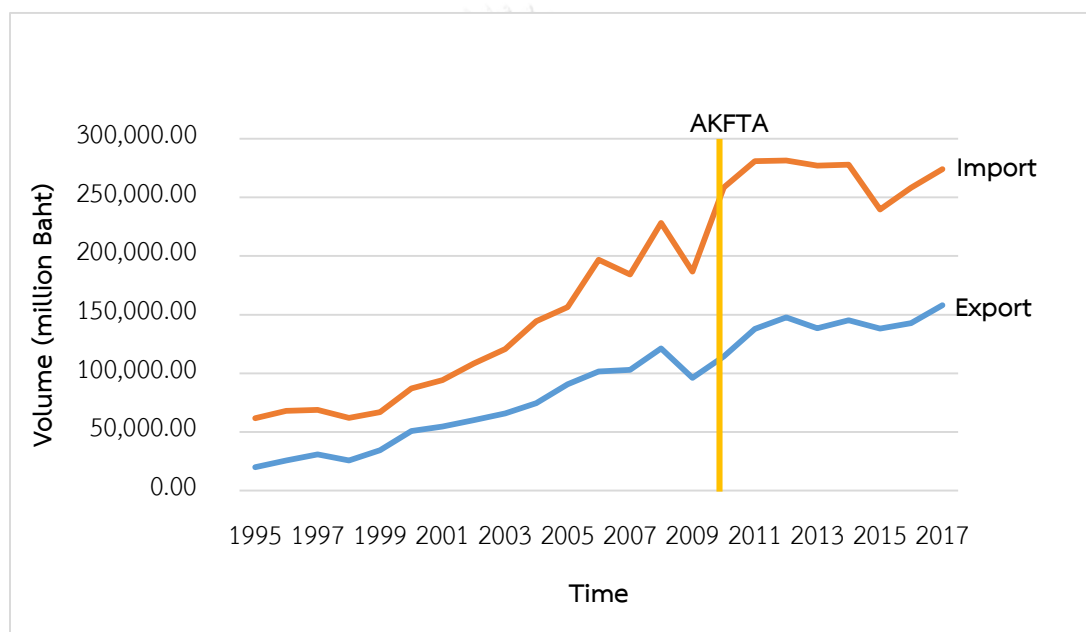
Agreement was signed on 21 November 2007 and ASEAN-Korea Investment Agreement on 2 June

2009. The information from the ASEAN Secretariat reveals that trade volume increased over 23%

⁵ <http://www.mea.gov.in/aseanindia/20-years.htm>.

in the first year of the implementation of ASEAN-Korea Trade in Goods. Bilateral trade volume between Korea and ASEAN increased almost threefold from 2001-2011 from 32 to 125 billion USD. In 2010, Korea remained as ASEAN's fifth largest trading partner, while ASEAN was the second largest trading partner of Korea. In 2018, Korea is the tenth largest trading partner of Thailand.

Figure 5: Thailand's Trade with South Korea



Source: Bank of Thailand

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2.2 Bilateral Agreements

2.2.1 India–Thailand Free Trade Area (ITFTA)

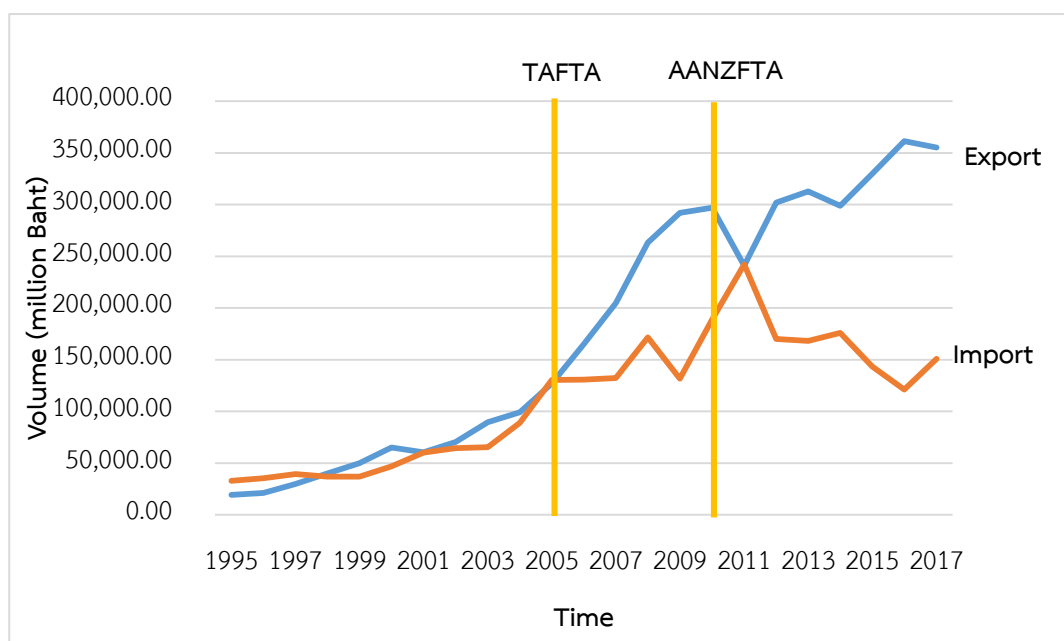
Thailand and India agreed to sign the agreement of India-Thailand Free Trade Area on 9 October 2003 covering liberalization on goods, services, and investment as well as cooperation in

other fields. The bilateral agreement of Thailand-India FTA has been implemented under the Early Harvest of 82 listed goods since 1 September 2004.

2.2.2 Thailand–Australia Free Trade Agreement (TAFTA)

The TAFTA came into effect on 1 January 2005. The agreement was Australia's third free trade agreement and Thailand's first comprehensive free trade agreement with a developed country. In 2012, which is the 60th anniversary bilateral relations between Australia and Thailand, the trade between the two countries increased significantly. During 2012, Thailand was ranked Australia's 10th largest export partner and Australia is the eighth largest partner for Thailand, highlighting the importance of bilateral trade between the two countries. As of 2018, Australia is ranked at number 8 in Thailand's top trading partners. Thailand's export to Australia mainly focuses on manufactures while Australia's exports to Thailand are primary products and manufactured metals. According to the Department of Foreign Trade, trade volume between Thailand and Australia in 2017 has grown from the implementation year in 2005 by 132.56 percent.

Figure 6: Thailand's Trade with Australia



Source: Bank of Thailand

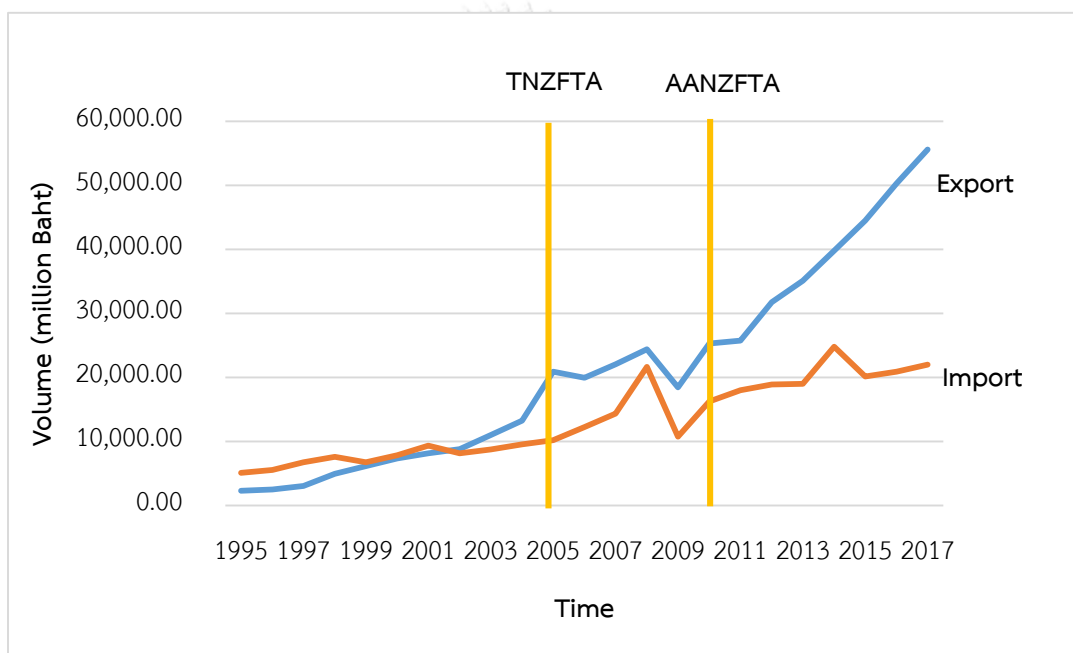
2.2.3 Thailand–New Zealand Closer Economic Partnership (TNZCEP)

Thailand and New Zealand Closer Economic Partnership (TNZCEP) was signed on April 19, 2005, and came into force on July 1, 2005. The Agreement covers the liberalization goods, services, and investment, as well as trade-related cooperation such as customs procedures, electronic commerce, intellectual property, government procurement, and competition policy⁶. At the moment, Australia and New Zealand have both reduced tariffs with Thailand to zero since 1 January 2015, while Thailand has reduced the tariffs close to zero to almost all goods from both

⁶ http://www.thaifta.com/english/eng_nz.html

countries. Some agricultural products such as dairy products are still protected but will be gradually liberalized in the future. Data from Department of Trade Negotiation shows that the trade volume between Thailand and New Zealand in 2016 has grown from the implementation year in 2005 by 194.87 percent.

Figure 7: Thailand's Trade with New Zealand



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Source: Bank of Thailand

2.2.4 Japan–Thailand Economic Partnership Agreement (JTEPA)

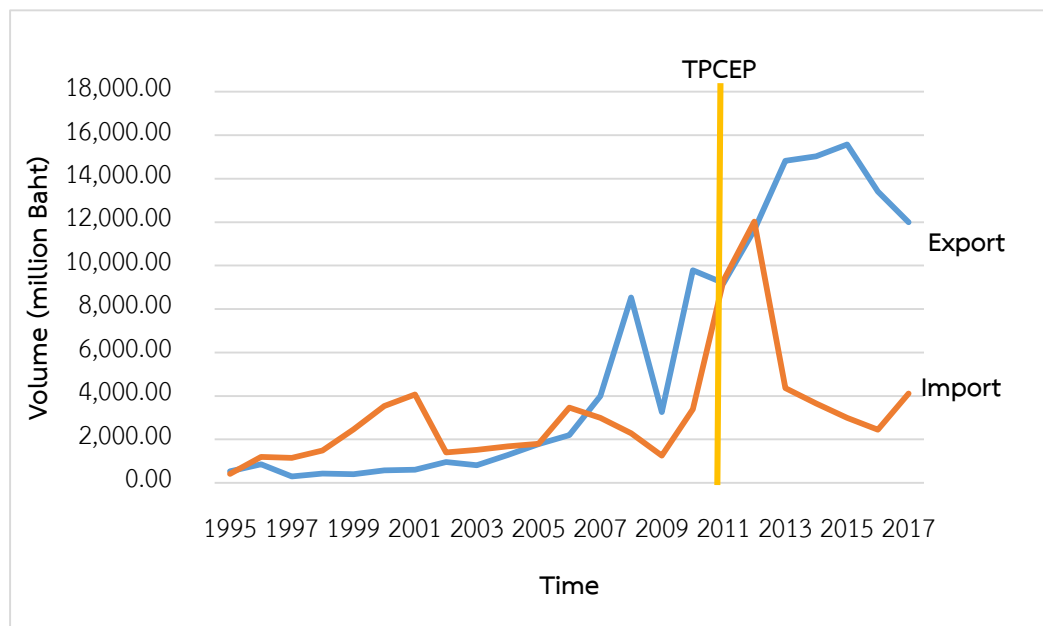
Negotiations for the Japan-Thailand Economic Partnership Agreement (JTEPA) began in February 2004, and was signed by the member leaders in Tokyo, Japan, on April 3, 2007. The Agreement later entered into force in November 2007. In addition to the liberalization of trade in

goods and services, this agreement includes various provisions on mutual recognition, movement of natural persons, intellectual property, and government procurement. The JTEPA will further broaden and deepen the already close ties of both countries by promoting closer economic relations, providing more favorable investment climate, and generating more business opportunities. Tariffs on 99.51% of goods Japan exports to Thailand in 2006 have been reduced eliminated, or granted a special quota quantity from Japan. In addition, tariffs on 92.95% of goods Thailand exports to Japan were reduced, eliminated, or receive special quotas.

2.2.5 Thailand–Peru Closer Economic Partnership Agreement (TPCEP)

Thailand-Peru Closer Economic Partnership Agreement is the newest effective free trade agreement Thailand has signed with other countries. Additionally, it is one of the only two effective agreements that Thailand has with countries from South America. The agreement came into force on 5 November 2015 covering trade liberalization on goods and services. In 2017, 87.22% of Thailand goods exported to Peru have received the preference of tariff reduction from the agreement.

Figure 8: Thailand's Trade with Peru

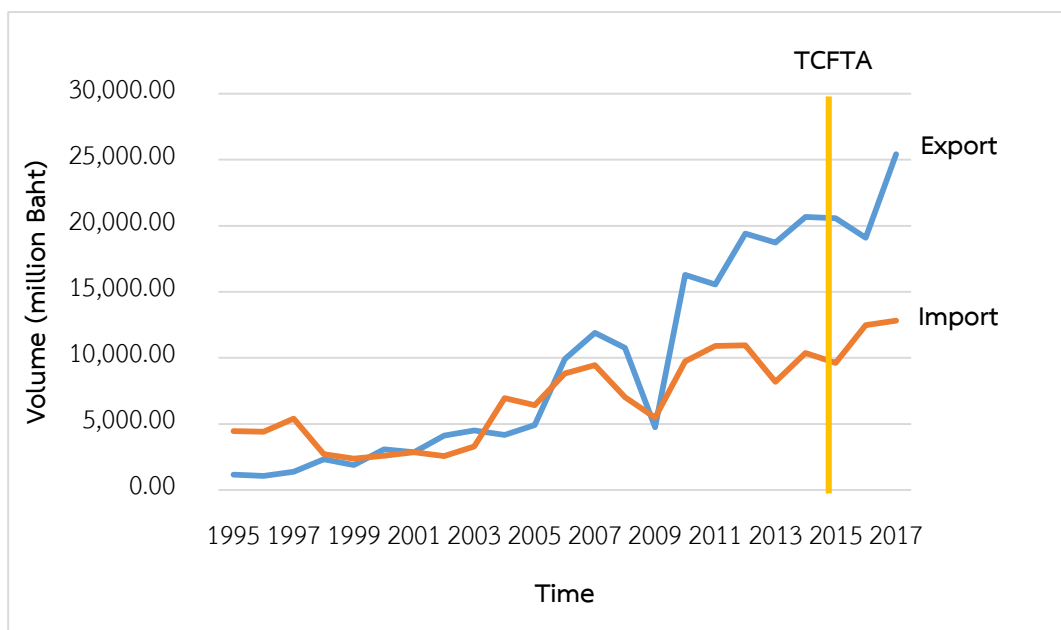


Source: Bank of Thailand

2.2.6 Thailand–Chile Free Trade Agreement (TCFTA)

Thailand and Peru signed the agreement of Thailand-Chile Free Trade Agreement (TCFTA) on 14 October 2003 to deepen bilateral trading relations by having trade liberalization on goods, services, and investments as well as trade-related cooperation. On 31 December 2011, the agreement came into force. Both countries agreed to reduce or eliminate tariff on 70 percent of the goods.

Figure 9: Thailand's Trade with Chile

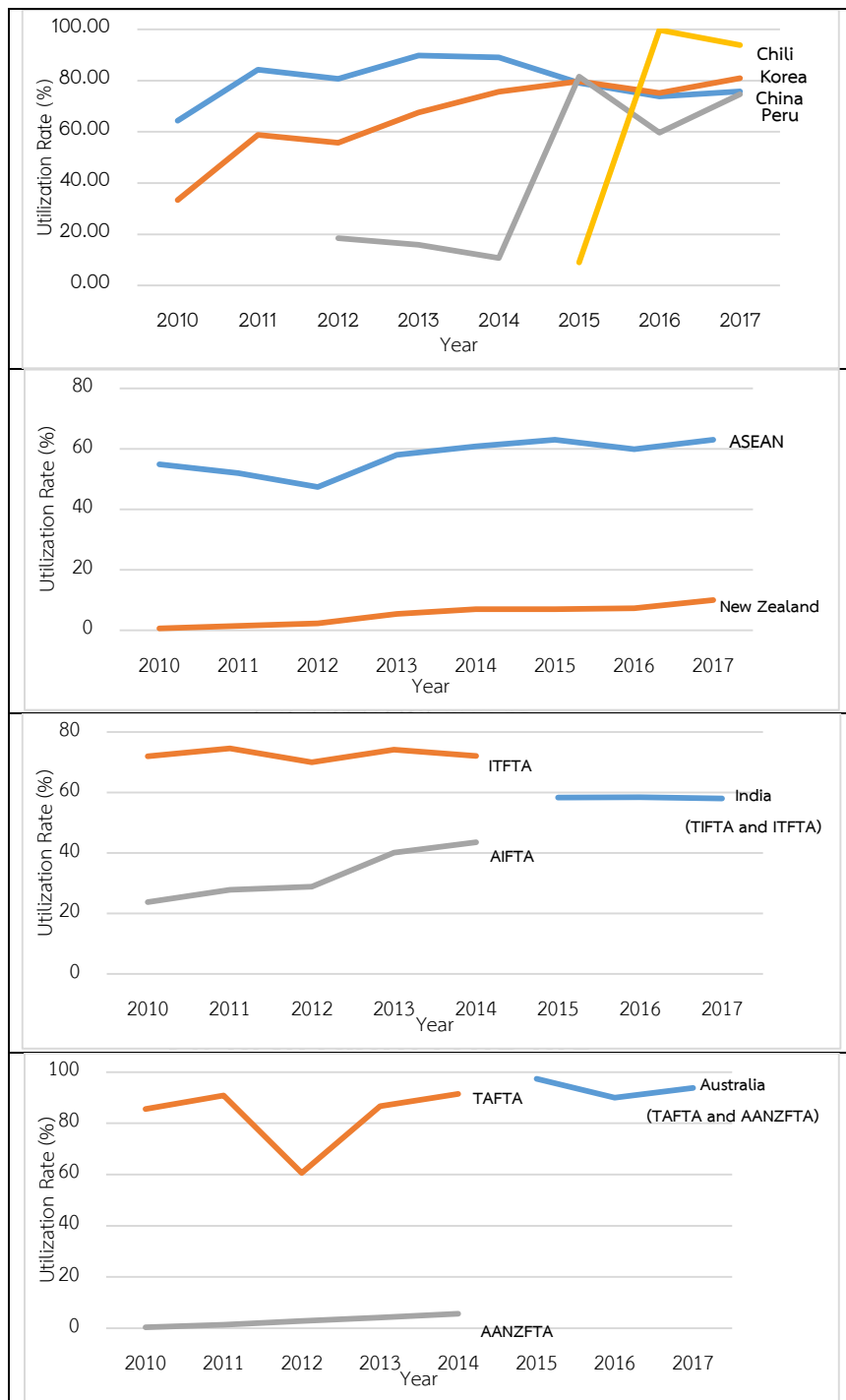


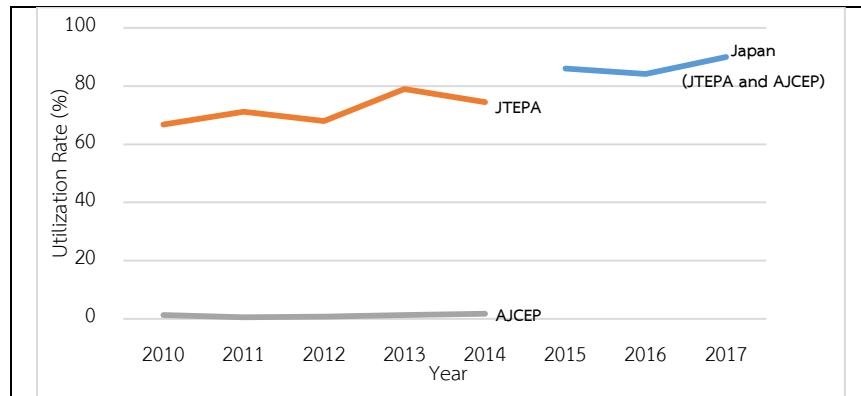
Source: Bank of Thailand

3.3 The Utilization Rate of the FTAs

We will look further into the utilization rate of the FTAs. The utilization rate can be seen as an index to measure how well FTAs are being implemented. It is calculated as the share of exports or imports that are actually receiving preferential treatments out of total exports or imports eligible for preferential tariff reduction. Table 2 shows the growth of free trade agreement utilization rate of Thailand by each country during the period of 2010-2017.

Table 2: Growth of FTA Utilization Rate of Thailand





Note: 1) The data was taken from Department of Foreign Trade
 2) Before 2015, the report was done according to each agreement but then was categorized by country in 2015. Therefore, India includes ITFTA and AIFTA, Australia includes TAFTA and AANZFTA, and Japan includes JTEPA and AJCEP for the data from 2015 onwards.

From the table, we can see that most of the agreements show increasing trend in utilization rate in 2017 compared to the rates in 2010. Furthermore, most of the agreements are being well utilized with more than 50 percent utilization rate in 2017, especially some extraordinary level of utilization from the agreements such as AFTA, ACFTA, AKFTA, TPCEP, and TCFTA. Despite having a high rate of utilization, the utilization rates from India, Australia and Japan do not provide us clear information as the data combines plurilateral agreements with bilateral ones, being categorized by country not by each agreement. On the other hand, it is worthy to note here that New Zealand is the agreement that shows exceptionally low rate of utilization from other agreements on the list with the rate of utilization of only 10%.

To have a better picture of how well each FTA is performing, we may look further into the value of exports of goods as well as the percentage growth under each FTA.

Table 3: Export Growth of Goods under FTA during 2016-2017

Country	Export Value under FTA (Million USD)		
	2016	2017	Δ%
AFTA	21,498.87	23,804.73	10.73
ACFTA	11,148.28	14,136.94	26.81
ITFTA	587.34	596.3	1.53
AIFTA	2,424.91	3,084.36	27.19
TAFTA	7,337.65	8,062.62	9.88
AANZFTA (AUS)	379.83	448.03	17.96
JTEPA	6,152.11	6,723.62	9.29
AJCEP	202.54	216.02	6.66
AKFTA	2,102.21	2,537.56	20.71
AANZFTA (NZ)	84.67	132.65	56.67
TPCEP	7.56	10.17	34.52
TCFTA	539.6	688.61	27.61

Source: Department of Foreign Trade

When we look at the export growth of Thai goods under each FTA, we can see that numbers of most FTAs reflect their level of utilization rate. AFTA shows 10.73% of growth although intra-trade of ASEAN is already the highest among other countries. At 26.81%, the high export growth from the agreements of ACFTA indicates deeper economic integration and relation between ASEAN and the major country of the East. AIFTA has 27.19% growth and ITFTA at 1.53% with AIFTA having relatively bigger export value referring that the utilization rate of FTA with India mostly go through AIFTA while ITFTA is being underutilized. Export value under TAFTA is at 8,062.62 million

USD, which is much higher than AANZFTA (AUS) at 448.03 million USD. Even though the bilateral agreement has the bigger volume, the export growth rate of AANZFTA is almost doubled of TAFTA. The same goes to Japan that many goods are being traded under the bilateral treatment of JTEPA. Surprisingly, AANZFTA of New Zealand shows a very high rate of export growth from Thailand at 56.67%. Lastly, the most recent agreements of TCFTA and TPCEP also show high growth rates at 34.52% and 27.61%, respectively.

3.4 Changes in Tariff Structures over Time

It is important to look at how the tariff structures imposed by FTA member countries change over time: before and after the FTAs become effective. Table 4 and 5 show the tariff rates Thailand's trading partners impose on Thailand and the tariff rates Thailand imposes on its trading partners, respectively. The tariffs are separated into agricultural products and non-agricultural products to see the difference in changes of tariff structures between the two categories. Tariffs imposed on and imposing by Chile are omitted because the most current data from UNCTAD is up to only 2014, unable to cover the period after TCFTA implementation.

*Table 4: Changes in tariff structures Thailand imposes on FTA trading partners
(Agricultural and non-agricultural products)*

Country	Year									
China	2004								2014	
	15.25	11.51							5.99	0.75
Japan	2006		2007						2014	
	25.36	11.93	24.69	9.79					10.21	0.77
Korea	2009								2014	
	25.12	10.54							7.85	0.96
Australia	2004		2009						2014	
	17.30	11.08	23.23	10.07					3.99	0.16
New Zealand	2004		2009						2014	
	9.46	11.13	18.74	10.91					4.65	0.49
India	2003		2009						2014	
	27.01	16.44	24.23	10.80					16.33	2.93
Peru	2010								2014	
	8.15	10.63							15.18	7.82
ASEAN	1991		2004		2007		2009		2014	
	43.82	34.68	15.40	11.44	21.13	11.42	24.17	11.34	0.00	0.00

- Note:
1. The data was taken from The UNCTAD Trade Analysis Information System (TRAINS)
 2. The tariff rate is measured in simple average
 3. The former number is tariff rate on agricultural products and the latter is tariff rate on non-agricultural products
 4. Agricultural products are listed by HS code 01-25) and non-agricultural products are listed by HS code 25-97

*Table 5: Changes in tariff structures FTA trading partners impose on Thailand
(Agricultural and non-agricultural products)*

Country	Year									
China	2004								2014	
	17.94	10.55							2.66	0.74
Japan	2006		2007						2014	
	23.67	2.37	20.37	2.27					19.12	0.75
Korea	2009								2014	
	45.76	7.43							33.45	0.92
Australia	2004		2009						2014	
	0.75	4.31	0.76	2.65					0.00	0.10
New Zealand	2004		2009						2014	
	5.38	4.56	0.00	1.04					0.00	0.48
India	2003		2009						2014	
	39.08	23.86	31.53	9.30					-	-
Peru	2010								2014	
	4.32	6.74							3.14	4.67
ASEAN	1991		2004		2007		2009		2014	
	28.30	13.97	5.01	4.16	6.18	2.57	2.55	0.92	1.89	1.23

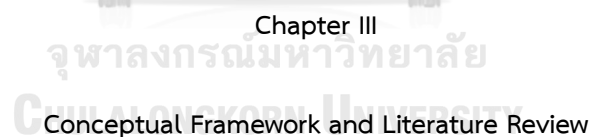
- Note:
1. The data was taken from The UNCTAD Trade Analysis Information System (TRAINS)
 2. The tariff rate is measured in simple average
 3. The former number is tariff rate on agricultural products and the latter is tariff rate on non-agricultural products
 4. Agricultural products are listed by HS code 01-25 and non-agricultural products are listed by HS code 25-97

From Table 4, we can see that the tariffs Thailand imposes on its trading partners in agricultural products are higher than non-agricultural products, before and after the FTA implementation. However, both rates were drastically decreased when the agreements came into force. On agricultural products, although relative higher than non-agricultural products, the tariffs

rate remain below 10% in 2014 with the exception of Japan, India, and Peru. On the other hand, in 2014, Thailand imposed tariffs on non-agricultural goods lower at the rate lower than 1% on most of its partners except Peru and India.

Next, we look at the tariffs structure the FTA partners imposed on Thailand's products.

The tariffs on both types of products are all reduced after the implementation of the free trade agreements. The most notable one may be ASEAN where tariffs on agricultural products are decreased from 28.30 prior the FTA to 1.89 in 2014, and 13.97 to 1.13 for non-agricultural products. In general, table 4 and 5 show that all tariffs, both imposing by and imposed on Thailand, have been significantly reduced over time.



3.1 Trade Creation

Trade creation refers to the net increase in trade volume when a country replaces its high-cost domestic goods with lower-cost imported goods from an FTA member country. The price of an imported commodity without tariff becomes less than the domestic price of the same

commodity. In general, trade creation results in a net welfare gain; hence, it is the motive for countries to engage in FTA.

Figure 10: Trade Creation Diagram

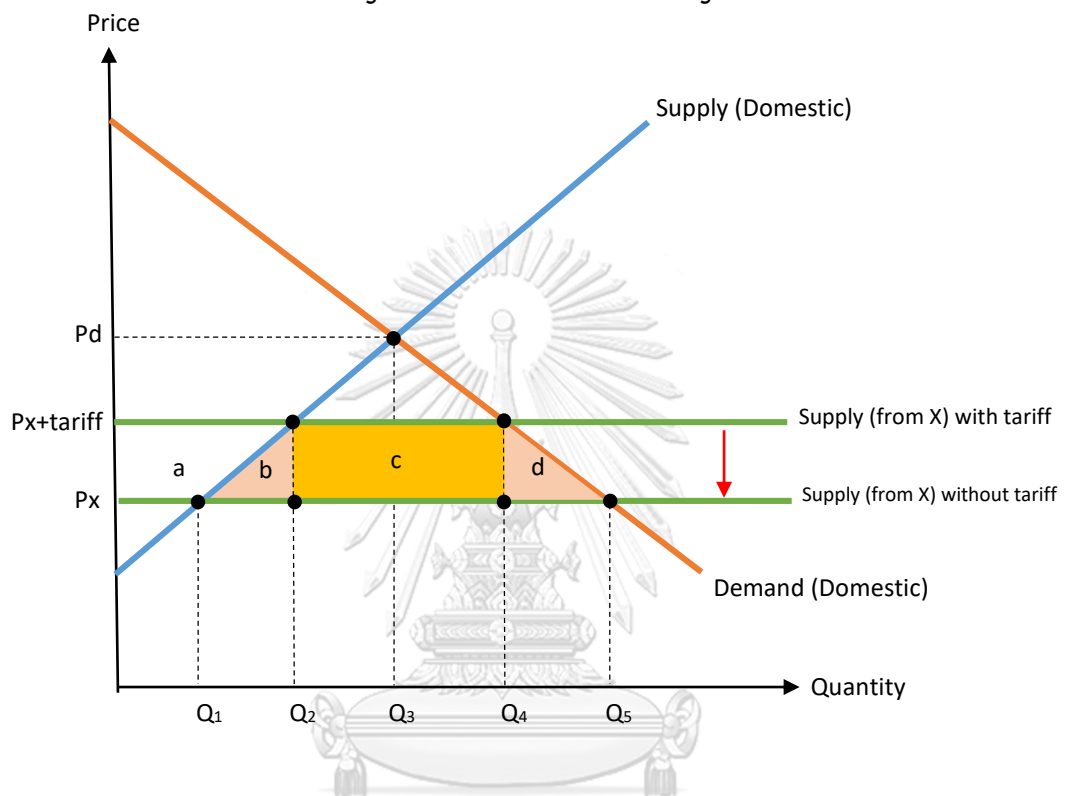


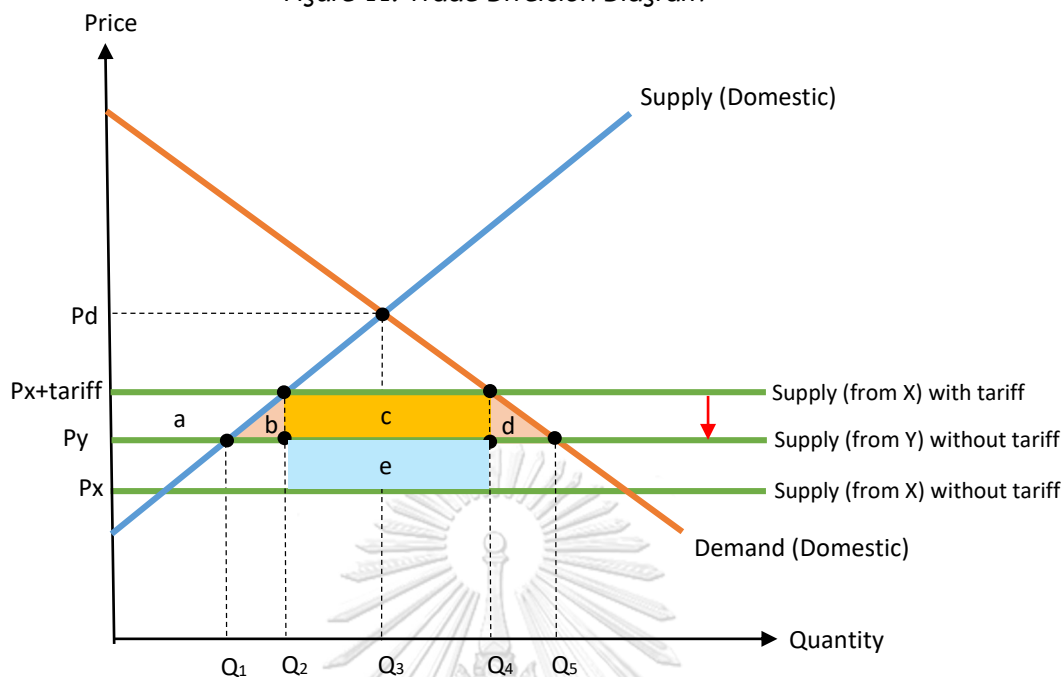
Figure 10 illustrates the effect of trade creation. Suppose that before the formation of the FTA, Thailand had a common tariff on all imports on cocoa. Thailand imported cocoa from country X at $P_x + \text{tariff}$ price. After Thailand has formed FTA with country X, the imported price becomes lower to P_x only. As a result, there is a consumer surplus of area $a + b + c + d$. However, Thai domestic producers lose producer surplus of area a and Thai government loses tariff revenue in area c . Therefore, there will be a net welfare gained in area $b + d$.

3.2 Trade Diversion (TD)

Trade diversion refers to the situation when the formation of FTA causes a country to divert its trade away from a more efficient non-FTA member towards a less efficient FTA member. A good from non-FTA member with tariff imposed becomes more expensive than the good from FTA member, despite the non-FTA member can produce the good at lower cost. Therefore, trade diversion generally results in a net welfare loss.

Figure 11 shows the effect of trade diversion. Before the formation of the FTA, Thailand had a common tariff imposed on all imports on cocoa. Thailand imported cocoa from country X at $P_x + \text{tariff}$ price. After Thailand has formed FTA with country Y, the imported price from country Y becomes P_y . Therefore, it is cheaper for Thailand to import from country Y instead of country X, even though country Y produces cocoa at higher cost. There is a consumer surplus of area $a+b+c+d$. However, Thai domestic producers loses producer surplus of area a and Thai government loses tariff revenue from country X in area c and area e . As a result, there will be a net welfare loss from trade diversion if $b+d$ is less than e . On the other hand, if $b+d$ is more than e , then there will be a net welfare gain from trade diversion.

Figure 11: Trade Diversion Diagram



3.3 Augmented Gravity Model

This study is an ex-post analysis i.e. study examines trade flows after the FTAs have been implemented. Most ex-post studies adopt gravity model for their analysis. The gravity model was originated from the gravity equation derived from Newton's theory of gravitation. The gravity model suggests that the volume of bilateral trade depends on the market size of both economies (usually use GDP as the proxy) and the distance between them (used as a proxy for transportation cost). It has been used intensively in previous studies where Tinbergen (1966) and Pöyhönen (1963) were the very first researchers to adopt gravity model in the study of international trade.

The generalized form of gravity model of of bilateral trade states that the volume of trade, exports, or imports between two countries, X_{ijt} , is a function of incomes of those countries, populations, distance between the two countries and a set of dummy variables either enhancing or restricting the bilateral trade such as border, common language, etc. This is often referred to as augmented gravity model. The form is shown below with u_{ijt} as the error term:

$$X_{ijt} = \beta_0 Y_{it}^{\beta_1} Y_{jt}^{\beta_2} N_{it}^{\beta_3} N_{jt}^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} u_{ijt}$$

For empirical studies in trade creation and trade diversion of ex-post studies, the gravity model has been adopted by many previous researchers and proved to be performing well due to two main reasons. First, gravity model can indicate the normal level of bilateral trade of the sample with the isolation of the effects of the FTA, which can be captured separately by dummy variables (Carrère, 2006). Besides being able to define the assessments of trade policy very well with the isolation of the effects of other trade determinants, trade gravity model can explain the variation in trade flows across countries and time, which makes it one of the most stable empirical relationships in economics (Benedictis & Salvatici, 2011).

However, the gravity model has been criticized in its lack of strong theoretical foundations. Several researchers have attempted to provide theoretical explanation for the gravity model since 1970s. The first formal attempt was from Anderson (1979) who explain by using the constant

elasticity of substitution (CES) expenditure system and assuming product differentiation. Bergstrand (1985) and Bergstrand (1989) also argued that gravity equations could be explained by simple monopolistic competition models. Helpman and Krugman (1985) developed gravity model in a Heckscher-Ohlin framework with the assumption of monopolistic competition and increasing returns to scale. Deardorff (1998) argued that the foundation of gravity model could be derived from the standard trade theories. Anderson and Wincoop (2003) derived an operational gravity model based on the CES expenditure system to solve the 'border puzzle'. Anderson and Wincoop (2003) also argue that there should be a trade resistance factor involved in the gravity model of bilateral trade. For the more recent studies, Helpman, Melitz, and Rubinstein (2008) introduced a theory based on the assumption of firm heterogeneity. Anderson and Yotov (2010) applied disaggregated estimations of gravity equations in a general equilibrium framework. These different theories with different explanation contribute to difference in specifications and diversity in the results of the empirical studies.

The stochastic log-linearized version of basic gravity model is usually constructed with bilateral trade flows, export, or import as the dependent variable and other various factors that might affect bilateral trade as the independent variables. The size, sign and level of significance of the coefficients produced by gravity equation are used to explain the relationship between bilateral trade volume and each independent variable. To estimate trade creation and trade diversion

effects, via the gravity model, many previous studies used FTA dummy variables to explain these effects.

3.4 Literature Review

Up until now, there are many empirical studies using gravity model specification to analyze free trade agreements and its effects on international trade flow. The gravity model has proved to be empirically robust and able to explain trade flows in the reality (Bergstrand, 1985). (Leamer & Levinsohn, 1995) also stated that the gravity model provide “some of the clearest and most robust findings in empirical economics. Because of its good empirical performance, gravity model has been used extensively since 1960s.

For methodological aspects, the Ordinary Least Squares (OLS) method has been the most common technique for estimating the coefficients of the gravity model specification. However, plain OLS use has been limited as it is criticized by the study of Anderson and Wincoop (2003).

Most studies use panel data analysis rather than cross-sectional data as Matyas (2002) stated that bilateral trade flows are better represented through a specification with three dimensions, which are exporting country, importing country, and time. According to Egger and Pfaffermayr (2003) and Martínez-Zarzoso and Nowak-Lehmann (2003), panel data analysis of the gravity model of bilateral trade has many advantages over cross-section estimation. For example,

using panel data analysis helps capture the role of the business cycle and the interactions between variables over time. Additionally, panel data estimation would lower the risk of getting biased estimates. However, the use of panel data raises a problem, as it cannot be used to run a regression with time-invariant and dummy variables.

Application of a panel data framework raises another issue of selecting the correct specification of individual effects between random and fixed effects. According to Egger (2002), selection between fixed and random effects models depends on the interests of the analysis, underlying theoretical model, the data properties, and the country sample used. Two way fixed or random effect models are required for the estimation of cross-country and time-effects, but it is important to note that random effects models can be considered if the models are sufficiently consistent and the estimation include time-invariant variables; otherwise, fixed effects models are the more proper alternative. Most of the previous studies reported that fixed effects models tend to provide better results. Glick and Rose (2002) used both fixed and random effects models in their study. They concluded that the fixed effects model generate better and robust results. In addition, Filippini and Molini (2003) implemented a fixed effect model with the assumption that there is a heterogeneity problem with the regression and noted that the fixed effect model applied to long-run data provide unbiased results with no endogeneity problems. This is also supported by the study from Baier and Bergstrand (2007). They provide the evidence of endogeneity problem as the

FTA dummy variable is correlated with the error term. They argued that, with the presence of endogeneity, standard cross-sectional analysis using instrumental variables and control functions produce unstable estimates of the FTA effects. They stated that gravity equation using panel data with fixed effects is the better alternative.

The gravity models are commonly used to analyze trade flows and policies. However, recent studies focus on investigating the effects of FTAs whether these agreements result in trade creation or trade diversion. Despite the fact that there are a great number of papers studying the effects of FTAs in different regions around the world, Baier and Bergstrand (2007) stated that recent empirical studies do not have clear evidence on the positive effects of FTAs towards trade creation or trade diversion. Kepaptsoglou, Karlaftis, and Tsamboulas (2010) also reported that results on FTA performance are still unclear; some indicate trade creation and diversion while others do not.

The reason might be explained by the study from Kepaptsoglou, Karlaftis, and Tsamboulas (2010) who has made a 10-year review of recent empirical studies with gravity model in international trade flows. Their study shows that datasets, model specification, and methodological aspects vary among previous studies, the differences in datasets, model specification and methodological aspects lead to different results. The adjustment on these things could potentially improve the results. That is one of the reasons why there are many empirical studies regarding this

matter. In addition, Hayakawa, Ito, and Kimura (2016) analyzed a large number of RTAs in the world and contributed two major findings. First, they reported that there are significantly positive trade creation effects found in their samples are greatly due to the tariff reduction while the effects for non-tariff barrier removal are relatively weak. Second, the trade creation effects in the case of trade among low-income countries are greatly affected by the tariff reduction and non-tariff barriers removal compared to the case of trade among high-income countries where the effect is weak.

The specifications and variables used in the gravity model, as mentioned above, is important as it could lead to different results. More importantly, the importance of determining the specifications and variables used needs to be emphasized, as there are consistent contribution of recent theoretical studies strengthening the foundations of the gravity model. One of the most well-known and important contributions in the study of free trade agreement and its effect on bilateral trade has been made by Anderson and Wincoop (2003) who came up with the famous “gravity with gravitas’ model. They introduced multilateral resistance terms (MRTs) or the relative trade costs which are usually excluded in the typical trade gravity model. The multilateral trade-resistance terms need to be controlled with the right specification of a gravity model in order to produce an unbiased estimation.

A number of earlier researches have shed lights on some of the concerned FTAs in this study. For example, Roberts (2004) did an ex-ante study on the potential of a FTA between China and ASEAN economies. He argued that the FTA would not cause neither trade creation nor diversion. In contrast, Yang and Martínez-Zarzoso (2014) analyzed trade creation and trade diversion effects of ACFTA in ex-post fashion. Their study indicates that the agreement has a positive effect in overall since liberalizing tariff barriers promote trade of both among FTA members and between intra-FTA and extra-FTA members.

In the case of AFTA, Magee (2008), using many ex-ante specifications including a new measure to explore the trade creation and trade diversion effects of AFTA, reported that ASEAN Free Trade Agreement promotes trade and has trade diversion effects. The result is similar to the study of Ekanayake and Mukherjee (2010) who did an analysis on some economic integrations among Asian developing countries. In addition, Okabe and Urata (2014) used gravity model and found that there are positive and significant trade creation effects from AFTA.

Bhattacharyya and Mandal (2016) did an ex post evaluation on India-ASEAN free trade agreement. The study reported that the net welfare of both ASEAN and India was positive up to 2012 or the first two years of implementation, but has been decreasing later on until it became negative in 2013 resulted from the global economic slowdown. The result is in accordance to Khurana and Nauriyal (2017) who used gravity model to analyze ex post effect of ASEAN-India free

trade agreement focusing on trade creation and trade diversion effects and found trade diversion effect occurred from the decline in export flows between member countries and the rest of the world.

In the case of Australia, Siriwardana (2006) did an ex-ante study using computable general equilibrium (CGE) model and provided the evidence of welfare gain in bilateral trade agreement between Thailand and Australia. The result is in line with Athukorala and Kohpaiboon (2011) who examined the ex-post impact of bilateral trade agreement of Thailand-Australia on bilateral trade. It is reported that trade between the two countries has expanded after TAFTA implementation.

Most of the previous studies did an analysis on the effects of FTA with the focus on overall trade flows of the whole trade bloc. To our best knowledge, there is no papers focus on the trade creation and trade diversion effects of FTAs only on a particular country. Therefore, this study aims to investigate such effects but with the focus of Thailand's FTAs on Thailand bilateral trade with other countries.

Chapter IV

Research Methodology and Data Description

4.1 Statement of Hypothesis and reasoning

4.1.1 AFTA, ACFTA, AANZFTA, AJCEP, AKFTA, TAFTA, TNZFTA, and JTEPA have caused trade creation to Thailand

These agreements share some characteristics. They are the free trade agreements Thailand have with its top trading partners, even before the implementation. The growth in bilateral trade between Thailand and these trading partners have been growing in a substantial rate as discussed in the previous chapter. In addition, these agreements are relatively old. There have been lots of development in various fields of trade liberalization. Besides the bilateral agreements, accumulative rules of origin from ASEAN-plus-one agreements are expected to facilitate the plurilateral trade. Previous literatures, as discussed in previous chapter, also provide evidence of trade creation on some of these agreements. Therefore, we expect that these agreements have promoted trade between Thailand and these members without the cost of diverting trade from non-member countries.

4.1.2 AIFTA, ITFTA, TCFTA, and TPCEP have caused trade diversion to Thailand

In the case of India, the country had previously imposed relatively high tariff on imported goods. Given the privilege in trade liberalization, India's intra-bloc partners, such as

Thailand, would give more attention to trading with the country; hence, diverting trade from other sources. This is particularly expected from ITFTA where it only covers focused 83 goods. For TCFTA and TPCEP, they are two newest effective free trade agreements of Thailand. They are also the most remote countries among other Thailand's FTA partners, with relatively low trade values with Thailand. Having an agreement to liberalize and stimulate bilateral trade between Thailand and these countries, it is expected that the increased trading volume would be diverted from lower other countries.

4.2 Estimation model

Ex-post study examines trade flows after the implementation of an FTA and compare the actual levels of trade with a prediction of trade in the absence of the FTA. In this study, I use panel data estimation of the gravity model of bilateral trade with traditional specification of independent variables: GDP, population, and distance.

In the selection of the dependent variable, exports or imports may be used in regression to represent the volume of bilateral trade flows. However, Clarke (2006) provided some important explanations of why using the sum of exports and imports is not the appropriate choice for the gravity model. First, if the sum of exports and imports is used, it will automatically imply that the coefficients of exports and imports between two countries are equal. Disaggregated trade flows as

either exports or imports are required in order to analyze the regression with separate effects between the two. Second, using exports or imports alone would provide more degrees of freedom and better result due to more observations, one where country A is exporter and another one where country A is the importer. Third, the issue of different sources of data recording export and import for the same directional flow, and sometimes the data is obtained using different methods i.e. free on board (f.o.b.) versus cost insurance freight (c.i.f.). Therefore, selecting either exports or imports is the better alternative.

Although it is expected that using either imports or exports data would ultimately result in the same conclusion, there remains the issue of how the data is recorded. Imports are usually recorded in cost insurance freight (c.i.f.) meaning that the data includes the transportation costs of goods while exports are recorded in free on board (f.o.b.) which excludes such costs. Including the transportation costs into the dependent variable would cause the model to suffer from biased results due to the correlation with distance between countries. Thereby, I decide to use exports data instead of imports as the dependent variable.

By having exports as the independent variable, all Thailand's trading partners will have two trade flow observations: one where Thailand is the exporter and the other is where Thailand is the importer. Doing so, bilateral exports and imports are both included explicitly in the equation.

To find trade creation and trade diversion effects, which is the focus of this study, I follow Martinez-Zarzoso and Nowak-Lehmann (2003) who introduced the use of three FTA dummy variables. The three dummy variables represent trade creation, export diversion and import diversion effects.

Therefore, the baseline model used in this study is as follows:

$$(1) \quad \ln X_{ijt} = \alpha + \phi_1 \ln GDP_{it} + \phi_2 \ln GDP_{jt} + \phi_3 \ln POP_{it} + \phi_4 \ln POP_{jt} + \phi_5 \ln DIST_{ij} \\ + \beta_1 BOTHINFTA_{ijt} + \beta_2 EXPORTERINFTA_{ijt} + \beta_3 IMPORTERINFTA_{ijt} + u_{ijt}$$

Subscript i denotes the exporting country, subscript j denotes the importer, and subscript t denotes time. $\ln X_{ijt}$ represents natural log of export volume from country i to country j. $\ln GDP_{it}$ is natural log of GDP of the exporting country and $\ln GDP_{jt}$ is natural log of its trading partner's GDP. Gravity model assumes that two countries with higher GDP level (size of an economy) tend to attract more trade with each other. This is also supported by the traditional international trade theory as the income level of a country increases, there will be more demand of imported goods, hence, more trade. $\ln POP_{it}$ is the natural log of population of country i and $\ln POP_{jt}$ is the natural log of population of the destination country. If population of exporter grows, economies of scale increases, this will boost export. On the other hand, more population leads to increased domestic demand; hence, the country will export less and import more. The coefficient will be negative.

Therefore, the expected sign is ambiguous. $\ln \text{DIST}_{ijt}$ represents the distance between the capital cities of the two countries in natural logs. Gravity model assumes that the closer the two countries are, the more they will trade with each other. On top of that, distance is represented as the proxy of transportation costs. The longer the distance the higher cost of the trade. BOTHINFTA_{ijt} is a dummy variable of value 1 if both Thailand and its trading partner belong to the same particular free trade agreement. For example, in the study case of AFTA, when Thailand (the exporting country) trades with Malaysia (the intra-AFTA importing country), the value of BOTHINFTA_{ijt} will be 1. But when Thailand (the exporting country) trades with Brazil (the extra-AFTA importing country), the value will be 0. The same applies to the cases when Thailand is the importing country. Theory of economic integration says that establishment of FTA is expected to increase trade volume between members because of the lower tariff on imported goods between members. Positive sign refers to an increase in intra-bloc exports. $\text{EXPORTERINFTA}_{ijt}$ is a dummy variable of value 1 if Thailand as the exporting country is in the particular FTA but its trading partner is not. For this variable, the exporter country will be only Thailand and no cases of Thailand being an importer. Giving another example under AFTA case, if Thailand as an exporting country exports to Malaysia, the value is 0, but it is 1 when Thailand exports to Brazil. Export to extra-bloc countries from intra-bloc countries may be affected from the FTA. The sign is positive if entering into the FTA leads to “export expansion” effect. However, if the sign is negative, it means entering into the FTA lead to

“export contraction” effect. The effects need to be considered together with the effects from intra-bloc exports. $IMPORTERINFTA_{ijt}$ is a dummy variable of value 1 if Thailand as the importing country is in the FTA but not the exporting country. For this variable, the importer country will be only Thailand and no cases of Thailand being an exporter. Import of intra-bloc countries from extra-bloc countries may be affected from the FTA. The sign is positive if entering into the FTA leads to “import expansion” effect meaning higher import volumes of Thailand from non-FTA countries after the FTA implementation. However, if the sign is negative, it means entering into the FTA lead to “import contraction” effect. The effects need to be considered together with the effects from intra-bloc exports.

The baseline gravity model, Equation 1, will be estimated using pooled OLS technique to provide a benchmark for other specifications. However, the results of equation 1 is expected to be biased and inconsistent since this specification does not control for unobserved heterogeneity.

Martinez-Zarzoso and Nowak-Lehmann (2003) argue that a fixed effects model is suitable to analyze trade flows between an ex-ante preselected group of countries instead of choosing randomly. The country sample used is not at all random or representative of the population since this study focuses on Thailand and its major trading partners to analyze the trade creation and trade diversion effects of the effective FTAs Thailand has. Therefore, the fixed effects

specification of the gravity model should be more suitable in this study. However, we will run both random effects and fixed effects for the sake of comparison.

Regarding the problem of how to control the multilateral resistance terms, Rose and van Wincoop (2001) and Baldwin and Taglioni (2006) argued that country-specific fixed effects can be used as proxies for the MRTs and need to be included in the model to provide an unbiased and consistent estimates. In addition, time effects should also be considered to control for time-specific macroeconomic shocks to the trading activities in the world. This approach would help us account for some sources of unobserved heterogeneity. However, the fixed effects makes time-invariant variables unable to be estimated (distance, in this case). The model, then, becomes Equation 2.

$$(2) \quad \ln X_{ijt} = \alpha + \phi_1 \ln GDP_{it} + \phi_2 \ln GDP_{jt} + \phi_3 \ln POP_{it} + \phi_4 \ln POP_{jt} + \beta_1 BOUTHINFTA_{ijt} \\ + \beta_2 EXPORTERINFTA_{ijt} + \beta_3 IMPORTERINFTA_{ijt} + I_i + I_j + I_t + u_{ijt}$$

Where:

I_i represents exporter fixed effects

I_j represents importer fixed effects; and

I_t represents time-fixed effects

Egger and Pfaffermayr (2001) argued that bilateral or country-pair fixed effects could be used instead of country-specific fixed effects without leading to omitted variables bias. Since the trading

is done and seen as a pair rather than individual country, the country-pair fixed effects can still represent the unique traits of each bilateral trade flow. This allow us to rewrite Equation 2 that now becomes Equation 3:

$$(3) \quad \ln X_{ijt} = \alpha + \phi_1 \ln GDP_{it} + \phi_2 \ln GDP_{jt} + \phi_3 \ln POP_{it} + \phi_4 \ln POP_{jt} + \theta_1 \text{BOTHINFTA}_{ijt} \\ + \theta_2 \text{EXPORTERINFTA}_{ijt} + \theta_3 \text{IMPORTERINFTA}_{ijt} + I_{ij} + I_t + u_{ijt}$$

Where:

I_{ij} represents country-pair fixed effects.

However, Anderson and van Wincoop (2003) argued that the inclusion of country-pair fixed effects and time effects does not fully control for the omitted variable bias. Several previous studies claimed that the proxy for multilateral resistance should be time-varying exporter effect and importer effect. Following Baier and Bergstrand (2007), while keeping the country-pair fixed effects, the introduction of country-and -time effects would allow us to control for the endogeneity bias as well as time-varying multilateral resistance terms. With this specification, we control for all sources of unobserved heterogeneity or the determinants such as GDP and population in country i and j that vary in the dimensions with it and jt as well as distance and other variables that embedded as time-invariant trading characteristics between two countries. Therefore, variables such as GDP and population are excluded from the specification due to perfect

collinearity. Besides being the better alternative compared to all the previous equations, this final specification also help us relief the problem of making a decision on which variables should be included in the model.

Equation 4 is the final equation with country-pair fixed effects and country-and-time effects as shown below:

$$(4) \quad \ln X_{ijt} = \alpha + \beta_1 \text{BOTHINFTA}_{ijt} + \beta_2 \text{EXPORTERINFTA}_{ijt} + \beta_3 \text{IMPORTERINFTA}_{ijt} + I_{ij} + I_{it} + I_{jt} + u_{ijt}$$

Where:

I_{it} represents exporter time varying individual effects; and

I_{jt} represents importer time varying individual effects

4.3 Estimation Technique

According to Yang and Martinez-Zarzoso (2014), the interpretation of the signs of the coefficients of BOTHINFTA, EXPORTERINFTA and IMPORTERINFTA dummy variables (β_1 , β_2 and β_3) is as follows:

Table 6: Interpretation of the signs of FTA coefficients

		Exporter effects		Importer effects	
		$\beta_2 > 0$	$\beta_2 < 0$	$\beta_3 > 0$	$\beta_3 < 0$
Intra FTA trade	$\beta_1 > 0$	Pure TC (X)	TC + XD ($\beta_1 > \beta_2$) or XD ($\beta_1 < \beta_2$)	Pure TC (M)	TC + MD ($\beta_1 > \beta_3$) or MD ($\beta_1 < \beta_3$)
	$\beta_1 < 0$	XE	XD + XC	ME	MD + MC

Source: Table 1, Yang and Martínez-Zarzoso (2014)

Notes:

(i) β_1 is the coefficient of BOTHINFTA which denotes exports among member countries. β_2 is the coefficient of EXPORTERINFTA which denotes exports from member countries to non-member countries. β_3 is the coefficient of IMPORTERINFTA which denotes exports from non-member countries to member countries.

(ii) TC (X) and TC (M) denotes trade creation in terms of exports and trade creation in terms of imports, respectively. XD and MD denotes export diversion and import diversion, respectively. XE and ME denote expansion of extra-bloc exports and expansion of extra-bloc imports, respectively. XC and MC denote contraction of intra-bloc exports and contraction of intra-bloc imports, respectively.

However, the focus of this study is on Thailand instead of the whole trade bloc as in the previous literatures, hence different interpretation. Therefore, it is important to redefine the interpretation on how the trade effects affect Thailand. For better understanding, we also have an example of AFTA case where there are Thailand, Malaysia (an intra-bloc country), and Brazil (an extra-bloc country). The trade effects interpretation is presented in the table below.

Table 7: Interpretation of Trade Effects on Thailand

Trade Effects	Thailand and Malaysia		Thailand and Brazil	Effect on Thailand
Pure TC (X)	TH +X to MY	&	TH +X to BR	(+)
TC+XD	TH +X to MY	>	TH -X to BR	(+)
XD	TH +X to MY	<	TH -X to BR	(-)
XE+OXD	TH -X to MY	<	TH +X to BR	(+)
OXD	TH -X to MY	>	TH +X to BR	(-)
XD+XC	TH -X to MY	&	TH -X to BR	(-)
Pure TC (M)	TH +M from MY	&	TH +M from BR	(+)
TC+MD	TH +M from MY	>	TH -M from BR	(+)
MD	TH +M from MY	<	TH -M from BR	(-)
ME	TH -M from MY	<	TH +M from BR	(+)
MD+MC	TH -M from MY	&	TH -M from BR	(-)

Note:

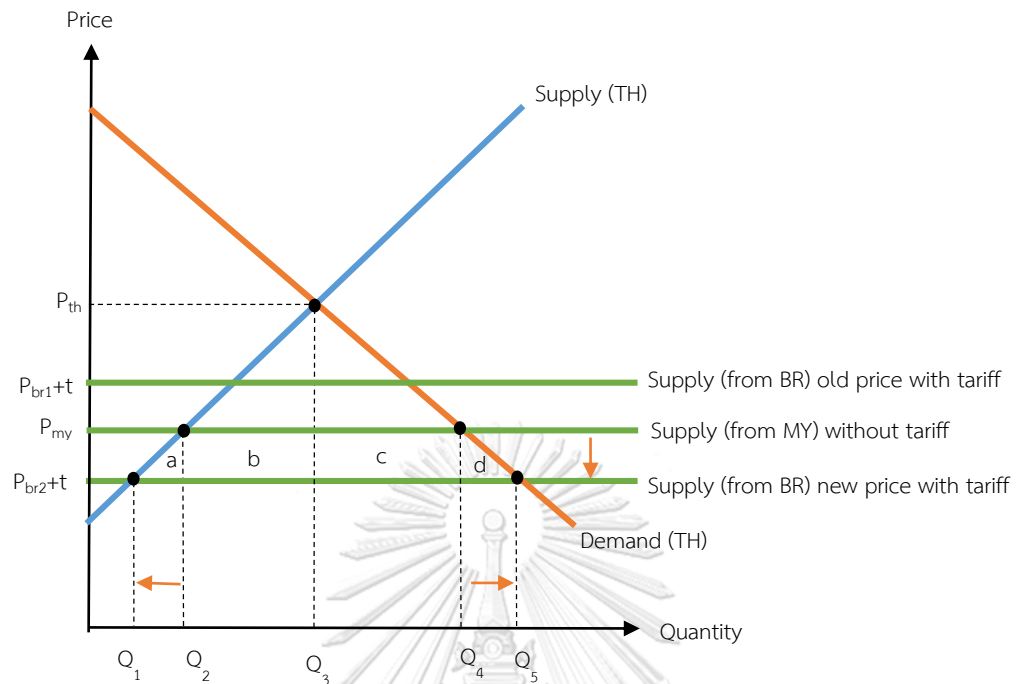
1. TC (X) and TC (M) denotes trade creation in terms of exports and trade creation in terms of imports, respectively. XD and MD denotes export diversion and import diversion, respectively. XE and ME denote expansion of extra-bloc exports and expansion of extra-bloc imports, respectively. OXD denotes outward export diversion. XC and MC denote contraction of intra-bloc exports and contraction of intra-bloc imports, respectively.
2. +X and -X denote increase in export and decrease in export, respectively. +M and -M denote increase in import and decrease in import, respectively
3. MY denotes Malaysia (an AFTA member) and BR denotes Brazil (a non-AFTA country). These countries are used in the example to show trade effects on Thailand under AFTA.

Looking at the export side, the trade effects will benefit Thailand if, after FTA is implemented, both changes in Thailand's exports to Malaysia and Brazil still lead to an increase in net export of Thailand. On the other hand, Thailand will be negatively affected from the agreement if the implementation causes a decrease in net export. Under this perspective, having only export

expansion (XE) when $\theta_1 < 0$ and $\theta_2 > 0$ do not provide a sufficient information on the impact on Thailand. Therefore, we need to introduce a new trade effect, outward export diversion (OXD), to represent the situation when Thailand diverts its exports from intra-bloc members to extra-bloc members, after FTA implementation. XE+OXD represents the situation where there are both export expansion effects (an increase export from Thailand to extra-bloc countries) and outward export diversion effects, but export expansion prevails hence an increase in net export of Thailand.

Unlike exports, an increase in imports does not necessarily refer to an increase in welfare to Thailand. Pure trade creation on imports provides benefit to Thailand as discussed in Figure 10. In addition, Figure 11 already explains the two possible impacts of trade diversion on imports. If the gain in welfare is greater than the loss in revenue (area b + area d > area e), the situation is represented by TC+MD where trade creation effects prevail. On the other hand, if the loss in revenue is greater, then the situation is represented by MD. Import expansion (ME) provides benefits to Thailand as shown in the import expansion diagram (area a, b, c, and d in Figure 12) where Brazil can sell their products with tariff on the lower price than Malaysian products without tariff.

Figure 12: Import Expansion Diagram



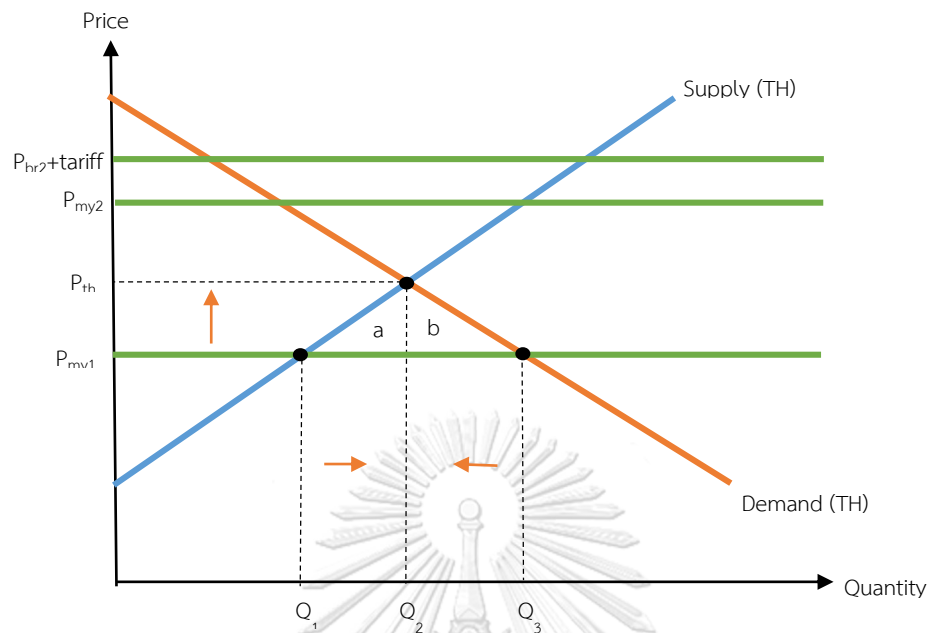
Lastly, the import contraction (MD+MC), which is the situation where the agreement

leads to a decrease in imports from both intra-bloc and extra-bloc countries, results in negative

impact to Thailand (as shown in area a and b in Figure 13). The relatively higher prices of

imported goods from both countries are better replaced by cheaper domestic goods.

Figure 13: Import Contraction Diagram



4.4 Data description


















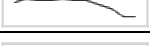

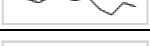
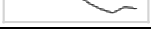
The sample group in this study is Thailand's 40 top trading partners, which include both countries inside and outside the focused FTAs. Instead of taking the top trading partners by the most recent year, the sample is sorted and selected based on the amount of trading volume in USD in average from 2007-2017. This is to find the top major trading partners over time. However,







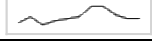






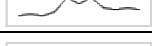
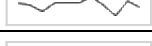

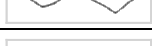

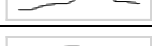
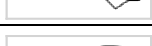
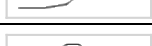
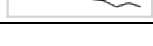
there are FTA countries that are not within the coverage, hence, I add them to the sample as well.

In total, there are 43 countries in the study's sample group, 17 of them have at least one trade agreement with Thailand and 26 of them do not. The 43 countries are presented in Table 8 below.

The bold are the countries that have signed at least one enforced FTA with Thailand.

Table 8: Thailand's Top Trading Countries (Average from 2007-2017)

No.	Country	Average Total Trade Volume with Thailand (Million USD)	Trend
1	Japan	55,853.21	
2	China	54,539.71	
3	USA	34,444.25	
4	Malaysia	21,829.55	
5	Singapore	16,747.56	
6	Indonesia	14,508.47	
7	Australia	14,082.23	
8	United Arab Emirates	13,301.10	
9	Hong Kong	13,273.43	
10	South Korea	11,651.51	
11	Taiwan	10,391.96	
12	Vietnam	9,897.34	
13	Germany	9,020.66	
14	Switzerland	8,664.35	
15	Saudi Arabia	8,607.13	
16	India	7,521.34	
17	Philippines	7,428.59	
18	Myanmar	6,122.47	
19	UK	6,094.76	
20	Netherlands	5,178.66	
21	Laos	4,200.13	


No.	Country	Average Total Trade Volume with Thailand (Million USD)	Trend
22	France	4,153.61	
23	Cambodia	3,797.17	
24	Russia	3,623.17	
25	Brazil	3,575.66	
26	Italy	3,487.10	
27	South Africa	3,111.18	
28	Qatar	3,029.39	
29	Belgium	2,495.54	
30	Oman	2,345.53	
31	Canada	2,324.08	
32	Mexico	2,206.22	
33	New Zealand	1,607.13	
34	Spain	1,549.95	
35	Sweden	1,288.08	
36	Turkey	1,287.89	
37	Yemen	1,261.68	
38	Israel	1,176.87	
39	Pakistan	993.93	
40	Nigeria	958.17	
41	Chile	807.62	
42	Brunei Darussalam	495.88	
43	Peru	467.55	

Source: Bank of Thailand

This paper uses a strongly balanced panel dataset consisting of a sample of 43 countries.

Annual data is collected covering 27-year period from year 1990-2016 at aggregated level. The

reason is to cover the period before the oldest FTA in this study, i.e. AFTA, became effective to make the three FTA dummy variables time varying, hence, able to be estimated with fixed effects model. Therefore, there are 2322 observations ($43 \times 2 \times 27$) for each estimation. All data is taken in nominal values following the criticism made by Baldwin and Taglioni (2006). Export volumes in aggregate level is taken from International Monetary Fund's (IMF) Direction of Trade Statistics (DOTS). The data on GDP and population is taken from International Monetary Fund's (IMF). Distance data comes from the CEPII database. The FTA dummy variables have been created according to the effective dates stated in World Trade Organization. Before the period of effectiveness, the dummies will take the value 0 but will take value of 1 starting from the year the particular FTA becomes effective.



Chapter V
จุฬาลงกรณ์มหาวิทยาลัย
Main Results and Discussion
CHULALONGKORN UNIVERSITY

We run the regression from the panel data models described in Equation 1, Equation 3, and Equation 4 to estimate the trade creation and trade diversion effects of the 12 free trade agreements. The main results are presented in the tables below. Equation 1, as shown in Column 1 in the tables, is the baseline model using Pooled OLS for the estimation without any country-pair or time dummies.

Equation 3 adopts panel data technique with country-pair and time fixed effects. Panel data, compared to cross-sectional data, has a benefit of being able to distinguish the specific effects across countries and capture the characteristics of trade integration effects over time. In addition, we will run and compare the results from Equation 3 with random effects and fixed effects, although most of the previous literatures support the use of fixed effects in panel data. Equation 3 with random effects are shown in Column 2. In Column 3, Equation 3 with fixed effects are presented with the cost of not being able to estimate the effects of time-invariant variables, i.e. distance in this case.

Finally, Equation 4, which considers time-varying multilateral resistance terms and country-pair fixed effects, is shown in Column 4. These effects will help us control for all potential determinants varying in it and jt dimensions (e.g. GDP and population of both countries) as well as time-invariant country-pair fixed effects (e.g. distance, culture, border, common language).

Therefore, GDP and population of both countries as well as distance between two countries are omitted from the equation.

Our goal is to obtain unbiased and consistent estimation on three dummy variables i.e. BOTHINFTA, EXPORTERINFTA, and IMPORTERINFTA that are the focused variables to estimate trade creation and trade diversion effects.

Table 9: Gravity Model Regression Results for AFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-5.033*** (1.104)	-18.698*** (3.167)	-13.495*** (2.445)	6.410*** (1.52E-06)
lnGDP _{it}	0.959*** (0.099)	0.515*** (0.127)	0.515*** (0.124)	
lnGDP _{jt}	0.829*** (0.067)	0.750*** (0.203)	0.750*** (0.199)	
lnPOP _{it}	-0.348*** (0.089)	0.814** (0.317)	0.814** (0.311)	
lnPOP _{jt}	-0.161* (0.090)	0.300 (0.368)	0.300 (0.361)	
lnDIST _{ij}	-1.018*** (0.096)	0.690*** (0.222)		
AFTA_BOTH _{ijt}	0.535** (0.242)	0.556 (0.459)	0.556 (0.450)	3.954*** (1.12E-06)
AFTA_EXPORTER _{ijt}	0.246 (0.167)	0.050 (0.327)	0.050 (0.320)	0.296*** (2.59E-06)
AFTA_IMPORTER _{ijt}	0.047 (0.255)	0.054 (0.351)	0.054 (0.344)	0.318*** (7.06E-07)
Observations	2322	2322	2322	2322
R-squared	0.707	0.897	0.314	0.166
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

For ASEAN Free Trade Agreement, our estimation in Column 1 show positive coefficients of $AFTA_BOTH_{ijt}$ ($\beta_1 > 0$), $AFTA_EXPORTER_{ijt}$ ($\beta_2 > 0$), and $AFTA_IMPORTER_{ijt}$ ($\beta_3 > 0$), but only $AFTA_BOTH_{ijt}$ gained significant level at 5% level. This indicates that AFTA has resulted in pure trade creation effect. Equation 3 with time and country-pair random effects is presented in Column 2. The coefficients of FTA variables remain unchanged in signs but lose its significance. The same results obtained from Equation 3 with time and country-pair fixed effects as presented in Column 3.

Finally, Equation 4 generates results with positive and statistically significant coefficients on three dummy variables. All equations provide consistent positive signs on all dummy variables. The positive coefficient of $AFTA_BOTH_{ijt}$ shows that there is an intra-bloc trade creation effect with average treatment effect at 5116.28% [= (EXP(3.95437)-1)*100] higher than expected from normal levels of trade. The positive dummy $AFTA_EXPORTER_{ijt}$ representing an increase in exports from Thailand to non-ASEAN members (export expansion). Regarding the $AFTA_IMPORTER_{ijt}$, the positive signs displays import expansion effect. Therefore, the estimated results clearly show that AFTA has caused pure trade creation effects in both exports and imports.

Table 10: Gravity Model Regression Results for ACFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.937*** (1.200)	-18.156*** (3.447)	-12.704*** (2.556)	8.191*** (2.66E-06)
lnGDP _{it}	1.001*** (0.097)	0.434*** (0.122)	0.434*** (0.120)	
lnGDP _{jt}	0.877*** (0.072)	0.707*** (0.221)	0.707*** (0.217)	
lnPOP _{it}	-0.373*** (0.079)	1.112*** (0.314)	1.112*** (0.308)	
lnPOP _{jt}	-0.195** (0.088)	0.181 (0.388)	0.181 (0.380)	
lnDIST _{ij}	-1.112*** (0.095)	0.727*** (0.226)		
ACFTA_BOTH _{ijt}	0.066 (0.217)	0.522 (0.442)	0.522 (0.433)	2.313*** (3.02E-06)
ACFTA_EXPORTER _{ijt}	-0.132 (0.130)	0.380 (0.336)	0.380 (0.330)	0.896*** (6.85E-06)
ACFTA_IMPORTER _{ijt}	-0.463** (0.190)	0.045 (0.342)	0.045 (0.336)	-4.289*** (1.90E-06)
Observations	2322	2322	2322	2322
R-squared	0.708	0.899	0.246	0.097
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

In the case of ACFTA, results in Column 1 show a positive coefficient for ACFTA_BOTH_{ijt} ($\beta_1 > 0$), but ACFTA_EXPORTER_{ijt} and ACFTA_IMPORTER_{ijt} have negative coefficients ($\beta_2 < 0$, $\beta_3 < 0$). Only ACFTA_BOTH_{ijt} gained significant level at 5% level. However, ACFTA_EXPORTER_{ijt} and ACFTA_IMPORTER_{ijt} in Column 2 appear to have positive signs. Also, ACFTA_IMPORTER_{ijt} becomes statistically insignificant. The exact same significance, size, and signs of 3 coefficients are also obtained from Equation 3 with time and country-pair fixed effects as presented in Column 3.

Equation 4 with country-time effects and country-pair fixed effects generates statistically significant coefficients on three dummy variables but only ACFTA_BOTH_{ijt} and ACFTA_EXPORTER_{ijt} appear to have positive sign. The positive coefficient of AFTA_BOTH_{ijt} in Equation 4 shows that there is an intra-bloc trade creation effect with average treatment effect at 910.93% [= (EXP(2.3135)-1)*100] higher than expected from normal levels of trade. The positive dummy AFTA_EXPORTER_{ijt} indicates an increase in welfare for extra-bloc countries (export expansion). The coefficient of dummy AFTA_IMPORTER_{ijt}, with the negative sign and size greater than of AFTA_BOTH_{ijt}, displays import diversion effect. Thailand diverts its imports from non-member to member countries. As $\beta_1 > 0$, $\beta_2 > 0$, and $\beta_3 < 0$, trade creation occurs in exports and there is import diversion effect.

Table 11: Gravity Model Regression Results for AANZFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.709*** (1.129)	-17.670*** (3.522)	-13.074*** (2.596)	8.982*** (2.22E-06)
lnGDP _{it}	0.996*** (0.087)	0.444*** (0.143)	0.444*** (0.140)	
lnGDP _{jt}	0.896*** (0.070)	0.745*** (0.227)	0.745*** (0.222)	
lnPOP _{it}	-0.355*** (0.076)	1.035*** (0.340)	1.035*** (0.333)	
lnPOP _{jt}	-0.208 (0.085)	0.205 (0.392)	0.205 (0.384)	
lnDIST _{ij}	-1.150*** (0.092)	0.616*** (0.228)		
AANZFTA_BOTH _{ijt}	-0.088 (0.172)	0.413 (0.431)	0.413 (0.423)	1.113*** (1.71E-06)
AANZFTA_EXPORTER _{ijt}	-0.269 (0.129)	0.303 (0.344)	0.303 (0.337)	-0.034*** (3.81E-06)
AANZFTA_IMPORTER _{ijt}	-0.530*** (0.150)	0.035 (0.357)	0.035 (0.350)	-4.892*** (9.75E-07)
Observations	2322	2322	2322	2322
R-squared	0.707	0.898	0.258	0.070
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

Table 11 shows estimation for AANZFFTA. Surprisingly, results in Column 1 show negative coefficients for all dummy variables ($\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 < 0$) with AANZFFTA_IMPORTER_{ijt} gains its significant level at 1%. This is a clear sign of trade contraction in all exports and imports of extra-bloc and intra-bloc countries. However, the coefficients are reversed in signs in Column 2. Also, AANZFFTA_IMPORTER_{ijt} now becomes statistically insignificant. The exact same significance, size, and signs of 3 coefficients are also obtained from Equation 3 with time and country-pair fixed effects as presented in Column 3.

Equation 4 with country-time effects and country-pair fixed effects produces statistically significant coefficients on three dummy variables. AANZFFTA_BOTH_{ijt} has a positive coefficient but coefficients for AANZFFTA_EXPORTER_{ijt} and AANZFFTA_IMPORTER_{ijt} have negative signs. An intra-bloc trade creation effect with average treatment effect at 204.36% [= (EXP(1.113)-1)*100] higher than expected from normal levels of trade is detected due to the positive coefficient of AANZFFTA_BOTH_{ijt} in Equation 4. The negative coefficient of AANZFFTA_EXPORTER_{ijt} with $\beta_1 > \beta_2$ indicates there is an export diversion effect but trade creation still prevails. The coefficient of dummy AANZFFTA_IMPORTER_{ijt}, with the negative sign and size greater than of AANZFFTA_BOTH_{ijt}, displays import diversion effect.

Table 12: Gravity Model Regression Results for AIFTA

	Equation 1	Equation 3	Equation 3	Equation 4
		Random Effects	Fixed Effects	Fixed Effects
	Pooled OLS	(t, ij)	(t, ij)	(it, jt, ij)
Constant	-4.640*** (1.124)	-17.552*** (3.534)	-12.912*** (2.612)	9.403*** (3.55E-07)
lnGDP _{it}	1.000*** (0.087)	0.434*** (0.144)	0.434*** (0.141)	
lnGDP _{jt}	0.894*** (0.069)	0.741*** (0.227)	0.741*** (0.222)	
lnPOP _{it}	-0.363*** (0.076)	1.042*** (0.341)	1.042*** (0.334)	
lnPOP _{jt}	-0.208** (0.086)	0.201 (0.392)	0.201 (0.384)	
lnDIST _{ij}	-1.157*** (0.093)	0.619*** (0.230)		
AIFTA_BOTH _{ijt}	-0.185 (0.185)	0.461 (0.448)	0.461 (0.439)	0.701*** (2.61E-07)
AIFTA_EXPORTER _{ijt}	-0.212 (0.128)	0.324 (0.347)	0.324 (0.340)	-0.735*** (6.03E-07)
AIFTA_IMPORTER _{ijt}	-0.518*** (0.149)	0.053 (0.358)	0.053 (0.351)	-4.365*** (1.65E-07)
Observations	2322	2322	2322	2322
R-squared	0.707	0.898	0.256	0.116
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

Next, we look at AIFTA. Results in Column 1 show surprising negative coefficients for all dummy variables ($\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 < 0$) with AIFTA_IMPORTER_{ijt} gains its significant level at 1%. Trade contraction effect in exports and imports of extra-bloc and intra-bloc countries is detected by Equation 1. However, the coefficients are totally reversed in signs in Column 2. Also, AIFTA_IMPORTER_{ijt} now becomes statistically insignificant. The same significance, size, and signs of 3 coefficients are also obtained from Equation 3 with time and country-pair fixed effects as presented in Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. Like the AANZFTA case, AIFTA_BOTH_{ijt} has a positive coefficient but coefficients for AIFTA_EXPORTER_{ijt} and AIFTA_IMPORTER_{ijt} have negative signs. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 101.5% [= (EXP(0.7)-1)*100] higher than expected from normal levels of trade. $\beta_1 > \beta_2$ indicates there is an export diversion effect but trade creation still prevails. $\beta_1 < \beta_3$ shows that there is an import diversion caused by the agreement.

Table 13: Gravity Model Regression Results for AJCEP

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.843*** (1.150)	-18.448*** (3.484)	-13.378*** (2.546)	8.871*** (2.32E-06)
lnGDP _{it}	1.010*** (0.091)	0.465*** (0.141)	0.465*** (0.138)	
lnGDP _{jt}	0.895*** (0.072)	0.755*** (0.223)	0.755*** (0.219)	
lnPOP _{it}	-0.369*** (0.077)	1.095*** (0.340)	1.095*** (0.334)	
lnPOP _{jt}	-0.205** (0.087)	0.135 (0.395)	0.135 (0.388)	
lnDIST _{ij}	-1.145*** (0.094)	0.689*** (0.231)		
AJCEP_BOTH _{ijt}	-0.061 (0.202)	0.354 (0.418)	0.354 (0.409)	1.379*** (1.70E-06)
AJCEP_EXPORTER _{ijt}	-0.214 (0.133)	0.313 (0.347)	0.313 (0.340)	-0.147*** (3.93E-06)
AJCEP_IMPORTER _{ijt}	-0.565*** (0.170)	-0.030 (0.348)	-0.030 (0.341)	-4.232*** (1.07E-06)
Number of obs	2322	2322	2322	2322
R-squared	0.709	0.898	0.248	0.138
l _{ij}	No	Yes	Yes	Yes
l _t	No	Yes	Yes	No
l _{it} , l _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

In the case of AJCEP, results from Equation 1 show negative coefficients for all dummy variables ($\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 < 0$) with AJCEP_IMPORTER_{ijt} gains its significant level at 1%. Trade contraction effect in exports and imports of extra-bloc and intra-bloc countries is detected by Equation 1. Again, the coefficients are totally reversed in signs in Column 2. AJCEP_IMPORTER_{ijt} also becomes statistically insignificant. The similar results also presented in Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. AJCEP_BOTH_{ijt} has a positive coefficient but coefficients for AJCEP_EXPORTER_{ijt} and AJCEP_IMPORTER_{ijt} have negative signs. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 297.02% [= (EXP(1.379)-1)*100] higher than expected from normal levels of trade. $\beta_1 > \beta_2$ indicates there is an export diversion effect but trade creation still prevails. $\beta_1 < \beta_3$ shows that there is an import diversion caused by the agreement.

Table 14: Gravity Model Regression Results for AKFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.659*** (1.123)	-17.897*** (3.515)	-13.154*** (2.584)	9.065*** (2.72E-06)
lnGDP _{it}	0.999*** (0.087)	0.444*** (0.142)	0.444*** (0.139)	
lnGDP _{jt}	0.893*** (0.069)	0.752*** (0.227)	0.752*** (0.223)	
lnPOP _{it}	-0.360*** (0.076)	1.062*** (0.343)	1.062*** (0.336)	
lnPOP _{jt}	-0.206** (0.086)	0.179 (0.394)	0.179 (0.387)	
lnDIST _{ij}	-1.153*** (0.093)	0.637*** (0.230)		
AKFTA_BOTH _{ijt}	-0.150 (0.184)	0.402 (0.435)	0.402 (0.426)	1.113*** (2.02E-06)
AKFTA_EXPORTER _{ijt}	-0.208 (0.127)	0.318 (0.346)	0.318 (0.339)	-0.034*** (4.62E-06)
AKFTA_IMPORTER _{ijt}	-0.537*** (0.147)	0.014 (0.356)	0.014 (0.349)	-4.892*** (1.21E-06)
Observations	2322	2322	2322	2322
R-squared	0.707	0.898	0.253	0.085
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

For AKFTA, results from Equation 1 show negative coefficients for all dummy variables ($\beta_1 < 0, \beta_2 < 0, \beta_3 < 0$) with AKFTA_IMPORTER_{ijt} gains its significant level at 1%. Trade contraction effect in exports and imports of extra-bloc and intra-bloc countries is detected by Equation 1. Again, the coefficients are totally reversed in signs in Column 2. AKFTA_IMPORTER_{ijt} also becomes statistically insignificant. The similar results also presented in Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. AKFTA_BOTH_{ijt} has a positive coefficient but coefficients for AKFTA_EXPORTER_{ijt} and AKFTA_IMPORTER_{ijt} have negative signs. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 204.36% [= (EXP(1.113)-1)*100] higher than expected from normal levels of trade. $\beta_1 > \beta_2$ indicates there is an export diversion effect but trade creation still prevails. $\beta_1 < \beta_3$ shows that there is an import diversion caused by the agreement.

Table 15: Gravity Model Regression Results for TAFTA

	Equation 1	Equation 3	Equation 3	Equation 4
		Random Effects	Fixed Effects	Fixed Effects
	Pooled OLS	(t, ij)	(t, ij)	(it, jt, ij)
Constant	-4.357*** (1.159)	-17.887*** (3.453)	-13.526*** (2.560)	9.898*** (3.60E-06)
lnGDP _{it}	0.995*** (0.096)	0.511*** (0.146)	0.511*** (0.144)	
lnGDP _{jt}	0.875*** (0.072)	0.736*** (0.219)	0.736*** (0.214)	
lnPOP _{it}	-0.368*** (0.079)	1.047*** (0.333)	1.047*** (0.326)	
lnPOP _{jt}	-0.186** (0.087)	0.134 (0.377)	0.134 (0.369)	
lnDIST _{ij}	-1.161*** (0.093)	0.617*** (0.217)		
TAFTA_BOTH _{ijt}	0.220 (0.358)	0.393 (0.436)	0.393 (0.428)	0.442*** (1.91E-06)
TAFTA_EXPORTER _{ijt}	-0.046 (0.124)	0.302 (0.362)	0.302 (0.355)	-0.791*** (5.57E-06)
TAFTA_IMPORTER _{ijt}	-0.401** (0.177)	0.016 (0.354)	0.016 (0.347)	-4.289*** (1.78E-06)
Observations	2322	2322	2322	2322
R-squared	0.707	0.898	0.251	0.118
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

Now we move to TAFTA, results from Equation 1 show that TAFTA_BOTH_{ijt} has a positive coefficient but the other two variables do not ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$) with TAFTA_IMPORTER_{ijt} gains its significant level at 5%. However, the coefficients for TAFTA_EXPORTER_{ijt} and TAFTA_IMPORTER_{ijt} have positive signs in Column 2 and Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. TAFTA_BOTH_{ijt} has a positive coefficient but coefficients for TAFTA_EXPORTER_{ijt} and TAFTA_IMPORTER_{ijt} have negative signs. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 55.53% [= (EXP(0.442)-1)*100] higher than expected from normal levels of trade. $\beta_1 > \beta_2$ indicates there is an export diversion effect but trade creation still prevails. Nevertheless, $\beta_1 < \beta_3$ shows that there is an import diversion caused by the agreement.

Table 16: Gravity Model Regression Results for ITFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.259*** (1.139)	-17.580*** (3.436)	-13.388*** (2.553)	9.226*** (6.20E-07)
lnGDP _{it}	0.991*** (0.096)	0.510*** (0.147)	0.510*** (0.144)	
lnGDP _{jt}	0.860*** (0.070)	0.724*** (0.216)	0.724*** (0.212)	
lnPOP _{it}	-0.365*** (0.082)	1.013*** (0.326)	1.013*** (0.320)	
lnPOP _{jt}	-0.168* (0.086)	0.172 (0.374)	0.172 (0.367)	
lnDIST _{ij}	-1.156*** (0.092)	0.592*** (0.214)		
ITFTA_BOTH _{ijt}	-0.547** (0.218)	0.573 (0.618)	0.573 (0.606)	2.088*** (2.38E-08)
ITFTA_EXPORTER _{ijt}	0.378 (0.120)	0.299 (0.360)	0.299 (0.353)	0.082*** (6.49E-07)
ITFTA_IMPORTER _{ijt}	-0.341* (0.183)	0.046 (0.352)	0.046 (0.345)	-3.854*** (6.41E-07)
Observations	2322	2322	2322	2322
R-squared	0.706	0.898	0.255	0.095
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

Estimation results for ITFTA is shown in Table 16, results from Equation 1 show that ITFTA_EXPORTER_{ijt} has a positive coefficient but the other two variables do not ($\beta_1 < 0$, $\beta_2 > 0$, $\beta_3 < 0$) with ITFTA_IMPORTER_{ijt} gains its significant level at 10%. The negative coefficient of ITFTA_BOTH in Column 1 refers to trade contraction effects in intra-bloc members. However, the coefficients for all dummies turn to be positive in Column 2 and Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. ITFTA_BOTH_{ijt} and ITFTA_EXPORTER_{ijt} have positive coefficients but the coefficient for ITFTA_IMPORTER_{ijt} has negative signs. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 707.27% [= (EXP(2.088)-1)*100] higher than expected from normal levels of trade. $\beta_2 > 0$ indicates there is an export expansion. However, $\beta_1 < \beta_3$ shows that there is an import diversion caused by the agreement.

Table 17: Gravity Model Regression Results for JTEPA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.521*** (1.156)	-18.155*** (3.599)	-13.572*** (2.696)	9.443*** (2.62E-07)
lnGDP _{it}	1.007*** (0.092)	0.502*** (0.150)	0.502*** (0.147)	
lnGDP _{jt}	0.891*** (0.073)	0.751*** (0.225)	0.751*** (0.221)	
lnPOP _{it}	-0.377*** (0.078)	1.095*** (0.342)	1.095*** (0.335)	
lnPOP _{jt}	-0.198** (0.087)	0.078 (0.378)	0.078 (0.370)	
lnDIST _{ij}	-1.172*** (0.093)	0.646*** (0.224)		
JTEPA_BOTH _{ijt}	0.322 (0.256)	0.180 (0.270)	0.180 (0.264)	0.223*** (1.00E-08)
JTEPA_EXPORTER _{ijt}	-0.119 (0.126)	0.321 (0.386)	0.321 (0.378)	-0.101*** (2.74E-07)
JTEPA_IMPORTER _{ijt}	-0.518*** (0.168)	-0.008 (0.377)	-0.008 (0.369)	-4.030*** (2.71E-07)
Observations	2322	2322	2322	2322
R-squared	0.711	0.898	0.242	0.123
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

For JTEPA, results from Equation 1 show that $JTEPA_BOTH_{ijt}$ has a positive coefficient but the other two variables do not ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$) with $JTEPA_IMPORTER_{ijt}$ gains its significant level at 1%. However, the coefficients for all dummies turn to be positive in Column 2 and Column 3. In addition, none of the FTA coefficients is significant.

Column 4 shows statistically significant coefficients on three dummy estimates. $JTEPA_BOTH_{ijt}$ has positive coefficient but the coefficients for $JTEPA_EXPORTER_{ijt}$ and $JTEPA_IMPORTER_{ijt}$ have negative signs. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 24.99% [= (EXP(0.223)-1)*100] higher than expected from normal levels of trade. $\beta_2 < \beta_1$ indicates there is an export expansion. However, $\beta_1 < \beta_3$ shows that there is an import diversion caused by the agreement.

Table 18: Gravity Model Regression Results for TCFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.115*** (1.044)	-17.386*** (3.536)	-13.538*** (2.574)	9.834*** (6.46E-07)
lnGDP _{it}	0.956*** (0.078)	0.488*** (0.143)	0.488*** (0.141)	
lnGDP _{jt}	0.867*** (0.063)	0.761*** (0.222)	0.761*** (0.217)	
lnPOP _{it}	-0.335*** (0.074)	0.949*** (0.348)	0.949*** (0.341)	
lnPOP _{jt}	-0.196** (0.085)	0.229 (0.380)	0.229 (0.372)	
lnDIST _{ij}	-1.140*** (0.088)	0.531** (0.229)		
TCFTA_BOTH _{ijt}	0.132 (0.297)	0.436 (0.471)	0.436 (0.462)	-0.166*** (2.48E-08)
TCFTA_EXPORTER _{ijt}	-0.126 (0.099)	0.336 (0.363)	0.336 (0.356)	-0.883*** (6.77E-07)
TCFTA_IMPORTER _{ijt}	-0.580*** (0.107)	-0.024 (0.362)	-0.024 (0.355)	-4.032*** (6.68E-07)
Observations	2322	2322	2322	2322
R-squared	0.703	0.897	0.269	0.103
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

For TCFTA, results from Equation 1 show that $TCFTA_BOTH_{ijt}$ has a positive coefficient but the other two variables do not ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$) with $TCFTA_IMPORTER_{ijt}$ gains its significant level at 1%. However, the coefficients for all dummies turn to be positive in Column 2 and Column 3. In addition, none of the FTA coefficients is significant.

Column 4 shows statistically significant coefficients on three dummy estimates. Interestingly, the coefficients for $TCFTA_BOTH_{ijt}$, $TCFTA_EXPORTER_{ijt}$ and $TCFTA_IMPORTER_{ijt}$ are all in negative signs. $\beta_1 < 0$ displays an intra-bloc trade contraction effect with average treatment effect at -15.28% [= (EXP(-0.166)-1)*100] lower than expected from normal levels of trade. Since β_1 , β_2 and β_3 are less than zero, trade contraction effects are identified in both imports and exports.

Table 19: Gravity Model Regression Results for TNZFTA

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects (t, ij)	Fixed Effects (t, ij)	Fixed Effects (it, jt, ij)
Constant	-4.409*** (1.155)	-17.891*** (3.455)	-13.556*** (2.560)	9.392*** (1.38E-06)
lnGDP _{it}	1.001*** (0.096)	0.514*** (0.146)	0.514*** (0.143)	
lnGDP _{jt}	0.878*** (0.072)	0.737*** (0.219)	0.737*** (0.214)	
lnPOP _{it}	-0.368*** (0.079)	1.040*** (0.333)	1.040*** (0.326)	
lnPOP _{jt}	-0.188** (0.087)	0.137 (0.377)	0.137 (0.370)	
lnDIST _{ij}	-1.167*** (0.093)	0.613*** (0.217)		
TNZFTA_BOTH _{ijt}	0.063 (0.373)	0.255 (0.497)	0.255 (0.487)	1.470*** (5.29E-08)
TNZFTA_EXPORTER _{ijt}	-0.052 (0.125)	0.297 (0.362)	0.297* (0.355)	0.197*** (1.44E-06)
TNZFTA_IMPORTER _{ijt}	-0.405** (0.181)	0.018 (0.355)	0.018 (0.348)	-4.289*** (1.43E-06)
Observations	2322	2322	2322	2322
R-squared	0.707	0.898	0.252	0.067
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

In the case of TNZFETA, results from Equation 1 show that TNZFETA_BOTH_{ijt} has a positive coefficient but the other two variables do not ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$) with TNZFETA_IMPORTER_{ijt} gains its significant level at 1%. However, the coefficients for all dummies turn to be positive in Column 2 and Column 3. None of the FTA coefficients is significant in Column 2 but the coefficient of TNZFETA_IMPORTER_{ijt} is significant at 10 % in Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. The coefficients for TNZFETA_BOTH_{ijt} and TNZFETA_EXPORTER_{ijt} have positive signs but it is the opposite case for TNZFETA_IMPORTER_{ijt}. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 334.94% [= (EXP(1.47)-1)*100] lower than expected from normal levels of trade. $\beta_2 > 0$ refers to export expansion while the negative β_3 with $\beta_3 > \beta_1$ indicates import diversion effect.

Table 20: Gravity Model Regression Results for TPCEP

	Equation 1	Equation 3	Equation 3	Equation 4
	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects
		(t, ij)	(t, ij)	(it, jt, ij)
Constant	-4.443*** (1.099)	-17.383*** (3.492)	-13.427*** (2.569)	9.370*** (2.80E-06)
lnGDP _{it}	0.990*** (0.085)	0.484*** (0.144)	0.484*** (0.141)	
lnGDP _{jt}	0.893*** (0.069)	0.749*** (0.221)	0.749*** (0.216)	
lnPOP _{it}	-0.357*** (0.076)	0.972*** (0.339)	0.972*** (0.332)	
lnPOP _{jt}	-0.206** (0.086)	0.227 (0.378)	0.227 (0.370)	
lnDIST _{ij}	-1.169*** (0.092)	0.545** (0.222)		
TPCEP_BOTH _{ijt}	0.034 (0.399)	0.817 (0.520)	0.817 (0.510)	0.212*** (1.07E-07)
TPCEP_EXPORTER _{ijt}	-0.180 (0.117)	0.255 (0.361)	0.255 (0.354)	-0.727*** (2.93E-06)
TPCEP_IMPORTER _{ijt}	-0.472*** (0.130)	0.074 (0.355)	0.074 (0.349)	-3.235*** (2.90E-06)
Observations	2322	2322	2322	2322
R-squared	0.706	0.897	0.263	0.226
I _{ij}	No	Yes	Yes	Yes
I _t	No	Yes	Yes	No
I _{it} , I _{jt}	No	No	No	Yes

*p < 0.1, **p < 0.05, ***p < 0.01

Finally, TPCEP results from Equation 1 show that TPCEP_BOTH_{ijt} has a positive coefficient but the other two variables do not ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$) with TPCEP_IMPORTER_{ijt} gains its significant level at 1%. However, the coefficients for all dummies turn to be positive in Column 2 and Column 3. None of the FTA coefficients is significant in Column 2 and Column 3.

Column 4 shows statistically significant coefficients on three dummy estimates. The coefficient for TPCEP_BOTH_{ijt} has a positive sign but it is the opposite case for TPCEP_EXPORTER_{ijt} and TPCEP_IMPORTER_{ijt}. $\beta_1 > 0$ displays an intra-bloc trade creation effect with average treatment effect at 23.59% [= (EXP(0.218)-1)*100] lower than expected from normal levels of trade. $\beta_2 > \beta_1$ and $\beta_3 > \beta_1$ indicates that there are trade diversion effects in terms of exports and imports.

From the results of all 12 FTAs above, it is clear that Equation 1 with Pooled OLS estimation provides inconsistent results. In addition, the coefficients of three dummy variables namely BOTHINFTA, EXPORTERINFTA, and IMPORTERINFTA are likely to be biased due to the inability of the specification to control for unobserved heterogeneity and multilateral resistance terms.

Results in Column 2 and Column 3, which are Equation 3 with random and fixed effect, usually provide very similar result with slightly different significance in some cases. However, in order to test which model is more suitable, Hausman Chi-Squared test was conducted. The results

suggest that fixed effect models are more suitable. This supports the previous literatures that fixed effects are recommended in gravity equation.

The results from Column 2 and Column 3 are still suffer from some unobserved heterogeneity problems. As suggested by Baier and Bergstrand (2007) and Benedictis and Salvatici (2011), the best method to be used in situations like this when the three dummy variables vary in three dimensions (i, j, and t) is to include time-varying exporter effects, time-varying importer effects and country-pair fixed effects. By doing so, we control for all determinants varying in i, j, and t dimensions. Therefore, the results presented in Column 4 provide unbiased estimates for three dummy variables.

Concerning the other determinant variables in the regression, of all the 12 focused FTAs, the results from Equation 1 with Pooled OLS technique show that the coefficients of GDP of both trading countries are positive and distance between the two countries are negative which are in line with the gravity literature. However, numbers of population in both exporting and importing countries have negative impacts on the bilateral trade.

In contrast, coefficients for population appear to be positive in Equation 3 with random effects and Equation 3 with fixed effects. GDP still has positive coefficients, but distance from

Equation 3 with random effect displays a positive sign, which contradicts the assumption of gravity model.

With the most unbiased estimation among all specifications in this study, the summary of estimation results of 12 FTAs obtained by using Column 4 are shown in Table 21.

Table 21: Summary of Estimation Results of 12 FTAs

	β_1	β_2	β_3	Exporter Effects	Importer Effects	Treatment Effects
AFTA	3.954***	0.296***	0.318***	Pure TC (X)	Pure TC (M)	5116.28%
ACFTA	2.313***	0.896***	-4.289***	Pure TC (X)	MD	910.93%
AANZFTA	1.113***	-0.034***	-4.892***	TC + XD	MD	204.36%
AIFTA	0.701***	-0.735***	-4.365***	XD	MD	101.50%
AKFTA	1.113***	-0.034***	-4.892***	TC + XD	MD	204.36%
AJCEP	1.379***	-0.147***	-4.232***	TC + XD	MD	297.02%
TNZFTA	1.470***	0.197***	-4.289***	Pure TC (X)	MD	334.94%
TAFTA	0.442***	-0.791***	-4.289***	XD	MD	55.53%
ITFTA	2.088***	0.082***	-3.854***	Pure TC (X)	MD	707.27%
JTEPA	0.223***	-0.101***	-4.030***	TC + XD	MD	24.99%
TCFTA	-0.166***	-0.883***	-4.032***	XD + XC	MD + MC	-15.28%
TPCEP	0.212***	-0.727***	-3.235***	XD	MD	23.59%

*p < 0.1, **p < 0.05, ***p < 0.01

In order to provide further insight on trade creation and trade diversion effects caused by the effective free trade agreements Thailand has, we will try to separate the effects of these FTAs by running a regression including dummies of all agreements with specification following Equation 4. The attempt is to control for overlapping effects of the FTAs. However, there are multicollinearity occurred when we include dummies from AANZFTA, AIFTA, AKFTA, TAFTA, and TNZFTA as these agreements became effective in the same year. Therefore, we need to combine some of them. AANZFTA is created to represent AANZFTA, AIFTA, and AKFTA, while TANZFTA represents TAFTA and TNZFTA. The estimation results are presented in Table 22 together with treatment effects, which reflect β_1 showing the different level of trade under the agreement compared to the normal level of trade.

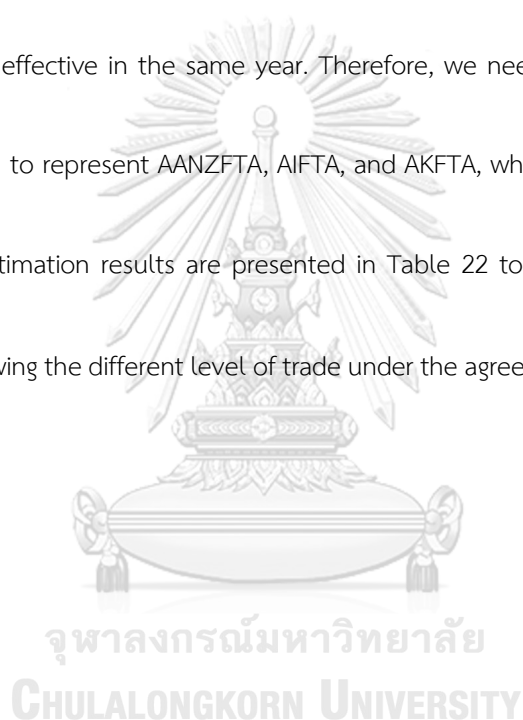


Table 22: Estimation Results of All 12 FTAs in a Regression

	β_1	β_2	β_3	Exporter Effects	Importer Effects	Treatment Effects
					Pure TC	
AFTA	1.206***	-1.035***	4.172***	TC+XD	(M)	234.03%
ACFTA	0.733***	0.842***	-0.259***	Pure TC (X)	TC+MD	108.15%
AANZIKFTA	4.393***	2.958***	-0.672***	Pure TC (X)	TC+MD	7991.65%
AJCEP	0.220***	0.130***	-0.325***	Pure TC (X)	MD	24.61%
TANZFTA	-0.335***	-0.132***	-0.912***	XD+XC	MD + MC	-28.45%
					Pure TC	
ITFTA	0.043***	-0.528***	0.435***	XD	(M)	4.36%
JTEPA	-2.227***	-2.461***	0.202***	XD + XC	ME	-89.22%
TCFTA	-0.166***	-0.883***	-4.032***	XD + XC	MD + MC	-15.28%
					Pure TC	
TPCEP	1.095***	0.156***	0.797***	Pure TC (X)	(M)	198.85%

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: TC (X) and TC (M) denotes trade creation in terms of exports and trade creation in terms of imports, respectively. XD and MD denotes export diversion and import diversion, respectively. XE and ME denote expansion of extra-bloc exports and expansion of extra-bloc imports, respectively. OXD denotes outward export diversion. XC and MC denote contraction of intra-bloc exports and contraction of intra-bloc imports, respectively.

Results from Table 22 reveal that, when we include dummies of all effective FTAs in the regression, the coefficients of these variables are rather different to the previous findings. AFTA has caused trade creation effects in exports and imports with small export diversion. ACFTA and AANZIKFTA have the pure trade creation effect in terms of exports as well as trade creation in

imports with small effect of import diversion. AJCEP has created trade creation in exports and imports with import diversion effect. The results from bilateral agreements are quite interesting. TANZFTA leads to unexpected trade diversion and trade contraction in both exports and imports. ITFTA has trade creation in imports but there is trade diversion effect found in exports. JTEPA has caused export diversion and contraction referring to lower trade volumes with extra-bloc and intra-bloc members after its implementation. However, the agreement caused import expansion effects, improving imports with extra-bloc countries but lessened trade with intra-bloc members. TCFTA leads to trade contraction and trade diversion in both exports and imports of extra-bloc and intra-bloc members. Finally, TPCEP created pure trade creation effects in terms of exports and imports.

To sum up, the results of this study indicate different effects from the free trade agreements on Thailand's bilateral trade flows. As we expected, AFTA has promoted trade between ASEAN members constituting in trade creation effects, supporting the studies from Ekanayake, Mukherjee and Veeramacheneni (2010) and Okabe and Urata (2014). The trade creation effects of AFTA come with little diversion effects on Thailand's exports. Overall ASEAN's FTAs or the plurilateral agreements of Thailand have caused trade creation effects in Thailand's exports with some or little trade diversion effects in imports.

On the other hand, the estimation results suggest that bilateral free trade agreements have various trade effects with Thailand's international trade. Contradicting to our hypothesis, TPCEP has caused pure trade creation effects to Thailand's overall trade. However, results obtained from ITFTA indicate that the higher trade level from the agreement is the result of trade diversion effects. Surprisingly, regressions on JTEPA and TCFTA indicate trade contraction effects, meaning the agreements lower trade volume between Thailand and other countries inside and outside the trade blocs.

We can indicate trade creation and trade diversion effects from only 7 out of 12 free trade agreements. Unfortunately, we are unable to analyze the trade effects of AANZFTA, AIFTA, AKFTA, TAFTA, and TNZFTA since these agreements could not be included into the regression due to multicollinearity problem.

From these results, it is noticeable that there is clear evidence plurilateral free trade agreements of Thailand generally promote overall trade without causing significant trade diversion effects to extra-bloc countries. On the other hand, bilateral trade agreements have different trade effects to Thailand's international trade with other countries. Some agreements have brought benefits to Thailand and its trading partners, while some have led to trade diversion or even trade contraction.

Table 23: Rules of Origin criteria of ASEAN's FTAs

FTA	Rules of Origin
AFTA	40% local or regional value-add required, based on FOB price; change in tariff heading (4-digit level), or product-specific rules may apply
ACFTA	Regional value content of at least 40%; or Product-specific rules may apply
AIFTA	35% regional value content based on FOB price and change in tariff subheading (CTSH)
AKFTA	40% regional value-add required, based on FOB price; change in tariff heading (i.e. change in HS code at the four-digit level); or Product-specific rules may apply
AANZFTA	40% regional value-add required, based on FOB price; change in tariff heading (i.e. change in HS code at the four-digit level); or Product-specific rules may apply
AJCEP	40% regional value-add required, based on FOB price; change in tariff heading (i.e. change in HS code at the four-digit level); or Product-specific rules may apply

Source: ASEAN Briefing

One plausible explanation why Thailand's plurilateral free trade agreements, in general, cause trade creation is due to one unique feature in the rules of origin of ASEAN's FTA. Unlike rules of origin of bilateral agreements, the rules of origin of these plurilateral agreements require a certain level of regional content instead of a country content. This more flexible regulation facilitates member countries to export and import under these FTAs. Since the ASEAN members are already doing lots of intra-ASEAN trading activities, AFTA and ASEAN+1 agreements would further encourage

parties to be even more active in the regional economic activities. Furthermore, the agreements promote regional integration by allowing the producers in the region to produce goods as one big production line, enabling countries to focus on producing products or parts they have comparative advantage and increasing the efficiency in the production.

Chapter VI

Conclusion and Recommendation

The aim of this study is to determine how 12 free trade agreements of Thailand affect its trade with other countries through trade creation and trade diversion effects. Using ex-post gravity analysis controlling for multilateral resistance terms, unobserved heterogeneity, endogeneity, and potential selection bias by including country-pair fixed effects and time-varying country effects, we obtained estimation of three FTA dummy variables. The sample of the study covers 43 countries over the period of 1990-2016 using aggregated export data. This study is able to analyze only 7 out of 12 total FTAs due to multicollinearity problem. The results show that AFTA has trade creation effects on international trade of Thailand, which supports the studies from Ekanayake, Mukherjee and Veeramacheni (2010) and Okabe, and Urata (2014). The trade creation effects of AFTA come with little diversion effects on Thailand's exports. Contributing to the study from Yang and Martinez-Zarzoso (2014), we found pure trade creation in exports and mild import diversion from The ASEAN-

China Free Trade Agreement. Similarly, AJCEP also reveals trade creation effects in exports with import diversion effects to Thailand's international trade. In general, ASEAN-plus-one agreements have caused trade creation effects in Thailand's exports and some or little trade diversion in importing side. On the other hand, the estimation results suggest that bilateral free trade agreements have different trade effects on Thailand's international trade. TPCEP causes pure trade creation effects to Thailand's overall trade. However, results obtained from ITFTA indicate that the higher trade level in exports arisen from the agreement come from trade diversion effects. Surprisingly, regressions on JTEPA and TCFTA indicate trade contraction effects, meaning the agreements lower trade volume between Thailand and other countries inside and outside the trade blocs.

Therefore, the evidence of this study supports the notion of trade liberalization since Thailand and its partners gain mutual benefits from having the free trade agreements. Additionally, the results indicate that the plurilateral agreements, namely AFTA and ASEAN+1, are generally promoting trade to all parties involved. This information may be a suggestion to Thai policy makers to focus on the plurilateral agreements, embark further negotiations with other countries in the settings of ASEAN. Such practice will be in line with one of the four pillars of ASEAN Economic Community (AEC): to have ASEAN fully integrated into the global economy. By having accumulative rules of origin to facilitate regional production, putting more emphasis on the economic

collaboration and integration in the region, such as ASEAN+1 free trade agreements, will benefit Thailand and all ASEAN member states by promoting regional value chain of production, raising the competitiveness of ASEAN, promoting more efficiency, and more bargaining power in the global stage. The initiative actions by Thailand, as one of the founding members, towards the creation of such agreements will also uphold the status of the country.

The major limitation of should be stated here that this study analyzed trade effects of all free trade agreements of Thailand except five agreements; namely AANZFTA, AIFTA, AKFTA, TAFTA and TNZFTA. Future researches may find a method to do the analysis on those agreements. Further study of trade creation and trade diversion effects of free trade agreements of a particular country may consider including the effects of different period of tariff reduction into their analysis, since the agreements do not remove tariffs on trade overnight. In fact, there may be early harvest period at the beginning and the tariff rates are gradually lowered over a period. These changes may lead to different results. Additionally, this study does not look into the effect of “trade diversion within the bloc”, which is the situation when one country diverts its trade from one intra-bloc member to another member and is not covered by the typical trade creation or trade diversion analysis. Future analysis could further investigate into this issue.

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