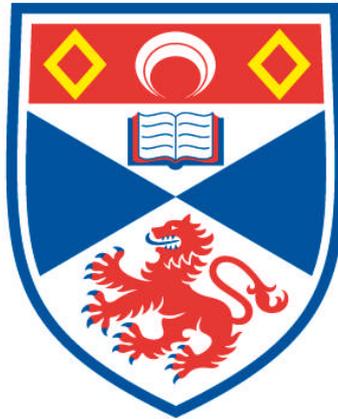


**ASEAN FREE TRADE AREA (AFTA): HOW FAR HAVE WE COME?
ANALYSIS AND EVIDENCE ON EFFECTS OF AFTA**

Orachat Niyomsuk

**A Thesis Submitted for the Degree of PhD
at the
University of St Andrews**



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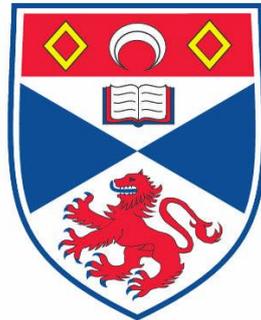
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ASEAN Free Trade Area (AFTA): How Far Have We Come?

Analysis and Evidence on Effects of AFTA

Orachat Niyomsuk



**This thesis is submitted in partial fulfilment for the degree of
Doctor of Philosophy in Economics**

University of St Andrews

24 October 2013

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Abstract

This thesis addresses issues concerning trade effects of a particular RTA: AFTA. In the first part of the thesis, 2 different but related gravity frameworks are constructed as to evaluate the independent effects of AFTA on relevant countries' trade flows. The first paper proposes examining '*AFTA-effects*' on members' trade, specifically within the AFTA context. This aims to distinguish trade effects that AFTA has had on early and delayed members' trading patterns. The panel '*Gravity Model*' is constructed, pointing to control for several biases commonly observed in the cross-section model. Although the result implies that early members do share trade benefits from AFTA more than non-members, the overall '*AFTA-effects*' on the membership's trade have not been benign. Another paper measures '*AFTA-effects*' on both members' and non-members' trade. This aims to assess whether AFTA has played a role as an export base for the international market. In this case, '*AFTA-effects*' appeared positive. Such effects are driven by an enhancement in extra-export bias, suggesting that the membership's exports to outside destinations have increased post-AFTA. The last paper provides a theoretical framework addressing the incidence of RTA-membership expansion. The fact that AFTA was gradually established and empirical results indicating AFTA's impacts on members and non-members brings about the idea that bloc-membership expansion could plausibly be explained by the economic effects that these countries have received. The corollaries of trading with/without RTA-membership of a potential member's gains of trade and welfare levels are related to the decision towards membership. Even though welfare effects are not always greater, the RTA-membership status surely benefits member countries in gains from trade more than non-members.

This can be perceived as one of the important reasons to explain the widespread regionalism worldwide and why joining the RTA is often seen as a safe haven strategy for a country.

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Orachat Niyomsuk

October, 2013

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Abbreviations

2SLS	Two-Stage Least-Squares
2way-FEM	2-Way Fixed Effects Model
AEC	ASEAN Economic Ministry
AEM	ASEAN Economic Minister
AFM	ASEAN Foreign Minister
AFTA	ASEAN Free Trade Area
AIJVS	ASEAN Industrial Joint Ventures
ANDEAN	The Andean Community
ANZCER	Australia-New Zealand Closer Economic Relations Agreement
APEC	Asia-Pacific Economic Cooperation
ASEAN	The Associations of Southeast Asian Nations
ASEAN-PTA	The ASEAN Preferential Trade Agreements
ATIGA	ASEAN Trade in Goods Agreement
BBC	The Brand to Brand Complementation
BLUE	The Belgium-Luxembourg Economic Union
CACM	Central American Common Market
CARICOM	The Caribbean Community
CEECs	Central and Eastern European Countries
CEPT	The Common Effective Preferential Tariff
CGE	The Computable General Equilibrium Model
CLMV	Cambodia, Laos, Myanmar and Vietnam
CU	Custom Union

CUSTA	The U.S-Canada Free Trade Agreement
EAC	The East African Trade Cooperation
EAEC	The East Asia Economic Caucus
EC	The European Commission
EEC	The European Economic Community
EFTA	The European Free Trade Association
ERS	The Economic Research Service
EU	The European Union
FDI	Foreign Direct Investment
FEM	Fixed Effects Model
G20	The Group of Twenty Finance Ministers and Central Bank Governors
GATT	The General Agreement on Tariffs and Trade
GCC	The Gulf Co-operation Council
GDP	Gross Domestic Product
GDP(PPP)	Gross Domestic Product (based on the Purchasing Power Parity)
GE	General Exclusion List
GLS	General Least Squares
HS	Harmonized System Code
HT	The Hausman Taylor Estimator
IL	Inclusion List
IMF	The International Monetary Fund (IMF)
IV	Instrumental Variable Estimation
LAIA	Latin American Integration Association

MOP	Margin of Preference
NAFTA	The North American Free Trade Agreement
NLD	The National League for Democracy
OECD	The Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PTA	Preferential Trading Agreements
REM	Random Effects Model
ROO	Rule of Origin
RTA(s)	Regional Trade Agreement(s)
SAARC	The South Asian Association for Regional Cooperation
SL	Sensitive List
SLORC	The State Law and Order Restoration Council
TEL	Temporary Exclusion List
TSP	Time Series Processor
UAPs	Unprocessed Agricultural Products
UN	The United Nations
USDA	United States Department of Agriculture
WTO	The World Trade Organization

Part I: General Information and Related Literature

1: Information on the Establishment of the ASEAN Free Trade Area (AFTA)

1.1 Historical notes on the formation of ASEAN

On 8th August 1967¹, the Association of Southeast Asian Nations or the so-called ASEAN was formed. This was a product of a joint effort and mutual agreement between 5 members: Indonesia, Malaysia, the Philippines, Singapore and Thailand. Brunei joined the group later in 1984 and together they were known as the original ASEAN-6 since, as far as objectives of establishing the regional formation are concerned, ASEAN can be perceived to enhance the region's political security as well as integrating closer economic cooperation. On the subject of an evolution of ASEAN cooperation, Tongzon (2002) summarized influential forces driving an ASEAN formation as:

All the signatory countries saw the need to foster their economic development and promote regional security in the face of a growing communist threat in Southeast Asia, precipitated by the fall of IndoChina to communism and the declared intention of the West to withdraw their military forces from the region (Tongzon, 2002, p.5).

Basically, ASEAN member states perceived regionalism² not only as a means to promote regional identity, but also as a shortcut to strengthen nation building processes since at that period the Communist influence was widespread across the region (Frost, 2008, p. 28). Even though politics had been a major component of this regional

¹ It is the Bangkok Declaration Meeting.

² In this paper, regionalism is defined as a political process whereby a group of countries agree to reduce the barriers to trade between each other to lower levels than exist between them and the rest of the world.

formation, according to the statements of the Bangkok Declaration³, ASEAN was, however, far from being a purely political assembly. On the contrary, creating formal regional integration as well as cultivating developments in economic, social and cultural arenas were fundamental areas for ASEAN members. According to the contents stated in the first ASEAN Declaration: the Bangkok Declaration, on 8th August 1967, membership countries declared that:

FIRST, the establishment of an Association for Regional Cooperation among the countries of South-East Asia to be known as the Association of South-East Asian Nations (ASEAN).

SECOND, that the aims and purposes of the Association shall be:

1. To accelerate the economic growth, social progress and cultural development in the region through joint endeavours in the spirit of equality and partnership in order to strengthen the foundation for a prosperous and peaceful community of South-East Asian Nations (“The ASEAN Declaration (Bangkok Declaration) Bangkok,” 1967, para. 2).

Despite this far-sighted preparation, it had been a long journey for ASEAN members to attain, if not to establish proper practices for regional formation. This is because, not only are historical and cultural grounds different across membership countries but, the members also vary greatly in terms of social and economic developments. Furthermore, at the early stage of this regional formation, membership countries encountered a series of post-independence problems: ethnic conflicts, communist insurgencies as well as political instability, which had been widespread across the region. It can be understood why during the early years of the ASEAN, each member state’s priorities had shifted, aiming to solve internal conflicts and planning for each member’s own domestic needs

³ The Bangkok Declaration is the founding document of the Association of Southeast Asian Nations . It is also called the ASEAN Declaration.

instead of pursuing regional objectives. For these reasons, preparations to promote economic developments at the regional level were undoubtedly delayed and distressed.

Before proceeding further, the following section briefly highlights key common characteristics as well as economic strengths and weaknesses of ASEAN-6 as they are regarded as AFTA founders. These countries are, in addition, major economies in ASEAN, therefore it is adequate to provide an overview of the ASEAN economies *en masse*. This piece of information is important for anyone who is interested in the setting of each ASEAN member before the most concrete form of ASEAN economic corporation: the ASEAN Free Trade Area (AFTA) was officially instituted in 1992.

1.2 ASEAN-6: key characteristics, economic strengths and weaknesses

Indonesia (Republic of Indonesia)

Indonesia is an archipelagic state comprised of 17,508 islands which was colonized by the Netherlands in the early 17th Century. During World War II, Japan invaded the country and eventually took control over the land for a short period: 1942-1945. The country managed to declare independence soon after Japan surrendered on 17th August 1945⁴.

Indonesia has the 16th largest land area of all the countries in the world at 1,919,440 square kilometres (741,050 sq mi). Having a population of 237.6 million⁵, it is in fact the world's largest archipelago in terms of population. It is also the world's

⁴ However, it took 4 years for the Netherlands to transfer sovereignty in 1949 (27 December 1949).

⁵ This information is sourced from the 2010 National Census.

largest Muslim country, and ranks 4th as the most populous democratic country⁶ in the world. Given this size and being an archipelagic state, the country stumbled upon severe ethnic and political instability problems. In fact, these problems still exist in some parts of the country to this day.

Regarding economic conditions, Indonesia is the only country in ASEAN that has acquired the G20⁷ membership status. This signifies the importance of Indonesia's economy at the global scale. In 2010, it was ranked by WTO as the world's 27th biggest exporting country. Besides large and fertile land areas as aforementioned, the country is rich in mineral resources such as petroleum, natural gas, tin, nickel, copper and bauxite. These resources have mainly been industrialized and have become one of the major sectors of export. Other important industries are textiles, apparels, footwear, foods and chemical fertilizers as well as tourism. Because of an abundant labour supply, cheap labour costs have become the country's key comparative advantage in expanding the diversification of the economy. Nonetheless, the Indonesian economy still relies heavily on its large domestic market. The unemployment rate is still high at approximately 7.9 %⁸.

Malaysia

On 31st August 1957, the federation of Malaya which was colonized by the British during the late 18th - 19th Centuries announced her independence. Similar to Indonesia, the area was occupied by Japan during the World War II period; 1942-1945. The federation of Malaya together with Singapore, Sarawak and Sabah later formed a new

⁶ CIA-The World Factbook. (2010). Retrieved 2010, from <https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>

⁷ G-20 is a group of finance ministers and central bank governors from 20 major economies.

⁸ CIA-The World Factbook. (2010). Retrieved 2010, from <https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>

country called Malaysia in 1963. Malaysia has an interesting landscape as it is comprised of 2 separate land areas: the Peninsular Malaysia and Malaysian Borneo, which the South China Sea passes between. Having a land area of 329,847 square kilometres (127,350 sq mi), it is regarded as the 66th largest country in the world. In 2010, the country was ranked 43rd as the world's most populated country with a population of approximately 28 million.

As far as economic strengths and weaknesses are concerned, Malaysia is endowed with natural resources suitable for the mining industry: tin, petroleum, timber, copper, iron ore, and natural gas. The oil and gas industry has been a major source of income for the country as the prices of energy elevated worldwide. In addition, in the mid 1980s, Prime Minister Mahathir⁹ had success in diversifying the Malaysian economy from being a raw materials producer and exporter to depend more on manufacturing, services and tourism sectors (Tongzon, 1998, p.15). In 2010, the country was ranked as the world's 29th largest economy in the world with a GDP (PPP) of \$414,400 billion¹⁰. However, Malaysia has been experiencing severe inequality issues among different ethnic groups, especially between the Chinese-Malay and the Malaysian backgrounds. Such issues are a deep-rooted economic problem for the country. In reality, approximately 70 % of the country's market capitalization is owned by the Chinese-Malay, despite accounting for only a third of the entire population¹¹.

⁹ His term covers 22 years: from 1981-2003.

¹⁰ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html>

¹¹ Chau, Amy. (2003). Minority Rule, Majority Hate [Newspaper]. Retrieved 2010, from http://www.atimes.com/atimes/Front_Page/EF07Aa01.html

The Philippines (Republic of the Philippines)

The Philippines was under the Spanish rule during the 16th Century. It was ceded by the United States later in 1898¹². The country had also gone through Japanese occupation during the World War II period. However, with the help of allied troops, the Philippines fought Japan and managed to declare her independence in 1946¹³.

The Philippines is another country in this region that has an archipelagic nature. Comprised of 7,107 islands with approximately 300,000 square kilometres (120,000 sq mi), the geographical setting has posed difficulties in governing the country in general. Several social as well as economic problems such as inadequate infrastructure, bureaucratic inefficiency, poverty, high unemployment rate¹⁴ as well as rapid population growth have been ongoing thus far. With a population of approximately 103,775,002¹⁵, it is considered the world's 12th most populous country. Nevertheless, in 2011, the country managed to be the world's 33rd largest economy with a gross domestic product (PPP) of approximately \$389.8 billion¹⁶. Major natural resources are timber, petroleum, nickel, silver, gold, cobalt and copper. As the country is endowed with natural and human resources, these have been perceived as a comparative edge, attracting foreign capital for investment in the manufacturing sector. The country's major industries are, for example, electronic assembly, garments, footwear, food processing products, pharmaceuticals, as well as petroleum.

¹² 12 June 1898 (independence proclaimed from the Spain)

¹³ 4 July 1946 was date of independence from the United States

¹⁴ As of 2010, the unemployment rate is 7.5 %.

¹⁵ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/rp.html>

¹⁶ Ibid.

Thailand (Kingdom of Thailand)

Thailand is the only country in ASEAN that was not empowered officially by any colonial masters. The country was, however, occupied by Japanese in the World War II period (1942-1945). Having a size of approximately 513,000 square kilometres (198,000 sq mi), Thailand is ranked as the world's 51st largest country in terms of total land area. As there are roughly 64 million people in it, it is considered the world's 20th most populous country.

Thailand is also considered a resource-rich country, being well-endowed with valuable natural resources such as tin, tungsten, natural gas, as well as tantalum. In fact, the country is the world's 2nd largest tungsten producer and 3rd largest tin producer¹⁷. Nonetheless, the country has been relying on labour-intensive industries covering basic to advanced products. They are, for example, agricultural commodities, textiles, footwear, machinery, electronic equipments, auto parts as well as jewellery. As Thailand has attractive natural landscapes and well-developed tourist attractions, tourism is another major industry for the country.

With regard to economic weaknesses, Thailand has been experiencing poverty and inequality issues as major infrastructure and various forms of development are restricted within urban areas. This consequently results in a population density problem in major developed cities (Tongzon, 1998, p.15). Thailand was hit hard by the 1997 financial crisis which the country did, in fact, start. As the Thai government could not defend the baht against the peg to the US dollar, the Thai currency underwent substantial

¹⁷ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/th.html>

depreciation. This currency crisis was turned into a financial crisis as many foreign funds which were invested in Thailand through the short term banking instruments, could not be paid off. Many financial institutions had to call for closure because of insolvency. This crisis had serious contagious effects on other countries. However, Thailand eventually recovered by turning to the IMF for financial assistance.

Singapore (Republic of Singapore)

Singapore was a British trading colony from 1819 to 1942. During World War II, Singapore was occupied by the Japanese and reverted to British rule again after the war. The island became self-governing in 1959. Singapore united with other former British territories nearby to form Malaysia in 1963. In 1965, the country separated from Malaysia and declared independence¹⁸.

Singapore is the only country in the region that has no natural resources. In addition, the country is a small island, having a total land area of approximately 704 square kilometres (272 sq mi) only. The population size is also small; there are approximately 5.35 million people in Singapore¹⁹. Though high labour and capital costs have limited economic activities, superior infrastructures, efficient bureaucracy and sound economic policies, have made Singapore the richest country in the region. In terms of GDP per capita, the country is ranked as the world's 5th richest, having a GDP per capita of approximately 59,900US\$²⁰ (US\$ in 2011 value): even higher than most developed countries. Because of its strategic location as a port, combined with a highly developed free market economy and a well-equipped infrastructure, most of the country's income

¹⁸ It was on 9th August 1965.

¹⁹ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/sn.html>

²⁰ Ibid.

is from trade and services. Moreover, Singapore is considered the 14th largest exporter and 15th largest importer in the world. The country has the highest trade-to-GDP ratio in the world at 407.9 %, emphasizing the importance of trade in this economy. In recent years, Singapore has promoted tourism as well as legalized gambling to attract more visitors. The country, in addition, tries to set up an image of being a pharmaceutical and medical hub of ASEAN.

Brunei (Nation of Brunei, the Abode of Peace)

Brunei was a British colony in 1888. Like others in the region, the Japanese took over the country from 1941-1945 during the World War II period. After that, it was under British administration until the country declared independence in 1984²¹. It is interesting to note that Brunei is comprised of 2 disconnected pieces of land with a total land area of only 5,765 square kilometres (2,226 sq mi).

Brunei is the only country in this region that is largely endowed with oil and natural gas. Forbes ranked Brunei as the 5th richest nation (out of 182 nations) due to its extensive petroleum and natural gas fields²². In fact, oil and natural gas production accounts for more than 90 % of its exports which is also the major source of GDP²³. The Brunei government is known to be well-regulated and almost all medical services and education through the university level are subsidized. However, the country has a very limited domestic market due to a population of only 395,027²⁴, of which approximately 150,000 live in the capital Bandar Seri Begawan. High operating costs and a shortage of

²¹ It was on 1st January 1984.

²² Too, D. (2012). Forbes Ranks Brunei Fifth Richest Nation [Newspaper]. Retrieved 2012, from <http://www.thejakartapost.com/news/2012/02/25/forbes-ranks-brunei-fifth-richest-nation.html>

²³ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/bx.html>

²⁴ Ibid.

labour has limited economic activities as well as their expansion. Notwithstanding an attempt to increase agricultural production and to further diversify economic activities beyond oil and gas industries, there has not been a sign of success.

From the brief overviews provided, it can be seen that diverse characteristics as well as distinctive domestic disorders have, undoubtedly, made it difficult for ASEAN countries to arrive at agreements which result in mutual benefits. Besides this, the primary economies of ASEAN-6 countries appear to be competitive rather than complementary as most of them have similar natural resources and rely on intermediate if not basic levels of technological advancements in the manufacturing sector. In fact, several industries have attracted the same sources of foreign direct investments. It is thus not surprising that ASEAN members took nearly a decade to form an official institution and to be granted regional development plans. Although ASEAN countries are different in many aspects, they had managed to put common trust to strengthen economic conditions at the forefront eventually. Indeed, forming a regional agreement was perceived as a vital path towards achieving this goal.

1.3 ASEAN Preferential Trade Agreement (ASEAN-PTA)

After the Bali Summit in 1976 which was the first ASEAN Heads of Government meeting, ASEAN-6 started to reflect its diplomatic role more clearly as a region. It was also as a result of the Bali Summit that ASEAN economic cooperation managed by ASEAN Economic Ministers (AEM) received independence in management from ASEAN Foreign Ministers (AFM). The decisions regarding economic cooperation

could then be more direct in aim and agreed upon by the AEM. In consequence, 5 separate economic committees were formed. These are:

The Committee on Trade and Tourism

The Committee on Industry, Minerals and Energy

The Committee on Finance and Banking

The Committee on Food, Agriculture and Forestry

The Committee on Transportation and Communications

Notwithstanding the fact that the region had imposed multi-channelled economic development plans, enhancing economic performance via trade and industry were put forth as a top priority. Matters concerning trade promotions, trade liberalization and industrial complementation were emphasized²⁵. The region also invested in research and strategic planning with the hope of constructing well-planned paths for regional economic cooperation. ASEAN's first steps towards trade liberalization worked on implementing preferential trading frameworks (tariff and non-tariff preferences), comprised of long term quantity contracts and preferences in procurement by government entities. As a result, the ASEAN Preferential Trading Arrangement (ASEAN-PTA) was officially formed on 24th February 1977. This ASEAN-PTA was approved by the General Agreement on Tariffs and Trade (GATT). In principle, the ASEAN-PTA worked on granting tariff preferences (the so-called '*Margin of Preference*' or '*MOP*') for imports among ASEAN members. The first batch of 71 trade

²⁵ There were 3 main programmes initially constructed: 1) the Preferential Trading Arrangements (PTA), 2) ASEAN Industrial Joint Ventures (AIJVS) and 3) the Brand to Brand Complementation (BBC) Scheme.

preferences came into effect on 1st January 1978. By 1981, member countries had managed to increase the number of products offered for tariff preferences to 6,581.

The agreement was, in actual fact, targeted to promote higher levels of intra-ASEAN trade (Tongzon, 2002, p.42). Nevertheless, with other regional groupings such as the European Commission (EC) and the North American Free Trade Agreement (NAFTA), ASEAN members, were concerned by the possibility of losing their bargaining power in the international trading system. ASEAN-PTA could thus be perceived as a counter strategic plan for ASEAN: acting as a safeguard to protect existing trade relations from shocks in global trade regimes. Furthermore, with closer assessment, ASEAN-PTA was viewed as a catalyst promoting closer economic ties among member states. This was aimed at causing domino effects in growth and development in the region as a whole. This point has, in fact, been mentioned by Castro (1980) in the essay on ASEAN economic co-operation that:

It might be said that the ASEAN-PTA was an effort to reverse the declining intra-ASEAN trade. That, however, would be only half true, because the thrust behind the ASEAN-PTA was not to arrest a decline but to promote growth and integration (Castro in R. Garnaut (Ed.), 1980, p.63).

Similar to other dimensions of ASEAN development schemes, managing ASEAN-PTA was not obstacle-free. Conflicts of interest remained as it was evident that membership countries were not straightforward in sharing preferential tariff reduction. A major flaw was due to the fact that, at an early state of ASEAN-PTA, trade liberalization processes were voluntary in terms of the product selection as well as the timeframe for tariff reduction. Basically there were no specific timeframes or deadlines for tariff liberalization. In particular, there were 2 types of voluntary offers: unilateral and

bilateral. For the unilateral approach, each country put products onto the tariff reduction list individually. The tariffs offered would, in consequence, be applicable to all membership countries. In the latter approach, member countries were able to request that products be put on the list by another trading partner bilaterally, but this had to wait for another party's approval. If the trading partner agreed, every member country would also receive the preferential offer on these products. The tariff preference effects would then be multilateral eventually. It can be seen that even though ASEAN-PTA had constructed an approach in which member countries are able to request products to be put onto the list for multilateral acceptance, it seemed that, in general, the majority of products offered for preferences were not produced by any member countries or, in other words, were unavailable in the regional market. Moreover, most of them had given products that have low market value for preference purposes or, sometimes, offered tariff preferences on zero-tariff items. According to Frankel and Wei (1996) which touched upon the historical setting of the ASEAN-PTA, the case in which Indonesia eliminated tariff barriers to the import of snow-removal equipment was referred to as one such example. These sorts of practices had, in consequence, delayed the primary objective of increasing intra-ASEAN trade as each member continued to place individual interests over regional ones. In addition, given that tariff reduction was done product-by-product via consensus format, this was time-consuming since each country had different products to be put on the list. Each country technically granted longer timeframes for important or strategic products to be co-ordinated in the tariff reduction process. Last but not least, the issues concerning rules of origin as well as the measurement of ASEAN's content of the products brought further difficulties in ASEAN-PTA. According to Acosta (1998) which studied the impact of AFTA on

selected agricultural products in ASEAN countries, the ineffectiveness of guidelines practiced in ASEAN-PTA in increasing intra-ASEAN trade was as well addressed:

From 71 listed products in 1977, the products voluntarily offered for tariff reductions increased to 6,581 by 1981. Despite the comprehensive list of products offered Margin of Preferences (MOPs), the intra-ASEAN trade did not grow substantially. The reason for this is that products offered by the ASEAN members have little consequences on their trade with each other (Acosta, 1998, p.6).

Furthermore, while the tariff reduction scheme was in use, non-tariff barriers in the form of quotas, dissimilar custom procedures and technical norms instead thrived. All of these issues certainly encouraged member countries to rely on extra-ASEAN trade rather than pursuing trade prospects at the regional level. As Table 1.1 indicates below, the utilization rate of ASEAN-PTA was negligible even a decade after its instalment. One can rather conclude that ASEAN-PTA had failed to promote closer economic ties within the region and was inept at increasing the volume of intra-ASEAN trade, in particular. The level of intra-ASEAN trade remained insignificant and indifferent after the PTA was formed.

Table 1.1: Utilization of Preferential Trading Arrangements in 1987

Country	No. of Items Granted PTA	No. of Items in PTA list	Imports granted PTA US\$('000)	Total Imports from ASEAN of PTA Granted Items US\$('000)	Share of No. of Items (%)	Share of Value of Items (%)
Indonesia	45	2,754	15,258	50,426	1.6	30.3
Malaysia	86	2,267	28,868	131,286	3.8	22.0
Philippines	Na	3,443	Na	Na	Na	Na
Singapore	114	2,465	35,970	293,608	4.6	12.3
Thailand	95	1,854	21,532	58,336	5.1	36.9
Total	337	12,783	101,628	239,214	2.6	42.5

Source: Committee on Trade and Tourism (COTT), ASEAN Secretariat (in Pangestu et al, 1992)

1.4 ASEAN Free Trade Area (AFTA)

Even almost a decade after the establishment of ASEAN-PTA, there had not been as much development in intra-ASEAN trade as expected. Despite several attempts aiming to improve the PTA, the result was not at all impressive. Moreover, with substantive changes occurring in the world's trading system including the growth of the regionalism concept, especially in Europe and North America, as well as the tightened economic ties of neighbouring APEC, ASEAN-6 was eventually aware of the need to finalize a new form of regional trade liberalization. This global phenomenon of regionalism was perceived as a form of protectionism for ASEAN-6 since non-tariff barriers in the form

of anti-dumping duties and voluntary export restraints were deemed to be prevalent instead. As a consequence, a better format of regional economic integration had to be formed maintaining the region's bargaining power. Among various forms of regional economic integration available, the Free Trade Area (FTA) was agreed to be the most feasible format for ASEAN members to establish. The ASEAN Free Trade Area (AFTA) was eventually institutionalized as a result of the fourth ASEAN Summit in Singapore in 1992. This point has, in fact, been pointed out in the study concerning ASEAN external economic relations by Tongzon (2002); the establishment of AFTA was perceived as a counter strategy for ASEAN countries to promote cooperative venture attracting trade and investment to the region:

First, the 1992 decision by the ASEAN countries to establish an ASEAN free trade area by the year 2008 and the recent decision to speed up the process by moving the implementation date to 2002 reflected the ASEAN efforts to maintain, if not improve, the attractiveness of the ASEAN region for trade and investment. At the same time, there has been an attempt to forge linkages with NAFTA and EU countries (Tongzon, 2002, p.126).

Nevertheless, given the disappointment of ASEAN-PTA, it was more than a decade before the AFTA could be materialized. Such a delay could still be attributed to the fact that ASEAN countries, on the whole, upheld national interests rather than regional ones. The essay on *'Regionalism and Globalism in Southeast Asia'* by Palmujoki (2001) also highlighted this point:

ASEAN ideology has emphasized **national resilience**, accompanied by **regional resilience**... Thus, even economic cooperation, requiring national economies to adapt, to some degree, to regional adjustments, has been difficult for the ASEAN countries. The ASEAN PTA and the failures of some common investment projects provide good examples of the way national interests have

watered down any serious attempts to create supranational economic cooperation in ASEAN (Palmujoki, 2001, p. 50).

In the mid 1990s, the ASEAN's founders, ASEAN-6, managed to expand, accepting 4 additional countries into this regional economic integration; Vietnam joined the zone in 1995, Myanmar and Laos joined the area in 1997 and Cambodia came in last in 1999. The admission of Cambodia completed ASEAN-10 which was indeed a remarkable achievement for the region in terms of achieving regional peace and political stability. As this group of countries is comprised of Cambodia, Laos, Myanmar and Vietnam, they are known as the CLMV. Being official members of ASEAN, this group of countries had to simultaneously perpetrate themselves to the trade liberalization proposed under AFTA. Even though it was aimed at giving the whole of Southeast Asia free trade status, this integrating preparation was a politically-driven process. That is because, in practice, the AFTA-membership status was given concurrently with the granting of ASEAN-membership²⁶. In other words, ASEAN countries made FTA politically acceptable.

Political considerations have largely influenced the CLMV to foster economic integration with former AFTA-members: ASEAN-6. Taking into consideration that these countries were newly emerging economies, they were literally absent from international markets. From CLMV's perspectives, being integrated with ASEAN-6 politically and economically could thus be perceived not only as a recommended path to create good relationships with the rest of the region but also a gateway to international environment jointly. Correspondingly, ASEAN-6 also wanted to expand this form of

²⁶ Not only did they join the free trade area at different times, this group of countries was also given different deadlines in completing tariff reduction plans. Deadlines for tariff liberalization were set to be in 2006 for Vietnam, 2008 for Laos and Myanmar, and 2010 for Cambodia.

regional cooperation further to include every country in the region. This too was driven by political motive as these ASEAN founders intended to respond to the regionalism concept that had been practiced widely across Europe and North America and was approaching to Asia. In summary, it can be said that the formation of AFTA is politically-oriented as it was not caused by high trade level between members. This, in other words, implies that AFTA-memberships are exogenous. Yet, having all ASEAN countries in AFTA, ASEAN-6 expected to promote the region as well as to strengthen the region's bargaining power further especially in terms of international negotiations. However, this course of action was not at all smooth. A number of obstacles were in the way that had delayed these CLMV countries opting into ASEAN/AFTA at the same time as ASEAN-6.

Before proceeding further, it is necessary to provide a brief overview of the CLMV countries. Important historical backgrounds, demographic and fundamental social settings of these countries will also be explored. This information is not only sufficient to spell out the lateness of CLMV's admission into ASEAN/AFTA but also casts light on their motivation in seeking to be a part of this regional cooperation.

1.4.1 Transitional economies: an overview of key characteristics

Cambodia (Kingdom of Cambodia)

Cambodia was under the joint control of Thailand and Vietnam during the Siamese – Vietnamese War during 1841-1845. In 1863, Cambodia sought French protection, and later became a part of French Indochina in 1887. After the Japanese occupation in World War II, Cambodia eventually gained independence from France in 1953.

Nevertheless, after declared independence, Cambodia has experienced social turmoil and several internal conflicts. One of the major social disruptions was invasion by the communist force from the Khmer Rouge which ended with the execution of 1.5 million people. With the assistance provided by the UN, the country managed to launch her first national election in 1993. Nevertheless, Cambodia was not peaceful until 1999 when the remaining Khmer Rouge surrendered²⁷.

Geographically, Cambodia has a total land area of 181,035 square kilometres with a population of approximately 14.9 million²⁸. With regards to the economic conditions, agriculture is the most important economic activity although more advanced industries have been growing in recent years. Major agricultural exports are rice, fish, timber and rubber. Other important industries are tourism, textile and garment sectors. As the country is rich in natural and mineral resources, oil exploitation, as well as mining industries have recently become one of the fastest growing industries attracting large amounts of foreign direct investment. Between 2004 and 2008, the Cambodian economy experienced a high growth rate of approximately 10 % annually. In fact, according to the IMF report, the country managed to rank as one of the world's top 10 countries in terms of annual average GDP growth between 2001 and 2010. Even so, Cambodia is still underdeveloped in several areas. As the country has long been suffering from wars and political conflicts, more than 50 % of the population is under 25 years old²⁹. This contributes to the lack of a skilled and educated labour force which further explains the limited economic activities aforementioned.

²⁷CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/cb.html>

²⁸ Ibid.

²⁹ Ibid.

Laos (Lao People's Democratic Republic)

Similar to Cambodia, Laos was a part of Thailand (previously known as Siam) during the late 18th Century and was later transferred to French Indochina in 19th Century. The country declared independence soon after the end of the Japanese occupation in 1945. However, she was under French rule again until receiving autonomy in 1949. After that, Laos was controlled by the monarchy which lost power to the Communist Party in 1975. Laos thus became a one-party socialist republic since then.

With regard to the landscape of the country, Laos is the only landlocked nation in South East Asia, having a total land area of only 236,800 square kilometres. The population size is also small, with approximately 6.6 million inhabitants. As far as the economic condition is concerned, the country still relies heavily on subsistence agriculture for its GDP and employment. For example, the rice cultivation sector accounts for approximately 30 % of the GDP and 75 % of total employment³⁰. In addition, the country is rich in natural and mineral resources, of which the majority, have not been exploited. The key resources are, for instance, timber, gypsum, tin, gold and gemstones as well as hydropower. Other key economic activities are cross-border trade and investment, mainly conducted with close neighbours such as Thailand, Vietnam and China. Apart from the time of the Asian Financial Crisis, Laos has been experiencing consistent and high average growth rates of approximately 6 % per annum since 1988³¹. Notwithstanding such high growth rates, the country is underdeveloped in many areas, especially in terms of its basic infrastructure. According to the UN Development Programme, Laos is still listed among the least developed countries.

³⁰ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/la.html>

³¹ Ibid.

Myanmar / Burma (Republic of the Union of Myanmar)

Historically, Myanmar was under British colonization as part of its Indian Empire for more than half a century (1824-1886). The country became independent from the Commonwealth in 1948. During the period of 1962-1988, General Ne Win who was the military ruler, appointed himself as president. The military deposed General Ne Win and formed the ruling stratocracy in 1988. In 1990, the country organized her first election, which resulted in a landslide victory for the National League for Democracy (NLD) headed by Aung San Suu Kyi. However, the ruling military did not hand over power and continued to govern the country until 1997 as the State Law and Order Restoration Council (SLORC). Another election in 2010 led to the formation of a parliament in 2011 having Thein Sein as a president. This government attempted to call for political and economic reforms which aimed to draw the more open economic and foreign policies.

With a total land area of 676,678 square kilometres, Myanmar is ranked as the world's 40th largest country. The country also has a large population of nearly 60 million, which makes it the world's 24th most populous country³². Myanmar is another resource-rich country in the region; having, for example, petroleum, natural gas, timber, tin, zinc, as well as precious stones. Nevertheless, the exploitation of these resources has been governed by the ruling elites, thus, in general, the majority of the population do not benefit from this economic activity. Furthermore, as the country has long been governed by the military, sound economic policies have not been provided despite numerous socio-economic reforms. Basic infrastructure and welfare systems are underdeveloped.

³² CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/bm.html>

Inflation has also been a serious problem especially during 2005-2007. At present, the country is still considered the poorest country in the region. Specifically, it is recorded that about 32 % of the population is living in poverty³³.

Vietnam (Socialist Republic of Vietnam)

Vietnam was a part of French Indochina in 1887. The country declared independence in 1945 after the Communist force won the first Indochina War. As a result of this war, Vietnam was divided into the Communist North and the anti-Communist South. Conflicts between these states led to the Vietnam War which resulted in the victory of Communist rule in 1975. The country then became a socialist republic.

The country has a total land area of 331,210 square kilometres with approximately 91 million people³⁴. This makes the country the 13th most populous in the world. With the concern on economic issues, the country has opened up to international markets by initiating a major economic reform known as the '*doi moi*' programme in 1986. Before that the country was conservative, being under the centrally-planned form of government. Since the reform took place, the country has been experiencing high GDP growth rates, especially during 1990-1997. Vietnam is now one of the fastest growing economies in the world with an annual rate of GDP growth of approximately 7 % since 2000. As trade liberalization has been promoted consistently, the country eventually managed to join the World Trade Organization in 2007. Despite numerous signs of economic development, the country is, however, affected by a high inflation rate. In

³³ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/bm.html>

³⁴ CIA-The World Factbook. (2011). Retrieved 2011, from <https://www.cia.gov/library/publications/the-world-factbook/geos/vm.html>

addition, many economic activities are still state-owned although private ownership has been encouraged. With regard to major industries, Vietnam is the world's largest producer of cashew nuts and the world's 2nd largest rice exporter. The country has, in recent years, become the 3rd largest crude oil producer in the region. Other key exports are marine products, coffee, tea and rubber. However, agriculture is no longer the largest source of GDPs as the manufacturing and industry share has evidently been increased. In 2011, the industry share accounted for 40.3 % while the agriculture share only accounted for 22 %. Major industries are clothes, footwear, marine products, food processing, electrical assembly as well as mining. Another important source of income is the tourist industry.

As evidently suggested, these new members have diverse colonial traditions which have produced different social, political and economic systems. Such factors made sharing similar views difficult, especially with respect to forming any kind of regional integration. As these countries were also newly independent countries, they were in a transition period of adjusting extensive domestic conflicts when AFTA was formed. All of them encountered post-independence problems such as communist insurgency and clashes among ethnic groups. For this reason, it was not until the end of the Cold War that the first transitional economy, Vietnam, was accepted into ASEAN/AFTA. This action was perceived as a sign of readiness of the country to transform her political as well as economic interests. As a socialist state, Vietnam had been influenced by the Communist ideology from her neighbouring country: China. Given these causes, the commitment to ASEAN/AFTA's rules and regulations indicated one of the greatest social and political revolutions of the country's history. In Tongzon (2002): the book's

chapter concerning AFTA and the transitional Southeast Asian economies, Vietnam's key motivations in seeking ASEAN/AFTA official membership were elaborated:

In political terms, Vietnam shares the same security and political interests with the other ASEAN countries. Vietnam considers joining ASEAN as an opportunity to make friends with other countries in the region and thus to contribute to the creation of a more friendly and conducive environment for economic development. Vietnam also needs ASEAN to have a more significant and influential voice in the international arena...its membership is necessary in order to maintain the balance of power in the region. The emergence of China with its potential to become a super military power must be balanced in order to avoid any dominance by one country in the region (Tongzon, 2002, p.201).

In a similar vein, the successful admission of Myanmar into ASEAN/AFTA in the following years implied that the political instability which was generally caused by the military coup d'état's alleged violation of the agreement to hand over power to the political leadership had been, more or less, improved. By being a part of ASEAN/AFTA, issues concerning violation of human rights and democratic principles can, in addition, be alleviated through opening dialogues with ASEAN's assistance. Laos was another socialist state that struggled to solve a series of post-independence problems such as civil strife and political violation. Together with the fact that it is the only landlocked country in the vicinity, these issues ended up separating Laos from the rest of the region and the world market. For these reasons, Lao's decision to acquire ASEAN/AFTA membership in the same year as Myanmar also implied that there were signs of political stability and a serious plan to exercise economic reform: domestically and internationally. Lastly, Cambodia's official membership into this regional grouping likewise underlined major developments in her political situation. Cambodia's acceptance into ASEAN/AFTA was not only a success for the country, but was also considered a great political achievement for the whole region since ASEAN/AFTA

could arrive at its full operation. This is certainly so because, as compared to other CLMV countries, Cambodia had numerous serious domestic issues: the longest history of internal wars and political clashes as well as foreign-related conflicts, especially along her border lines. These problems largely affected diplomatic relationships with neighbouring countries and damaged any potential investors' confidence in the country's long-term stability. Hence, for Cambodia, it can be said that one of the major factors in following into ASEAN/AFTA was seeking assistance in settling such outstanding internal problems. By coming out of isolation, the country could receive help from international organizations such as the United Nations (UN) and cooperation from its own region. In fact, ASEAN-6 provided various institutional structures to assist membership countries resolving relevant social and political issues. In summary, it can be said that besides their readiness to be exposed to trade liberalization, governing parties in transitional economies turned to regional cooperation as the potential benefits in political area are obvious.

1.4.2 Objectives and main instruments of AFTA

AFTA's objectives, in general, remained similar to ASEAN-PTA. However, in addition to increasing intra-ASEAN trade which had long been the key mission for ASEAN members, the ASEAN's FTA was also perceived as a vital path to bring in development related factors to the region (Pangestu et al., 1992). That is because the ultimate objective of AFTA is to build the region's competitive advantage as a production base geared for the world market. Advancing trade liberalization via an expansion of intra-

ASEAN trade thus serves as a catalyst to promote efficient production and competition in the long term.

Hence, in comparison to ASEAN-PTA era, there were significant changes required from all members in order to establish the free trade zone. In spite of many routes that could be implemented toward successful regional trade liberalization, a necessary first step that ASEAN countries began with was the elimination of tariffs. As a result, *the 'Agreement on the Common Effective Preferential Tariff (CEPT) Scheme for the ASEAN Free Trade Area (AFTA)'*³⁵ was signed in 1992. This so-called '*1992 CEPT Scheme*' applied to all manufactured products including capital and processed agricultural goods³⁶. In principle, member countries agreed to segregate these goods further into numbers of product listings allowing each product category to have different timeframe for tariff and non-tariff liberalising requirements. These lists are namely 1) *Inclusion List* 2) *Temporary Exclusion List* 3) *Sensitive List* and 4) *General Exception List*. With regards to trade liberalization through reduction in the CEPT, the *Inclusion List* covers products that have to undergo immediate tariff liberalization while the *Temporary Exclusion List* allows products to be excluded from this process for a temporary period of time. Nevertheless, these products will have to be transferred to the *Inclusion List* eventually. Given that the so-called Unprocessed Agricultural Products (UAPs) are commonly perceived as strategic products within the region, member countries therefore agreed to put them into the *Sensitive List*. These products are thus given a

³⁵ It is a cooperative arrangement among member countries whereby intra-regional tariffs will be brought down to 0-5 %. The CEPT also requires that non-tariff barriers will have to be eliminated. However, in order to utilize this scheme, member countries need to meet the rule of origin (ROO) or the local content requirement; products produced have to contain a minimum of 40 % of AFTA value if not totally produced within AFTA countries.

³⁶ In this scheme the unprocessed agricultural products were, however, excluded. See Appendix I for details.

longer timeframe to meet tariff and non-tariff liberalization targets. In addition, for products that are deemed important to a nation security, public morals, human, animal, plant life and health and articles of artistic, historic and archaeological value, they are excluded from this free trade zone. These products are, for that reason, listed in the *General Exception List* permanently. On top of these diversified product lists, member countries also divided the CEPT Scheme further into 2 tariff liberalization schedules: the so-called '*normal track*' and the '*fast track*' programmes³⁷ aiming to ease as well as to speed up this tariff liberalization process. In details, the products listed under the '*normal track*' were planned to have 0-5 % tariff levels by 2008, while the ones under the '*fast track*' were aimed to reach the same tariff levels in 2003. Nevertheless, according to AFTA-memberships' acknowledgement of the '*Framework Agreement on Enhancing ASEAN Economic Cooperation*' in 1995³⁸, the tariff reduction implementation was forwarded to 2003 instead of 2008³⁹. Thus, for the '*fast track*' programme, products with tariff rates above 20 % were required to arrive at the tariff rate of 20 % by 1998 and to attain the target of 0-5 % tariff levels by 2000. In addition, products with tariff rates of 20 % and below had to reduce the tariffs to 0-5 % by 1998. For the '*normal track*' programme, products with tariffs rates above 20 % were demanded to have the tariff rate of 20 % by 2000. For products with tariff rates of 20 % or below, the deadline to achieve tariff rates of 0-5 % was given to be 2003. Other trade restrictions and non-tariff barriers were, likewise, planned to be removed by 2003.

³⁷ There were 15 products listed under the '*fast track*' programme. They are vegetable oils, cement, chemicals, pharmaceuticals, fertilizer, plastics, rubber products, leather products, pulp and paper, textiles, ceramic and glass products, gems and jewellery products, copper cathodes, electronics, wood and rattan furniture. The rest of the products in the '*1992 CEPT Scheme*' were thus listed in the '*normal track*' programme.

³⁸ This agreement was signed during the fifth Summit Meeting in Bangkok in 1995.

³⁹ It was forwarded further to 2002.

Despite the fact that AFTA's principle and its key mechanism is similar to ASEAN-PTA, the major difference is that AFTA worked under the CEPT Scheme which is reciprocal and sectoral, making it more encompassing and less cumbersome than the unilateral product-by-product approach of ASEAN-PTA (Soloaga and Winter, 1999). Under the CEPT Scheme, there is an interchange such that once the goods are accepted under the scheme, member countries have to grant preferential tariffs. Nonetheless, the new version of CEPT Scheme, the '*1995 CEPT Scheme*', covered almost all of product categories, including the UAPs which are generally exempted in preferential trade agreements⁴⁰ (Acosta, 1998, p.9). This move undoubtedly signalled the strong ambition of ASEAN countries to form integrated economies, although there were many doubts and arguments following such an action. This was so because agricultural products, in particular, unprocessed agricultural goods had long been regarded as a strategic and politically sensitive sector for most of the membership countries. Given similar natural resources in these members, agricultural goods produced are, in addition, perceived as competitive rather than complementary. Thus, this progress strongly implies that member states were ready to open markets for regional competition.

For these reasons, AFTA could be seen as an advance in the pursuit of regional trade liberalization. Most importantly, the major objectives of AFTA are much more straightforward than ASEAN-PTA as it focuses on expanding intra-ASEAN trade as well as increasing the competitiveness of ASEAN countries specifically. Therefore, procedures assembled to support these plans ranged from imposing product standard

⁴⁰ In the '*1995 CEPT Scheme*', agricultural products are defined as 1) agricultural raw materials and unprocessed products covered under 1-24 of the Harmonized System Code (HS), and similar agricultural raw materials and unprocessed products in other related HS headings; and 2) products which have undergone simple processing with minimal change from the original products. (Acosta, 1998, p.9).

harmonization, and investing in transport infrastructure in order to facilitate intra-regional trade liberalization processes, to providing macroeconomic consultations and coordination of foreign investment policies. Furthermore, the CEPT Scheme also requires member countries to eliminate quantitative restrictions and other non-tariff barriers.

After the time limit agreed to adjust tariff reduction, member states could gradually exploit the CEPT Scheme to cut tariff lines to fall within the target band of 0-5 %. As of 2007⁴¹, AFTA managed to put approximately 98.58 % of total products in ASEAN under the Inclusion List, with 93.67 % of these products having tariff within the 0-5 % range. The rest of the products having tariffs above 5 % are products that are in the Sensitive List and the General Exclusion List respectively. Considering specifically ASEAN-6 economies, 98.67 % of products in the Inclusion List were brought down to 0-5 %. Within this category, 71.44 % of these products had already achieved 0 % tariff. For the rest of ASEAN, 97.32 % of their products were included into Inclusion List, and 86.21 % of these products had achieved the tariff band of 0-5 %. The products that remained in the Sensitive List were minimal as they accounted for only 0.51 % of the tariff lines in Cambodia, 1.90 % in Laos and 0.25 % in Myanmar. Thus, at the time that the research investigated this free trade area in 2007, the average tariff rate under the CEPT Scheme for ASEAN-6 was very low at approximately 1.59 %. This amount had been hugely reduced considering the average tariff of 12.76 % in 1993. And for the rest of ASEAN, the average tariff rate was around 4.4 % in that same year. It can be seen

⁴¹ At the time of writing this thesis: 2009, the most updated data available was in 2007.

that in 2007, AFTA was very close to its full realization of the ASEAN Free Trade Area status already.

Taking above causes into consideration, the study perceives the year 2007 to be an important year in which to examine AFTA. This is because besides average tariffs among membership countries were near to the ground in 2007, it was also the time that the ASEAN Economic Ministers (AEM) had agreed to enhance the CEPT Scheme as a legal instrument. This decision led to the signing of the ASEAN Trade in Goods Agreement (ATIGA) later in 2009. With the hope of establishing the single market, namely the ASEAN Economic Community (AEC), by 2015, this agreement would, in fact, act beyond an ordinary agreement: being a rule-based trade facilitating medium aiming to enhance the confidence of traders coming from within and outside the region⁴². In the case of the ATIGA coming into law, the CEPT agreement and certain protocols would be superseded. Therefore, in evaluating the success of AFTA which has the CEPT Scheme as the major tool for trade liberalization, the year 2007 is thus the appropriate time to account for the effects. With ATIGA and other related developments in trading policies, substantive changes could have occurred in the ASEAN economies after 2007. In that case, it would clearly be more complicated, if not impossible, to isolate the effectiveness of the key liberalization mechanism: the CEPT Scheme exhibited in AFTA from other sources. Secondly, at the time of conducting this piece of research, which was in early 2009, the best available data on ASEAN countries was complete up to 2007. Last but not least, 2007 was also the year that the last AFTA member, Cambodia, had transferred the remaining products under the Temporary

⁴² See Appendix II.

Exclusion List into the Inclusion List. With this progress, there were no products left in the Temporary Exclusion List under the CEPT Scheme.

1.5 Organization and scope of the thesis

In pursuing the upcoming plan to create the AEC in 2015, ASEAN require a more integrated approach, especially in the trade dimension. Prior to that, it is, however, important to state the performance of the current form of regional economic integration, the long-established free trade zone: AFTA. The fundamental question often addressed by economists and policy makers within the region, is whether the creation of AFTA has brought about the desired effects for the member states over this time. The question of *'how far have we come?'*, even though it sounds simple, is very important and indeed necessary to allow AFTA members to consider and realize their position before strategizing any appropriate actions in order to obtain the best economic outcome from regional economic integration of any type. Otherwise, even if the most profound regional economic formation is established, it could end up as nothing more than the so-called *'vision'* statement.

Given this background, the advanced progress of AFTA (in 2007), plus an improvement in ASEAN's trade data prompt this study to reflect on examinations made regarding the past studies on *'AFTA-effects'*. An updated empirical account is essentially required for an evaluation of AFTA which is also vital for the whole region's future plan regarding economic integration. The following chapter, Chapter 2, therefore deals with the concept of the *'Gravity Model'* in the study of international trade as it is the empirical tool that this thesis relies on. The chapter starts by describing why, in comparison to

other empirical tools, the '*Gravity Model*' has become one of the most popular means to study RTA(s)-effects on countries' trade flows. The origin of the model in the subject of international trade is also elaborated here. As far as theoretical foundations of the '*Gravity Model*' are the concern, the chapter selectively presents key literature that justified the model's theoretical grounds. The chapter additionally explains various forms of empirical specification of the model that are commonly employed to study the issue. Last but not least, the chapter points out the format of the empirical gravity specification that the thesis will be used as a benchmark.

Chapter 3 discusses the application of the '*Gravity Model*' to ASEAN's trade database; ASEAN's trade ties are examined in general and '*AFTA-effects*' on intra-ASEAN trade flows are assessed, in particular. The chapter starts off reviewing related research in detail. Concerns regarding methodologies and modelling issues from past studies are also discussed. Aiming to control for several biases found in traditional cross-sectional work, the panel data framework is, in consequence, proposed as the solution. The time dimension of panel structure makes it possible to consider the role of the '*business cycle*' or the time dimension in the long period panel data. Furthermore, it allows heterogeneities between trade-pairs to be observed and controlled for: the area in which traditional cross-section analysis ceases to function. By relying on the panel data structure, the upshot of '*AFTA-effects*' on countries' trade flows can therefore be evaluated using a time-variant AFTA dummy variable which captures not only membership status but also the point in time that each member joins the cooperation.

Chapter 4 continues to work on the application of the '*Gravity Model*', extending the domain of the analysis to cover membership countries and ASEAN's top 10 most

important trading partners outside the region. In general, trade impacts of AFTA are assessed but this time the analysis covers both intra-regional and extra-regional trade flows. In the same manner as Chapter 3, the first part of this chapter discusses literature reviews. In aiming to control for several biases found in conventional cross-section estimation techniques, the panel data setting is thus, again, anticipated as an empirical framework in this appliance. By relying on a similar approach, the result from this study can, in addition, be perceived as the robustness test for the estimated results concerning '*AFTA-effects*' obtained in the previous chapter.

Chapter 5 provides an independent theoretical account illustrating pure economic motives underlying the incidence of RTA-membership expansion. The idea stems from the standard political economy framework: the '*Domino Theory of Regionalism*' of Baldwin (1995). Even so, the theoretical model developed is original, focusing specifically on conceptualizing the pure economic reasons underlying non-members' decisions towards calling for RTA-membership in differing circumstances. In brief, this chapter aims to point out cases where RTAs are an outcome of large trade flows rather than a source: RTAs are endogenous. Even though this theoretical chapter is not directly related to AFTA as it was largely driven by political motives, this theoretical development can be used to analyze other forms of RTAs that involved large (trade) countries or developed nations. The theoretical model is then set up under the standard symmetric-tariff and countries' size assumptions. Given the positive model of the RTA, trading partners' gains from trade and their welfare effects are then compared and contrasted between the case whereby one of them decides to join the existing RTA, and the case that she continues to trade without having RTA-membership. The

outcomes of these actions which are observed in the form of profits and welfare gains are assumed to be the only factors that drive countries to engage in the existing RTA in this application. The chapter finishes by relaxing this symmetric-tariff assumption. With asymmetric tariffs, countries' gains from trade as well as welfare effects are then re-examined in a set of differing circumstances. In this case, beside the country's status of being the RTA-membership, the status of her trading partners, whether or not they are RTA members and their tariff levels as well as the size of the bloc, would play an important role in determining the gains/losses from trade as well as welfare effects in this specific country. The chapter illustrates that with a simple alteration: the asymmetric tariff assumption, calculating a country's gains from trade, especially in the form of welfare, can be markedly complicated.

Chapter 6 briefly provides the conclusion of the whole thesis.

2: Description of the Model Concept: Theoretical Framework of the ‘Gravity Model’

2.1 Introduction

For more than half a century the ‘*Gravity Model*’ or so-called ‘*Gravity Framework*’ has been used extensively in international trade studies. Even though the research’s focus is to use the ‘*Gravity Model*’ to evaluate impacts of AFTA or intra-bloc bias, its usages are, in fact, versatile ranging from, for instance, examining trade flows, identifying trade patterns both within and across countries, quantifying trade effects of various forms of economic integration, to evaluating impacts of other trade-related policies. Even so, before moving on to discuss the model’s theoretical foundations in this chapter, it is worth providing some backgrounds as to why the ‘*Gravity Model*’ had become one of the most famous empirical tools in studying the issue.

Apart from the celebration of the ‘*Gravity Model*’, some trade economists, however, relied on a simple method called ‘*trade-share statistics*’ to measure RTA(s)-effects or any intra-regional bias of sampling countries. This statistical assessment is, in fact, described in the form of a ratio, having the numerator as the trade share that country pairs carry out with each other and the denominator as the total trade undertaken by particular RTA-membership countries. From the definition given, it can be seen that this method actually measures the concentration of trade within a particular bloc. Because of this simple setting, the ‘*trade-share statistics*’ contained few shortcomings, but those which are present are major. Firstly, it does not adjust for the size of the RTA; secondly, it fails to take into account any divergent characteristics of each RTA and, lastly, it

cannot control for any impacts of the time dimension. As a result, it was usually found that the larger the RTA is, the higher its intra-regional trade ratio becomes. On several occasions, the intra-regional trade share of many RTAs had, in addition, been found to have progressively increased, in spite of the fact that those RTAs did not appear to be active in reality at all.

As far as reliable RTA(s)-effects on countries' trade flows are concerned, Frankel and Wei (1996), which aimed to measure intra-regional biases of numerous RTAs across the globe, had also addressed negative aspects found using the '*trade-share statistics*' to examine APEC's and Western Europe's intra-bloc biases. In particular, the high values of intra-regional trade shares within these blocs were perceived to be driven by their large size (size is influenced by the number of membership countries and/or the size of each trading country), instead of the large amount of trade that was actually conducted. For this reason, Frankel and Wei (1996), in addition, disclosed that this trade-share ratio actually measures the '*effects of bilateral trade*' instead of evaluating effects of preferential tariffs or other trade-related policies as many have understood. In order to adjust for any measurement errors which may occur from an increase in size of each country plus biases found from the overall bloc's size effects, Frankel and Wei (1996) therefore suggested that researchers have to consider including all countries that are trading in the world at that moment in order to obtain a ratio of 100 % as a benchmark. By doing so, the statistical value indicating a particular bloc's trade share can thus be comparable to this world setting that is fixed at 100 %. This basically explains that any particular bloc's bias or their intra-regional trade share has to be adjusted for its importance against the world's trade or the particular reference group being discussed.

Otherwise, the intra-regional trade share obtained is not informative as there is no comparative sector to be judged upon. The high statistical value from the *'trade-share statistics'* only implies that the concentration of trade within the group is large which, as aforementioned, could probably be because that particular region has many membership countries and/or this group of countries is comprised of large trading partners. Even with this adjustment, the *'trade share statistics'* are yet able to control for any impacts across the time dimension. Any special events occurred within the group of RTA-members or even nearby regions at a particular timeframe may play a part in shaping RTA-members' trade patterns to be lower or higher than it is supposed to be. In measuring the true effects of a RTA, a good empirical tool should therefore be able to control such time-driven factors that could potentially manipulate sampling countries' trade flows. In their paper, the *'Gravity Model'* was therefore concluded as an empirical tool.

Given the downside of the simple *'trade-share statistics'*, an alternative method suggested measuring RTA(s)-effects on members' trade flows by dividing the intra-regional trade share abovementioned by that particular region's share of world trade. This term is known as the *'concentration ratio'* or the *'intensity ratio'* as it, in fact, evaluates whether the level of bilateral trade observed is geographically concentrated (Frankel and Wei, 1996). If this ratio is larger than 1, it implies that trade is concentrated within this group of countries while if the ratio is less than 1, it means that there is no regional bias found within this group of countries. If, however, this ratio is fairly close to 1, it means that the level of bilateral trade that takes place in this specific region is proportionate to these countries' total trade. Despite such

developments, the statistical method is still not able to distinguish the source of intra-regional concentration. Intuitively, regional bias may be caused by geographical influences, RTA-memberships or even other unobserved or unknown factors. Trade economists as well as policy makers were, for this reason, interested to find out what forces truly drive or influence regional concentration in trade. In this regard, the standard '*Gravity Model*' with proper estimating technique will still, nonetheless, be able to tackle these issues.

As the key empirical task was then to disentangle trade effects of a particular RTA from any other RTAs and whichever changes in an economy that could affect trade flows, another empirical method that has been invented to scrutinize RTA(s)-effects on trade flows is the Computable General Equilibrium model: the so-called '*CGE*' model. Nevertheless, in contrast to the '*trade-share statistics*', the '*concentration ratio*' and the '*Gravity Framework*' that aim to study trade effects of RTA(s) *ex-post*, this technique focuses on examining RTA(s)-effects from an *ex-ante* perspective. It, in addition, claims to evaluate these effects in the form of welfare. In principle, the CGE model usually assumes tight theoretical structures with specific functional forms, particular parameter values as well as fixed terms of trade in representing countries of interest in a base year with the pre-RTA situation. Furthermore, most CGE studies usually do assume across the board elimination of tariffs in order to ease the calculating procedures (Dee and Gali, 2003). In general, the model then works on a counterfactual analysis, assuming there is a removal of tariffs in order to calculate the potential welfare effects of a particular RTA or trade bloc. However, because of these strong assumptions, many trade economists have cast doubts on the CGE model's findings. This is because, for

example, the fixed terms of trade assumption directly prohibits the research from finding the terms of trade changes from the RTA which is in fact the key empirical question in this field of research. Such simple yet rigid assumptions aforementioned have furthermore ignored the complex patterns of real RTAs, which if comparing to the '*Gravity Model*', the latter does not, examining actual RTAs, taking into consideration real trade data as well as other complexities of RTAs at the same time. In this regard, the '*Gravity Model*' is, hence, perceived to be able to explain the reality of international trade flows better than the CGE model which works on the simulated RTAs. By examining RTA(s)-effects in the form of an *ex-ante* evaluation, the CGE model is, in addition, considered a rough estimation when compared to the '*Gravity Model*' which directly measures RTA(s)-effects *ex-post*. In addition, the '*Gravity Model*' not only estimates the level of bilateral trade that is supposed to be within and between trade-pairs but also enables the user to segregate RTA(s)-effects from the actual trade flows that have occurred. This can be done via the cross-sectional, the time-serial as well as the panel data frameworks according to each research's interest. Nevertheless, concerning an evaluation of the welfare effects of RTA(s), readers have to keep in mind that the '*Gravity Model*' does not measure welfare effects from RTA(s) directly but focuses on finding their trade effects (trade creation and trade diversion). This is so because the model perceives that welfare is an unobservable term and the link between RTA(s)-effects and welfare terms should not be as straightforward as usually assumed in the CGE-based research.

From the choice of empirical tools discussed thus far, this, to a certain extent, explains why the '*Gravity Model*' has been vindicated eventually. Nevertheless, it is important to

address here that the research is far from saying that the '*Gravity Model*' is flawless but given the limitations of other empirical tools, the model is certainly a better-quality medium for dealing with the subject of interest. Eichengreen and Irwin (1998), which studied the role of history in bilateral trade flows, had even regarded the '*Gravity Model*' as the workhorse in this field of research,

The rise of regionalism continues to pose challenges for specialists in international trade. One classic question is the aggregate welfare effects of regional trade liberalization. Another is the political economy of regionalism...A third question, with which we are concerned in this paper, is how important regional arrangements actually have been for the pattern of trade.

The gravity model of international trade has been the workhorse for empirical studies of this question to the virtual exclusion of other approaches (Eichengreen and Irwin, 1998, p. 33).

To date, the '*Gravity Model*' has, in fact, been used to evaluate trade effects of numerous RTA(s) across the globe. This chapter selectively reviews a few key empirical accounts that studied these issues on major RTAs, especially during early 2000s as it was at this time that the trend of regionalism was strong. For instance, Martinez-Zarzoso (2003) employed the '*Gravity Model*' to evaluate effects of well-known RTAs: the European Union (EU), the North-American Free Trade Area (NAFTA), the Caribbean Community (CARICOM), and the Centro-American Common Market (CACM), on 47 countries' trade flows during 1980-1999. The model was estimated on the panel data set using several methodologies: the year-by-year OLS estimator, the between estimator and the within estimator to compare estimated results. With respect to an evaluation of RTA(s)-effects, in conclusion, the estimated coefficients on dummy variables for memberships in RTAs provide mixed results. Briefly, the coefficients are positive and significant from 1985 onwards for EU

,but for NAFTA, they are positively significant only from 1995. For CARICOM, the coefficients are positive and significant from 1980-1985 only. Estimated coefficients for CACM present positive coefficients in all years but they become insignificant in the second half of the 1990s.

Marinez-Zarzoso and Nowak-Lehmann (2003) employed the '*Gravity Framework*' when investigating MERCOSUR-EU trade on 20 countries' trade flows⁴³ from 1988 to 1996. Constructing the panel data, the '*Gravity Model*' was estimated using the fixed effects specification. When emphasizing intra-bloc effects for both MERCOSUR and EU, these RTA-membership dummy variables present a positive sign and are statistically significant as expected. To be precise, the estimated results on the MERCOSUR dummy variable implied that intra-MERCOSUR is approximately 49 % above the expected level while intra-EU trade is about 18 % higher than what the gravity variables assumed.

Focusing only on Sub-Saharan countries, Kirkpatrick and Watanabe (2005) focused on finding trade effects of the famous East African Trade Cooperation (EAC) on Kenya, Tanzania and Uganda. Examining 84 countries⁴⁴, trade flows during 1970-2001, the '*Gravity Model*' analysis which was estimated using the Tobit Maximum Likelihood estimator, indicates a mean coefficient on intra-bloc trade of EAC equal to 1.08. However, considering yearly estimates of the EAC, the intra-bloc trade coefficient is volatile over time⁴⁵. Such changes were perceived to be related to the collapse and

⁴³ They are 15 EU countries and 5 MERCOSUR countries.

⁴⁴ This includes 40 reporting countries: 16 Sub-Saharan Africa, 6 South Asia, 6 Southeast Asia, 5 Latin America and 7 Middle East countries and 44 partner countries.

⁴⁵ The estimated value is 2.28 in 1970 which then fell to 0.04 in 1978 and went up to 1.90 in 1996.

redevelopment of the the whole East African Integration that occurred during the same period. However, the study concluded that the formation of EAC supports the expansion of trade between membership countries.

Additional literature that employed the '*Gravity Framework*' to study trade effects of renowned RTAs are briefly summarized as follows. Bayoumi and Eichengreen (1997) studied trade effects of the European Economic Community (EEC) - and the European Free Trade Association (EFTA) from 1956 to 1992. Gros and Gonciarz (1996) and Nilsson (2000) studied RTA(s)-effects of the EU and the Central and Eastern European Countries (CEECs) in the early 1990s. Sapir (2001) examined trade effects of EU and EFTA from 1960-1992. McCallum (1995), Dhar and Panagariya (1994), and Hassan (2001) attempted to evaluate NAFTA-effects together with other RTAs in the same study⁴⁶.

Even though today there is a large amount of gravity-based literatures available, in the early days, the '*Gravity Model*' was criticized for a lack of theoretical foundations. Thus any empirical tasks that had applied this gravity framework were doubted as being a result of mere intuitive notion. Because of the fact that numerous significant and robust empirical verifications have been delivered, many have agreed those pieces of evidence ought to be more than accidental phenomena. As time goes by, more than a few theoretical accounts have succeeded in finding theoretical foundations for the

⁴⁶ McCallum (1995) studied trade effects and trade potential of NAFTA and The U.S.-Canada Free Trade Agreement (CUSTA) in 1988, Dhar and Panagariya (1994) studied trade effects of the European Commission (EC), East Asia as well as NAFTA from 1980-1991. Hassan (2001) investigated RTA(s)-effects of The South Asian Association for Regional Cooperation (SAARC), ASEAN, EEC and NAFTA from 1996 to 1997.

'Gravity Model', of course under differing circumstances⁴⁷. It can be said that concerns over the model being set up without theories are rather outdated. Nevertheless, before proceeding to employ the 'Gravity Model' to evaluate AFTA's performance in promoting intra-regional and extra-regional trade, this chapter perceives it is worthwhile casting light on key literature that has laid out the fundamental theoretical grounds of the model.

As the focus of this chapter is to lay out some theoretical foundations of the 'Gravity Model', the paper is comprised of 3 subsections. This research goes back to the time when the 'Gravity Model' was brought into the study of international trade in Section 2.2. This is also where the research reviews early gravity-based accounts that claimed to justify the model theoretical grounds. Nevertheless, in Section 2.3, the research specifically highlights Anderson (1979) as it was pioneering research, attempting to validate the model's theoretical foundations as well as its (gravity) equation as commonly specified. The section explains the simplest form of the 'Gravity Model' which was derived from the linear expenditure systems. The chapter closes by reviewing theoretical settings of an applied work by Oguledo and Macphee (1994) in Section 2.4. This piece of research was, in actual fact, developed further from Anderson (1979). However, in contrast to the conventional setting of the 'Gravity Model' in which the price term was generally omitted, Oguledo and Macphee (1994) theoretically included price as one of the factors that influences trade flows between countries explicitly. The theoretical concepts as specified in Oguledo and Macphee (1994) are, in fact, to be relied upon throughout the empirical analyses in this thesis. Not only is this

⁴⁷ See for examples, Anderson (1979), Bergstrand (1985), Helpman (1987), Bergstrand (1989, 1990).

approach perceived to be a more realistic theoretical set up of the '*Gravity Model*' as the notion of price is directly included, but more importantly, as far as the research's objective is concerned, its purpose is also akin to this thesis's interest i.e. evaluating RTA(s)-effects on trade flows.

2.2 Origin of the '*Gravity Model*' in the study of international trade

'*Laws of Universal Gravitation*' or, briefly, '*Laws of Gravity*' came into existence in the 16th Century. Natural phenomena in which objects with mass attract one another were considered to be more than coincidental occurrences. Isaac Newton proved that these incidents occur systematically via interactions of mass, distance and gravitational forces. Since then, '*Newton's Laws of Gravity*' have been applied to other disciplines.

The very first '*Gravity Model*' of social sciences was brought into the field by Carey in the 1860s, using the metaphor of Newtonian physics to define gravitational interactions of social incidents, in order to explain human behaviours, in particular. Carey (1858) remarked on his observations concerning social gravitation that:

“Gravitation is here, as everywhere else in the material world, in the direct ratio of the mass and in the inverse one of the distance” (Carey ,1858, p. 644).

Even so, it was not until the 1950s that the so-called '*Gravity Framework*' came into practice in the subject of international trade. Walter Isard⁴⁸ noticed that the '*Gravity Model*' applied in the social sciences could plausibly be modified to explain trade flows

⁴⁸ He is regarded as the principal founder of regional sciences.

among countries. Nevertheless, this was examined as a part of the '*Location Theory*'⁴⁹ and the '*Regional Analysis*'⁵⁰ during that period. Following '*Newton's Laws of Gravity*', trade flows between countries are hypothetically related to their respective sizes and the distance between them. The traditional setting of the '*Gravity Model*' of trade was thus of the form:

$$X_{ij} = \gamma \frac{Y_i^\alpha Y_j^\beta}{D_{ij}^\lambda} \quad (2.1)$$

From the equation above, X_{ij} represents trade flows between countries i and j and D_{ij} denotes the distance between them. Y_i and Y_j signify countries' sizes which are written in the form of national incomes and γ is given as the constant term. In addition, α and β are and λ are parameters to be estimated. While α , β are imposed to capture income elasticity of country i and country j respectively, λ is imposed to indicated a distance elasticity. As is evident, bilateral trades were assumed to be positively related to size and negatively obstructed by distance between trade-pairs.

What made the '*Gravity Model*' stand out? This is certainly an interesting question to ask. The answer, in fact, lies amidst contradictions between trade theories and the empirical evidence found. As far as empirical evidence was concerned, it was, to a large extent, observed that countries did engage in the type of '*Intra-Industry Trade*' in which (differentiated) products under the same industry are traded. At that period, such

⁴⁹ The subject is concerned with the geographic location of economic activity. Later, it became a part of economic geography.

⁵⁰ It is commonly known as '*Regional Sciences*'. It is a field in the Social Sciences that are generally concerned with spatial dimensions of societies. Analyses cover urban, rural as well as regional issues.

findings undoubtedly challenged the classical views underlined by the factor abundance theory⁵¹. Further investigations as well as alternative theories were called for, as many agreed that considering only factor endowments as a way of quantifying a country's comparative advantage and as a key economic reason to trade was deemed too contracted a way to explain the reality of international trade. This is where the '*Gravity Model*' was employed formally as an innovative empirical tool to assess international trade flows. As a result, bilateral trade relationships, as well as global trading patterns were made evident for the first time.

In this regard, Nobel laureate Tinbergen is considered the first to have conducted empirical research applying the '*Gravity Model*' (it was then regarded as the gravity equation) to the study of international trade flows. Aiming to provide a report determining normal patterns of international trade in the absence of trade impediments, the gravity equation was estimated on 18 countries' trade flows in the year 1958⁵². In addition to the basic gravity variables: countries' sizes and bilateral distance, dummy variables were also employed to capture effects of preferential trade agreements⁵³. Basically, each preferential dummy variable was given the value of 1 if particular trade-

⁵¹ The classical Heckscher-Ohlin (H-O) model is one of the fundamental theoretical trade models that build on Ricardo's theory of comparative advantage. It assumes that countries are completely specialized and only trade (export) products in which their factors of production are abundant. In such a setting, input costs are perceived as a key factor determining a country's profitability. This further implies that production output is of a constant return to scale type where the same levels of technological developments are also restricted. In conclusion, such strong restrictions allow no room for (different types of) firm to exist, as production functions consequently have to be identical for all countries. It can be said that, as long as these assumptions hold, this type of intra-industry trade would not be allowed to occur in the H-O world.

⁵² They are Brazil, Venezuela, South Africa, Japan, Canada, USA, Austria, BLEU, Denmark, France, Western Germany, Italy, The Netherlands, Norway, Sweden, Switzerland, UK and Australia. The study was also extended to include 42 countries' trade flows in 1959 as a robustness check.

⁵³ The dummy variables were imposed to capture preferential treatment of the British Commonwealth and Benelux.

pairs belonged to the same trade agreement: otherwise, the value would be 0. Tinbergen (1962)'s model was:

$$X_{ij} = G \frac{\left(\left(\frac{Y_i}{P_i}\right)P_i\right)^\alpha \left(\left(\frac{Y_j}{P_j}\right)P_j\right)^\beta}{(D_{ij})^b} \quad (2.2)$$

where G is a constant term, the first and second terms of the numerator capture countries' incomes written in the form of income per capita times population. D_{ij} represents physical distance between particular trade-pairs.

The above model was extended further to capture preferential effects in the following form:

$$X_{ij} = G \frac{\left(\left(\frac{Y_i}{P_i}\right)P_i\right)^\alpha \left(\left(\frac{Y_j}{P_j}\right)P_j\right)^\beta}{(D_{ij})^b} (N)^\gamma (PR_C)^\delta (PR_B)^\epsilon \quad (2.3)$$

where G is a constant, N denotes a set of dummy variables posted to capture neighbouring countries. The PR_C dummy variable was posted to account for any trade effects from the Commonwealth preference. PR_B was, in the same manner, posted to capture the Benelux preference on trade.

Almost concurrently but independently, Pöyhönen (1963) used the gravity concept to examine the exchange of goods between 10 European countries in 1958⁵⁴. The strength

⁵⁴ They are Belgium, Denmark, Finland, Western Germany, Italy, Netherlands, Norway, Portugal, Sweden and the United Kingdom.

of the '*Gravity Model*' was notably acknowledged as Pullianen (1963) extended this same data set, testing the validity of the model on a larger scale with 62 (non-communist) countries over the period of 1948-1960. The results showed that the pattern of trade flows in these 62 countries did not alter much over the period of study. This then implied that trade flows were rather consistent over a period of years and the 1958's estimate was therefore concluded as a reliable outcome. In that period, Leamer and Stern (1970) also acknowledged the use of the '*Gravity Model*' in studying international trade flows in their book: '*Quantitative International Economics*'. Provided with the consensus of these empirical studies the '*Gravity Model*' has been a subject of study ever since.

Notwithstanding its empiric origin, the '*Gravity Model*' became widely known after it was used to test trade theories of interest in various applications. In general, the empirical success of the '*Gravity Model*' was deemed to be in support of the monopolistic competition explanation of intra-industry trade⁵⁵. Even so, formal associations between theories and empirical work were criticized as absent. It can be said that while, on the one hand, the '*Gravity Model*' has been employed to test trade theories of interest, on the other hand the model itself was searching for its own backbone.

Despite the doubt concerning similarities between physical gravitation and trading relationships, Linneman (1966), nonetheless, derived the '*Gravity Model*' to explain

⁵⁵ In the world in which intra-industry trade exists, each country is assumed to specialize in different product varieties. The firms in different countries may produce the same product varieties in Autarky, but because it is also assumed that, with trade, they can choose to produce a variety that is profit maximizing, it ends up that there is trade in these product varieties. See, Helpman (1987) and Hummel and Levinsohn (1995), for examples.

international trade flows. As a result, his account was the earliest attempt that provided theoretical explanations for the '*Gravity Model*' in the international trade arena. In his setting, gravitational relationships were linked with international trade flows under a quasi-Walrasian general equilibrium framework. Countries' incomes were proxied as the level of demand in the importing country and the level of supply in the exporting one. The basic reason for countries to trade was assumed to be the mismatch between levels of demand and supply in each country. In addition, countries were perceived to be different in terms of comparative advantages, which could be explained by economies of scale and levels of technological development. Linneman (1966) basically asserted that the '*Gravity Model*' was a reduced form of a (four equations) partial equilibrium model of export supply and import demand functions. Distance was used as a proxy for transport cost as its impacts could drive demand and supply away from an equilibrium. The price terms were treated as endogenous and thus implicit as they were adjusted to equate supply and demand in this setting. In the same vein as Tinbergen (1962), a set of trade-preferential dummy variables were employed to capture any positive effects of trade agreements on membership trading partners. Although Linneman (1966)'s framework was an eye-opening contribution, it was still considered too simple to explain the reality in cross-country trade relationships.

2.3 The pioneering research: theoretical foundations of the '*Gravity Model*' of trade

Despite the lack of rigid theories, early research continued to favour the use of the '*Gravity Model*' in empirical studies. This was so, simply because of its high estimating power that often provided statistically significant results. In fact, it was not until the late

1970s that the proper theoretical justification of the model was established. In this sense, Anderson (1979) was regarded as the first account that provided legitimate theoretical grounds for the model; the simple form of the '*Gravity Model*' was shown to be derived from a linear *Cobb-Douglas* expenditure system. As his work has been developed further into various applications, empirically and theoretically⁵⁶, this section of the thesis perceives it is important to underline the essential arguments stated in his findings.

In brief, Anderson (1979) started off the analysis by assuming that bilateral trade between country *i* and country *j* was costless (no tariffs or transport costs) and each country was completely specialized in the production of its own good. The latter assumption consequently implied that there is only one good produced in each country. Having identical *Cobb-Douglas* preferences applied, this led to symmetry in the share of traded goods in all countries and income elasticities always sum to unity. In consequence, country *j*'s consumption (imports from) on country *i*'s products was denoted as:

$$M_{ij} = b_i Y_j \quad (2.4)$$

where M_{ij} represents consumption in value or quantity of goods *i* in country *j*, b_i denotes the share of income spent on country *i*'s products by country *j*, and Y_j symbolizes country *j*'s income. With the assumption of trade balance assumed, country *i*'s income: Y_i , has to be equal to its product's sales to country *j*. Thus, this accordingly implies that:

⁵⁶ Theoretical frameworks that progressed further from Anderson's (1979) work are, for instance, Oguleo and Macphee (1994) and Anderson and Van Wincoop (2003).

$$Y_i = b_i(\sum_j Y_j) \quad (2.5)$$

Given Eq. (2.4) and Eq. (2.5), b_i was solved and substituted back into Eq. (2.5) giving the simplest form of the ‘Gravity Model’ as:

$$M_{ij} = \frac{Y_i Y_j}{\sum_j Y_j} \quad (2.6)$$

Even though the above equation can be estimated using the ordinary least squares (OLS) method⁵⁷, it has not been employed in any applications. This is because, given the assumptions previously used: identical preferences, income elasticities of unity as well as the same and constant prices across countries, the above model is considered too basic to capture the truth in international trade relationships. In order to disclose the more realistic scenarios, Anderson (1979) further assumed that countries (i and j) basically produce 2 types of goods; traded and non-traded goods. Another assumption: identical preferences which imply income elasticities of unity as well as the same and constant price across countries, was also relaxed. In addition, variations in traded goods shares of total expenditure were allowed to depend on income (Y_i, Y_j) and population (N_i, N_j) across countries⁵⁸. As Φ_i and Φ_j symbolize country i 's and country j 's shares of all traded goods in the total expenditure, their relationships with income and population were stated accordingly as:

$$\Phi_i = F_i(Y_i, N_i) \quad (2.7)$$

⁵⁷ This can be done by disregarding the error structure or assuming it is well-behaved.

⁵⁸ This notion was originally suggested in ‘Patterns of Industrial Growth’ by Chenery (1960).

$$\Phi_j = F_j(Y_j, N_j) \quad (2.8)$$

In this setting, each country's utility function was thus written as:

$$U = u [g (\textit{traded goods}), (\textit{non-traded goods})] \quad (2.9)$$

where g is preference function. Considering Eq. (2.9), it further implies that this preference function was assumed to be weakly separable with respect to the partition between traded and non-traded goods.

As Eq. (2.9) portrays, it can be seen that the expenditure on traded goods-shares is determined as if it is a homothetic utility function in traded goods alone. The country's traded goods-shares are thus functions of traded goods' prices. The demand equation of an importing country: country j 's consumption on country i 's goods (M_{ij}) was thus derived as:

$$M_{ij} = \theta_i \Phi_j Y_j \quad (2.10)$$

where θ_i denotes the expenditure on country i 's traded goods in country j 's total expenditure on tradable goods. As the trade balance condition was, again, assumed to hold, country i 's income could be described as:

$$Y_i \Phi_i = (\sum_j Y_j \Phi_j) \theta_i \quad (2.11)$$

Finally, the ‘Gravity Model’ was subsequently derived as:

$$M_{ij} = \frac{\Phi_i Y_i \Phi_j Y_j}{\sum_i \sum_j M_{ij}} \quad (2.12)$$

The above equation can be specified under the condition of zero-transport costs or the free trade assumption. It is however important to note that the true objective of Anderson (1979) was to theoretically justify one of the most common empirical specifications of the gravity equation of this form:

$$M_{ijk} = \alpha_k Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\gamma_1} N_j^{\gamma_2} D_{ij}^{\delta} U_{ijk} \quad (2.13)$$

where M_{ijk} represents the flow of good k from country i to country j , and Y_i and Y_j denote the incomes of country i and country j , respectively. N_i and N_j represent the population of country i and country j , D_{ij} represents the distance between trade-pairs and U_{ijk} is a log normally distributed error term.

In order to obtain the above equation, the ‘Gravity Model’ as stated in Eq. (2.12) had to be re-derived. Anderson (1979) complicated the aforementioned assumptions further to incorporate a many goods case (k variations of product) and non-zero trade costs which is assumed to be an increasing function of distance. Hence, with Cobb-Douglas preference, country j ’s demand was, as a result, described as:

$$M_{ij} = \sum_k M_{ijk} = (\sum_k \theta_{ik}) \Phi_j Y_j \frac{1}{f(d_{ij})} U_{ij} \quad (2.14)$$

where M_{ij} denotes aggregate trade flows between country i and country j , $\sum_k \theta_{ik}$ represents the common aggregate traded-good expenditure share for country i 's goods, $\Phi_j Y_j$ is the total expenditure on traded goods of country j , and $f(d_{ij})$ represents transit cost factor (τ_{ijk}) that is an increasing function of distance and is assumed to be the same across commodities ; thus, in this case, $\tau_{ijk} = f(d_{ij})$ with $f(0) = 1$ and $f' > 0$). The U_{ij} is a log normally distributed error term with $E(\ln U_{ijk}) = 0$. Again, with the trade balance condition assumed implying $m_i \Phi_i Y_i = \sum_j M_{ij}$, country i 's income was written accordingly as:

$$m_i \Phi_i Y_i = (\sum_k \theta_{ik}) \sum_j \Phi_j Y_j \frac{1}{f(d_{ij})} \quad (2.15)$$

In this case, the 'Gravity Model' was derived accordingly as:

$$M_{ij} = \frac{\Phi_i Y_i \Phi_j Y_j}{\sum_j \Phi_j Y_j} \cdot \frac{1}{f(d_{ij})} \cdot [\sum_j \frac{\Phi_j Y_j}{\sum_j \Phi_j Y_j} \cdot \frac{1}{f(d_{ij})}]^{-1} U_{ij} \quad (2.16)$$

Considering the 'Gravity Model' in Eq. (2.16) and the common empirical specification in Eq. (2.13), it can be seen that the major difference is the term⁵⁹ $[\sum_j \frac{\Phi_j Y_j}{\sum_j \Phi_j Y_j} \cdot \frac{1}{f(d_{ij})}]^{-1}$.

Given that the majority of traditional research was conducted on cross-section analysis, this famous form of the gravity specification could thus be prone to omitted variable biases as such a term was not usually taken into consideration in the specification.

⁵⁹ In fact, there are 2 other distinctive points 1) the 'Gravity Model' derived is in an aggregated form and 2) the $1/f(d_{ij})$ is not in the log-linear form.

Nevertheless, Anderson (1979) acknowledged the cross-section specification as stated in Eq. (2.13), seeing that the bias was negligible⁶⁰ and the simplicity of estimating the general form of the gravity specification surmounted it. It is thus not surprising if one were to generally observe the form of the gravity equation as indicated in Eq. (2.13) in practice, since it is one of the most renowned versions of the '*Gravity Model*' commonly specified.

Following Anderson (1979) in employing the product differentiation by country of origin assumption, Bergstrand (1985) however investigated on the supply side of economies in an attempt to provide theoretical explanations for the '*Gravity Model*'. He started by criticizing the conventional specification of the gravity equation that generally inhibits the inclusion of the price term. In order to derive the theoretical '*Gravity Model*', the standard general equilibrium model of trade in which countries maximize the CES utility functions subjected to constraints on countries' resources and trade impediments was conducted. Additional assumptions: 1) bilateral trade between country i and country j is small relative to the rest of the world⁶¹ and 2) identical utility and production functions across countries were also imposed to simplify the calculation. Even though Bergstrand (1985) accepted the theoretical grounds used to derive the '*Gravity Model*' in Anderson (1979), the latter was perceived to work under the restriction of certain assumptions: for example, perfect substitutability of goods in consumption and production as well as perfect commodity arbitrage. Regarding this, Bergstrand (1985) inserted empirical evidence to support the claim that there are

⁶⁰ This is especially so when countries of interest are in the same region (Anderson, 1979, p. 113).

⁶¹ This is to imply that certain price levels can be treated as exogenous.

differences in products' price levels across countries and suggested that the price term should be included in deriving the theoretical '*Gravity Model*'.

Since Bergstrand (1985), several theoretical analyses have followed to provide alternative justifications for the '*Gravity Model*'. For instance, Helpman (1987) and Bergstrand (1989, 1990) employed the monopolistic competition framework of the new trade theory to provide theoretical grounds for the '*Gravity Model*'. In brief, the basic assumption whereby the product is differentiated by country of origin was replaced by the assumption that the product is differentiated among firms. Given this assumption, the intra-industry trade is allowed to exist. This notion later became the area that the empirical success of the '*Gravity Model*' was deemed to explain. Deardorff (1998), on the other hand, imposed the assumption that there is a differentiation among products. He, in fact, explained further that the '*Gravity Model*' or the form of gravity-like equations, does characterize many trade models inclusive of the standard H-O model⁶² which many had, on the contrary, claimed was theoretically inconsistent with the '*Gravity Model*'. Because of this claim, Deardorff (1998) concluded that the empirical results from the '*Gravity Model*' were regarded as a '*fact of life*':

“For reasons I have already indicated, I suspect that just about any plausible model of trade would yield something very like the gravity equation, whose empirical success is therefore not evidence of anything, but just a fact of life” (Deardorff, 1998, p.12).

Even though the theoretical foundations of the '*Gravity Model*' have been clarified, the debate over which particular theory best describes the empirical findings of the '*Gravity*

⁶² This is so in both cases of his examples: frictionless trade versus impeded trade.

Model' is ongoing. This is not the core of this research, however. What matters more is whether the '*Gravity Model*' is able to capture RTA-effects of AFTA as well as explaining trading relationships across countries in the form of trade flows in particular. From theoretical accounts reviewed thus far, it is reasonable to state that even the simplest form of the '*Gravity Model*' has theoretical grounds.

2.4 The augmented '*Gravity Model*': theoretical foundations and an application to study RTA-effects on trade flows

As the research aims to employ the '*Gravity Model*' to evaluate impacts of regional trade agreements such as AFTA on its membership's trade flows, an empirical framework has to be constructed. Nevertheless, as far as the theoretical grounds of the '*Gravity Model*' and its empirical specification are concerned, this part of the research highlights a theoretical note from Oguledo and MacPhee (1994) which has the same objective: assessing the trade effects of the RTA(s).

In brief, Oguledo and MacPhee (1994) differs slightly from Anderson (1979)'s study in the area, in that the notion of price was directly addressed. This concept is also different from other traditional settings of the '*Gravity Model*' as price terms were commonly omitted or perceived to be implicit. Thus, besides all necessary assumptions previously imposed in Anderson (1979) (*Cobb-Douglas* utility functions, productions of traded goods and non-traded goods and a preference function that is weakly separable with respect to the partition between traded goods and non-traded goods), the study explicitly included price terms in the function determining the share of all traded goods in the

country's (i and j) total expenditure⁶³. As Φ_i and Φ_j represent the country's (i and j) shares of all traded goods in the total expenditure, these were therefore described as:

$$\Phi_i = F_i(Y_i, N_i, P_i) \quad (2.17)$$

$$\Phi_j = F_j(Y_j, N_j, P_j) \quad (2.18)$$

where, as previously, Y_i and Y_j represent the income of country i and country j , respectively. N_i and N_j denote the population size of country i and country j . In this setting, the terms P_i and P_j were imposed to capture price levels in both countries. To complicate the scenario further, trade costs which were accounted in the form of distance were incorporated in this setting. Country j 's imports from country i were thus defined as:

$$M_{ij} = \frac{1}{T_{ij}} \theta_i(T_{ij}) \Phi_j Y_j \quad (2.19)$$

where M_{ij} refers to the value of imports, T_{ij} represents the distance from country i to country j ⁶⁴ and θ_i symbolizes the share of traded goods i in country j 's total expenditure on tradable goods. As the trade balance condition is assumed, the above equation further implies trade relationships for country i :

$$\Phi_i Y_i = \left(\sum_j \frac{1}{T_{ij}} \Phi_j Y_j \right) \theta_i(T_{ij}) \quad (2.20)$$

⁶³ This is perceived to represent the income effects whereby Φ_i and Φ_j are changed because of the change in relative price.

⁶⁴ Oguledo and MacPhee (1994) in fact explained that besides distance, *ad-varoalem* tariffs might be included in order to capture total trade resistance.

The study solved for $\theta_i(T_{ij})$ and substituted it back into Eq. (2.19); the ‘Gravity Model’ was therefore derived as:

$$M_{ij} = \frac{\Phi_i Y_i \Phi_j Y_j TC_{ij}}{\sum_i \Phi_j Y_j TC_{ij}} \quad (2.21)$$

where $TC_{ij} = \frac{1}{T_{ij}}$. In this application, TC_{ij} can be seen as the total trade resistance variable of which, distance is only a part⁶⁵. However, this term was elaborated further to include *ad-valorem* tariffs as:

$$TC_{ij} = TC_{ij}^{\wedge} t_j \quad (2.22)$$

where TC_{ij}^{\wedge} denotes transport costs from country i to country j and t_j represents the *ad-valorem* tariffs that are imposed by country j on imported goods from country i . Since the denominator of Eq. (2.21) was treated as a constant (k), Oguledo and MacPhee (1994) substituted Eq. (2.17) and (2.18) into Eq. (2.21), the gravity equation was, as a result, specified as:

$$M_{ij} = \frac{\gamma}{k} Y_i^{\alpha_1} Y_j^{\beta_1} N_i^{\alpha_2} N_j^{\beta_2} P_i^{\alpha_3} P_j^{\beta_3} TC_{ij}^{\wedge \delta} t_j^{\omega} U_{ij} \quad (2.23)$$

⁶⁵ This explanation is in accordance with numerous empirical accounts in which other factors such as communal languages, common borders as well as *ad-valorem* tariffs, have also been found to play a role in influencing bilateral trade flows across countries

In their application, a set of dummy variables was, in addition, added to capture any preferential effects from trade agreements⁶⁶. The above equation was rewritten as the log-linear form giving the estimating gravity equation as:

$$\log M_{ij} = \log(\gamma/k) + \alpha_1 \log Y_i + \beta_1 \log Y_j + \alpha_2 \log N_i + \beta_2 \log N_j + \alpha_3 \log P_i + \beta_3 \log P_j + \delta \log TC^{ij} + \omega \log t_j + \tau \log d_{ij} + \log U_{ij} \quad (2.24)$$

where d_{ij} represents a set of trade preferential dummy variables.

As evaluating effects of trade preferential policies or regional trade agreements has been one source of issues that the ‘*Gravity Model*’ has exploited, forms of the empirical model as well as those following specifications similar to the set-up stated above have been relied on in a number of studies⁶⁷. As far as the objective of assessing RTA(s)-effects is concerned, it can be said that Oguledo and MacPhee (1994) has not only confirmed theoretical supports for the augmented ‘*Gravity Model*’ generally employed in empirical studies, but also justified one of the most common specifications of the gravity equation being used. As briefly aforementioned, more than a few studies have attempted to derive a theoretically-driven ‘*Gravity Model*’. The fact that different economic theories could be used to provide grounds for the ‘*Gravity Model*’ primarily explains why there have been various forms of the gravity equations specified in

⁶⁶ They aimed to examine effects of preferential trade arrangements among 11 major preferences giving countries. The gravity model is estimated on a cross-section of imports by 11 major preference giving countries from 162 countries in the year 1976.

⁶⁷ In practice, the dependent variable has been specified as export, import, or total trade (export plus import). See, for instance, Frankel (1993a), Frankel and Wei (1993, 1996), Leamer (1993), Frankel, Stein and Wei (1995, 1998), Shamar and Chua (2000).

empirical research. In summary, it is fair to say that the standard '*Gravity Model*' has valid theoretical foundations.

Part II : Empirical Analysis

3: Regionalism With (Without) Regionalization? : The ‘Gravity Model’ as an Empirical Tool to Assess ‘AFTA-Effects’ on Intra-ASEAN Trade

3.1 Introduction

The preceding chapter has presented formal links between the conventional ‘Gravity Model’ and economic theories. The augmented ‘Gravity Model’ as well as the gravity equation commonly applied to assess RTA(s)-effects have, in addition, shown that they are supported by theoretical justifications. This chapter, therefore, moves one step further, applying the gravitational approach to evaluation of the most important form of ASEAN’s economic cooperation: the ASEAN Free Trade Area (AFTA). As AFTA was established more than a decade ago, during this time¹, to what extent has AFTA shaped trade relationships within ASEAN? This question is yet to be answered.

Even though regional trade agreements have been practiced worldwide, it is somewhat surprising that empirical investigations that touch upon AFTA are still limited. This is especially so when the scope is specific to the gravitational approach as it appears that traditional researches, on the whole, do apply the ‘Gravity Model’ to access effects of closer (geographical as well as political) integration i.e. ‘ASEAN-effects’, rather than effects of regional trade agreements such as ‘AFTA-effects’ *per se*. In other words, it can be said that ‘regionalism’ which is a political process whereby a group of countries agree to liberalize trade between each other against the rest of the world was a centre of attention in traditional research instead of ‘regionalization’ which explains an economic

¹The time of considering the ‘AFTA-effects’ is from 1992 to 2007.

process whereby relevant economies in the region actually become more entwined. Considering Southeast Asian countries, ASEAN is indeed a politically-driven corporation that developed a formal form of economic integration: AFTA, with the hope of generating forces of '*regionalization*' among membership countries. As '*regionalism*' may or may not lead to '*regionalization*' in reality, ASEAN, despite having AFTA, may not necessarily bring about success in preferential trading between its members as expected. Nevertheless, it has been found that a significant amount of the literature concerning an evaluation of RTA-effects of AFTA actually used the terms '*ASEAN-effects*' and '*AFTA-effects*' arbitrarily without giving much attention to differentiating their properties. The chapter perceives that this is one of the major reasons that mixed results on '*AFTA-effects*' have been found. The choice of countries included in the examination is another vital factor that influences whether '*AFTA-effects*' are estimated to be greatly different across them. The limitation of econometric techniques used in traditional gravity research is furthermore perceived to obstruct examining the true effects of AFTA on relevant countries' trade flows as more than a few accounts are suspected to contain biases. As concerns were raised whether previous gravity estimates on '*AFTA-effects*' are reliable, such aforementioned issues are, briefly, areas that this chapter aims to improve on. In summary, the paper plans to provide the most consistent estimates of '*AFTA-effects*' on intra-ASEAN trade flows using the gravity framework.

Thus, the next section of this chapter therefore reviews related literature as well as summarizing drawbacks found to be associated with the traditional gravity-based settings. Considering the unique character of AFTA as well as its historical formation,

in Section 3.3, the research then proposes the use of the panel data framework to solve for any outstanding estimating issues and various biases commonly found in previous cross-sectional/ time-series categories. By implementing the panel data framework, the research is able to capture AFTA's progress on its memberships trade flows at each point in time throughout the whole period of study. In addition, in contrast to the time-invariant '*regional dummies*' that are commonly employed in cross-sectional research, with the panel structure constructed, this chapter is able to impose the so-called '*dynamic regional dummies*' which are time-variant to evaluate the evolution of AFTA even before its official formation in 1992. Nevertheless, as the research focuses on constructing the correct setting of the panel gravity specification, Section 3.4 reviews another set of related literature and discusses relevant procedures used to find the most appropriate panel data model in this application. In Section 3.5, the research applies the aforementioned knowledge, estimating the gravity equation on the ASEAN's actual panel trade data. Trade effects of AFTA on the membership's trade ties are evaluated for the long period between 1970 to 2007. A brief description of the data used and econometric issues concerning panel data techniques are also provided in this section. Results of various specifications are in addition compared and discussed in order to select the correct and the most consistent estimation. Section 3.6 extends the scope of research to examine trade relationships between early and delayed members of AFTA : ASEAN-6 countries as one group and Cambodia, Laos, Myanmar and Vietnam as another group. The '*AFTA-effects*' are in consequence evaluated on these 2 groups of countries' trade flows using a similar gravity framework. Lastly, Section 3.7 concludes.

3.2 Related Literature

One of the earliest empirical accounts that focused on the ASEAN region was Endo (2000); the research, in fact, aimed to examine trade relationships of countries within the Asia-Pacific region during the post-World War II period. Under the cross-section setting, the '*Gravity Model*' was estimated using 80 countries' trade flows at intervals of 5 years from 1960 to 1995. In order to control for regional effects in each region, 4 sets of regional dummies: ASEAN, APEC (89), EAEC and APEC (95) were added accordingly in the gravity specification². Nevertheless, issues concerning overlapping memberships in these regional blocs as well as differences in the objectives of each regional formation were not carefully considered. With regard to ASEAN economies, the result suggested no significant '*ASEAN-effects*' on the membership's trade flows³.

With a shorter timeframe, 1980-1995, Sharma and Chua (2000) studied whether ASEAN would be affected by larger neighbouring regional economic cooperation at that period : APEC. In order to do so, trade flows of 33 Asia-Pacific countries were investigated. Aiming to capture '*ASEAN-effects*', the '*Gravity Model*' was estimated on time-series data of ASEAN-5's trade flows individually⁴. This result indicated no

² Besides basic gravitational variables which are countries' income, populations and distance, the '*Gravity Model*' was augmented to include an adjacency dummy variable, a common language dummy variable and 4 regional dummies: ASEAN, EAEC, APEC(89) and APEC(95). In this study, each regional dummy variable was further elaborated into: 1) the import dummy captures trade flows from non-member to member countries 2) the intra-region trade dummy captures trade flows within the region and 3) the export dummy represents trade flows from members to non-member countries.

³ The study focused on ASEAN-5 countries: Indonesia, Malaysia, the Philippines, Singapore and Thailand. Brunei was eliminated because the research claimed that data was scarce.

⁴ The augmented '*Gravity Model*' was specified following Frankel (1993b) as the sum of exports and imports were used as a dependent variable. However, unlike Frankel (1993b), this paper used GDP instead of GNP as an independent variable. The GDP for countries was entered as a product form in the gravity equation. The paper also included GDP per capita in the product form in the equation. Concerning RTA-effects, there were 2 regional dummy variables, ASEAN and APEC, imposed to capture whether there are any preference membership effects.

significant ‘*ASEAN-effects*’ on the membership’s trade flows⁵. As this was the case, the paper went further to conclude that ASEAN-PTA which was signed in 1977, failed to boost intra-ASEAN trade flows. An increase in intra-ASEAN trade that had become visible was instead perceived to be driven by the increase in size of the economies. In this setting, such an increase was deemed to come from the side of APEC-membership countries rather than ASEAN members. However, it is worth noting that the fact that AFTA was established in 1992 was not taken into account in this case despite the time frame of the study extending up to 1995.

Another example can be seen in Elliott and Ikemoto (2004). As the study attempted to investigate ASEAN’s trade relationships pre- and post-AFTA as well as finding out whether AFTA’s objective in increasing intra-regional trade was negatively affected by the 1997-Asian financial crisis, the ‘*Gravity Model*’ was estimated on 35 countries’ trade flows during the period between 1982-1999⁶. Numbers of regional dummies were accordingly posted in order to control for any RTA(s)-effects on the membership’s trade flows for APEC, ASEAN, EU and NAFTA, respectively. Using the Ordinary Least Squares (OLS) method on the Time Series Processor (TSP), the result pointed out that trade flows of ASEAN-5 were not significantly influenced by AFTA especially in the years immediately following its formation. Much to the surprise of many, the 1997-Asian financial crisis was not found to obstruct AFTA’s goal as imports among

⁵ The exception covers the Philippines as the coefficient estimated portrayed the positive sign.

⁶ In their study, the standard ‘*Gravity Model*’ was augmented to include both GDP and per capita GDP. Imports were used as the dependent variable. In addition to gravitational variables, the dummy variable: ADJ_{ij} was applied to capture whether trade-pairs share a common land border. The complementarily index: COM_{ij} was introduced into the specification in order to capture factor endowment differences between trading partners. The regional variables were elaborated further into 3 dummy variables: RTA_{ijk} , $imRTA_{ijk}$ and $exRTA_{ijk}$. These were posted to capture any trade preferential effects when trade-pairs are members of the RTA- k , when only an import country is member of the RTA- k , and when only an export country is member of the RTA- k , respectively.

members were perceived to have increased, in comparison with imports from non-members.

Instead of relying on the cross-sectional data setting, Kien and Hashimoto (2005) tried to examine AFTA members' trade flows during 1988-2002 using the panel data framework. The '*Gravity Model*' was estimated using the Hausman-Taylor (HT) instrumental variable estimation method on 39 countries' panel trade data⁷ in order to measure '*AFTA-effects*'. As this paper implemented the panel data setting, it was distinguished further from other research in the use of regional dummies. In contrast to cross-sectional research in which regional dummies are usually specified as time-invariant variables, this paper stated these terms in the dynamic form⁸, allowing for changes through time in the panel database. The main result implied that AFTA significantly affected trade (export) flows of membership countries. The estimated result suggested that AFTA members had increased trade among themselves approximately 87% more than would have otherwise occurred without AFTA.

Other empirical applications that indirectly touch upon ASEAN as well as AFTA can be found in the realm of research concerning an evaluation of RTA(s)-effects across the globe during the mid-1990s to 2000s in general. Soloaga and Winters (2001) measured

⁷ Under the panel data framework, the '*Gravity Model*' was specified in the 2-way error component model incorporating the time effects and export effects. The dependent variable is value of exports from country i to country j at time t . Apart from standard gravitational variables (GDPs, distance and population), the study additionally incorporated bilateral exchange rate and communal language variables into the specification. With regards to regional dummy variables, EU, AFTA, NAFTA and MERCOSUR were included in this application.

⁸ The regional dummy variables were written in the dynamic form as $FTA_{(ijk)t}$, $imFTA_{(ijk)t}$ and $exFTA_{(ijk)t}$. Intra regional trade was captured by $FTA_{(ijk)t}$ aiming to measure any trade effects when both countries i and j belong to the FTA- k at time t . The dummy $imFTA_{(ijk)t}$ was imposed to capture trade effects when an import country j belongs to the FTA- k at time t , and the dummy $exFTA_{(ijk)t}$ was specified to evaluate trade effects when an export country i belongs to FTA- k at time t .

'ASEAN-effects' along with other RTAs (ANDEAN, CACM, EU, EFTA, GCC, LAIA, MERCOSUR, NAFTA) on 58 countries' trade flows for the period of 1980-1996. Employing the Tobit model as an estimator, the estimated results from the '*Gravity Model*'⁹ implied no significant intra-bloc effects for the case of ASEAN, despite the fact that the negative sign on intra-ASEAN dummy variable was actually obtained. Nevertheless, when annual estimates were observed, there were significant and negative effects of ASEAN on memberships' trade flows, especially throughout the 1987-1995 period. The study also extended the analysis to examine overall bloc imports and overall bloc exports which account for trade conducted among members themselves and between members and non-members in each regional bloc. The result, however, signified that ASEAN's imports and exports had increased on the whole. Since this was the case, Soloaga and Winters (2001) concluded that it was the consequence of ASEAN countries practicing outward-oriented trading strategies so strongly.

On a different note, Tang (2005) augmented the '*Gravity Model*' to study trade effects of 3 RTAs: NAFTA, ANZCER and ASEAN, from 1989 to 2000¹⁰. Employing both

⁹The '*Gravity Model*' was estimated cross-sectionally using the Tobit model on non-fuel import data. In addition to intra-bloc effects which aimed to measure any trade effects occurring when both traders i and j are bloc members, the study imposed 2 additional dummy variables to capture members' total import effects and members' total export effects, respectively. The members' total import effects are specified to account for any trade effects when country i is the bloc member, regardless of whether country j is in the bloc. In a similar vein, the members' total export effects are posted to evaluate any trade effects expected when country j is in the bloc, regardless of whether country i is also a bloc member.

¹⁰ Besides finding trade effects of the 3 RTAs, the analysis aimed to test for the Linder hypothesis. Thus, the variables indicating income similarity and its interaction terms with developed and developing countries were, in addition included into the gravity equation. The study conducted 2 analyses: 1) the full-period analysis where the gravity model is estimated on 1989-2000 data and 2) the sub-period analysis in which the time frame was divided into 3 sub-periods (1989-1992, 1993-1996 and 1997-2000). Regional dummy variables were specified to capture intra-regional effects considering when trade-pairs are in the RTA, and trade diversion effects accounting for times when only one of them belongs to a particular RTA of interest.

OLS and 2SLS estimating procedures on 21 countries' trade flows¹¹, the estimated result revealed that being ASEAN had benefited intra-regional trade for the entire period of study. In contrast to Soloaga and Winters (2001)'s findings, such a positive outcome was perceived to persist throughout the 1990s. As AFTA was established in 1992, the study isolated '*AFTA-effects*' by comparing coefficient estimates from the sub-period estimations¹². The result however suggested that ASEAN's trade among member countries and with non-member trading partners had been increased even after the establishment of AFTA. The study therefore concluded that AFTA not only facilitated trade flows within the membership but also promoted trade relationships with non-member countries.

Regardless of their objectives, it is evident that the empirical accounts stated above have one common character; ASEAN was perceived as one form of RTA and is usually treated as if it is homogeneous to AFTA in general. With regard to examining RTA(s)-effects, this research views that such an approach could be problematic as ASEAN, albeit being one form of regional integration, was far from being a trade agreement since its commencement. Hence, even though ASEAN's and AFTA's founders are the same group of countries and AFTA eventually managed to incorporate all ASEAN-membership countries as its affiliates, it should not be forgotten that this process took more than a decade to accomplish. In addition, given AFTA's formation in 1992, it is evident that AFTA members have taken a long time to realize the free trade status as it

¹¹ They are comprised of 3 NAFTA countries (the United States, Canada and Mexico), 2 ANZCER countries (Australia and New Zealand), 5 ASEAN countries (Malaysia, Singapore, Indonesia, Thailand and the Philippines) and 11 other countries (the United Kingdom, Germany, France, Italy, Belgium, Netherlands, Spain, Japan, South Korea, China and Hong Kong).

¹² The study divided the timeframe into 3 sub-periods which were 1) 1989-1992 , 2) 1993-1996 and 3) 1997-2000.

is formerly indicated in Chapter 1 that AFTA was close to full tariff liberalization in 2007. Therefore, ASEAN and AFTA were not the same form of regional integration. Regrettably, given the amount of literature reviewed, it seems that this piece of important information has been overlooked area until now.

Taking this viewpoint into consideration, doubt is cast on the traditional empirical approach in which '*ASEAN-effects*' and '*AFTA-effects*' were referred to interchangeably. As aforementioned, these 2 effects are certainly different in their meanings. Even though ASEAN was established in 1967, it was not until 1977 that membership countries agreed to form their first formal RTA: ASEAN-PTA. Since then, ASEAN has taken another 25 years to construct plans for trade liberalization concluding with AFTA in 1992. Given these facts, research that simply considers the membership statuses of ASEAN and AFTA without taking into account the difference in the timings of their formations and other diverse characteristics are worth revisiting.

To the extent that differences between '*ASEAN-effects*' and '*AFTA-effects*' are concerned, Frankel and Wei (1996) appears to be the only account that discerns the issues. As the study planned to examine ASEAN's trading relations, the standard '*Gravity Model*' was estimated on 63 countries' trade flows using yearly data for 1980, 1990, 1992 and 1994 timeframes. Employing the OLS regression technique, the result suggested that there was an intra-regional bias in ASEAN. Specifically, the positive coefficient estimated on the ASEAN-regional dummy implied that the 2 ASEAN countries appeared to trade 6 times more than 2 other trading partners¹³. Contrary to

¹³ The study relied on the coefficient estimated in the year 1992 which was 1.8. As trade was expressed in logs, the exponential of the coefficient: $\exp(1.8) = 6$.

conventional interpretations, the study was cautious to note that such an outcome was influenced ,if not driven by, the very first formal regional integration which was ASEAN, rather than effects from regional trade agreements that had been formed at a much later date such as ASEAN–PTA and AFTA. The study, last but not least, pointed out the sensitivity of the estimated result on ‘*ASEAN-effects*’ in that it was highly dependent on the choices of other regional trade blocs that were included in the model’s specification at the same time. In their words, Frankel and Wei (1996) stated that:

A question like ‘what is the effect of ASEAN on trade among its members’ can change radically, depending on what other bloc effects are being tested at the same time. When we test for an East Asian bloc effect simultaneously with an ASEAN effect, the latter disappears completely. If one is interested solely in formal regional arrangements, then one can accept at face value...the strong bloc effects for ASEAN (Frankel and Wei, 1996, p.15).

Because AFTA was limited to its institutional formation when it was first formed, Frankel and Wei (1996), in addition, was among the earliest accounts that suggested stating the starting point of examining ‘*AFTA-effects*’. As evident in empirical accounts abovementioned, it can be straightforwardly said that there had not been a standard approach set to identify the specific timeframe in assessing the RTA-effects of AFTA. Hence, for the case of AFTA, it was suggested that the year 1992 should be considered as the first year to begin observing whether there have been any trade effects generated from AFTA given it was the year of its establishment. This viewpoint could be one of the reasons explaining why many early empirical findings were unable to find significant ‘*AFTA-effects*’, as they started observing such effects before AFTA had even been established.

Furthermore, the fact that ASEAN took many years to complete its first FTA can be regarded as one of the best explanations for the limited amount of research concerning ‘*AFTA-effects*’, in particular. With large amounts of empirical research concerning an evaluation of RTA(s)-effects worldwide, it is true that AFTA was usually dismissed. While other RTAs had already been at work for years, AFTA was still being constructed. It was because of this sluggish establishment of AFTA that almost all of the available accounts disclosed only the key AFTA-founders: ASEAN-5¹⁴ or at best ASEAN-6¹⁵ economies. Nevertheless, as AFTA has now expanded and is complete, updated empirical evidence is, undoubtedly, needed to evaluate its performance. To the knowledge of the author, however, this has not been done under the so-called ‘*Gravity Framework*’ research in recent years.

This chapter of the thesis therefore aims to fill in this research gap, aiming to provide a case study to evaluate impacts of AFTA, ‘*AFTA-effects*’, on all of ASEAN’s trade. As ASEAN has been involved in multi-dimensional regional development programmes, by focusing on AFTA, the study is able to shape the research’s scope to focus on the trade channel specifically. An important question that the chapter aims to answer is whether AFTA has performed its role in increasing intra-regional trade thus far. In order to answer this query, an empirical investigation is indeed required. Even though the conventional ‘*Gravity Model*’ is to be relied on, an update on the data set, improvements in methodologies and econometric techniques deemed to be lacking in previous analyses will be inserted into this application.

¹⁴ See, for examples, Endoh (2000), Soloaga and Winters (2001), Sharma and Shua (2000), Elliott and Ikemoto (2004), Tang (2005).

¹⁵ See Kien and Hashimoto (2005).

3.3 Conceptual frameworks to investigate trade effects of AFTA or the so-called ‘AFTA-effects’

In quantifying RTA(s)-effects on trade flows, dummy variables have typically been used to indicate whether trade-pairs belong to a particular RTA or a certain form of economic cooperation of interest hence the given name of ‘*regional dummies*’. This approach has, in fact, been set as the tradition since Tinbergen (1962). The underlying concept is straightforward; while the conventional ‘*Gravity Model*’ works to suggest ‘*normal*’ levels of bilateral trade flows, the so-called ‘*regional dummies*’, on the other hand, work to capture ‘*atypical*’ effects generated by the particular RTA, if any (Carrere, 2006). The norm in this field of research is to give these ‘*regional dummies*’ the value of 1 if trade-pairs belong to the same RTA, otherwise, they are equal to 0. In order to interpret the result, the positive sign on a specific regional dummy’s estimate is inferred if that particular RTA has increased the membership’s trade whereas the negative sign simply suggests the opposite. Conforming to international trade theories, such positive effects on ‘*regional dummies*’ can be interpreted further as trade creation from the RTAs whilst negative effects implied trade diverting RTAs.

However, considering that AFTA was not constructed all at once but had been slowly expanded over time, this is one of the most obvious features that differentiates AFTA from other RTAs. From its commencement in 1992, AFTA took another 8 years to technically arrive at free trade status for the entire region. In the year 1999, ASEAN’s free trade zone was completed: it was comprised of all 10 countries in South East Asia. Nevertheless, as elaborated in Chapter 1, the region’s tariff liberalization was not

achieved immediately. In order to reap the benefits of the FTA status, AFTA put in the deadline for the key founders, the ASEAN-6 countries, to complete the target of 0-5% tariffs in 2003, while the new members; Cambodia, Laos, Myanmar and Vietnam, known as the CLMV, had until 2008 to do so¹⁶. The following chart summarizes the timeline of AFTA development.

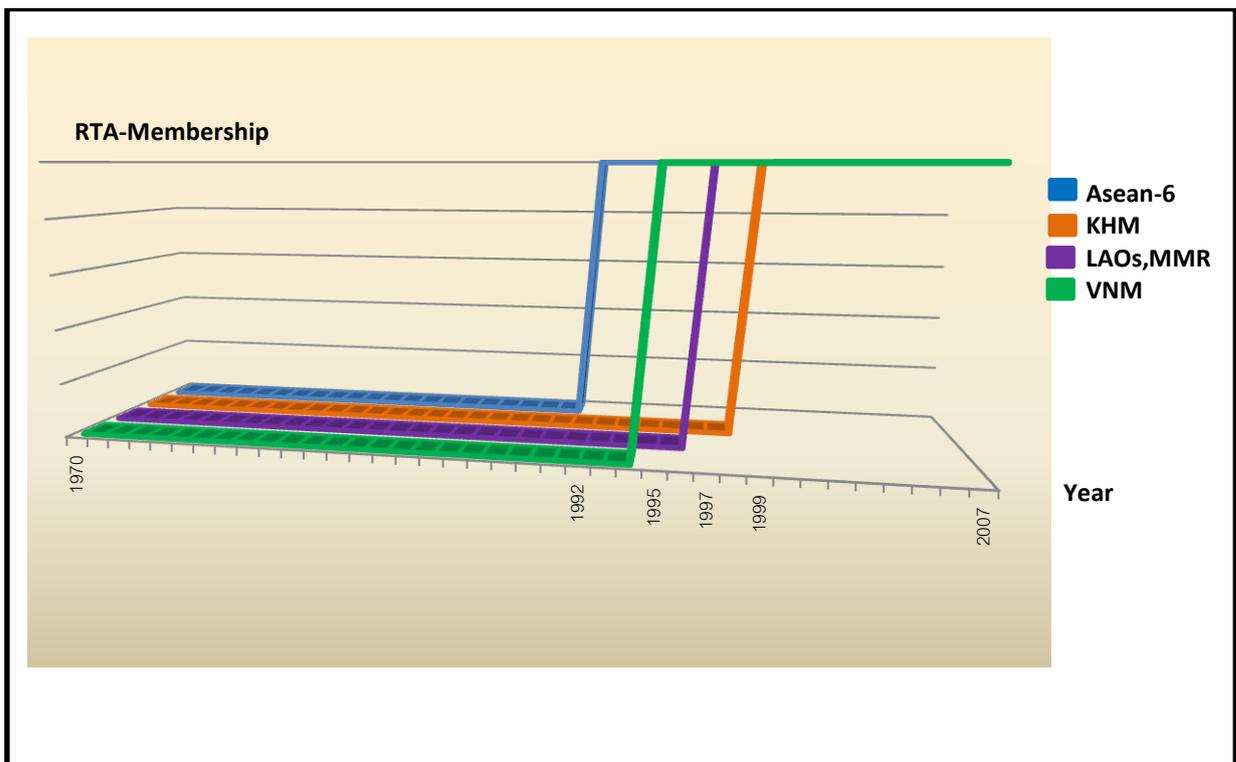


Figure 3.1: Comparison of the Year of Entry into the Free Trade Zone by Each ASEAN Member

Source: Author's own presentation.

As can be seen in Figure 3.1, the founding ASEAN members: Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand, agreed to sign the ASEAN-FTA in 1992. From this point onwards, the rest of the region automatically received AFTA-membership status once it joined ASEAN. Vietnam was accepted into the zone in 1995,

¹⁶ Cambodia has until 2010 to do so.

Laos and Myanmar joined in 1997 whilst Cambodia was the last member to join in 1999. At the time of this research: 2009, major structural changes to the region's trade sector that have occurred because of AFTA should have become visible, if there are any. In addition, as far as '*AFTA-effects*' are concerned, the fact that the CLMV joined the zone at a later date is predicted to play a part in swaying '*AFTA-effects*' that early and delayed membership countries could have received.

Considering details of AFTA's formation and its sluggish progress, this is where traditional empirical accounts may no longer be the best source of reference regarding the true effects of AFTA on its members' trade flows as usually the different times at which the countries had joined the corporation were not taken into account¹⁷. In addition to the lengthy formation of AFTA, the building structure of this free trade zone is different from other types of regional integration. This can be seen by comparing levels of commitments required across forms of regional formation as summarized in the study concerning the growth of regionalism by Gibb and Michalak (1994). AFTA, as a free trade association, is presented as one of the most primitive forms of regional integration.

¹⁷The exception covers Kien and Hashimoto (2005) as the panel data framework was conducted. However, their application employed the Hausman Taylor (HT) estimator and only ASEAN-6 was investigated during the period of 1988-2002.

Table 3.1: Different Levels of Regional Integration

Details Level	Removal of Internal quotas & tariffs	Common external customs tariffs	Free movements of land, labour, capital & services	Harmonization of economic policies & development of a supra national institution	Unification of political & powerful supra national institutions
Sectoral Cooperation	◐				
Free Trade Association	●				
Custom Union	●	●			
Common Market	●	●	●		
Economic Union	●	●	●	●	
Political Union	●	●	●	●	●

Source: Gibb and Michalak (1994, p.24)

From Table 3.1, it can be seen that each form of regional integration is distinctive, not only in terms of commitments required but also in their objectives. Therefore, the conventional method of measuring RTA-effects across various forms of regional integration by using *‘regional dummies’* to capture RTA-membership statuses alone is perceived to be inequitable. Even so, most gravitational research in this field does not seem to distinguish types of regional integration. As aforementioned, the norm is that as long as it is evident that the 2 trading partners are members of the same regional

grouping, a dummy variable is given the value of 1, otherwise it is 0. Concerns arise as this method simply implies all forms of regional integration are alike if not identical; this assumes each of them brings in similar trade effects which, according to the information provided in Table 3.1, should not be the case. In principle, the more advanced form of regional integration is supposed to bring in larger trade effects to membership countries in comparison to the less advanced form. With tighter forms of regional integration, such effects are expected to be positive even though this is not always what occurs in reality.

What is worth investigating further is that, in traditional gravitational exercises, standard cross-section or time-series analyses are often relied on and the simple estimation method such as the Ordinary Least Squares method (OLS)¹⁸ has been commonly used. This paper perceives that research which employs such methods is prone to an unobserved heterogeneity problem that is often found when correlations between observable and unobservable factors exist. In international trade flows, the unobserved heterogeneous issue can be defined as all omitted and indeterminate variables that have an influence on countries' trade relationships. They can be referred to as many things including differences in tastes or preferences, habits or demographics, and historical as well as political factors. To explain this scenario in a real world example, the circumstances in which countries trade or export different amounts to 2 trading partners which are of the same size and are located at an equal distance, are plausibly explained by unobserved heterogeneous factors or unknown specific characteristics within those particular trade-pairs. Thus, when considering international

¹⁸ See Endo (2000) and Elliott and Ikemoto (2004).

trade relationships in a given gravity equation, it is highly likely that, among observable and unobservable factors, one could expect to find correlations between explanatory variables and such unobservable factors which if uncontrolled will bring about bias and erroneous statistical inferences. In Arellano (2003)'s book: *'Panel Data Econometrics'*, this unobserved heterogeneity bias is also highlighted as an enduring problem in cross-section regression:

There are several instances in which we would expect correlation between observables and unobservables....there may be correlation due to unobserved heterogeneity. This has been a pervasive problem in cross-sectional regression analysis. If characteristics that have a direct effect on both left- and right-hand side variables are omitted, explanatory variables will be correlated with errors and regression coefficients will be biased measures of the structural effects (Arellano,2003, p. 8).

Even though previous cross-sectional research did not pay much attention to fixing this issue, the paper perceives that this problem can, in fact, be startling because the failure to control for unobserved heterogeneities not only brings about bias to the whole specification in general but also produces unreliable estimates, especially on any RTA(s)-effects of interest. Certainly, the estimated results on the RTA(s)-effects from previous cross-sectional accounts may be biased upward as they may have accumulated effects from persistent unobserved heterogeneous factors. What has been done thus far in order to control for heterogeneous biases among trade-pairs is to include additional variables as well as sets of dummies that are perceived to influence countries' trade flows on top of the standard gravitational variables and *'regional dummies'* imposed. Nevertheless, it shall not be forgotten that these factors are not always determinate and observable in reality; as the name suggests they are unobservable heterogeneous factors.

This chapter therefore argues that the conventional procedure of controlling for unobserved heterogeneous bias is still far from sufficient.

3.4 Econometric issues and methodologies

In order to reduce, if not eliminate, drawbacks found in cross-sectional gravity research, this paper starts off bringing the panel data framework into consideration. As controlling for unobservable heterogeneous bias is one of major concerns here, the use of the panel data framework has been regarded by a number of researchers to be well suited to tackling the issues¹⁹. According to Gardner (1998)²⁰ which discussed ways to control for the unobserved heterogeneous bias, the advantage of using the panel data structure in this fashion has been highlighted:

“A benefit of combining time series and cross sectional data is the ability to account for unobservable individual effects” (Gardner, 1998, p.39).

In his application, the panel data model was explained in this form:

$$Y_{ij} = \alpha + X_{it}\beta + Z_i\gamma + U_{it} \quad (3.1)$$

and:
$$U_{it} = u_i + v_{it} \quad (3.2)$$

¹⁹ See, for instance, Gros and Gonciarz (1996), Mátyás (1997).

²⁰ Nevertheless, Gardner (1998) aimed to control for unobserved heterogeneity issues by implementing the instrumental variables panel data model. The use of the Hausman Taylor (HT) instrumental panel data model was proposed to solve the issue.

From Eq. (3.2), it can be seen that the unobserved heterogeneous term; u_i is a part of the error component term; U_{it} . When there are relationships between explanatory variables and unobservable factors, the biasedness exists. One thus needs to control for such biases in order to obtain consistent estimates as a result. Specifically, there are a number of econometric methods that can be employed to ease this specific area of concern. The panel data framework is, undoubtedly, one of them.

However, before moving on to discuss the application of the panel data model, adding to the above point, the book '*Econometric Analysis of Panel Data*' by Baltagi (2001) is another example that addressed several benefits of using the panel data framework. Key contents stated in the book are summarized below:

1. Panel data is able to control for individual heterogeneity whereas cross-section or time-series studies are not.
2. Panel data provides more information yet less collinearity among variables, while time-series often suffer from multicollinearity.
3. Panel data is more suitable for studying the dynamics of adjustments over time such as unemployment, poverty and policy changes.
4. Panel data is able to quantify effects that are not noticeable in cross-section or time-series data.
5. Panel data can be modelled to test for complicated behavioural models.
6. Panel data affords empirical studies on microeconomic applications.

From the list of advantages above, it can be seen that the panel data framework is not only able to control for unobserved heterogeneous bias, but also facilitates an empirical analysis that demands more information in general. Furthermore, the fact that the panel data setting is suitable for the long period study matches this study's requirements in the area such that the role of time or the so-called '*business cycle*' can be observed and controlled for. For example The question of whether the long episode of AFTA establishment has influenced or shaped trade relationships over time can be clarified. Thus, in comparison to traditional techniques, cross section or time-series analyses, it is thus undeniably superior to conduct an analysis under the panel data framework in this study.

This section turns to the econometric specification in detail. Under the panel data framework, the standard '*Gravity Model*' can be specified in view of the error component model as stated below:

$$\ln X_{ijt} = \gamma_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} + \sum_h \delta_h T_{ij(t)h} + \varepsilon_{ijt} \quad (3.3)$$

and:
$$\varepsilon_{ijt} = \gamma_{ij} + \nu_{ijt} \quad (3.4)$$

where:

- X_{ijt} : Real exports of country i to country j at time t ,
- Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively
- P_{it}, P_{jt} : Population of country i and country j at time t , respectively

- D_{ij} : Geographical distance between countries i and country j ,
- $\sum_h \delta_h T_{ij(t)h}$: Set of dummy variables; h i.e. trade resistance or trade facilitating variables; T that country i and country j share at time t ,
- ε_{ijt} : Error component terms,
- γ_0 : An unknown constant term,
- γ_{ij} : Unobserved heterogeneities,
- v_{ijt} : The remaining error term.

As can be seen, the unobserved heterogeneities or bilateral specific effects (γ_{ij}) are posited in the empirical '*Gravity Model*' specified above. The common method of dealing with them is basically to treat this term as a catch all term for random variables or fixed parameters that can be estimated. Intuitive explanations have generally been employed to choose the fitting panel data models. In most applications these unobserved heterogeneities (γ_{ij}) are treated as fixed as long as they are believed to be non-random. In studies relating to an investigation of RTA-effects on trade flows, these factors are often assumed to be associated with historical, political and geographical factors that are correlated with the volume of bilateral trade yet invariable over time and specific to each country²¹. Thus, if one employs the traditional approach to select the desired panel data models, the terms '*random effects*' and '*fixed effects*' which are often understood and referred to as the random effects model (REM) and the fixed effects model (FEM) respectively, actually suggest how that particular research identifies unobserved heterogeneous terms (γ_{ij}) in the data set. This can be seen, for instance, in Egger (2000) where proper econometric specification of the gravity equation was studied. The paper

²¹ See Egger (2000) and Cheng and Wall (2005).

provided the explanation that the unobserved heterogeneities (γ_{ij}) were perceived as fixed parameters when specific (non-random) sampling procedures were conducted. Besides political, geographical and historical factors that are usually perceived to be particular to each country, he additionally pointed out the intuition underlying an application of the FEM that is shown below :

In many applications the gravity model is used to calibrate integration effects and thus to project trade flows between EU or OECD and the Central and Eastern European Countries (CEECs). In that cases one is not interested in the estimation of typical trade flows between a randomly drawn sample of countries but between ex-ante predetermined selection of nations...Under such circumstances the FEM would be the right choice, since the sample is exhaustive (Egger, 2000, p.2).

Another methodological paper by Mátyás (1997) also supported the use of FEM in estimating the gravity equation. In his study, the heterogeneous terms (γ_{ij}) are assumed to be observable and are specified as fixed parameters. These '*fixed effects*' were elaborated further into time-specific effects, export- and import-country specific effects in order to control for variations in bilateral trade flows of relevant trading countries over spanning years. In a similar vein, Cheng and Wall (2005) perceived that the FEM is suitable for controlling heterogeneity biases as it allows unobserved or unknown factors that explain trade volume between country-pairs to be included in the gravity specification. In their words, the FEM was in actual fact regarded as the result of ignorance:

...cultural, historical, and political factors are often difficult to observe, let alone quantify. This is why we control for these factors using a simple fixed-effects model...It is in this sense that fixed-effects modelling is a result of ignorance: We do not have a good idea which variables are responsible for the

heterogeneity bias, so we simply allow each trading pair to have its own dummy variables (Cheng and Wall, 2005, p.54).

On the other hand, Mátyás (1998) stood for the REM in the modelling econometric setting of the '*Gravity Model*'. In his application, it was suggested that treating unobserved heterogeneities (γ_{ij}) as random variables is appropriate as long as the sample i.e. countries in the data set, is large and the subject of interest relates to observing general relationships of variables. In contrast to the FEM where heterogeneous factors are treated as observable, the REM perceives these terms as unobservable random variables. With regard to examining effects of RTA(s), this REM was therefore claimed to be better suited to large-scale research i.e. the world model (Mátyás, 1998). Nevertheless, if the REM is assumed, one has to test for the homogeneity of the data set, as one of the fundamental assumptions in the REM is that all parameters are the same across the sample²².

In contrast to traditional research, Wooldridge (2002) argued that viewing the unobserved bilateral effects (γ_{ij}) as random variables or as fixed parameters to be estimated is in conflict with microeconomic theoretical foundations. This is because in the panel data structure where large numbers of cross sections exist, it is adequate to view unobserved heterogeneities (γ_{ij}) as a random draw from a normal distribution of the population. However, it does not necessarily designate which setting of the panel data models that should be applied. Instead, one should be concerned with whether there are correlations between explanatory variables and unobserved heterogeneous terms (γ_{ij}). Wooldridge (2002) certainly mentioned:

²² In Mátyás (1998), the Chow test and the poolability tests for panel data (Baltagi, 1995) were suggested to construct the stability test.

In modern econometric parlance, “random effects” is synonymous with zero correlation between the observed explanatory variables and the unobserved effects...the term “fixed effects” does not usually mean that c_i is being treated as non-random; rather, it means that one is allowing for arbitrary correlation between the unobserved effect c_i and the observed explanatory variables X_{it} ²³... (Wooldridge,2002, p.252).

Taking Wooldridge (2002)’s viewpoint into consideration, in order to obtain consistent estimated results under the REM, one has to satisfy the fundamental assumption that explanatory variables have to be uncorrelated with unobserved heterogeneous terms (γ_{ij}). This is a strong assumption to meet especially when the long panel format is observed. This is because the likelihood that the unobserved heterogeneities (γ_{ij}) are correlated with some of the explanatory variables will be high. In the case of this assumption being violated, the REM’s estimates are no longer consistent. While the REM suits the case in which there is no correlation between explanatory variables and unobserved heterogeneous terms (γ_{ij}), the FEM allows for arbitrary correlations among such terms. The FEM is, for these reasons, always accepted as a consistent estimator regardless of whether correlations between unobserved heterogeneous terms (γ_{ij}) and explanatory variables are presented. This is so because the FEM consistently estimates partial effects of time invariant omitted variables which are arbitrarily related to the explanatory variables. By allowing for correlations between unobserved effects (γ_{ij}) and explanatory variables, this makes the FEM more robust than the REM. However, this robustness comes with a cost as the FEM estimation procedure is not fully efficient. As unobserved heterogeneities (γ_{ij}) are allowed to be arbitrarily correlated with each element of explanatory variables under the FEM, one thus cannot distinguish whether effects are from time-invariant observables or time-invariant unobservable

²³ The unobserved effects model is written as $y_{it} = X_{it}\beta + c_i + u_{it} \quad t=1,2,\dots,T$ where X_{it} is $1 \times K$ observable variables that change across t but not i , variables that change across i but not t , and variables that change across i and t while c_i represents unobserved heterogeneity in the application.

heterogeneities (γ_{ij}) (Wooldridge, 2002, p.266). Without further assumptions, time-invariant factors cannot be included in the explanatory variables as a result.

Even so, it depends on the type of research as to whether there are any negative aspects in using the FEM in an applied empirical work. Wooldridge (2002) certainly affirmed this point;

The fact that \mathbf{X}_{it} cannot include time-constant explanatory variables is a drawback in certain applications, but when the interest is only on time-varying explanatory variables, it is convenient not to have to worry about modelling time-constant factors that are not of direct interest (Wooldridge,2002, p.266).

Considering relevant discussions thus far, it can be summarized that in order to choose the most appropriate panel data models between the REM and the FEM, one has to find whether unobserved bilateral effects (γ_{ij}) are correlated with other observed explanatory variables or not. Indeed, this chapter perceives examining correlations between unobserved heterogeneities (γ_{ij}) and explanatory variables as crucial as it not only specifies the appropriate panel data model but also ensures the empirical results obtained are consistent. In order to check for this, the Hausman Test (1978) provides an uncomplicated way to detect this issue. This test is certainly a standard procedure employed in the panel data analysis testing for inconsistency of an estimator. In practice, it is often used to select between 2 alternative panel data models: the FEM and the REM.

According to Hausman (1978), the simple panel model is firstly specified as;

$$y_{it} = X_{it}\beta + u_i + \varepsilon_{it} \quad (3.5)$$

where $i = 1, 2, \dots, N$; $t = 1, 2, \dots, T$ and u_i is the individual effect. If the choice of specification is the REM, it is crucial to highlight key assumptions stated in the REM that u_i has to be drawn from an idd distribution: $u_i \sim N(\mathbf{0}, \sigma_u^2)$ and it also needs to be uncorrelated with the X_{it} and ε_{it} . The REM's specification can therefore be rewritten in the form of a variance component model as;

$$y_{it} = X_{it}\beta + \eta_{it} \quad (3.6)$$

where
$$\eta_{it} = u_i + \varepsilon_{it} \quad (3.7)$$

From assumptions above, $E_\eta = \mathbf{0}$ and the covariance matrix is block diagonal. The appropriate estimator for the model stated above is the General Least Squares (GLS). If, on the contrary, the FEM is to be elected, Hausman (1978) stated that the FEM only requires treating u_i as a fixed but unknown constant terms differing across individuals. As deviation from means are used to estimate β , it is also known as the within estimator.

Taking into consideration that the correctness of the panel model's specification is vital, the key area that requires close assessment is whether the conditional mean of u_i is independent of or uncorrelated with the regressors: X_{it} . Considering the panel model stated above, that is to find whether $E(u_i/X_{it}) = 0$. Hausman (1978), for that reason, provides the null hypothesis testing for the independent of u_i by simply observing the

difference of estimates derived from the 2 panel specifications: FEM versus REM. If the REM is correct, the estimates from the REM: $\hat{\beta}_{GLS}$ should not be too different from the FEM's estimates: $\hat{\beta}_{FE}$. Given that \hat{q} is the difference between 2 models' estimates: $\hat{q} = \hat{\beta}_{FE} - \hat{\beta}_{GLS}$, on the condition that the REM assumption holds, \hat{q} should be close to 0. Otherwise, the Hausman Test suggests that there is misspecification in the REM; the model ends up with biased and inconsistent estimates. In case this occurs, the FEM is, as a result, preferred as it remains unbiased and consistent even if the null hypothesis is rejected.

However, with the help of a statistical package such as STATA, one can observe whether there is large value of the Chi-squared statistic from the Hausman Test as this accordingly implies that the high degree of correlation between unobserved heterogeneous factors (γ_{ij}) and explanatory variables exists. If this is so, the null hypothesis testing for the independent of u_i has to be rejected and the FEM will, instead, be relied on as a consistent estimator. Nevertheless, estimated results derived from the REM and the FEM are to be compared in this application as the study plans to provide additional evidence to support the claim that previous practices that simply employed intuitive notions to select the desired panel data models could be severely biased.

In the following section, the specification of the gravity equation formerly stated in Eq. (3.3) is augmented to examine ASEAN's trade relationships in general, as well as to investigate whether there is any evidence of '*AFTA-effects*' on intra-ASEAN trade flows, in particular. Unlike many empirical accounts that are generally designed to

compare and contrast RTA(s)-effects in different parts of the world, it is important to stress here that this chapter intends to study the effects of AFTA on its intra-ASEAN trade exclusively. For this reason, instead of including RTAs across the globe, this study draws the domain of the analysis to be within the ASEAN region wherein only AFTA is observed.

Recall the discussion made by Frankel and Wei (1996) where the sensitivity of any RTA(s)-effects estimated could partly be explained by the choice of RTAs or countries that are being incorporated in the empirical specification of the '*Gravity Model*' at the same time. The chapter agrees with this view and observes that the inclusion of larger and more efficient RTAs is one of the main factors that drives the mixed results of '*AFTA-effects*' on the membership's trade thus far. In order to explain these issues, it can be said that these estimates are derived in comparative terms. Any '*AFTA-effects*' observed are not independent effects but are their effects weighed against other RTAs or trade blocs in that particular study. Hence, by taking an alternative approach in specifying the scope of an investigated area in this way, the chapter will be able to draw the focal point underlying detailed relationships between AFTA-membership and ASEAN-membership countries' trade ties specifically. As ASEAN's territory is independently observed, the analysis can be conducted without having to be concerned about the effects that nearby RTAs may have, overshadowing AFTA. Certainly, this research can be viewed as a case study on AFTA rather than a general overview of RTA(s)-effects worldwide. With improved econometric techniques and an updated data set, the coefficient estimates on '*AFTA-effects*' which will be determined can thus be

observed as an additional piece of evidence to verify whether AFTA has actually been effective in increasing intra-regional trade flows.

3.5 An empirical strategy proposed to evaluate ‘*AFTA-effects*’ on intra-ASEAN trade

To examine ‘*AFTA-effects*’ on intra-ASEAN trade flows, all 10 AFTA members are accessed longitudinally in this application. The timeframe covers 38 years dating back to the year 1970 when regionalism flourished worldwide yet was rather a new concept to ASEAN. With the use of the panel data setting, this study is able to observe the trend in intra-ASEAN trade covering periods before and after AFTA’s establishment. Apart from qualitative and narrative accounts that discussed the prospects as well as the performance of AFTA in increasing intra-ASEAN trade, there is no quantitative study that includes all ASEAN members in the gravity-based research for this long period of time. To the knowledge of the author, this is, heretofore, the most comprehensive account in terms of data coverage on studies relating to an evaluation of AFTA. The study constructs an unbalanced panel of 90 trading pairs over 38 years comprised of 3,420 observations in total.

3.5.1 Variables and data sources

Trade data

Trade data in the form of bilateral export value²⁴ is derived from the COMTRADE data set developed by the United Nations (UN)²⁵. In this application, the current value is converted to real terms (2005 US\$) using an historical GDP deflator from the Economic Research Service, United States Department of Agriculture (ERS/USDA)²⁶. The reason that the dependent variable is bilateral exports (country i exports to country j , and *vice versa*), rather than their total trade (export plus import) is to allow one to estimate the difference in income elasticities for exports and imports.

Gross Domestic Products (GDP)

In the gravitational concept, GDP data is categorized in terms of size variables. The size of countries' economies can be reflected in their income levels. In this application, the data is sourced from ERS/USD in the form of annual real gross domestic products. The units are standardized in billions of 2005US\$. The basic '*Gravity Model*' specifies that trade between 2 countries is proportionate to their GDPs. Hence, these income variables (Y_i, Y_j) are expected to have a positive sign. In addition, as the coefficients of GDPs can imply the income elasticities of trade with respect to an exporter's and importer's income, an increase in income also indicates greater production available for exports, and given a relatively high marginal propensity to import, will lead to an increase in imports.

Population

²⁴ Export value in UN COMTRADE is reported in terms of the local currency. It is converted from the national currency into US dollars using exchange rates supplied by the reporting countries or derived from money market rates and volume of trade.

²⁵ See <http://comtrade.un.org/>

²⁶ See <http://www.ers.usda.gov/data-products/international-macroeconomic-data-set.aspx#.UWxVwqKsiSp>

Population is perceived as another size variable in the gravity equation. The data is also collected from ERS/USDA and the units are in thousands. Even though the population variable is categorized to represent the size of the economy, its effects on trade flows are in fact indeterminate²⁷. This is because: on the one hand, a large population plausibly indicates that the economy is efficient as economies of scale are present. Thus, considering an exporter, the expected sign on the estimated population coefficient is therefore positive as a country is able to increase exports once the size of population increases. On the other hand, large population also implies that the country's demand is large. As export trade is observed, *ceteris paribus*, the exporter has little left to export after satisfying her large-sized demand domestically. If this is the case, the estimated sign on the population variable is expected to be negative. In case the importer is observed, on the other hand, an increase in the population size may indicate that the economy is increasingly efficient in terms of production. This further implies that fewer goods may be imported since the country's domestic supply would be large enough. When this relationship is observed, the expected sign on the population variable is therefore negative. However, it is also possible that an importing country may import more once the population size has increased as the domestic demand may no longer be sufficient. In the case of this correlation occurring, the estimated sign on the population variable of the importer is therefore positive.

Distance

The distance variable is sourced from the *Centre d'Etudes Prospectives et d'Informations Internationales*²⁸ (CEPII) database. It is measured in the form of

²⁷ See, for instances, Oguledo and Macphee (1994), Kien and Hashimoto (2005).

²⁸ Institute for Research on the International Economy (in English)

geodesic distances calculated following the great circle formula which uses the latitudes and longitudes of the capital cities or the most important cities. The units are in kilometres. As distance is perceived as a form of trade resistance variable relating to trade costs, the estimated coefficient is expected to be negative.

Communal languages

The measure of linguistic similarity is also sourced from CEPII. Degrees of communal language between trading partners are collected if at least 9 % of the population speak the same language. As this variable is qualitative in nature, it is denoted in the form of a dummy variable. If 2 trading countries share a linguistic similarity, the communal language dummy is set equal to 1, otherwise it is 0. As communal languages characterize cultural and historical similarities between trade-pairs, which are thought to facilitate trade between countries, the expected sign on this variable's estimated coefficient is therefore positive.

Real exchange rate

The real exchange rate is readjusted to be in the form of bilateral real exchange rates. That is the value of a unit of the exporter's currency in terms of the importer's currency. Each local currency unit is standardized into real term using 2005 US\$ value as the base year. The data is sourced from ERS/USDA. The higher real exchange rate denotes that country i 's currency depreciates compared to country j 's currency. Given this relationship, country i 's exports should increase, implying that the expected sign on the estimated coefficient of bilateral exchange rate is positive.

3.5.2 Methodological and modelling issues

Regional dummy issues

Let us begin by considering the traditional method that uses '*regional dummies*' to capture whether trade-pairs belong to the RTA of interest. If trade-pairs are members of that particular RTA, the dummy is given the value of 1, otherwise it is 0. As only countries' RTA-membership statuses are concerned, '*regional dummies*' are usually specified as time-constant variables. Even though this paper agrees that this traditional method is not incorrect, it is only appropriate to the case when a group of countries are given RTA-membership status at the same period. This point is, without a doubt, not the case in AFTA as it is evident from Figure 3.1 that the CLMV countries attained AFTA-membership status at different times. This paper views that such timing differences between ASEAN-6 and CLMV countries attaining AFTA-membership should affect the trade effects that they have received from this free trade zone differently. Therefore, in these circumstances, the conventional way of specifying '*regional dummies*' as a time-invariant variable to capture only countries' free trade status is certainly not the best empirical strategy for the analysis of AFTA.

Employing the panel data framework, this allows the research to apply the so-called '*dynamic regional dummies*' to capture AFTA's membership which has not been static through time. This approach was also used by Kien and Hashimoto (2005)²⁹ as earlier reviewed. An assumption, in which timing differences in joining AFTA are influential in determining '*AFTA-effects*' that countries receive, can be investigated if the

²⁹ Nevertheless, Kien and Hashimoto (2005) conducted an Instrumental Variable Approach to estimate the '*Gravity Model*' which is different from the empirical procedure that will be used in this study.

conventional time-invariant AFTA dummy variable is specified as a time-variant variable instead. This is truly different from the yearly cross-section framework in which the time-invariant AFTA dummy variable only captures whether trade-pairs belong to AFTA in a particular year. By allowing for the time dimension in the panel data framework, one is able to examine whether ASEAN's overall trade flows have been greatly improved since AFTA was implemented. In spite of the fact that the ASEAN's trading environment was foreseen to be altered after the establishment of AFTA in 1992, early and delayed members should not be affected in the same way. This is another point which the time-invariant AFTA dummy variable commonly specified in the cross-section estimation is unable to distinguish since only countries' AFTA-memberships are observed. Certainly, the detailed examination of this area has thus far been neglected.

In addition, as far as potential endogeneity of '*regional dummies*' is concerned, previous gravity-based studies that commonly conducted the simple cross-sectional type of research employing the Ordinary Least Square (OLS) method could contain biased and consistent estimates in general. The effects of RTAs on trade flows, in particular, could have been wrongly estimated if RTAs of interest are actually endogenous. Endogeneity of RTA(s) can be caused by 1) omitted variables or unobserved heterogeneities 2) simultaneities and 3) measurement errors (Woolridge, 2002). However, it is interesting to note that almost all of the available gravity-based research, thus far, treated RTA(s)-memberships as an exogenous variable. This might be due to the fact that the research's question only focuses on finding RTA-effects, given that a particular RTA already existed. Among recent literature, there are only a few accounts

that deal with issues concerning the endogeneity of RTAs: Magee (2003) and Baier and Bergstrand (2004, 2007). In this regard, Baier and Bergstrand (2004) attempted to control for endogeneity bias of RTA(s)-memberships in the cross-section gravity analysis by applying the instrumental variable (IV) and the Heckman control function procedures. However, results were far from satisfactory as they themselves admitted that the average treatment effects of RTAs were unstable; considering all forms of specifications, estimated treatment effects of RTAs were found to cause a decline in trade of up to 92% to an increase in trade of 1100%. This is not informative as the estimated values cover such a wide range. Estimated results were, in addition, sensitive to the instruments chosen and there was a difficulty in finding suitable instruments. In their application, there were only 2 specifications where the null hypothesis was not rejected while, in most specifications, the test for overidentifying restrictions rejected the null hypothesis that the instruments were exogenous. Similar problems were observed in Magee (2003) as the IV approach was also used; the average treatment effects of RTAs were found to cover a wide range of large positive to large negative effects of RTAs on trade flows and the difficulty in finding appropriate instruments remained. The RTA(s)-effects estimated are, again, also sensitive to the choice of instruments used. Considering problems found from controlling for endogeneity issues in the cross-section gravity equation, Baier and Bergstrand (2007) concluded in their work that the IV estimation method and the Heckman control function were thoroughly inappropriate tools in this regard. That is because a number of variables that are correlated cross-sectionally with a particular RTA-membership are usually correlated with trade flows at the same time. Thus, when using cross-sectional estimating techniques such as the IV and the Heckman control function, they will not be able to

eliminate such bias completely. In contrast to previous findings, Baier and Bergstrand (2007) therefore proposed the use of the panel data framework; the fixed effects model with country-and-time fixed effects and the first difference estimator were employed to control for the potential endogeneity of RTA(s). Comparing with the OLS estimates in the cross-section gravity equation, their paper found that RTA(s)-effects of interest were much improved and more consistent. Baier and Bergstrand (2007) certainly mentioned that

...Standard cross-section techniques using instrumental variables and control functions do not provide stable estimates of these ATEs in the presence of endogeneity and tests of overidentifying restrictions generally fail. However, we find convincing empirical evidence using panel data of unbiased estimates of ATEs ranging from 0.61-0.76. These estimates are five to six times those using OLS (Baier and Bergstrand, 2007, p. 92).

As there was a need for a continuous variable in order to capture progress of RTA-effects at each point in time, the *'dynamic regional dummies'* or time-variant regional dummies were employed in this panel data setting. In addition, the lagged effects of RTA(s) on trade were also introduced to capture the so-called *'phased-in'* effects from RTA(s) instead of imposing the static value of 0 or 1 on the time-invariant *'regional dummies'* that the cross-section gravity equation usually employed. In this regard, Baier and Bergstrand (2007) perceived that a particular RTA may take some time to produce any economic effects on member countries after the day of its establishment. Thus, one or two lagged regional dummies are added in order to capture any delayed in terms of trade changes. In this regard, the *'dynamic regional dummies'* that this paper aims to implement is thus appropriate. Even though the chapter does not include lagged effects of AFTA this setting is able to evaluate RTA(s)-effects throughout the whole period of

study because it covers a long time span of nearly 4 decades, starting before this particular free trade zone is implemented.

Nevertheless, in order to control for the potential endogeneity of RTA(s), this paper believes that one, first of all, needs to identify factors that drive the formation of a particular RTA. In the case that the RTA of interest is endogenously formed, common causes of RTA formation are, for example, that countries have similar levels of GDPs, countries are closer to each other than they are to any other countries as well as the high degree of difference in their factor endowments. As these features are the same reasons that explain large trade flows between countries, in order to judge whether a particular RTA should be treated as an endogenous variable, a simple question to ask is whether RTA causes trade or trade causes RTA? This point conforms to Baier and Bergstrand (2004, 2007) as they likewise mentioned that countries that have large trade flows with each other tend to jointly initiate the RTA because they foresee mutual benefits from these RTA(s)-memberships. However, in Baier and Bergstrand (2004) in which economic determinants of RTAs were studied, they found that although such aforementioned issues: similar GDPs levels, the close distance between trade-partners as well as the high trade value among them, are perceived as key indicators driving countries to form RTAs with each other, other unobserved factors remain that most likely influence countries' decisions in engaging in RTA formation. Considering causes of endogeneity in RTA(s)-memberships as aforementioned, Baier and Bergstrand (2007) in fact addressed the omitted variable, usually known as the unobserved heterogeneity, as one of the most important sources of endogeneity of RTAs in the cross-section gravity equation. Indeed, there are factors that are not accounted for in the gravity

variables but may be correlated with the decision to form a RTA. In other words, there may be correlations between the gravity equation's error terms and RTA(s) dummies.

Hence, relating this discussion to the context of AFTA, it is worth revisiting the historical note described in Chapter 1 which states that AFTA was a politically driven free trade area. Considering the low level of intra-ASEAN trade pre-AFTA, it moreover highlights the fact that ASEAN countries did not actually form AFTA because of the high level of trade that they have conducted with each other. AFTA was, in fact, a consequence of ASEAN regional cooperation. As elaborated in the introductory chapter, this regional integration aimed to raise the membership's negotiating power as a group against larger and more powerful countries as well as other RTAs which were expanding. Thus, strengthening intra-regional trade ties among membership countries was not the first priority. Yet, member countries did hope for more as well as better opportunities to increase intra-regional trade and, later on, this motive led to the formation of AFTA after ASEAN had been successfully established. Given this relationship, it can be considered that the formation of AFTA may cause (future) trade in this application. However, as AFTA's establishment was certainly not driven by the high level of trade between member countries. In other words, it can be simply said that the relationship between AFTA and (changes in) trade is definitely not simultaneous. This therefore contradicts the classification of endogenously formed RTAs. However, one may question the delayed entrance of CLMV countries in terms of whether their decisions in following into AFTA were driven by trade between them and former AFTA-members: ASEAN-6 countries. Once again, the history of AFTA provided in Chapter 1 is useful in this matter. In brief, CLMV countries do not have any alternatives

but to join AFTA as they are geographically situated in the South East Asia region. Moreover, AFTA-membership was given automatically once CLMV countries were officially approved as part of ASEAN regional cooperation. As aforementioned, these procedures were principally political; forming AFTA was perceived as one channel of ASEAN economic development. Thus, it can be said that regardless of trade that the early AFTA-members ASEAN-6, have conducted with the CLMV group of countries, every country in the region had to join the zone in the end. Otherwise, their relationships with the rest of the region would be hampered as they would be ruled out of the whole region's administration politically and economically. One would expect that the trade changes seen for early AFTA-memberships would have affected CLMV's decisions on whether to follow into AFTA. The study perceives that this rationale does not apply here as elaborated earlier that, in this setting, political reasons were major factors in this region's integration. As far as trade effects or terms of trade changes from AFTA to CLMV countries are concerned, they would probably delay or hasten time at which the countries joined the cooperation but would not alter the decision whether to join the bloc. That is because the commitment as well as the deadlines for joining AFTA were earlier agreed by the ASEAN/AFTA founders. However, the extent to which the trade effects of early AFTA-members could have influenced CLMV countries in choosing when they joined the zone is beyond the scope of this chapter. As far as political drives dominate ASEAN integration as a whole and considering the fact that the deadlines that CLMV countries have to join AFTA were set even before they joined the bloc, this paper perceives that AFTA-memberships, both early and delayed, are exogenously specified. This implies that the standard gravity framework in which the RTA-membership is treated as an exogenous variable is valid here. After all, the

question that this research aims to answer is, given the establishment of AFTA in this region, what can we expect from this free trade zone in terms of trade effects: trade creation or trade diversion?

For these reasons, by employing the panel data framework, the setting of the so-called '*dynamic regional dummies*' in this application is therefore $AFTA_{ijt}$. This dummy variable is assumed to start capturing any trade effects of AFTA on the original 6 AFTA-founders from when they first formed the free trade zone in 1992. Indeed, this is to quantify whether the '*regionalization*' process has occurred after AFTA members engaged in the process of '*regionalism*'. Given the time dimension as an observable year: t , the dummy variable $AFTA_{ijt}$ is imposed to pick up a joint AFTA-membership status for every set of trade-pairs in the same year. If AFTA is effective in improving intra-regional trade, in principle, it is supposed to transfer '*AFTA-effects*' to early members' trade flows from 1992 onwards. The full trade effects from AFTA are, in addition, expected to have been delivered to the whole region when the last member, Cambodia, had entered the free trade zone receiving AFTA-membership status in 1999. When AFTA has a full house, any trade benefits arising because of this free trade zone are supposed to bring in the positive sign on $AFTA_{ijt}$ estimated. If, however, AFTA is unable to meet its goal in liberalizing trade in the region, the negative sign will instead be observed.

Moreover, by implementing this so-called '*dynamic regional dummies*' mechanism, it allows the study to examine whether trade effects caused by AFTA have been significantly different from years prior to the formation of the zone. In the past, when

the time-invariant AFTA dummy was used, the question had been addressed, at best, by testing for effects of AFTA on the membership's trade flows throughout the whole period of study. Hence, the '*dynamic regional dummies*' approach not only facilitates an analysis which captures effects of AFTA but also enables detailed examinations relating to its formation, contraction or expansion altogether. On top of that, this approach is useful in assessing directions of intra-ASEAN trade flows which is essential for the analysis concerning trade-creation and trade-diversion effects of AFTA. Considering the fact that AFTA is unique in having been developed gradually, once again, the traditional approach which employs time-constant '*regional dummies*' cannot identify directions of trade clearly as only the overall trade effects of AFTA are identified. Undoubtedly, it will thus be difficult to distinguish if AFTA has been the cause of trade creation or trade diversion on the region's trade flows.

Taking into account modelling issues, the '*Gravity Model*' as previously stated in Eq. (3.3) is re-specified including the AFTA dummy in the '*dynamic regional dummies*' format. On top of standard gravitational variables, the econometric specification is augmented to incorporate bilateral exchange rate variables and communal language dummies in order to account for any preferential impacts in each trade-pair, if any.

As a result, the '*Gravity Model*' is specified as:

$$\ln X_{ijt} = \gamma_0 + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} \\ + \beta_6 \text{Lang}_{ij} + \beta_7 \ln \text{REX}_{ijt} + \beta_8 \text{AFTA}_{ijt} + \varepsilon_{ijt} \quad (3.8)$$

where :

- X_{ijt} : Real exports of country i to country j at time t ,
- Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively
- P_{it}, P_{jt} : Population of country i and country j at time t , respectively
- D_{ij} : Geographical distance between countries i and country j ,
- $Lang_{ij}$: A dummy variable takes the value of 1 if both country i and country j share communal languages. Otherwise, it is 0,
- REX_{ijt} : Bilateral real exchange rate of country i to country j at time t ,
- $AFTA_{ijt}$: A dummy variable takes the value of 1 if both country i and country j are members of AFTA at time t . Otherwise, it is 0,
- γ_0 : An unknown constant term,
- γ_{ij} : Unobserved heterogeneities or bilateral effects specific to each trade-pair,
- ε_{ijt} : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance.

Time effects

As the period of study covers a long time span of nearly 4 decades, controlling for the 'time effects' is perceived necessary. In applied work, the statistical test checking for the inclusion of the 'time effects' is conducted in order to confirm the importance of the time dimension in the specification of the estimating gravity equation. This is aimed at explaining whether the natural representation of trade flows within ASEAN have been influenced by any special events which occurred at any specific time. If they have been influenced, by how much? In addition to standard gravity variables, dynamic AFTA

dummy ($AFTA_{ijt}$) and bilateral unobserved effects (γ_{ij}), much variation in intra-ASEAN trade relationships over the long term could, to a certain extent, be entwined with the effects of time.

Therefore, if the test result suggests the importance of the time dimension in this data set, the gravity equation previously specified in Eq. (3.8) has to be re-specified again so as to incorporate the ‘time effects’. The gravity equation can thus be rewritten as:

$$\ln X_{ijt} = \gamma_0 + \gamma_t + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} + \beta_6 Lang_{ij} + \beta_7 \ln REX_{ijt} + \beta_8 AFTA_{ijt} + \varepsilon_{ijt} \quad (3.9)$$

and,

$$\gamma_t = \sum_{t=1970}^{2007} \gamma_t T_t \quad (3.10)$$

$$T_t = \begin{cases} 1 & ; \text{if } T = t : T = \text{year } 1970, 1971, \dots, 2007 \\ 0 & ; \text{if } T \neq t \end{cases} \quad (3.11)$$

where:

X_{ijt} : Real exports of country i to country j at time t ,

Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively

P_{it}, P_{jt} : Population of country i and country j at time t , respectively

- D_{ij} : Geographical distance between countries i and country j ,
- $Lang_{ij}$: A dummy variable takes the value of 1 if both country i and country j share communal languages. Otherwise, it is 0,
- REX_{ijt} : Bilateral real exchange rate of country i to country j at time t ,
- $AFTA_{ijt}$: A dummy variable takes the value of 1 if both country i and country j are members of AFTA at time t . Otherwise, it is 0,
- γ_0 : An unknown constant term (the portion of intercept that is common to all years and trade-pairs),
- γ_{ij} : Unobserved heterogeneities or bilateral effects specific to each trade-pair,
- γ_t : Time effects,
- ε_{ijt} : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance.

3.5.3 Empirical results

This section proposes that proper econometric specification of the ‘Gravity Model’ does affect results and their interpretations significantly. This paper theoretically specifies the ‘Gravity Model’ according to the microeconomic foundations abovementioned. Firstly, when aiming to control for unobserved heterogeneous factors (γ_{ij}), there are basically 2 panel data models to rely on. The study starts by estimating the panel specification of the gravity equation as stated in the form of Eq. (3.8). Without including an AFTA dummy variable, one gets the benchmark specification. The results of the REM and FEM are compared in Table 3.2 as presented below.

Table 3.2: Benchmark Results of the ‘Gravity Model’ Estimates: the Random Effects Model (REM) versus the Fixed Effects Model (FEM)

Dependent Variable :	Benchmark (REM)	Benchmark (FEM)	AFTA-context (REM)	AFTA-context (FEM)
Real Exports				
Exporter's GDP (Y_{it})	0.83504332*** (0.0944128)	1.2625494*** (0.1490019)	0.76556786*** (0.0961348)	1.2650253*** (0.1486844)
Importer's GDP (Y_{jt})	1.104903*** (0.0999292)	0.76365671*** (0.143694)	1.0668093*** (0.1047656)	0.66269796*** (0.1474501)
Exporter's Population (P_{it})	-0.1109362 (0.1275723)	0.46315927 (0.4209273)	-0.10611319 (0.1193209)	0.47643632 (0.4200477)
Importer's Population (P_{jt})	-0.30413774** (0.1463451)	-1.1779267** (0.4815456)	-0.29923965** (0.1369165)	-1.5138585*** (0.493943)
Distance (D_{ij})	-1.0708428** (0.4798482)	-	-0.99773284** (0.4416461)	-
Real Exchange Rate (REX_{ijt})	0.15865857*** (0.0193996)	0.21570279*** (0.0211948)	0.15039822*** (0.0192496)	0.21372023*** (0.0211601)
Common Language ($Lang_{ij}$)	1.5326144** (0.6696509)	-	1.6258342*** (0.6169108)	-
AFTA-effects ($AFTA_{ijt}$)	-	-	0.17004253 (0.1067602)	0.33486034*** (0.1140395)
Constant	-18.233884*** (3.958709)	-23.430507*** (3.479263)	-16.46413*** (3.829214)	-15.896729*** (4.316955)
Hausman Test	$Chi^2(5) = 70.49$		$Chi^2(6) = 112.28$	
Within vs. GLS	$Prob > Chi^2 = 0.0000$		$Prob > Chi^2 = 0.0000$	

Note: * denotes significant at 99%, ** and * denotes significant at 95% and 90% respectively
Standard errors are given in parentheses.**

The benchmark specification provides the traditional way of estimating ‘*normal*’ trade levels when the AFTA dummy variable ($AFTA_{ijt}$) is excluded. As is evident, coefficients’ estimates in the benchmark REM and FEM frameworks are, in general, similar to estimates in the REM and FEM in the AFTA-context’s specification. The latter however measures ‘*atypical*’ effects resulting from AFTA in terms of signs, values and significance levels. This simply implies that the ‘*Gravity Model*’ specified is, to a certain extent, sturdy enough to determine the trade relationships of this data set.

As one of the main objectives of this paper is to evaluate AFTA’s impacts on intra-ASEAN trade relations, the regression results in the AFTA context under the REM and the FEM are presented in the last 2 columns of this table. It is evident in the third column that the REM provides the estimated coefficients with expected signs. Since coefficients estimated on GDPs (Y_{it} , Y_{jt}) imply the income elasticities of trade in an exporter’s and importer’s income, with the estimated values of 0.76556786 on Y_{it} and 1.0668093 on Y_{jt} , an exporter’s income is perceived to be less elastic to trade (exports) than an importer’s income elasticity on trade (imports). However, their estimated coefficients are both highly significant at the 99% level. Considering population variables (P_{it} , P_{jt}), as they reflect market sizes, the negative estimated coefficient on P_{it} implies that the exporting country has to satisfy a large demand. As the population grows, the exporting economy therefore decreases the amount it exports. However, the estimated coefficient is not significant in this application. Considering the importing economy, the negative coefficient estimated on P_{jt} likewise implies that the country reduces imports once the size of population has increased. Given that the estimated coefficient is significant at the 95% level, this implies further that the economy is

efficient in terms of production and thus it is less reliant on imports. Bilateral trade is, as theoretically predicted, negatively affected by the distance (D_{ij}) between the 2 trading partners. As these countries are located within the same region, the distance variable strongly implies that the trade costs i.e. transportation costs between countries are still high even though they are neighbours. The bilateral real exchange rate (REX_{ijt}) appears to play a supporting role in driving trade flows in the region as the estimated coefficient portrays an expected positive sign and is highly significant at the 99% level. Once the exporting country's currency depreciates, this implies that exported goods are cheaper than previously. Hence, *ceteris paribus*, the amount of goods being exported should increase. Historical and cultural characteristics which are proxied by the communal languages dummy variable ($Lang_{ij}$) provide evidence to support the claim that speaking similar languages is a trade facilitating factor. In addition, the estimated coefficient presents a positive sign and is also significant with the 99% level. It can be summarized that, despite the fact that each country in the region having a different official language, in general, they use 'English' when conducting international trade activity. With regards to the significance levels of all the coefficients estimated, it is worth highlighting that although almost all the estimated coefficients are highly significant³⁰, the coefficient of the variable of interest $AFTA_{ijt}$ is not so, despite having the desired positive sign.

The last column shows results from the FEM's estimates. While the majority of estimated coefficients do attain their signs, the exporter's population variable (P_{it}) changes its sign in this specification: a positive sign is observed. Although the estimated coefficient on P_{it} is not significant, this nonetheless conforms to results found in

³⁰ The exception is on the exporter's population variable (P_{it}).

numerous gravitational researches where the expected signs on population variables are inconclusive³¹. Oguledo and Macphee (1994) which studied trade flows of 162 countries using the gravity framework affirmed this point;

Population size can be trade-enhancing as well as trade-inhibiting. On the one hand, a large population may indicate large resource endowment, self-sufficiency, and less reliance on international trade. On the other hand, it is possible that a large domestic market (or population) promotes division of labour and thus creates opportunities for trade in a wide variety of goods (Oguledo and MacPhee, 1994, p. 114)

Nevertheless, it is interesting to observe that, in general, significance levels of estimates still hold and even improve for some of the variables. It can be seen that estimated coefficients on GDP levels (Y_{it} , Y_{jt}), the bilateral real exchange rate (REX_{ijt}), and the importers' population (P_{jt}) are all significant at 99%. This also includes the variable of interest: $AFTA_{ijt}$ as it is now highly significant at 99% and maintains the expected positive sign.

Taking a closer look at results on the AFTA-context, both REM's and FEM's estimates are markedly different. The Hausman Test (1978), based on differences between these 2 estimators has to be conducted in order to test for the null hypothesis of no correlation between explanatory variables and unobserved heterogeneous factors (γ_{ij}). As the statistical results of the Hausman Test (1978) are shown in the last row of Table 3.2, the test statistic reveals a high value for Chi-squared, equal to 112.28. The null hypothesis is, as a result, rejected. This implies further that the REM's estimates are not consistent

³¹ See Brada and Mendez (1983), Oguledo and MacPhee (1994) and Kien and Hashimoto (2005).

even though estimated coefficients present the expected sign and the most of them are highly significant. The preference is thus posted on the FEM's estimates.

However, as briefly discussed earlier, the empirical investigation does not end here. Because the study covers a long time span of 38 years, the joint test signifying the importance of the time dimension has to be carried out. By performing the joint test, the result portrays the F-statistic of $F(37,1731) = 2.09$ with $\text{Prob} > F = 0.0001$. This test therefore indicates the significance of the time dimension in this gravity specification. By including the '*time effect*' in the selected FEM as aforementioned in Eq. (3.9), the so-called two-way fixed effects model (2-way FEM) is constructed (Baum, 2006). Consequently, the gravity equation's estimates of the 2-way FEM is provided in the last column of Table 3.3 below.

Table 3.3: Results of the ‘Gravity Model’ Estimates: the Fixed Effects Model (FEM) and the Two-Way Fixed Effects Model (2-Way FEM)

Dependent Variable : Real Exports	AFTA-context (FEM)	AFTA-context (2-way FEM)
Exporter's GDP (Y_{it})	1.2650253*** (0.1486844)	1.2153623*** (0.1712207)
Importer's GDP (Y_{jt})	0.66269796*** (0.1474501)	0.73517878*** (0.1812397)
Exporter's Population (P_{it})	0.47643632 (0.4200477)	0.79549044* (0.4721928)
Importer's Population (P_{jt})	-1.5138585*** (0.493943)	-1.0911003 (0.6771392)
Distance (D_{ij})	-	-
Real Exchange Rate (REX_{ijt})	0.21372023*** (0.0211601)	0.20079673*** (0.0217708)
Common Language ($Lang_{ij}$)	-	-
AFTA-effects ($AFTA_{ijt}$)	0.33486034*** (0.1140395)	-0.35077028** (0.172958)
Constant	-15.896729*** 4.316955	-28.379009* (15.89954)

Note: *** denotes significant at 99%, ** and * denotes significant at 95% and 90%, respectively. Standard errors are given in parentheses. The time-effects are not included here in order to save space. The estimates are, however, available upon request.

As evidence suggests, Table 3.3 compares results from the fixed effects model (FEM) and the two-way fixed effects model (2-way FEM). It can be seen that substantial

changes occur in the 2-way FEM's results. First of all, the estimated coefficient of the variable of interest: $AFTA_{ijt}$ has changed to have a negative sign yet becomes significant at 95%. This chapter perceives that such a negative and significant estimate on $AFTA_{ijt}$ is the result of controlling both country-pairs as well as time specific effects. This approach, defining the AFTA dummy variable in a dynamic setting plus incorporating the 'time effects' in the FEM specification, provides a clearer picture of 'AFTA-effects' on regional trade flows. From the empirical evidence stated in the 2-way FEM, it seems that AFTA has not been effective in increasing intra-trade for the region. In contrast to the bulk of gravity-based accounts earlier reviewed, 'AFTA-effects' found here are not as beneficial as has been claimed. Considering the positive 'AFTA-effects' in Kien and Hashimoto (2005) and Tang (2005) as an example, it is important to note that these accounts included AFTA among other larger RTAs in the specification. This, as previously discussed, could have brought certain effects to AFTA which are being estimated at the same time. In addition, these studies did not examine all AFTA-members; while Kien and Hashimoto (2005) selected only 6 AFTA-members³², Tang (2005) only chose to study 5 AFTA-members³³, hence the trade effects found could probably be referring to this group of countries but not the whole region. Furthermore, their econometric techniques are rather outdated. Kien and Hashimoto (2005) employed the Hausman Taylor estimating procedure in order to correct for unobserved heterogeneity bias where estimates were sensitive to instrumental variables chosen. In addition, there was a difficulty finding appropriate instrumental variables as this matter is in fact subjective. And, Tang (2005) relied on simple OLS and 2SLS procedures in finding the trade effects of AFTA without controlling for unobserved heterogeneity

³² They are Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

³³ They are Indonesia, Malaysia, the Philippines, Singapore and Thailand.

issues. Considering these points, though '*AFTA-effects*' estimated were satisfying as the positive sign was obtained, the chapter perceives that biases existed in these results.

With proper specification imposed in the estimating gravity equation, despite the fact that the unconstructive effects of AFTA on the membership's trade are found in this part of the thesis, the rest of the estimated coefficients retain their signs. Furthermore, estimated coefficients on GDP levels (Y_{it} , Y_{jt}) and bilateral real exchange rates (REX_{ijt}) are positive and stay highly significant at 99%. Considering specifically GDP variables (Y_{it} , Y_{jt}), by allowing for the '*time effects*' in the 2-way FEM, this implies that trade remains positively related to both the exporter's and the importer's incomes. The positive and highly significant estimate of the bilateral real exchange rates variable (REX_{ijt}) confirms the fact that the depreciation in exporting country's currency increases trade (exports) in this data set, *ceteris paribus*. For population variables (P_{it} , P_{jt}), it can be seen that significance levels of the estimates on the exporter's population (P_{it}) and the importer's population (P_{jt}) are greatly affected in the 2-way FEM. The estimated result of the exporter's population (P_{it}) which was insignificant in the FEM, has now improved: become significant at the 90% level in the 2-way FEM. Conversely, the estimated result of the importer's population (P_{jt}) which was significant at the 99% level in the FEM, has become insignificant in the 2-way FEM. As the population variable is one of the channels determining market size and economies of scale, this suggests that, *ceteris paribus*, the large exporting country (in terms of population) would be able to enjoy economies of scale which allow the country to increase exports. For importing countries, besides having economies of scale, the large population size may also imply that countries' per capita incomes have decreased. These countries will

thus tend to be self-reliant, reducing cross-border imports. Once again, the estimated results on the population variables are similar to previous gravity research in the sense that they are not conclusive.

Hence, considering results of the FEM and the 2-way FEM, this study has shown that the 2-way FEM is, to a certain extent, able to control for unobserved heterogeneities (γ_{ij}) as well as the effects of the time dimension (γ_t). It is evident that '*AFTA-effects*' previously captured in the FEM are observed to be markedly influenced by the time dimension in this case. Certainly, a positive sign on $AFTA_{ijt}$'s estimate under the conventional FEM contains effects from the unobservable heterogeneous factors (γ_{ij}) that plausibly contribute to an increase in AFTA members' trade over this long period of time. Hence, omitting the importance of the time element could result in measurement errors, especially on the '*AFTA-effects*' estimated as much variation would be absorbed in $AFTA_{ijt}$. For these reasons, findings in the FEM and the 2-way FEM as compared in Table 3.3 post a cautious remark on numerous panel data analyses that have examined long period studies especially those that have shown positive effects of AFTA. The chapter believes that a failure to control for the time-dimension is another plausible reason that previous gravity-based literature provided mixed results on '*AFTA-effects*' estimated. On many occasions, the importance of the time dimension can be large, and proper econometric techniques are essentially required in order to control for its influence. This is indeed what this research has presented. Although the '*time effects*' estimated for each year are plausibly minimal, the time span of 38 years is more than adequate to consider whether '*time*' is one of the important dimensions that has influenced intra-ASEAN trade relationships during these years.

In addition, as far as the degree of fitting of the estimating ‘Gravity Model’ is concerned, one of the ways to check this is to conduct the test for homoskedasticity or constant variance. Given that the null hypothesis is homoskedastic, if the test result suggests rejecting this null, this implies that the residuals are heteroskedastic. Even though values of estimated coefficients are not affected as they will still be consistent regardless of whether heteroskedasticity in residuals is observed, standard errors obtained can be inflated if the degree of heteroskedasticity is large. Taking this point into consideration, the study therefore employs STATA commands to test whether there is constant variance or homoskedasticity in the 2-way FEM specified³⁴. The result of the modified Wald test for groupwise heteroskedasticity in the regression model is indicated in Figure 3.2 below :

<p style="text-align: center;">Modified Wald test for groupwise heteroskedasticity</p> <p style="text-align: center;">in fixed effect regression model</p> <p style="text-align: center;">H0 : $\sigma(i)^2 = \sigma^2$ for all i</p> <p style="text-align: center;">chi2 (85) = 5.2e+06</p> <p style="text-align: center;">Prob>chi2 = 0.0000</p>

Figure 3.2 : Results of the Heteroskedasticity Test in the Two-Way Fixed Effects Model.

From the statistical test above, it suggests that there is an indication of heteroskedasticity. Thus, the null hypothesis has to be rejected. One can, in addition, observe the graphical presentation for detecting degrees of heteroskedasticity. If the null hypothesis is true, there should be no discernible pattern to the residuals against the fitted value in the data set. That is because the average residual for each country-pair

³⁴ The command ‘*xttest3*’ is used after the normal fixed effects model regression.

would be 0. The STATA programming command is, once again, employed to plot the residuals versus the predicted values; patterns of the 2-way FEM estimation's residuals across country-pairs are shown in Figure 3.3.

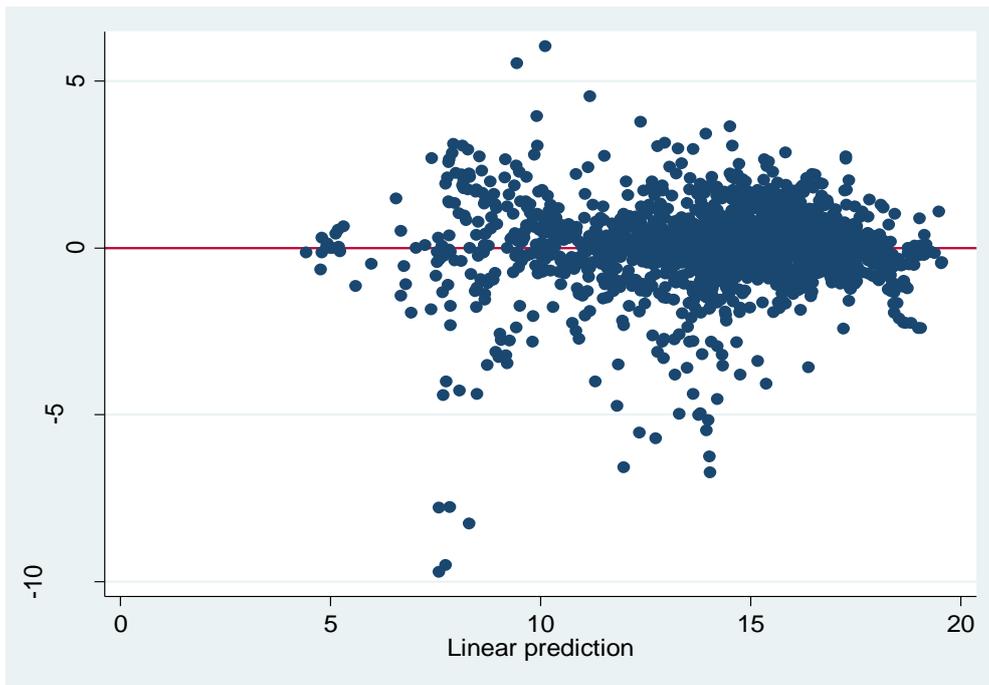


Figure 3.3 : The Scatter Plot of the 2-Way FEM's Residuals by Trade-pairs

As evidently illustrated in Figure 3.3, the graphical presentation does not exhibit the obvious pattern of scatter plots of the 2-way FEM's residuals. Despite the modified Wald Test indicating signs of heteroskedasticity in residuals, the shape of scatter plot implies that the degree of heterogeneity is not strong in this case. As previously mentioned, the incidence of heteroskedasticity does not affect the values of estimated coefficients thus, researchers, every so often, do nothing with the results as long as the graphical presentation does not portray a strong pattern in the graph of the residuals against the fitted values. Nevertheless, standard errors given may be incorrect. For this

reason, the chapter reports estimated results with robust standard errors in order to adjust for heteroskedasticity in residuals although values of estimated coefficients obtained are unaltered. This is, in fact, common practice to control for the incidence of heteroskedasticity in the fixed effects panel data estimation. The detail of this empirical results are presented in Appendix III.

Hence, by controlling for all sources of potential biases commonly found in estimating the gravity equation, the empirical '*Gravity Model*' given in this application is correctly specified. Therefore, from 1970 to 2007, the panel estimates for patterns of intra-ASEAN trade flows recorded by trade-pairs are accordingly presented in Figure 3.4 below. This figure in fact portrays trade flows of all ASEAN members covering pre- and post-AFTA periods exclusively.

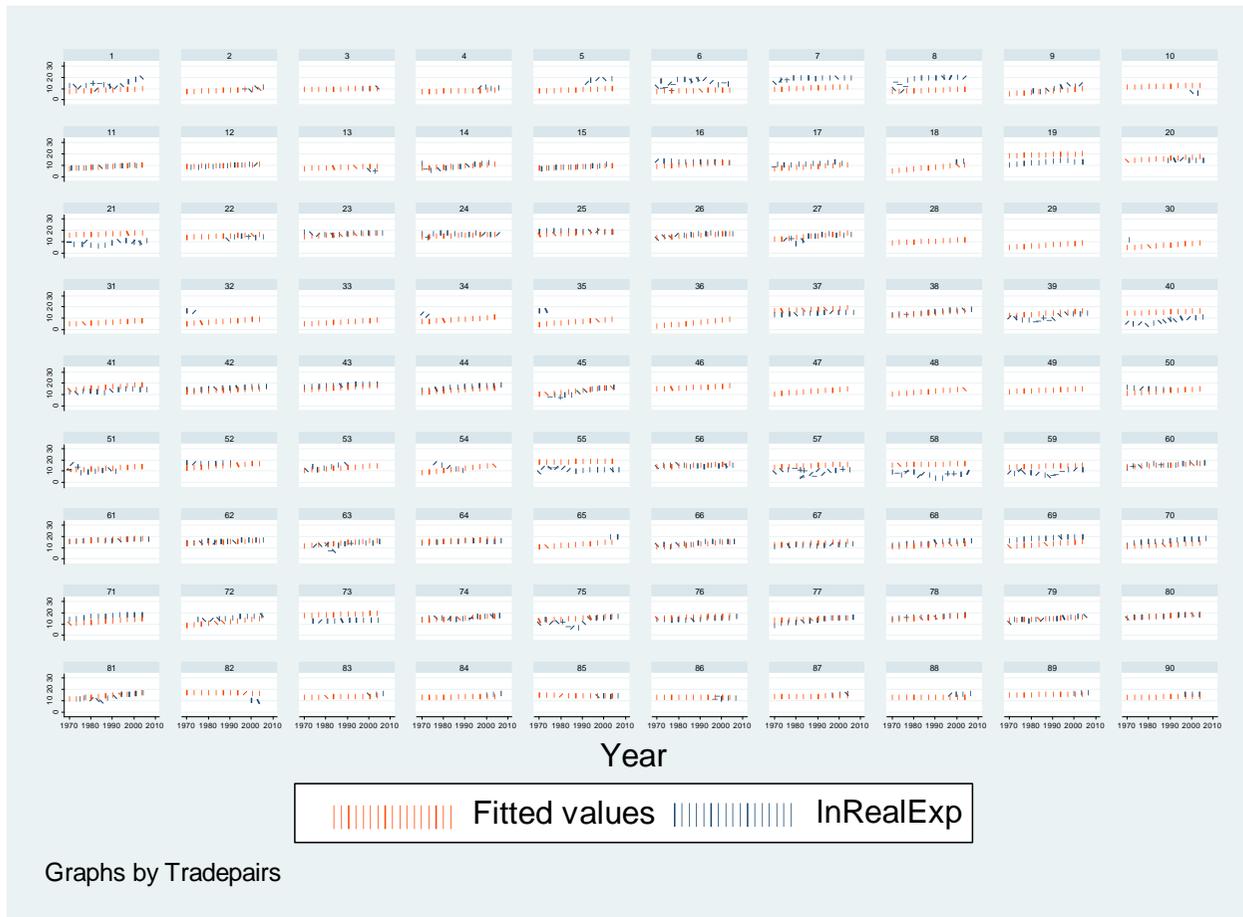


Figure 3.4: The Estimation of the 'Gravity Model' for intra-ASEAN Trade Flows; Represented by Trade-pairs

As can be seen from Figure 3.4, in most cases, the predicted trade flows and the actual trade flows are closely related suggesting that the panel gravity specification employed here is, to a certain extent, efficient. There are only a few trade-pairs where actual trade patterns do differ markedly from the predicted trade flows. In particular, those trade-pairs that have actual trade higher than the predicted value are all involved with Brunei which is the major, if not the largest, oil and gas exporting country in the region. By including oil and gas trading activity, the value of bilateral trade flows are usually larger than the usual commodity trade that is estimated by the standard gravitational variables. Figure 3.4, in addition, provides an important piece of information that though intra-ASEAN trade flows have shown to have improved slightly over years, there was no significant bound on intra-ASEAN's trade flows in 1992 given it was the time of AFTA establishment.

3.6 Extending the test to focus on trade with CLMV countries: evidence on trade creation and trade diversion effects of AFTA

Thus far, the research has examined the overall '*AFTA-effects*' on intra-ASEAN trade flows over the period from 1970 to 2007. Recall that not all ASEAN members entered into this free trade zone at the same time. The research hence extends the scope to scrutinize '*AFTA-effects*' in detail: explaining the incident in which a group of ASEAN-6 were AFTA's early members, whilst the rest remained outside the zone. To do so, the research divides this state of affairs into 2 cases, considering each trade-pair when 1) the AFTA member is an exporter and 2) the AFTA member is an importer. By applying the '*dynamic regional dummies*' concept, this chapter is able to observe '*AFTA-effects*' at a

country-pair level. The chapter denotes $I\text{-AFTA}_{ijt}$ to capture effects from AFTA that are specific to the case in which only the export country is a member of AFTA. These can be referred to as ‘*export-effects*’. $J\text{-AFTA}_{ijt}$ is, on the other hand, imposed to gauge ‘*AFTA-effects*’ assumed to occur when the import country is in AFTA. These are therefore described as ‘*import-effects*’.

Basically these regional dummies: $I\text{-AFTA}_{ijt}$, $J\text{-AFTA}_{ijt}$, work to pick up any ‘*AFTA-effects*’ hypothesized to transfer to AFTA-membership exporters and AFTA-membership importers at a particular time. This empirical specification not only measures ‘*AFTA-effects*’ on trade flows of early and delayed members but also differentiates their trade patterns, which are assumed to be influenced by AFTA differently when trading statuses, exporter versus importer, are being observed. Again, with issues concerning potential endogeneity of AFTA, it is worth mentioning that the time at which each CLMV country was allowed to join AFTA was set by ASEAN/AFTA founders. In fact, the plan was set since ASEAN-6 planned to expand AFTA to cover all ASEAN members. This simply explains the scenario in which AFTA-membership was given at the same time as countries were accepted into ASEAN. For these reasons, one is able to rule out issues concerning potential endogeneity of AFTA-memberships in this case as firstly, AFTA was definitely not a trade-induced FTA. Secondly, the late entrances of CLMV countries were politically planned as ASEAN-6 aimed to put everyone in this form of regional economic integration. Thus, the use of ‘*dynamic regional dummies*’ which assumes exogeneity of AFTA-membership is suitable here. This study, in addition, intends to avoid specification issues associated with the use of nested dummies i.e. multicollinearity

problems that are likely to occur when all regional dummies are included in the same specification. For this reason, there will not be a specification that includes all 3 regional dummy variables: $AFTA_{ijt}$, $I-AFTA_{ijt}$, $J-AFTA_{ijt}$ altogether in this application. Again, before estimating the gravity equation, the necessity to control for the influence of the time trend has to be tested. The result of the joint test checking for the inclusion of 'time effects' portrays the F-statistic of $F(37,1730) = 2.02$ with $\text{Prob} > F = 0.0003$. This test therefore confirms that the inclusion of the 'time-effects' is necessary in this specification. Thus, for the 'export-effects' and 'import-effects' case, the 'Gravity Model' assumes that, in a given year, trade flows from exporting country i to importing country j can be estimated using:

$$\ln X_{ijt} = \gamma_0 + \gamma_t + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} + \beta_6 \text{Lang}_{ij} + \beta_7 \ln \text{REX}_{ijt} + \beta_8 I - AFTA_{ijt} + \beta_9 J - AFTA_{ijt} + \varepsilon_{ijt} \quad (3.12)$$

$$\gamma_t = \sum_{t=1970}^{2007} \gamma_t T_t \quad (3.13)$$

$$T_t = \begin{cases} 1 & ; \text{if } T = t : T = \text{year } 1970, 1971, \dots, 2007 \\ 0 & ; \text{if } T \neq t \end{cases} \quad (3.14)$$

where :

X_{ijt} : Real exports of country i to country j at time t ,

- Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively
- P_{it}, P_{jt} : Population of country i and country j at time t , respectively
- D_{ij} : Geographical distance between countries i and country j ,
- $Lang_{ij}$: A dummy variable takes the value of 1 if both country i and country j share communal languages. Otherwise, it is 0,
- REX_{ijt} : Bilateral real exchange rate of country i to country j at time t ,
- $AFTA_{ijt}$: A dummy variable takes the value of 1 if both country i and country j are members of AFTA at time t . Otherwise, it is 0,
- $I-AFTA_{ijt}$: A dummy variable takes the value of 1 when an export country is a member of AFTA. Otherwise, it is 0,
- $J-AFTA_{ijt}$: A dummy variable takes the value of 1 when an import country is a member of AFTA. Otherwise, it is 0,
- γ_0 : An unknown constant term (the portion of the intercept that is common to all years and trade-pairs),
- γ_{ij} : Unobserved heterogeneities or bilateral effects specific to each trade-pair,
- γ_t : Time effects,
- ε_{ijt} : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance.

The chapter, on top of that, considers the case in which only one country in the trade-pair: either country i or country j , is in AFTA. This can be regarded as a robustness check for ‘*AFTA-effects*’ that early AFTA members, regardless of whether they are exporters or importers, could have attained. For this reason, the name ‘*one country-effects*’ is thus imposed. The dynamic regional dummy variable: ***One-AFTA*** $_{ijt}$ is

specified to segregate such effects accordingly. This specification also tests for the inclusion of the time trend in the same manner. The joint test stating the necessity to include the ‘time effects’ in the estimating ‘Gravity Model’ as the F-statistic found is $F(37, 1731) = 2.02$ with $\text{Prob} > F = 0.00$. As the time trend is shown to be important in influencing the trade flows of AFTA members, the specification is therefore written as:

$$\begin{aligned} \ln X_{ijt} = & \gamma_0 + \gamma_t + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} \\ & + \beta_6 \text{Lang}_{ij} + \beta_7 \ln \text{REX}_{ijt} + \beta_8 \text{one} - \text{AFTA}_{ijt} + \varepsilon_{ijt} \end{aligned} \quad (3.15)$$

and,

$$\gamma_t = \sum_{t=1970}^{2007} \gamma_t T_t \quad (3.16)$$

$$T_t = \begin{cases} 1 & ; \text{if } T = t : T = \text{year } 1970, 1971, \dots, 2007 \\ 0 & ; \text{if } T \neq t \end{cases} \quad (3.17)$$

where :

- X_{ijt} : Real exports of country i to country j at time t ,
- Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively
- P_{it}, P_{jt} : Population of country i and country j at time t , respectively
- D_{ij} : Geographical distance between countries i and country j ,

- $Lang_{ij}$** : A dummy variable takes the value of 1 if both country i and country j share communal languages. Otherwise, it is 0,
- REX_{ijt}** : Bilateral real exchange rate of country i to country j at time t ,
- $One-AFTA_{ijt}$** : A dummy variable takes the value of 1 when only one country in the trade-pairs is a member of AFTA. Otherwise, it is denoted as 0,
- γ_0** : An unknown constant term (the portion of intercept that is common to all years and trade-pairs),
- γ_{ij}** : Unobserved heterogeneities or bilateral effects specific to each trade-pair,
- γ_t** : Time effects,
- ε_{ijt}** : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance.

Table 3.4: Results of the ‘Gravity Model’ Estimates: All Specifications of the Two-Way Fixed Effects Model (2-Way FEM)

Dependent Variable : Real Exports	AFTA-context (overall ‘AFTA-effects’)	AFTA-context (‘export-effects’ and ‘import-effects’)	AFTA-context (‘one-country effects’)
Exporter's GDP (Y_{it})	1.2153623*** (0.1712207)	1.1922973*** (0.1707177)	1.2112282*** (0.1710902)
Importer's GDP (Y_{jt})	0.73517878*** (0.1812397)	0.77707078*** (0.1807994)	0.74518733*** (0.1810327)
Exporter's Population (P_{it})	0.79549044* (0.4721928)	0.73239736 (0.4708321)	0.787251* (0.471831)
Importer's Population (P_{jt})	-1.0911003 (0.6771392)	-1.0353871 (0.6748922)	-1.0848037 (0.6765866)
Distance (D_{ij})	-	-	-
Real Exchange Rate (REX_{ijt})	0.20079673*** (0.0217708)	0.20165476*** (0.0216812)	0.20062192*** (0.0217388)
Common Language ($Lang_{ij}$)	-	-	-
AFTA-effects ($AFTA_{ijt}$)	- 0.35077028** (0.172958)	-	-
One-country effects ($One-AFTA_{ijt}$)	-	-	0.45393583*** (0.1727708)
Export-effects ($I-AFTA_{ijt}$)	-	0.53951921*** (0.1742912)	-
Import-effects ($J-AFTA_{ijt}$)	-	-1.778512** (0.7074945)	-
Constant	-28.379009* (15.89954)	-28.66017* (15.84234)	-28.474607* (15.88603)

Note: * denotes significant at 99%, ** and * denotes significant at 95% and 90%, respectively Standard errors are given in parentheses. The time-effects are not included here in order to save space. The estimates are, however, available upon request.**

It can be seen in Table 3.4 that when ‘*AFTA-effects*’ are analysed in detail, the research is able to explain why the overall ‘*AFTA-effects*’ are not positive as many expected. Considering the case in which exporters are AFTA members or the so-called ‘*export-effects*’, the estimated result on $I\text{-}AFTA_{ijt}$ portrays a positive sign with the value of 0.53951921 and is significant at 99% level. This implies that AFTA-membership exporters have increased their trades with non-members³⁵. As this study covers ASEAN-10, these non-members simply refer to CLMV countries. This result can be interpreted further in that the exporting markets have expanded in size and these include new trade ties created from the side of early AFTA-membership exporters among themselves as well as between them and the delayed members. With AFTA, early members’ products could be more competitive especially in terms of price as they incurred less tariffs and, for some products, they do not even have to pay tariffs. Even if they keep their prices unchanged, countries could earn more than the pre-AFTA situation since there are lower tariffs to be paid post-AFTA. *Ceteris paribus*, their profits could be higher post-AFTA as the cost of production would be lowered with no tariffs incurred. Basically, in comparison to delayed members, early AFTA-members have a better chance of becoming efficient or cost-effective producers/exporters. Thus, it is possible that they would want to increase the amount of exports to existing markets as well as to expand their exports to new markets which include the CLMV group of countries.

Conversely, when ‘*import-effects*’ are considered, the coefficients estimated on $J\text{-}AFTA_{ijt}$ are negative and significant at 90% level. With a large estimated value of -1.778512,

³⁵ Even though trade has been created, this research avoids the use of the term ‘trade creation’. This is because, according to the original Viner’s (1950) definition, trade creation refers to an increase in trade among an RTA’s members after the elimination of tariffs are applied to the region.

this implies that early AFTA-membership importers have reduced imports from the delayed members. Intuitively speaking, this is possible as cross-border trading regulations as well as tariffs remain unchanged in the CLMV group of countries even when AFTA is established. With tariff liberalization, trading activities, especially importing between AFTA members and non-AFTA members, are definitely more costly in comparison to those among AFTA members themselves. Thus, given that goods are similarly produced and tastes and preferences do not play a major role when it comes to intra-ASEAN trade, it is highly likely that early members would want to reduce their trade (imports) from delayed members but to increase trade (exports and imports) among themselves instead.

Last but not least, considering the '*one country-effects*' specification, the estimated coefficient on *One-AFTA_{ijt}* as portrayed in the last column of Table 3.4 presents a positive sign and is highly significant at 99% level. With the estimated value of 0.45393583, this does confirm that AFTA members, regardless of whether they are exporters or importers, do benefit from joining AFTA early. Considering this result, it sounds realistic as it is known that AFTA was driven by political concerns rather than economic ones especially at the beginning of its formation. Since 1992, early AFTA-members had enjoyed tariff liberalization or tariff preferences which the CLMV countries did not. Not only could they take this opportunity to increase exports among themselves but they could also do the same to all other trading destinations. In addition, they could even establish new trade ties with existing traders or new trade partners as, with tariff liberalization, they are relatively more cost-effective than previously.

Considering estimated coefficients on other explanatory variables through all 3 detailed specifications in this AFTA-context, it is worth pointing out that they do retain their signs and the majority are still highly significant. All of them, in addition, do provide the expected signs. This can therefore be perceived as another piece of evidence to affirm the consistency of estimated results as well as the stability of empirical specifications of the '*Gravity Model*' in this study.

Given the empirical evidence above, this brings us to a famous study by Baldwin (1995) : the so-called 'domino theory of regionalism'. The theory elaborates that the formation of the new RTA as well as the expansion of the existing one is the factor that triggers trade loss among the now non-membership countries. What can be analysed further from the result is that the timing differences in joining this free trade zone do affect trade flows of early and delayed members of AFTA. When AFTA was incomplete, having only ASEAN-6, trade benefits from this formal economic integration were found to be shared by these early members. Delayed members, CLMV countries, are on the contrary, found to be negatively affected by AFTA as their exports (from early members' import ties) have been clearly reduced. In addition, estimated results appear to suggest that early members, regardless of their trading statuses as exporters or importers, do benefit from the free trade zone. In order to explain this outcome, it can be said that with tariff liberalization, early birds in AFTA could expand their exports to non-members while old trade (export) lines with other members could still be maintained. The delayed members, on the other hand, would be affected by relatively higher trade costs, *ceteris paribus*. In comparison to early AFTA-members, even though product prices in CLMV countries would be lower pre-AFTA, it is still possible that the

trade conducted with early AFTA members would have become more expensive after AFTA's establishment. In this setting, early AFTA members would have better alternatives in seeking similar products from member trading partners at more competitive prices while delay ones could have lost certain market shares entirely, *ceteris paribus*. Despite it being for such a short time, from 1992 to 1999, that early members could enjoy preferential tariffs and enlarged exporting markets, their trade effects are shown to be outstanding as the estimated coefficients portray highly significant levels; $I\text{-AFTA}_{ijt}$ is significant at 99% with a positive sign of 0.53951921 and $J\text{-AFTA}_{ijt}$ is significant at 90% with a negative sign of 1.778512. These results imply that any trade created by early AFTA-members to non-members (delayed-members) was outweighed by the decrease in their imports from delayed members. As trade diversions in imports are more prominent than the creation of exports, it is straightforward to indicate why the overall '*AFTA-effects*' have appeared to be negative in this case.

3.7 Conclusion

The empirical frameworks in this chapter have improved a number of aspects of those used in previous studies. First of all, with regards to AFTA's members coverage, this study is among the latest few empirical accounts that cover all 10 early and delayed members of AFTA. Having collected intra-ASEAN trade data for nearly 4 decades, this is, secondly, the largest coverage in terms of trade data of this region. Thirdly, while traditional gravity analyses commonly conduct the comparative type of empirical investigation measuring '*AFTA-effects*' against other RTAs worldwide, this study aims

to draw the focus to be specific within the AFTA context. Discussions have been provided in this fashion as to why this method could be one of the most appropriate empirical strategies if the objective of research is to examine a particular RTA's effects on its intra-regional trade exclusively. Instead of relying on simple cross-section analyses, this study employs the panel data framework; the 2-way FEM is imposed to control for unobserved heterogeneous biases as well as shocks that could have occurred to countries' trade flows over a long period of time. The effects of AFTA on the membership's trade are, last but not least, examined via the use of the '*dynamic regional dummies*', enabling detailed examinations of '*AFTA-effects*' on each trade-pair at a specific time. This chapter strongly asserts that the '*dynamic regional dummies*' method is vital if not necessary in the case of AFTA, as membership countries entered into the zone, receiving membership status at different times. Moreover, under this '*dynamic regional dummies*' method, one is able to separate '*AFTA-effects*' that may have influenced exporting-members and importing-members differently; the '*export-effects*' and '*import-effects*' can be further specified in the estimating gravity equation.

As these empirical developments are employed, the findings suggest that trade effects from the establishment of AFTA, even though they are beneficial, are not proven to last. Given the fact that a group of countries had entered the free trade zone first, this action certainly played a role in affecting the trade relationships of early and delayed members as well as the overall trade effects delivered to the region as a whole. In this case, any new trade created was, in large part, due to the expansion of early members' trade (exports) to delayed members during the period between 1992 and 1999. At the same time, these early members had, on the contrary, reduced trade (imports) from delayed

members. Provided that such a reduction in imports has outweighed the increase in exports that early members traded with delayed members, the incident of trade diversion was therefore concluded as an overall trade effect of AFTA. Although ASEAN countries started to experience rapid growth in the 1980s and the size of intra-ASEAN trade was expected to increase substantially soon after the formation of AFTA, findings in this application have suggested that this occurrence has not been observed in reality. The increase in intra-ASEAN trade is observed to be primarily due to an increase in economic size of countries and other gravitational factors instead of the intra-regional bias associated with the only form of economic integration in the region: AFTA.

Taking this additional piece of empirical evidence into consideration, the result posts a remark on previous gravity analyses that conducted cross-sectional research without solving for certain econometric issues and failing to consider AFTA's sluggish expansion over the period of study. In addition, it also casts doubts on related research that simply measured '*AFTA-effects*' in comparative terms with other RTAs. Indeed, this case study has shown that not only issues concerning unobserved heterogeneous factors, the importance of the time dimension and idiosyncratic shocks have to be controlled for in the gravity specification, but the appropriate selection of countries to be included in the analysis is also required as long as a consistent and independent estimate of '*AFTA-effects*' on intra-regional trade flows is the research's objective.

4: The So-Called ‘Gravity Framework’ Revisited: ASEAN’s Major Trading Partners and Trade Effects of AFTA on Intra-ASEAN and Extra-ASEAN Trade Flows

4.1 Introduction

This part of the thesis aims to extend the preceding analysis employing the renowned gravity framework to assess trade flows of ASEAN countries and their key trading partners. Traditionally, ‘*AFTA-effects*’ are observed in order to determine whether the formal economic integration within the region has altered external trade ties at all, and *vice versa*. For many, the deficiency of empirical evidence concerning ‘*AFTA-effects*’ on the ASEAN region’s trade flows may already be disconcerting, but their records on external trade ties are actually worse. Considering the large amount of *ex-ante* as well as *ex-post* research on RTA-effects across the globe over recent years, the shortage of studies concerning ‘*AFTA-effects*’ on its own regional trade ties and beyond is certainly not new. Given such limited resources, mixed results have, in addition, been found regarding the upshot of AFTA on intra-regional and extra-regional trade ties¹. The range of countries included, differences in time frames observed, heterogeneous sets of variables considered as well as dissimilarities in the empirical methodologies applied, in general, cause variations in the estimated results. Although these issues are generally common in empirical investigations, this chapter aims to point out that with regards to measuring trade effects of AFTA on both intra-regional and extra-regional trade flows, one needs to be more careful in all these aspects.

¹ Details of some of the related literature are explained in the following section.

By observing empirical studies that measured trade effects of a particular RTA or ones that quantified many RTAs' effects in a single study, it is often found that, besides including RTA-membership countries, the general method is to incorporate as many countries as possible into the '*Gravity Model*' specified. This technique is often claimed to be capable of describing the complexity of the world's trade relationships and in many applications, it is referred to as '*the world model of the gravity specification in international trade*'. This chapter perceives that this procedure, although it suits the common objectives of many empirical studies in attempting to compare and contrast types of RTAs and their effects on relevant countries' trade flows internationally, is plausibly not as sturdy if the research's focus is more specific i.e. to find independent RTA-effects of AFTA.

Given the impressive number of empirical applications on an evaluation of RTAs'-effects, it seems that the choice of countries included is primarily subject to the availability of data rather than other causes. Basically, '*the more the merrier*' can be stated as the norm in this field of research as a large number of countries being included in the gravity specification is usually preferred over a small number. As earlier mentioned, as long as the objective of the research is to examine the world's trade relationships or to generalize RTA(s)-effects at the global level, this approach is not unusual. What is evident in reality is that even in studies that claimed to put an emphasis on evaluating '*AFTA-effects*' on ASEAN's trade flows exclusively, this same technique had still been utilised. In such applications, much attention was paid to covering large numbers of countries regardless of their importance or relevance (as traders) to the domain: ASEAN countries. In many cases, the choice of countries

selected to be included in the gravity specification were ones that ASEAN members had never traded with at all. To sum up, it can be said that countries were rather selected rather arbitrarily and this could be one of the reasons explaining why not much information regarding the impact of AFTA on its key trading partners has been accessible.

As AFTA is unique in its development², specific measures have to be considered if '*AFTA-effects*' are to be accurately and independently evaluated. Chapter 3 of this thesis has shown an alternative method in which an empirical investigation specifically within the ASEAN border was set up to evaluate AFTA's role in boosting intra-regional trade. The reason that this facet of AFTA's performance has been emphasized is simply because it is one of the most important objectives that ASEAN-membership countries have hoped to achieve through the establishment of the free trade zone³. As the focus is on the trade effects of AFTA, the key empirical result, however, indicates that the overall '*AFTA-effects*' on the regional trade flows are negative. This can be elaborated further in that trade relationships in the form of trade diversion have outweighed trade creation over the period of study. Before proceeding further, the chapter perceives this piece of evidence to be worth revisiting and investigating in detail. Given the negative and significant estimated value of -0.35077028 on the dynamic *AFTA_{ijt}* dummy variable, this can thus be interpreted to show that negative trade effects have become prominent since the completion of AFTA in 1999⁴. As the study also distinguishes

² See background information on the establishment of AFTA in Chapter 1.

³ See Tongzon (2002, p.182).

⁴ It is important to note that the *AFTA_{ijt}* dummy only captures trade effects occurring from AFTA when both trading partners are members at the same time. As it is evident, this is written in the dynamic form which takes into account the time dimension. The interpretation of this dummy variable is thus different

between cases in which AFTA members are exporters and importers, the negative '*AFTA-effects*' on regional trade flows can, in fact, be explained by *I-AFTA_{ijt}* and *J-AFTA_{ijt}* dummies which are the so-called '*export-effects*' and '*import-effects*', respectively. The positive and significant coefficient estimate of 0.53951921 on *I-AFTA_{ijt}* designates that trade had been increased as early members plausibly enhanced their trade (exports) to the delayed ones. Such an increase was, however, short-lived as eventually every country in the region became a member of AFTA. Once this happened, this dummy variable stopped picking up any '*export-effects*' generated from membership exporters to non-membership importers. On the other hand, as the negative and significant estimate of -1.778512 on *J-AFTA_{ijt}* was observed, it can be said that early AFTA-membership importers did decrease imports from delayed members. This could certainly be the case because the current AFTA-membership countries would prefer to import products among themselves rather than from delayed members since, *ceteris paribus*, trade costs incurred would be smaller; tariffs would be lower or non-existent. Considering the reduction of early members' imports from delayed members, import diversion was therefore recorded. Theoretically, it could be interpreted that members' import structure had basically been switched from non-members' goods to members' goods, implying further that new trade had not been induced. AFTA members probably ended up trading with less cost efficient (more expensive) membership producers as Viner (1950) explained in the concept of trade diversion. Comparing the positive impact of '*export-effects*' with the negative influence from '*import-effects*', as the latter was more prominent, this was perceived to drive '*AFTA-effects*' to be negative, on the whole. From these results, it can be said that ASEAN

from traditional accounts that measure only the membership status of AFTA without considering the time that each trader joins the zone.

members have not been able to eliminate trade barriers and overcome general obstacles in order to increase intra-regional trade, even if there have been signs of improvement since the formation of AFTA⁵. There are more than a few reasons for these unimpressive trade effects of AFTA. One of the key reasons could plausibly be the similarity in endowments and products traded as narrated in the key characteristics of ASEAN economies in Chapter 1. A large degree of similarity in products traded has made ASEAN countries less complementary to but more competitive with each other. This competition could undoubtedly cause difficulties in arriving at mutual agreements from regional trade liberalization. According to the book *'The Economies of Southeast Asia'* by Tongzon (1998), identical if not similar factor endowments within ASEAN territories were, in addition, forecast as a root of significant trade diversion (Tongzon, 1998, p.168). In association with Chapter 3's findings, this discussion has proven to reflect the case empirically. The fact that ASEAN's economy has contracted has also been regarded as an additional hindrance preventing intra-regional trade from expanding much further: even with the help of free trade zones such as AFTA. Furthermore, the incident of financial crisis in 1997 had in fact slowed down trade liberalization processes for the entire region, especially Thailand where the crisis was initiated. During that period, ASEAN countries' trade policies were reversed to become more inward-looking as much attention was paid to adjusting for high debts as well as restructuring mainstream financial services for the entire region. This episode undoubtedly affected the growth of intra-ASEAN trade. Last but not least, past economic institutions and the political instability of ASEAN countries additionally constrained their ability to take full advantage of the opportunities offered by AFTA.

⁵ This is so, for example, when *'export-effects'* are concerned.

Provided the above grounds, institutional capacity needed to be improved and adequate legal and regulatory frameworks were required straight away if the region aimed to get back on track in liberalizing intra-regional trade.

Nonetheless, it is important to point out that AFTA's objectives are not limited to boosting trade within the ASEAN border. But, ASEAN also aims to enhance the region's competitiveness. When AFTA was established in 1992, AFTA Reader (1993) collected the objectives of AFTA as stated below:

The ultimate objective of AFTA is to increase ASEAN's competitive edge as a production base geared for the world market. A critical step in this direction is the liberalization of trade in the region through the elimination of intra-regional tariffs and the elimination of non-tariff barriers. This will have the effect of making ASEAN's manufacturing sectors more efficient and competitive in the global market. At the same time, consumers will source goods from the more efficient producers in ASEAN, thus creating intra-ASEAN trade. ("Questions and Answers on the CEPT," 1993, p.1).

Having abundant natural resources and labour-intensive economies⁶, the region is able to help in filling the world's demands, supplying a number of primary agricultural goods as well as manufacturing products at competitive prices. The region is also good at attracting foreign direct investment (FDI) as their labour force is not only large but their hiring costs are also cheaper than many parts of the world. By strengthening external trade links, the ASEAN market can definitely be diversified and expanded further in due course. Therefore while aiming to promote trade within the region directly AFTA members ought to utilize this integrated tariff preferential zone to increase production as well as to expand their trade outside the region at the same time.

⁶ The only exception is Singapore as it is the country in the ASEAN region that has limited labour and no natural resources.

As a result, this could indirectly assist the region in achieving its ultimate goal of increasing intra-regional trade.

Taking this viewpoint into consideration, an observation on external trade ties is thus necessary and perhaps equally important if one is to pass judgement on AFTA's performance. In other words, linkages between intra-regional and extra-regional trade relationships are for this reason, hypothesized to signify how well AFTA has been working to achieve the ultimate ASEAN dream as aforementioned. By looking at external trade ties, this benefits the research further as more information regarding ASEAN's trade relationships can be obtained, enabling us to evaluate AFTA's performance in a larger domain. Doubt over whether ASEAN countries have become more closely integrated or rather more open towards a broader economy can then be additionally clarified via this approach.

4.2 Related literature

In the realm of research that aims to quantify RTA-effects, it is known that the '*Gravity Model*' has stood the test of the time as a key empirical strategy. As elaborated in Chapter 3, it is evident that the gravity concept first started in the area of international trade in the 1960s when 2 trade economists employed the gravity framework to assess the flow of goods between countries at almost the same time. Tinbergen (1962) employed the '*Gravity Model*' to study international trade flows of 18 countries in 1959; while PÖyhönen (1963) proposed a similar model to explain the exchange of goods between 10 European countries in 1958. In the half century since then, the '*Gravity Model*' has been exploited to assess international trade flows. Constrained by

the limited amount of empirical research that has investigated the AFTA's area, this section reviews related gravity-based literature that either aimed to study '*AFTA-effects*' in particular, or literature that measured trade effects of many RTAs in general: including AFTA among other RTAs from different parts of the world. It is worth clarifying here that it is not coincidental that some of the literature reviewed here has also been mentioned in the preceding chapters. As the scope of this research has been extended to cover external trade ties, literature that studies such relationships, though reviewed already, will have to be mentioned here once more.

Under the gravity framework, examining RTA-effects on external trade relationships has been used to capture whether a particular RTA has caused any extra-bloc trade. In fact, this notion was a trend in empirical studies during the period of the so-called '*second wave*': a time in which researchers were interested in finding whether a particular RTA or RTAs in general are building or stumbling blocs to multilateral trade liberalisation. Basically, in contrast to the '*first wave*' period in which the traditional gravity-based research was confined to determining intra-bloc trade or the intra-bloc effects, gravitational assessments in the '*second wave*' epoch were aimed at scrutinizing both intra-bloc effects and extra-bloc effects of RTA(s). This was done to gauge any undisclosed ways that a particular RTA may have increased members' trade, either by diverting from countries outside the bloc or simply at the expense of multilateral trade.

Recall that the benchmark method of assessing the impact of a particular RTA is to add the specific RTA-membership dummy variable into the '*Gravity Model*'. Any trade effects beyond those assumed to be generated by normal bilateral trade determinants are

seized by this RTA-membership dummy. It was as early as the first gravity framework, Tinbergen (1962), that this method was employed to capture effects of the specific RTA on its memberships' trade flows. In detail, the dummy variable is given a value of 1 if particular trade-pairs are members of the same RTA of interest: otherwise it is given the value 0. The sign, value, and the significance level of the estimated coefficient on this particular RTA-membership dummy basically indicates how advantageous and influential that RTA has been to its members. For instance, the positive sign (and its significance level) on the specific RTA-membership dummy's estimated coefficient implies that intra-bloc trade has been enhanced or trade creation has occurred because of the RTA: whereas the negative (and significant) estimated coefficient suggests that trade diversion has, instead, occurred. Nevertheless, one should not forget that there were no external trade relationships directly discussed in this traditional method. The RTA-effects are justified on the grounds of the so-called '*gross trade effects*'⁷ that are derived by referring on the overall impacts of the RTA on memberships' trade flows only.

As far as '*second wave*' issues were concerned, Bayoumi and Eichengreen (1997)⁸ and Frankel and Wei (1998)⁹ were among the first to evaluate RTA-effects on non-

⁷ This term was invented by Balassa (1967).

⁸ The study investigated preferential effects of the EC and EFTA on 21 developed European countries using the first difference version of the '*Gravity Model*'. The period of study was from 1953 to 1992. Specifically, as the dependent variable was total trade, explanatory variables are specified in the product form (except the 'distance' variable).

⁹ The study employed the augmented '*Gravity Model*' to investigate effects of regional blocs on 63 countries' trade flows under 6 regional groupings: EC, EFTA, CUSTA, MERCOSUR, ANDEAN GROUP and ASEAN. The '*Gravity Model*' was modified to include the '*remoteness*' variable which captures the distance of each country from its average trading partner, in addition to the standard '*distance*' variable.

members' trade flows empirically¹⁰. In doing so, an additional set of regional dummy variables was incorporated into the gravity specification in an attempt to capture trade diversion that the theoretical analysis has identified. As the first customary dummy is given the value of 1 when trade-pairs are members of this specific RTA, another RTA-membership dummy variable is also given the value of 1 when only one country in this particular trade-pair belongs to this specific RTA. Albeit adding a new set of RTA-membership dummy variables for each RTA, the interpretation of these dummies' estimates is still similar to the traditional concept. As a positive sign on the first RTA-membership dummy variable indicates that members of that particular RTA trade more with each other than would otherwise be predicted by normal bilateral trade determinants, the positive sign on the second dummy implies that the extent of trade between these RTA members and outside countries has been additionally enhanced. That is because, relative to random country-pairs that do not belong to the RTA of interest, the second dummy variable measures any additional trade generated between RTA members and non-RTA trading partners. This is one of the ways to account for extra-bloc trade effects of a particular RTA empirically. When the estimated sign on the second RTA-membership dummy's coefficient is negative, it is interpreted that an increase in intra-bloc trade (that was formerly captured by the first RTA-membership dummy) has, in fact, come at the expense of lower extra-bloc trade. This implies further that a particular RTA exhibits a certain degree of trade diversion. One, nonetheless, has to compare the signs as well as the absolute values of both sets of RTA-membership dummies' estimated coefficients in order to draw a conclusion toward the overall trade effects of the RTA of interest. On the condition that a positive value on the first RTA-

¹⁰ In fact, Frankel and Wei (1993) employed this concept as well but their application was intended to study trade bloc and currency bloc effects rather than the effects of the regional trade agreements.

membership dummy's estimated coefficient exceeds the negative value on the second dummy's estimate, trade creation is deemed to outweigh trade diversion. When that is the case, it can be said that despite it being a sign of trade diversion that non-RTA members are affected negatively by the RTA, its trade benefits, such as the amount of additional trade that is provided to membership countries is overpowering. What if the empirical result appears otherwise? Instead it can be summed up that the amount of trade diversion surpasses trade creation. In such circumstances, trade benefits created by the RTA are still applied to its members but the costs from trade diversion affecting outside countries exceed such gains. This results in a net trade diverting RTA or an economically inefficient one. With regard to ASEAN countries, Frankel and Wei (1998) found positive intra-ASEAN effects throughout the period of study. In addition, ASEAN was perceived to be an opened regional bloc as ASEAN's imports from the rest of the world are deemed to have increased. These positive effects were diminishing, however, and the implementation of AFTA in 1992 was thought to be related to the reason for this descending correlation.

Having a similar objective in examining RTA-effects, Soloaga and Winters (2001), however, added 3 sets of regional dummies for each RTA. This was aimed not only at distinguishing trade effects of this particular RTA on intra-bloc and extra-bloc trade but also at distinguishing extra-bloc effects on exports and extra-bloc effects on imports from one another. They argued that bloc-memberships' importers and bloc-memberships' exporters should be affected differently by the RTA. In their findings, the first regional dummy is set up in the traditional way; it is given a value of 1 if both trading partners are members of the same RTA: otherwise, it is given the value 0. On

another regional dummy variable which is aimed at capturing extra-bloc effects on imports, the value of 1 is given if, in particular trade-pairs, an importer is an RTA-member, regardless of whether her trade partner (an exporter) is a member of this RTA. On the last regional dummy variable which is imposed to quantify extra-bloc effects on exports, the value of 1 is given as long as, in each trade-pair, an exporting country is in the RTA, regardless of whether the trading partner (an importer) is in the RTA or not. By imposing regional dummies in this way, an interpretation of these extra-bloc effects on imports and extra-bloc effects on exports is therefore different from an interpretation in the former case where there are only 2 sets of RTA-membership dummies imposed for each RTA. This is so because Soloaga and Winters (2001) perceived these extra-bloc effects on imports and extra-bloc effects on exports to represent degrees of 'openness' that RTA-membership traders could have imposed on their outside trading partners. This therefore enables the study to account for the overall imports and exports that RTA members have conducted among themselves and with non-members at the same time. In particular, the study employed the 'Gravity Model' to examine trade effects of 9 preferential trade agreements¹¹ (PTAs) on 58 countries' trade flows during the period of 1980-1996 using the Tobit model. As preferential effects among the ASEAN group of countries were also assessed, the estimated result, however, indicated negative intra-ASEAN effects in general. Even though such negative effects were not consistently significant, annual estimated results suggested that the negative sign was pronounced throughout the period of 1987-1995. With respect to its one and only RTA: AFTA, the study plotted these intra-ASEAN effects through time in order to identify changes that could be due to the formation of AFTA. However, in this case, it was

¹¹ They are ANDEAN, ASEAN, CACM, EFTA, EU, GCC, LAIA, MERCOSUR and NAFTA.

regarded that there was no indication of '*AFTA-effects*' on members' trade flows as intra-ASEAN trade did not increase at all after the implementation of AFTA. Given that external trade ties were also considered, the findings portrayed positive and significant estimated results on the ASEAN-imports and ASEAN-exports overall. This result could imply that ASEAN countries in fact depended on external trade ties rather than regional ones and these positive extra-ASEAN effects (on exports and imports) could be perceived as the outcome of the outward-oriented trading policies that the region has been pursuing thus far.

Elliott and Iketmoto (2004) is another empirical account that evaluates the effectiveness of AFTA in increasing intra-ASEAN trade and its effects on non-members' trading relationships. Using the OLS estimation method, the '*Gravity Model*' was regressed on 35 countries' trade flows during the period of 1982-1999. In contrast to Soloaga and Winters (2001), when an independent ASEAN-bias was investigated, the result found that ASEAN members traded more with each other than would otherwise be predicted by normal trade determinants. With an emphasis on the effectiveness of AFTA, the study in addition summarized that this free trade zone had, to a certain extent, brought positive effects to intra-ASEAN trade flows as the estimated coefficient on the ASEAN-membership dummy appeared to be positive and even increased in value in the years after AFTA's establishment. Moreover, these effects were consistent even when other regional dummies: NAFTA, EU, and APEC, were also considered in the specification. This confirms that, in comparative terms, AFTA caused trade creation among its members. With respect to external trade relationships, this gravity study introduced 2 additional sets of regional dummy variables to capture extra-bloc effects on imports and

extra-bloc effects on exports on top of the conventional RTA-membership dummy variables of ASEAN, EU, NAFTA and APEC and other standard gravity variables. The ' $imRTA_{ijk}$ ' dummy variable which is imposed to measure extra-bloc effects on imports or extra-regional import bias was given the value of 1 only if the import country i is in the RTA k : otherwise, it was 0¹². The ' $exRTA_{ijk}$ ' dummy variable that is incorporated to measure extra-bloc effects on exports or extra-export bias was given the value of 1 only if the export country j is in the RTA k , and 0 otherwise. Concerning ASEAN's territory, the study found that all 3 dummies: ' $ASEAN_{ij}$ ', ' $imASEAN_{ijASEAN}$ ' and ' $exASEAN_{ijASEAN}$ ' produced positive and significant estimated results throughout the period of study. This implies that ASEAN members had conducted trade among themselves and with outsiders more than predicted by the gravitational assumption. It is worth noting that as the timeframe of the research, 1982-1999, covered the phase of AFTA's establishment in 1992, it was additionally inferred that ASEAN countries had exhibited the open regionalism concept instead of being the discriminating regional bloc many had expected.

Another empirical account by Tang (2005) examined 3 FTAs namely NAFTA, ANZCER and AFTA, to find out whether there is trade creation among FTA members and whether trade diversion impinged upon non-FTA members in each regional zone. The '*Gravity Model*' was therefore employed to assess 21 countries' trade flows during 1989-2000 and, in order to capture RTA-effects on both members' and non-members' trade flows, RTA-membership dummy variables were incorporated into the gravity specification in the same fashion as in Bayoumi and Eichengreen (1997). With the

¹² The study used imports as the dependent variable.

emphasis on the '*AFTA-effects*', the OLS's estimated results presented positive estimates on both intra-ASEAN and extra-ASEAN trade flows¹³. This finding is in fact similar to Elliott and Iketmoto (2004) in the area in that AFTA was seen to cause trade creation among members without having caused trade diversion from non-members. For these reasons, it can be said that, despite the implementation of AFTA, ASEAN was perceived as an opened region keeping the level of trade among relevant countries, both members and non-members, far above what was estimated using standard gravity variables.

In a similar timeframe, Kien and Hashimoto (2005) employed the '*Gravity Model*' to assess AFTA's performance during the period of 1988-2002¹⁴. Similar to other conventional studies that were concerned with examining the effectiveness of RTAs, this paper measured '*AFTA-effects*' in an interdependent context with other RTAs: NAFTA, EU and MERCOSER. Using the panel trade data of 39 countries, for each RTA, the paper imposed 3 forms of RTA-membership dummies, into the estimating gravity specification. The first RTA-membership dummy was given the value of 1 if both trading partners belonged to the particular RTA at time t , otherwise it was given a value of 0. The second RTA-membership dummy was aiming to signify import diversion was given the value of 1 if, in each trade-pair, only the import country was in the RTA at time t . Otherwise, it was given a value of 0. As the last RTA-membership dummy is aimed at observing export diversion, the value of 1 was given when, for a particular trade-pair, only the export country was in the RTA at a specific time t : Otherwise, it was given a value of 0. Regarding '*AFTA-effects*', the study found AFTA

¹³ The study covered 5 ASEAN countries: Malaysia, Singapore, Indonesia, Thailand and the Philippines.

¹⁴ The study used the Hausman Taylor as an estimation technique.

to be a beneficial RTA, promoting trade among members. When external trade ties were considered as well, such an increase in trade among members was, in addition, not diverted from outsiders. This study therefore concludes that AFTA did not cause any trade diversion effects to the rest of the world.

Taking the empirical evidence reviewed into consideration, it is interesting to note that research generally incorporated a wide range of countries as well as different types of RTAs into the estimating gravity specification. This chapter asserts it was so because these traditional studies have the mutual interests of evaluating as well as comparing the effectiveness of numerous RTAs that were widespread across the globe during the 1970s-1990s. Although perceived to be useful as this investigating framework contained large quantities of information, doubt was cast on more than a few accounts, as contradictory results on numerous estimated RTA(s)-effects were found, instead of consistent outcomes. As presented thus far, this is without a doubt inclusive of the '*AFTA-effects*' that had been estimated.

4.3 Empirical approaches to assess trade effects of AFTA on intra-ASEAN and extra-ASEAN trade flows

Considering previous gravity-based research thus far, this study's interest, however, differs from that of preceding empirical accounts as no comparisons across different RTAs and their effects are made. The chapter intends to be distinctive, focusing on examining the independent effects of AFTA within the ASEAN context as opposed to providing general comparisons of numerous RTAs' effects situated in different parts of

the world. Otherwise, the '*AFTA-effects*' this study aims to estimate could be influenced by larger RTAs that are considered in the gravity specification at the same time. As previously discussed in Chapter 3, the characteristics of AFTA are too different to simply be generalized and compared with other RTAs. This is especially so if the sovereign or confined effects of AFTA are the most important objective of the research. As the independent effects of AFTA are the focus, this chapter therefore conforms to the previous chapter in that the domain of this research is drawn to be specific to within ASEAN's border. This is, nonetheless, not to say that the interdependent trading relationships of various RTAs across the globe are unimportant, but an evaluation of the effectiveness of AFTA on its members and important traders is urgently required for the region to plan far-sighted trade-related policies. This sort of empirical evidence is, however, far from sufficient.

Given the research's focus as stated above, the chapter has conducted primary yet detailed investigations and found that throughout the period that Chapter 3 investigates, 1970-2007, ASEAN has not relied on the whole world but only on specific markets for international trade. This information brings the research to the viewpoint mentioned in Frankel and Wei (1996) which stated that the choice of countries included in the study is one of the major determinants that influences the RTA(s)-effects estimated. Certainly, this viewpoint will once again be proven to be valid here. The research by Bayoumi and Eichengreen (1997) is another account that focused on putting the appropriate choice of countries into the estimating equation; in their study only developed European countries were chosen to be included in the gravity specification. This approach was suggested as

it was perceived to be able to avoid mixed RTA(s)-effects that could be generated by including both developed and developing countries in the same '*Gravity Model*':

We limit our sample to 21 industrial countries to reduce the danger of conflating distinct industrial- and developing-country effects; it is the fact that the resulting sample is heavily European that leads us to focus on the European Community and The European Free Trade Association (EFTA) (Bayoumi and Eichengreen 1997, p. 143).

Considering the relevant literature aforementioned together with the minimal size of ASEAN-trade in the world's market, it certainly suffices to say that this study focuses on key external traders instead of including many countries that the region has not been trading with: or has had very little trade with thus far. For this reason, only ASEAN members and their important trading partners will be considered in this empirical application. By including only top trading partners in the analysis, this chapter expects to enhance the possibility of achieving a reliable outcome, especially with regard to the effectiveness of AFTA on intra-ASEAN and extra-ASEAN trade flows. In relation to Chapter 3, the timeframe of this study is thus kept the same, covering from 1970 to 2007. This aims to afford comparisons of estimated results from both accounts directly. With such a long time span covered, this framework is not only able to explain the extent to which ASEAN countries have relied on outside traders but is also capable of informing us how important it is that this group of key traders has, at the same time, influenced ASEAN's trade during times pre- and post-implementation of AFTA. With regards to empirical techniques, definitely, certain improvements in empirical methodologies and econometric modelling applications will be proposed, though the customary '*Gravity Model*' is still relied on as an empirical tool.

In addition, it is somewhat surprising that the related literature that managed to cover all ASEAN countries is mostly in the form of the *ex-ante* type. These accounts generally employed the Computational General Equilibrium model (CGE)¹⁵ as an empirical tool. The majority of CGE-based accounts usually found that RTA benefits membership countries as welfare is predicted to increase if RTA takes place. However, CGE-based accounts have been criticized for providing underestimated results as the estimating model usually imposes strong assumptions such as perfect competition in product markets and static price effects, in order to simplify the estimation procedures (Plummer, 2006). Moreover, these accounts usually assume a specific model structure with certain functional parameters to represent the estimating countries in a base year prior to the formation of the RTA. That is because the objective of CGE studies is to calculate welfare effects from the RTA in case tariff preferences for that particular RTA are actually occurred. In this regard, Dee and Gali (2003) which studied trade and investment effects of PTAs, highlighted one of CGE's strongest assumptions, which is namely the fixed terms of trade assumption, which actually prohibits examination on the terms of trade effects or the terms of trade changes from the PTA. This is, indeed, a very serious shortcoming as one of the objectives of examining RTA(s)-effects on trade flows is to find whether that particular RTA will alter relevant countries' terms of trade. Given all abovementioned concerns and limitations of CGE fundamentals, there is thus a gap in this field of research, not only that there was no CGE account that specifically focused on AFTA or included all ASEAN countries into the specification but also when the research's interest was the *ex-post* effects of AFTA. Due to these reasons plus the fact that AFTA has been at work for years, this is another point at which the '*Gravity*

¹⁵ See De Rosa (1999), Park (1998), Robinson and Thierfelder (2002), Gilbert (2003) , DeRosa and Gilbert (2005).

Model' is deemed an appropriate empirical tool to study '*AFTA-effects*' on relevant countries' trade. In contrast to the CGE principles that focus on finding the welfare effects of a particular RTA, the gravity framework's aim is to measure trade effects of the actual RTA on real trade flows data. This is simply because the gravity concept perceives that welfare effects are unobservable thus one cannot measure these effects directly (Dee and Gali, 2003). Nevertheless, taking into consideration particular literature that studied '*AFTA-effects*' on the gravity framework *ex-post*, there has not been a study that includes all AFTA members in the specification. In general, previous studies were limited, covering ASEAN-5 or, with a better data coverage, ASEAN-6 only. The slow progress of an establishment as well as the completion of AFTA has been mentioned as a major reason for this loophole. Since AFTA has now been joined by every country in the region, it is thus necessary to update the empirical analysis to include ASEAN-10 in the examination concerning '*AFTA-effects*' *ex-post*.

As abovementioned, this study aims to construct a gravitational framework to evaluate *ex-post* effects of AFTA on intra-ASEAN and extra-ASEAN trade flows. Despite the fact that the '*Gravity Model*' was criticized for its weak theoretical foundations in its early years, a large quantity of research has, over time, asserted and confirmed that the model has valid theoretical grounds. Chapter 2 of this thesis has presented some key literature that elaborated the model's theoretical foundations in detail. As these concerns have passed, current issues have shifted to stress on technical notes, selecting the most appropriate if not the best empirical methodologies to employ the gravity framework to assess international trade flows. As can be seen from the empirical accounts reviewed earlier in this chapter, the '*Gravity Model*' was generally conducted under the cross-

sectional framework having employed the simple OLS method as an estimator. Although satisfying outcomes have been delivered, the majority of these optimistic results were found without having controlled for heterogeneous or country-specific factors¹⁶. As elaborated in Chapter 3, beside standard gravity variables, trade flows across nations may be shaped by country-specific or trade-pair-specific factors that are usually unobservable. These factors range from cultural and historical ties, forms of government, technological developments and preferences to trade as well as the propensity to export and import. It is known that without controlling for heterogeneities in the cross-section analyses, it is highly likely that incorrect or biased estimates would be obtained. This problem is far from acceptable, especially when the coefficients estimated on the trade effects of a specific RTA are the focus. From the empirical frameworks mentioned thus far, however, the only exception is Kien and Hashimoto (2005) as this study attempted to control for heterogeneous issues explicitly.

In order to control for heterogeneities or country-specific biases in the cross-sectional gravity framework, the traditional empirical technique used is to impose country-specific variables that trading partners are considered to have in common¹⁷. These country-specific factors are usually captured in the format of dummy variables as they are enumerative in general. Even so, this method has a flaw in reality as one does not know exactly what determinants are responsible for heterogeneities within and between certain trade-pairs. Thus, by attempting to use a number of dummy variables to capture various specific features in each trade-pair in the estimating gravity equation, it is doubtful whether heterogeneous issues will be controlled for completely. This weakness

¹⁶ See Soloaga and Winters (2001), Elliott and Ikemoto (2004), Tang (2005).

¹⁷ See Frankel and Wei (1993a, 1993b), Benedictis and Taglioni (2011).

of using dummy variables to control for heterogeneity bias in the cross-section gravity specification was also mentioned by Brun et al. (2005). In an attempt to estimate the role of distance or the so-called '*distance puzzle*' in the gravity framework¹⁸, the traditional method of using dummy variables to control for unobserved heterogeneous issues was instead perceived to post bias to the distance variable estimated:

“...because the dummy variables capture only part of the unobservable heterogeneity of country pairs, the remaining unobservable heterogeneity could potentially bias estimates of the coefficient for distance” (Brun et al., 2005, p.102).

Despite the fact that this chapter does not actually share the same interest as Brun et al (2005), the viewpoint whereby the use of dummy variables alone is not the perfect strategy to solve for heterogeneity biases is shared. This study believes that, without the proper empirical techniques being applied, the biased results not only suggest erroneous information on '*AFTA-effects*' but also mislead relevant policy implications later on.

In addition, traditional cross-section gravity research is prone to endogeneity bias which can be observed when there are correlations between explanatory variables and the error term. To be precise, the source of correlations causing the potential endogeneity of explanatory variables can be derived from omitted variable issues, simultaneity and measurement errors that are commonly observed in the cross-section work (Wooldridge, 2002, p.50). With the focus on an evaluation of RTA(s)-effects on trade flows, the RTA dummy variable is often dubious as to whether it is econometrically endogenous. Even so, there had only been a small number of previous cross-section studies that addressed

¹⁸ The gravity equation was estimated on the panel data of 130 countries over 35 years (from 1962-1996) using variations of the panel data model.

these issues directly¹⁹ thus far as gravity-based research, in general, assumed that RTA(s)-membership dummies are exogenous. Chapter 3 of this thesis selectively reviewed recent empirical accounts that attempted to control for the potential endogeneity of RTA(s) though the results obtained were rather disappointing. These accounts employed the Instrumental Variables (IV) method and the Heckman control functions on the cross-section data. The concept works by firstly constructing the Probit function that predicts the formation of RTA(s). After that, the researcher needs to find a set of instruments for a set of exogenous variables that are not included in the gravity equation variables. These instruments have to be correlated with the probability of a country pair forming an RTA but uncorrelated with the gravity equation's error term. This was the critical point as each researcher's decision in choosing appropriate instruments was subjective. The difficulty in finding appropriate instruments, in addition, existed as the exogeneity requirement is undoubtedly not easy to fulfil in empirical analysis. Even though there was the test of over-identifying restrictions which could be employed to check whether the instruments were exogenous to the gravity equation error term, this test often failed and the results on the RTA(s)-effects were sensitive to the choice of instruments chosen. Last but not least, both the IV and the Heckman control function were fragile in solving endogeneity bias in the cross-section setting as a number of variables that are correlated cross-sectionally with the probability of forming a particular RTA are highly likely correlated with trade flows cross-sectionally. As there has not been an appropriate cross-sectional technique to solve for this type of bias, alternative empirical techniques were, for this reason, sought after.

¹⁹ See Trefler (1993), Lee and Swagel (1997), Baier and Bergstrand (2002, 2004) and Magee (2003).

Thus, in order to deal with drawbacks persisting in cross-section gravity analyses and to find liable inferences about the RTA(s)-effects estimated, Baier and Bergstrand, (2007) which attempted to investigate the so-called '*Average Treatment Effects*' of FTAs across the globe²⁰, followed the econometric textbook, Wooldridge (2000), employing the panel data framework as a better option. This method is generally suggested as one practical solution to handle the presence of unobserved heterogeneities which are one of the major sources of endogeneity bias of RTA(s)-memberships and, moreover, to disentangle transition probabilities among cross-sectional populations over time²¹. In detail, Baier and Bergstrand (2007) mentioned this problem in their work that;

First, several plausible reasons exist to suggest that the quantitative (long-run) effects of FTAs on trade flows using standard cross-section gravity equation are biased; we argue that unobservable heterogeneity most likely biases estimates downward. Second,...traditional estimates of the effect of FTAs on bilateral trade flows have tended to be underestimated by as much as 75-85%. Third,...the most plausible estimates of the average effect of an FTA on a bilateral trade flow are obtained from a theoretically-motivated gravity equation using panel data with bilateral fixed and country-and-time effects or differenced panel data with country-and-time effects (Baier and Bergstrand, 2007, p.74).

Nevertheless, as previously discussed in Chapter 3, in order to control for the potential endogeneity of a particular RTA, one, first of all, needs to figure out how that specific RTA is formed. If country-pairs share economic characteristics that potentially influence them to form the RTA or the particular RTA is perceived to be a trade-induced RTA, this RTA should be treated as an endogenous variable. Basically, the factor that trade economists use to judge whether a particular RTA is endogenously

²⁰ The study included 96 potential trading partners during the period of 1960-2000 (The data was collected every 5 years starting from 1960 and continuing from 1965,...2000). The FTA dummy variables were imposed to capture full FTAs and Customs Unions only.

²¹ As pointed out in the previous chapter, Baltagi (2001) had gathered several advantages of using the panel data framework in his book titled: '*Econometric Analysis of Panel Data*'. The brief contents have already been summarized in page 82 of this thesis.

formed is to observe whether membership countries have ‘chosen well’ in coming into the RTA; this involves seeing whether countries already have high trade flows or are highly likely to have welfare enhancing effects that will probably lead them to form the RTA with each other (See Baier and Bergstrand, 2007). On the contrary, if reasons for forming the RTA between countries are far from economic or not related to trade such as historical, political or even cultural factors, the RTA of interest can be treated as an exogenous variable. It is hence once again worth recalling the fact that AFTA membership countries do have diverse characteristics not only in terms of economic but also in historical settings, social values as well as political environments. In addition, the intra-regional trade level was initially fairly low as ASEAN countries did prefer to trade with countries outside the region. For these reasons, there were thus limited opportunities to induce trade creation effects if these countries formed an RTA with each other. It is, nonetheless, evident that the establishment of AFTA was initiated because of political reasons rather than other causes. Taking into account Baier and Bergstrand (2007)’s quote stated above plus the information about AFTA establishment, former AFTA members had not ‘chosen well’ by constructing this free trade zone. In summary, this chapter agrees with Chapter 3 in the sense that AFTA should be considered as an exogenous RTA in this fashion.

Trade economists, however, believe that there are other unobservable factors which are included in the gravity equation’s error term that may be correlated with the decision to form an RTA. This, according to Baier and Bergstrand (2007) is another source of endogeneity bias in the cross-section gravity equation as the determinants of any particular RTA are likely to be cross-sectional. For this reason, this issue can be

controlled for by putting appropriate variables into that cross-sectional gravity equation setting. If such issues are not known, the use of the panel data structure with specific fixed effects can be employed to tackle this estimating problem as Baier and Bergstrand (2007) simply perceived the endogeneity issue as a part of the unobserved heterogeneity or omitted variable biases that are commonly found in the panel data structure.

As one of the objectives of this research is to improve if not correct estimating problems found in the cross-section gravity equation, the panel data framework is, at this point, a better method to implement. Another viewpoint that supports the use of the panel data framework in estimating the gravity equation has also been noted by Benedictis and Taglioni (2011) in the book's chapter: *'The Gravity Model in International Trade'*. Selected aspects are indicated below:

Even though elements such as distance and size are best captured by cross sections with the panel not adding much content in short horizons, in most cases panel specifications should be preferred to cross-section specifications because of the inability of the latter to properly account for the omitted variable bias. On the other hand, policy effects, such as the trade promotion of free trade agreements or custom unions, are always better identified in panels, through the time series dimension. Indeed, in the cross section specification they are highly collinear with the distance (Benedictis and Taglioni, 2011, p.61).

In general, there are various gravity-based studies that are in support of the panel data framework. Focusing only on studies that aim to evaluate RTA(s)-effects on trade flows, these can be seen in Coe and Hoffmaister (1999), Carrere (2002, 2006), Martinez-Zarzoso and Nowak-Lehmann (2003), for instance.

Taking into account all key advantages of implementing the panel data analysis mentioned in the literature reviewed, this chapter perceives it is well-founded to employ the panel methodology to assess intra-ASEAN and extra-ASEAN trade flows in this way. Given that this application is developed further from an empirical examination conducted in Chapter 3, the panel on all ASEAN countries is extended to include additional traders outside the region. In order to select key traders, the paper goes back as far as 1970, as that was the time in which the regionalism concept was becoming widespread across Europe and starting to spread to other parts of the world. It was also the time when ASEAN countries were in the process of transforming their international trade strategies. The import substitution approach which was literally the heart of the region's international trading policy, aiming to protect domestic industries, was gradually replaced by the export promoting regime in 1980s (Tongzon, 2002, p.31). Partly influenced by the worldwide wave of regionalism, the ASEAN countries slowly developed into an opened trading zone and AFTA was eventually established as a product of the formal regional trade liberalization in 1992. In choosing the time frame of the examination, the chapter perceives that observing ASEAN's trade relationships for certain years may not be appropriate if the research's aim is to examine the effects of AFTA on the membership's trade flows as well as to investigate how the region's trade relationships have generally been influenced by external traders, and *vice versa*. For these reasons, the paper imposes the period of study to be 1970 to 2007, which is actually the same time-span as in the previous chapter. Once again, this is aimed at allowing a comparison between this piece of empirical evidence and the one in Chapter 3. In addition, the year 2007 is selected as the last year of an empirical investigation

because it was the time that the most recent data on ASEAN's trade was obtainable at the time of conducting this thesis.

As far as the choice of countries to be included in the gravity specification is concerned, this chapter lists ASEAN's major trading partners for every decade (an exception applies to the last period which covers only 7 years). Interestingly, it is found that ASEAN countries have notably traded with a particular group of countries throughout this lengthy period. Therefore, the chapter selects the top 10 external traders that have been seen to trade consistently with the region. Combined with all 10 members of AFTA, the full sample of countries included in the analysis is listed below.

Table 4.1: The List of Countries Included in the Gravitational Framework

<i>Country</i>	<i>Country Name</i>	<i>Country</i>	<i>Country Name</i>
1	Brunei	11	Japan
2	Indonesia	12	Korea
3	Malaysia	13	China
4	The Philippines	14	United States
5	Singapore	15	United Kingdom
6	Thailand	16	Netherland
7	Cambodia	17	Germany
8	Laos	18	Hong Kong
9	Myanmar	19	Australia
10	Vietnam	20	India

4.3.1 Variables and data Sources

In order to construct the panel data used in the specification of the '*Gravity Model*', it is important to point out that this analysis focuses on the consistency of data. Therefore, the sources of data used are not just the usual ones, but also those that are able to provide historical records of every country. In addition, great attention has been paid to standardizing data using the same base year: 2005 (i.e. monetary value is recorded in term of 2005US\$) so any estimated values are consistent as well as correct. On top of standard gravity variables²², this paper conforms to numerous gravity analyses in including additional factors which are theoretically perceived to be important in

²² The standard gravity variables are countries' incomes, populations and distances.

explaining international trade flows in the database. Considering 20 trading partners over 38 years, this application is comprised of 14,440 observations. Even though this chapter requires more information as another 10 external traders are included in the data set, it is worth noting that all of the data used in this chapter are, in actual fact, derived from the same sources as the variables mentioned in Chapter 3.

The UN COMTRADE data is the fundamental source of trade data employed in this empirical application. The Economics Research Services: United States Department of Agriculture (ERS/USDA), once again, provides annual real gross domestic products (GDPs) as well as historical GDP deflators used to standardize data into real terms (2005US\$). It, in addition, gives historical data on countries' populations and nominal exchange rates. Information on geodesic distances and the measure of linguistic similarity are derived from the *Centre d'Etudes Prospectives et d'Informations Internationales*²³ (CEPII) data base. Additional details of all the variables included in the gravity specification, their expected estimated signs, subsequent interpretations and implications are similar to what has been discussed in the previous chapter.

4.3.2 Methodologies and modelling issues

Regional dummy issues: the AFTA-membership dummies

This variable is aimed at measuring the extent of trade liberalization (tariffs and non-tariffs) within the region. As the literature reviewed shows, it was as early as the 1960s that empirical accounts concerning an examination of international trade flows did

²³ Institute for Research on the International Economy (in English).

employ the RTA-membership dummies or the so-called '*regional dummies*' to capture RTA(s)-effects on relevant countries' trade flows. In most cases, these '*regional dummies*' were perceived in a static form i.e. invariable through time. This was so because past empirical studies usually conducted cross-sectional specification of the gravity equation. In such applications, the fact that traders are members of a particular RTA is accounted for without observing further exactly when these countries entered into the liberalized zone. The '*regional dummies*' are given the value of 1 as long as trade-pairs are both members of the RTA of interest; otherwise the given value is 0. However, as literature reviews showed, cross-section gravity analyses were criticized as being prone to several biases, thus the time-invariant '*regional dummies*' specified were also called into question for producing incorrect estimates on RTA(s)-effects of interest.

Nevertheless, given that the panel data framework is suggested as an alternative approach in this application, the '*time*' dimension should be taken into account when specifying any RTA-membership dummy variables. As the independent '*AFTA-effects*' are to be observed the AFTA-dummy variable is captured in the form of $AFTA_{ijt}$. This dummy is given the value of 1 when trade-pairs are in AFTA at the same time, otherwise it is given the value of 0. Whilst the importance of the time dimension is included in the specification, the AFTA-membership dummy picks up not only the membership status of trade-pairs but also the year that each country entered into the free trade zone. This chapter perceives that this method is appropriate for this study as the ASEAN countries did not all join AFTA in the same year. Thus, on top of '*AFTA-effects*' that are assumed to impact AFTA members and non-AFTA members (external traders) differently, this time-variant dummy: $AFTA_{ijt}$ is able to distinguish between the

trade effects of AFTA on early members and delayed ones. Most of the time, the coefficient estimated on this variable is expected to be positive if intra-ASEAN trade is increased as a result of AFTA.

In order to form an empirical specification, the standard '*Gravity Model*' is augmented to incorporate additional variables that are perceived to be important for trade flows. Even though the new data set is to be scrutinized, the panel data's gravity specification can be written in the same set-up as previously indicated in Eq. (3.8) which is :

$$\ln X_{ijt} = \gamma_0 + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} + \beta_6 \ln Lang_{ij} + \beta_7 \ln REX_{ijt} + \beta_8 AFTA_{ijt} + \varepsilon_{ijt} \quad (4.1)$$

and,

$$\varepsilon_{ijt} = \gamma_{ij} + v_{ijt} \quad (4.2)$$

where:

X_{ijt} : Real exports of country i to country j at time t ,

Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively,

P_{it}, P_{jt} : Population of country i and country j at time t , respectively,

D_{ij} : Geographical distance between countries i and country j ,

$Lang_{ij}$: A dummy variable takes the value of 1 if both countries; country i and country j have common languages. Otherwise, it is 0,

REX_{ijt} : Real exchange rate of country i to country j at time t ,

$AFTA_{ijt}$: A dummy variable takes the value of 1 if both countries, country i and country j are members of AFTA at time t . Otherwise it is 0,

γ_0 : An unknown constant term (the portion of intercept that is common to all years and trade-pairs),

γ_{ij} : Unobserved heterogeneities or bilateral effects specific to each trade pair,

ε_{ijt} : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance

Panel models: Random Effects Model (REM) versus Fixed Effects Model (FEM)

In choosing between the random effects model (REM) and the fixed effects model (FEM), this paper follows microeconomic theories suggested by Wooldridge (2002) in that one needs to find whether the unobserved bilateral effects (γ_{ij}) are correlated with other observed explanatory variables (Wooldridge, 2002, p.252). If correlations between unobserved effects (γ_{ij}) and explanatory variables are detected, the FEM is more robust than the REM. This is so because the REM has a strong assumption that the explanatory variables have to be uncorrelated with unobserved heterogeneous terms (γ_{ij}) in order for the estimates to be consistent. Without a doubt, this strong restriction is easily violated, especially in the long panel data format as it is unlikely that there would be no correlations between the heterogeneous terms (γ_{ij}) and the regressands. If this happens, the REM is therefore prone to produce biased estimates. The FEM, on the other hand, does not require this assumption and will always be consistent, regardless of whether there are correlations between unobserved effects (γ_{ij}) and explanatory variables.

In order to check for this problem, the paper formally conducts the Hausman Test (1978), testing against the null hypothesis of no correlations between unobserved bilateral effects (γ_{ij}) and the explanatory variables. The large value of the Chi-squared statistic suggests that there are correlations between unobserved heterogeneity factors (γ_{ij}) and explanatory variables at high degrees. If this is the case, the null hypothesis is rejected and the appropriate panel data model is the FEM. Otherwise, the REM is sufficient.

4.3.3 Empirical results

This section presents estimated results of the '*Gravity Model*' as empirically specified in Eq. (4.1). As the study has to choose the most appropriate panel data models, the results from the REM and FEM are compared in Table 4.2. The Hausman Test (1978) statistic is shown in Figure 4.1 accordingly.

Table 4.2: Results of the ‘Gravity Model’ Estimates: the Random Effects Model (REM) versus the Fixed Effects Model (FEM)

Dependent Variable : Real Exports	REM	FEM
Exporter's GDP (Y_{it})	0.7983431*** (0.0324788)	0.66326402*** (0.0492697)
Importer's GDP (Y_{jt})	0.62163926*** (0.030097)	0.58850261*** (0.044179)
Exporter's Population (P_{it})	0.26554482*** (0.0606697)	0.76322359*** (0.1413635)
Importer's Population (P_{jt})	-0.10498592* (0.0605192)	-0.16366754 (0.1309496)
Distance (D_{ij})	0.05193959 (0.1267231)	-
Real Exchange Rate (REX_{ijt})	0.15993055*** (0.0090757)	0.18075834*** (0.0099494)
Language ($Lang_{ij}$)	1.9558936*** (0.2749449)	-
AFTA-effects ($AFTA_{ijt}$)	0.32974124*** (0.0546795)	0.35916163*** (0.0581501)
Constant	-22.458393*** (1.367092)	-24.741225*** (1.932801)

Note: * denotes significant at 99%, ** and * denotes significant at 95% and 90% respectively. Standard errors are given in parentheses.**

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	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
lnrdpx	.663264	.7983431	-.1350791	.037049
lnrdpy	.5885026	.6216393	-.0331367	.0323412
lnpopx	.7632236	.2655448	.4976788	.1276825
lnpopy	-.1636675	-.1049859	-.0586816	.1161259
lnxratxy	.1807583	.1599306	.0208278	.0040771
bothfta	.3591616	.3297412	.0294204	.0197883

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 131.23
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

Figure 4.1: The Hausman Test Comparing the Estimates from the REM and the FEM

Considering the differences in estimates provided by the REM and FEM, together with the Hausman Test (1978)'s results abovementioned, these pieces of evidence suggest that unobserved heterogeneities (γ_{ij}) have influenced results. The null hypothesis in which there are no correlations between the unobserved heterogeneous factors (γ_{ij}) and explanatory variables is evidently rejected. Even though the signs, the significant levels and the absolute values on the AFTA-membership dummy ($AFTA_{ijt}$) estimates are quite similar in both REM and FEM estimations, estimated results on other variables are very different in terms of values and significant levels. Thus, one should be cautious of depending on the results of past research that intuitively employed the REM without conducting the appropriate statistical test to check for unobserved heterogeneity issues. Considering the estimated results in Table 4.2, in general, it can be seen that the REM tends to bias results downwards.

Since the FEM is preferred, it is evident that almost all of the estimated coefficients in the FEM show the expected signs and are highly significant statistically. The economic sizes which are captured by trading partners' GDPs (Y_{it} , Y_{jt}) produce the expected

positive sign and are highly significant at 99%. As these variables are perceived as proxies to measure for the level of demand in the importing country and the level of supply in the exporting country, the positive and significant coefficients imply that richer countries do, in fact, trade more. Considering another size variable, population, it is evident that the estimated coefficients on the exporter's population (P_{it}) and the importer's population (P_{jt}) give different signs in this case. The estimated coefficient on P_{it} is positive while that of P_{jt} is negative. It is, however, common in gravity research that the signs on population variables are interchangeable. In this case, only the former estimate is significant at 99%. This can be interpreted in terms of the size of exporting economies (in terms of population) being positively related to trade (exports). The large domestic market implies that the country could enjoy the economies of scale in production which also indicate the ability to supply goods domestically and internationally. The estimated coefficient on the bilateral exchange rate variable (REX_{ijt}) provides the positive sign as expected and it is highly significant at 99%. This basically indicates that depreciation in an exporting country's currency promotes exports. This is because when the exporting country's currency becomes less expensive relative to her trading partners, these trading partners are highly likely to increase the amount of trade (imports) with the exporting country, *ceteris paribus*.

As one of the main objectives of this paper is an assessment of AFTA's impacts on the relevant countries' trade relationships, the positive and highly significant (at 99%) estimate on the AFTA-membership dummy variable ($AFTA_{ijt}$) implies that AFTA has been effective in increasing intra-regional trade in this dataset. Nonetheless, one should not take this result as the final conclusion. This is so because this chapter aims to

examine '*AFTA-effects*' on relevant countries' trade flows in the long period panel data framework. When covering 4 decades, the effects of the time dimension need to be considered including whether it plays any parts in driving trade flows between sampling countries.

Thus, besides controlling for cross-sectional biases and the unobserved heterogeneous effects (γ_{ij}), we need to test for the importance of the '*time-effects*': whether it is important enough to be included in the FEM specification. If these effects are included in the gravity specification, one is able to distinguish natural representations of bilateral trade flows across traders from the impacts of the business cycle through this long episode of study. In order to verify the importance of the '*time*' dimension or the so-called '*time effects*' in the gravity specification, the STATA command conducting the statistical joint test has to be implemented. As the statistical test's result portrays the F-statistic of $F(37, 9058) = 9.05$ with $\text{Prob} > F = 0.0000$, this accordingly signifies the significance of the time dimension in this study. Therefore, it suggests that the '*time effects*' should be included in an estimating gravity equation.

According to the book '*An Introduction to Modern Econometrics Using STATA*' by Baum (2006), failure to include the '*time effects*' in the specification of a model which requires doing so will bring about variations that would be captured by the individual fixed effects. Taking this viewpoint into consideration, even the FEM which, in this case, proved to be consistent, could undoubtedly produce a biased estimate on the '*AFTA-effects*' of interest.

In order to avoid biased '*AFTA-effects*' being estimated, the gravity specification previously stated in Eq. (4.1) has to be re-specified including the '*time effects*'. Following Baum (2006), this specification is named the two-way fixed effects model (2-way FEM). The gravity specification can be written as:

$$\ln X_{ijt} = \gamma_0 + \gamma_t + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} + \beta_6 \ln Lang_{ij} + \beta_7 \ln REX_{ijt} + \beta_8 AFTA_{ijt} + \varepsilon_{ijt} \quad (4.3)$$

and,

$$\gamma_t = \sum_{t=1970} \gamma_t T_t \quad (4.4)$$

$$T_t = \begin{cases} 1 & ; \text{if } T = t : T = 1970, 1971, \dots, 2007 \\ 0 & ; \text{if } T \neq t \end{cases} \quad (4.5)$$

where :

X_{ijt} : Real exports of country *i* to country *j* at time *t*,

Y_{it}, Y_{jt} : Real GDP of country *i* and country *j* at time *t*, respectively,

P_{it}, P_{jt} : Population of country *i* and country *j* at time *t*, respectively,

D_{ij} : Geographical distance between countries *i* and country *j*,

$Lang_{ij}$: A dummy variable takes the value of 1 if both countries; country *i* and country *j* have common languages. Otherwise, it is 0,

REX_{ijt} : Real exchange rate of country *i* to country *j* at time *t*,

$AFTA_{ijt}$: A dummy variable takes the value of 1 if both countries, country i and country j are members of AFTA at time t . Otherwise it is 0,

γ_0 : An unknown constant term (the portion of intercept that is common to all years and trade-pairs),

γ_{ij} : Unobserved heterogeneities or bilateral effects specific to each trade pairs,

γ_t : Time effects,

ε_{ijt} : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance.

Table 4.3: Results of the ‘Gravity Model’ Estimates: the Fixed Effects Model (FEM) and the Two-Way Fixed Effects Model (2-way FEM)

Dependent Variable : Real Exports	FEM	2-way FEM
Exporter's GDP (Y_{it})	0.66326402*** (0.0492697)	0.75870505*** (0.0540402)
Importer's GDP (Y_{jt})	0.58850261*** (0.044179)	0.73148512*** (0.0496958)
Exporter's Population (P_{it})	0.76322359*** (0.1413635)	1.4290107*** (0.1517552)
Importer's Population (P_{jt})	-0.16366754 (0.1309496)	0.57072289*** (0.1500368)
Distance (D_{ij})	-	-
Real Exchange Rate (REX_{ijt})	0.18075834*** (0.0099494)	0.17658444*** (0.0099433)
Language ($Lang_{ij}$)	-	-
AFTA-effects ($AFTA_{ijt}$)	0.35916163*** (0.0581501)	0.08101158 (0.0629329)
Constant	-24.741225*** (1.932801)	-54.498996*** (3.921766)

Note: * denotes significant at 99%, ** and * denotes significant at 95% and 90%, respectively Standard errors are given in parentheses. The time-effects are not included here in order to save space. The estimates are available upon request, however.**

As shown above, Table 4.3 provides the estimated results from the FEM and the 2-way FEM. After the ‘time effects’ are controlled for, all of the estimated values have been notably been altered even though their signs are retained. In addition, the significant levels of all the variables’ estimates are improved in the 2-way FEM. The only

exception is the importer's population variable (P_{jt}); it was negative and insignificant in the FEM and it has become positive and significant at 99% in the 2-way FEM. This, consequently, implies that importer's demand increases with the size of her population. With regard to the estimated coefficient of interest, $AFTA_{ijt}$, it is no longer significant in the 2-way FEM despite the positive sign it attained in this specification. This can be seen to imply that after controlling for factors that naturally contribute to the volume of trade as well as the effects of time, AFTA has not brought any dramatic changes to the region's trade flows during this period. Any observations showing an increasing share of intra-ASEAN trade could be entirely due to the region's above-average growth rate, with minimal explicit free trade effects. In addition, this result seems to be related to the viewpoint of Frankel and Wei (1996) mentioned earlier that states country choices as well as the number of RTAs (and their memberships) included in each gravity specification are key factors that influence estimated results. One could, in fact, compare the 2-way FEM's estimates in this chapter with the 2-way FEM's estimates in the previous chapter. What can be seen from these 2 empirical accounts is that the independent negative effects of AFTA as formerly observed in Chapter 3 are restricted to within ASEAN's border. As also elaborated in Chapter 3, such a negative result on '*AFTA-effects*' could be because of the limited size of ASEAN economies as well as the similarity of products traded among AFTA members. When the domain of the research is extended to include additional key traders, those effects from AFTA, however, disappear. By broadening the boundaries and allowing for external trade relationships to be observed, the results obtained in this application are deemed to agree with the assumption made at the beginning of this chapter that ASEAN still stands a chance to benefit from AFTA if the region could exploit tariff preferences among members to

promote this regional zone as a production as well export base for the world's market. Even though AFTA-membership countries may not have benefitted as much from this free trade area as expected, since trade effects found are still insignificant and negligible, it is a good sign that these effects are shown to be positive when external key traders are observed.

This paper is also interested in examining whether AFTA has had a different impact on member countries when their statuses are different: exporters versus importers. To do so, the $AFTA_{ijt}$ dummy variable is specified further to capture any additional trade effects that could occur to AFTA-members when these countries are being exporters or importers during each specific time period. Hence, in this case, AFTA-membership dummy variables are denoted further as $I-AFTA_{ijt}$ and $J-AFTA_{ijt}$, respectively, in order to detect the so-called 'export-effects' and 'import-effects' that membership-exporters and membership-importers probably have on their trading partners in each trade-pair. While the first term is aimed at taking account of the fact that, in each trade-pair, only the exporting country is in AFTA, the latter considers the case in which an importing country is in AFTA. Furthermore, as the time dimension is also considered, these dummies; $I-AFTA_{ijt}$ and $J-AFTA_{ijt}$ actually measure 'AFTA-effects' on the trade flows of membership-exporters and membership-importers starting from the time when AFTA was comprised of only 6 members and continuing up to the point at which every country in the region was a member. This is one of the methods used to observe directions of trade especially when the flows of trade diversion are to be identified. In addition, given that the 'export-effects' and 'import-effects' are included in the specification, this enables the analysis to observe 'AFTA-effects' at the country-pair

level. As the positive sign on $I-AFTA_{ijt}$ ($J-AFTA_{ijt}$) implies that the flows of AFTA members' exports (AFTA members' imports) to non-members have increased, the negative sign on these variables suggests the opposing relationship. If negative values are observed on $I-AFTA_{ijt}$ and $J-AFTA_{ijt}$, they are referred to as export-diversion and import-diversion, respectively.

By incorporating all the necessary explanatory variables, the full specification of the 'Gravity Model' in this setting is therefore:

$$\ln X_{ijt} = \gamma_0 + \gamma_t + \gamma_{ij} + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{it} + \beta_4 \ln P_{jt} + \beta_5 \ln D_{ij} + \beta_6 \ln Lang_{ij} + \beta_7 \ln REX_{ijt} + \beta_8 I-AFTA_{ijt} + \beta_9 J-AFTA_{ijt} + \varepsilon_{ijt} \quad (4.6)$$

$$\gamma_t = \sum_{t=1970} \gamma_t T_t \quad (4.7)$$

$$T_t = \begin{cases} 1 & ; \text{if } T = t : T = 1970, 1971, \dots, 2007 \\ 0 & ; \text{if } T \neq t \end{cases} \quad (4.8)$$

where :

X_{ijt} : Real exports of country i to country j at time t ,

Y_{it}, Y_{jt} : Real GDP of country i and country j at time t , respectively

P_{it}, P_{jt} : Population of country i and country j at time t , respectively

D_{ij} : Geographical distance between countries i and country j ,

$Lang_{ij}$: A dummy variable takes the value of 1 if both country i and country j share communal languages. Otherwise, it is 0,

REX_{ijt} : Bilateral real exchange rate of country i to country j at time t ,

$AFTA_{ijt}$: A dummy variable takes the value of 1 if both country i and country j are members of AFTA at time t . Otherwise, it is 0,

$I-AFTA_{ijt}$: A dummy variable takes the value of 1 when an export country is a member of AFTA. Otherwise, it is 0,

$J-AFTA_{ijt}$: A dummy variable takes the value of 1 when an import country is a member of AFTA. Otherwise, it is 0,

γ_0 : An unknown constant term (the portion of intercept that is common to all years and trade-pairs),

γ_{ij} : Unobserved heterogeneities or bilateral effects specific to each trade-pair,

γ_t : Time effects,

ε_{ijt} : An error component term which is assumed to be well-behaved; i.i.d with zero mean and constant variance.

The result of this specification is presented in the second column of Table 4.4. The table, in addition, includes results of other 2-way FEM's gravity specifications of interest. The first column, once again, portrays estimated coefficients from the 2-way FEM formerly specified in Eq. 4.3²⁴ in which only 'AFTA-effects' are investigated. While column 3 presents estimated results of the 2-way FEM with only 'export-effects' included, column 4 indicates the 2-way FEM with only 'import-effects' considered. The last column accordingly presents results of the 2-way FEM with all fixed effects:

²⁴ These estimated results are also indicated in the second column of Table 4.3.

'FTA-effects', *'export-effects'*, and *'import-effects'*, that are included in the same specification.

Table 4.4: Results of the ‘Gravity Model’ Estimates: All 2-Way FEM Specifications

Dependent Variable : Real Exports	2-way FEM	2-way FEM , export-effects ,import effects	2-way FEM , export-effects	2-way FEM , import-effects	2-way FEM, all effects
Exporter's GDP (Y_{it})	0.75870505*** (0.0540402)	0.75719198*** (0.0540475)	0.75749143*** (0.0540499)	0.75958477*** (0.0540262)	0.75330328*** (0.0540866)
Importer's GDP (Y_{jt})	0.73148512*** (0.0496958)	0.73730464*** (0.0496673)	0.73702523*** (0.0496696)	0.73497356*** (0.049645)	0.7338249*** (0.0497012)
Exporter's Population (P_{it})	1.4290107*** (0.1517552)	1.3592328*** (0.1562039)	1.4104665*** (0.151853)	1.427261*** (0.1491547)	1.2344453*** (0.1715926)
Importer's Population (P_{jt})	0.57072289*** (0.1500368)	0.77245532*** (0.1572529)	0.70203567*** (0.1489768)	0.71819679*** (0.1528408)	0.66896574*** (0.1679169)
Distance (D_{ij})	-	-	-	-	-
Language ($Lang_{ij}$)	-	-	-	-	-
Real Exchange Rate (REX_{ijt})	0.17658444*** (0.0099433)	0.17696346*** (0.0099431)	0.17676297*** (0.0099436)	0.17661588*** (0.0099429)	0.1769566*** (0.0099423)
AFTA-effects ($AFTA_{ijt}$)	0.08101158 (0.0629329)	-	-	-	0.13518249* (0.0769829)
Export-effects ($I-AFTA_{ijt}$)	-	0.08045793 (0.0549083)	0.08953733 (0.0545258)	-	0.13546262** (0.0632092)
Import-effects ($J-AFTA_{ijt}$)	-	-0.07107052 (0.0508313)	-	-0.07987946 (0.0504778)	-0.0283461 (0.0563489)
Constant	-54.498996*** (3.921766)	-56.82721*** (3.517883)	-56.514116*** (3.510432)	-57.081469*** (3.513323)	-52.736089*** (4.218655)

Note: *** denotes significant at 99%, ** and * denotes significant at 95% and 90%, respectively
Standard errors are given in parentheses. The time-effects are not included here in order to save space.

The estimates are available upon request, however

As is evident in the second column of Table 4.4, when the so-called ‘*export-effects*’ ($I-AFTA_{ijt}$) and ‘*import-effects*’ ($J-AFTA_{ijt}$) are incorporated in the estimating gravity equation, ‘*export-effects*’, or the extra-export bias of AFTA which have been derived at 0.08045793 are larger than ‘*import-effects*’ which have been found at -0.07107052. Given that this study includes key trading partners outside the region and hence, by the definition of these terms, the positive sign on ‘*export-effects*’ ($I-AFTA_{ijt}$) implies that AFTA-membership countries have increased their trade in the form of exports to non-members. The amount of trade increase includes any trade flows from the original 6 AFTA members to CLMV countries that have increased during the period from 1992 to 1999, as well as trade flows from any AFTA-membership exporters to outside traders throughout the period of study. Conversely, a negative sign on ‘*import-effects*’ ($J-AFTA_{ijt}$) suggests that AFTA-membership countries have reduced imports from non-members. In a similar vein to the interpretation given for ‘*export-effects*’, these ‘*import-effects*’ cover any imports that the 6 AFTA founders have diverted from CLMV countries during the period of 1992-1999 and ones that come from external traders throughout the whole period of study. Taking this piece of information into consideration, this, to a certain extent, can be used to explain further why ‘*AFTA-effects*’ on members’ trade flows have, in total, become positive in this application. *Ceteris paribus*, an increase in AFTA members’ exports to delayed members and to key external traders has played a part in benefiting membership countries because trade creation plausibly occurs as a consequence of this expansion in exports. It is evident that such an increase in the membership’s exports is large enough to outweigh the reduction in the membership’s imports from non-members or the import-diversion. This result therefore conforms to the discussions earlier mentioned which state that in order to

achieve the ultimate goal of increasing intra-ASEAN trade, besides aiming to enhance trade within the region directly, AFTA members should seek to increase their production as well as exports beyond their own territory. This detailed examination of directions of trade flows is able to indicate that AFTA can still be utilized as a trading hub, gathering regional products as well as facilitating exports to the rest of the world.

In addition, this analysis performs two additional regressions analysing the ‘*export-effects*’ ($I-AFTA_{ijt}$) and ‘*import-effects*’ ($J-AFTA_{ijt}$) separately in each gravity specification. As earlier mentioned, the estimated results are presented in the third and fourth column of Table 4.4, respectively. It can be seen that when only the $I-AFTA_{ijt}$ dummy is included, the sign of this dummy’s estimated coefficient remains positive and the value obtained at 0.08953733 is close to the result provided in the second column which has the estimated value on the $I-AFTA_{ijt}$ dummy of 0.08045793. Considering other variables’ estimates in this third column, it can be seen that estimated results remain similar in terms of their signs as well as significant levels as compared to the specification that examines ‘*export-effects*’ and ‘*import-effects*’ jointly. In the fourth column in which the extra-export bias is independently considered, the estimated value of -0.07987946 on the $J-AFTA_{ijt}$ dummy variable is again very close to the specification that includes $I-AFTA_{ijt}$ and $J-AFTA_{ijt}$ jointly in the same specification (the estimated coefficient on $J-AFTA_{ijt}$ is -0.07107052). Other explanatory variables’ estimates, in addition, retain their signs and significant levels in this specification, as compared to the other 2-way FEM specifications that their results are shown in the first, second and third columns of Table 4.4, respectively. This simply implies that the gravity

specifications conducted in this chapter are, to a certain extent, consistent and stable enough to examine intra-ASEAN and extra-ASEAN trade flows under this data set.

The analysis, furthermore, applies Soloaga and Winters (2001)'s concept which suggests the inclusion of all RTA-membership dummies in the estimating gravity equation; in this case 3 AFTA-membership dummy variables: $AFTA_{ijt}$, $I-AFTA_{ijt}$, $J-AFTA_{ijt}$ are therefore included in the same specification. This aims to observe '*AFTA-effects*' on the membership's trade as well as to separate export and import diversions, if any, altogether. The result of this specification is presented in the last column of Table 4.4. In general, coefficients' estimated values are similar to other 2-way FEM specifications formerly conducted. Considering '*AFTA-effects*', '*export-effects*' and '*import-effects*' which are the estimates of interest, their signs remain the same in this specification. In addition, the estimated coefficients on the $AFTA_{ijt}$ and $I-AFTA_{ijt}$ dummy variables are now significant at 90% and 95% levels, respectively. It is also evident that by including 3 types of AFTA-membership dummies at the same time, the estimated coefficients, especially on specific effects of AFTA, have improved in value, without any alterations in their signs. In detail, it can be seen that the estimated value of '*AFTA-effects*' ($AFTA_{ijt}$) is improved from 0.08101158 to 0.13518249. These positive '*AFTA-effects*' obtained are indeed perceived to be generated by '*export-effects*' or an extra-export bias of AFTA when AFTA countries have increased exports to external traders. Such positive '*export-effects*' are however counterbalanced by the import diversion or '*import-effects*' generated by the fact that AFTA members have reduced imports from non-members (this also includes CLMV countries before they became members of AFTA). Given that '*export-effects*' generated by AFTA-members are

captured at 0.13546262 while the *'import-effects'* or import-diversion are derived at -0.0283461, as the former is larger than latter, it implies that the positive trade benefits from AFTA overwhelm the negative effects. This reasonably explains the overall *'AFTA-effects'* in which the positive sign is obtained.

However, as long as trade effects of AFTA are the focal point, this chapter suggests that one should be cautious in interpreting the specification which includes 3 specific AFTA-membership dummy variables: $AFTA_{ijt}$, $I-AFTA_{ijt}$, $J-AFTA_{ijt}$ together. This is because by incorporating many RTA-membership dummies at one time, this so-called *'nested dummies calculation'*²⁵ could post a multicollinearity problem in estimates²⁶, despite the improvement in estimated results. A simple way to detect whether there is multicollinearity among regional dummies is to examine standard errors and the t-statistics of each regional dummy. In cases where there are multicollinearity issues among independent variables, the coefficient estimated for these variables will have high standard errors and low t-statistics. In certain cases, there will also be incidents of high magnitude or unexpected signs on the estimated coefficients as well as insignificant estimates despite the high R^2 . In this application, however, it is evident that the standard error of $AFTA_{ijt}$ is 0.0769829, and the ones for $I-AFTA_{ijt}$ and $J-AFTA_{ijt}$ are 0.0632092 and 0.0563489, respectively. These values are not high enough to conclude that multicollinearity issues exist here. The model's specification is therefore acceptable.

²⁵ See Endo (2000).

²⁶ Multicollinearity is a condition whereby independent variables are strongly correlated with each other.

This chapter, in addition, tests whether the model is well-fitted: that is to conduct the heteroskedasticity test checking for patterns of the empirically specified model's residuals and the fitted values. The STATA programme has commands for this matter as well as providing the graphical presentation of the test results. Basically, one has to observe the scatter plot showing relationships between residuals and the fitted values, to see whether they depict any specific patterns. In the case that the model is well-fitted, there should be no obvious or specific relationships between the residuals and the fitted values. This is because the average residual for each country-pair would be 0 if the model is homoskedastic. Otherwise it indicates that the residual variance is instead heteroskedastic (non-constant). As the scatter plots of this test are presented in Figure 4.2 below, it can be said that there is no specific shape between residuals and the fitted values in this specification.

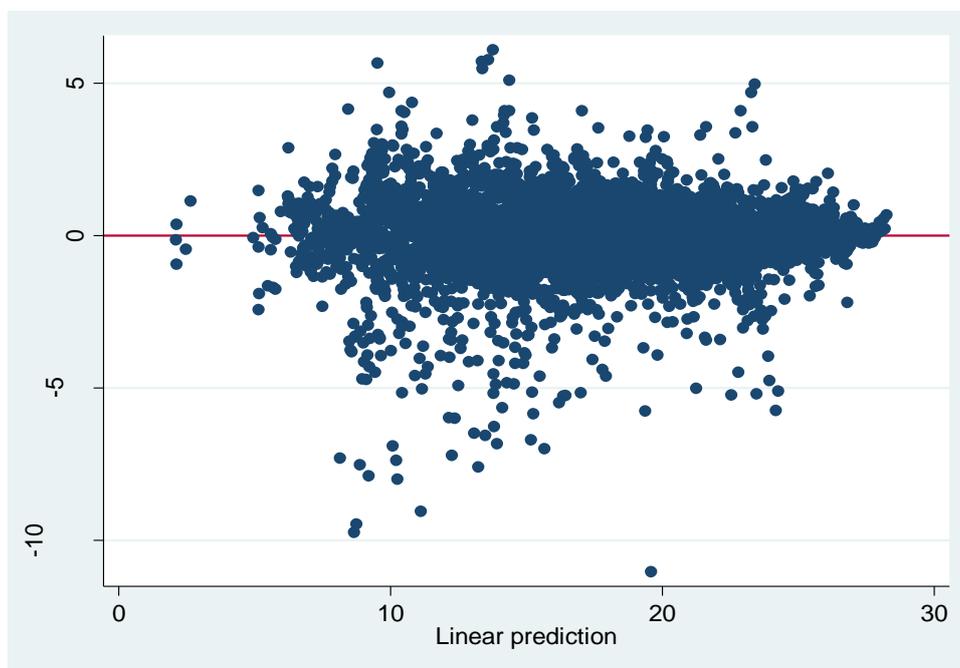


Figure 4.2: The Scatter Plot of the 2-Way FEM's Residuals by Trade-pairs

However, the study also conducts a modified Wald test testing for the null hypothesis of homoskedasticity in the fixed effect regression model. The statistical result is presented in Figure 4.3 below.

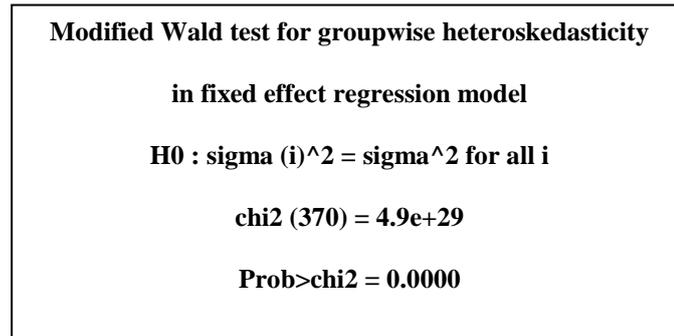


Figure 4.3: Results of the Heteroskedasticity Test in the Two-Way Fixed Effects Model.

Contrary to the graphical representation, the test result indicates that there is heteroskedasticity in the residuals: the test result suggests rejecting the null hypothesis of homoskedasticity. Nevertheless, it is important to address the fact that heteroskedasticity does not affect values of estimated coefficients, thus the 2-way FEM's estimates as recorded in the last column of Table 4.4 are still applicable. As a common practice in empirical research, the solution to the case of heteroskedasticity in the panel data framework is to report the coefficients' estimates with robust standard errors even though the estimated coefficients are unaltered. For that reason, this chapter also presents results with robust standard errors as a reference in an Appendix IV.

In compliance with the previous chapter, the panel estimates for patterns of intra-ASEAN and extra-ASEAN trade flows during the period of 1970-2007 indicated by trade-pairs are accordingly presented in Figure 4.4 - Figure 4.7. This is done in order to

illustrate the trends of intra-ASEAN and extra-ASEAN trade flows pre- and post-AFTA.

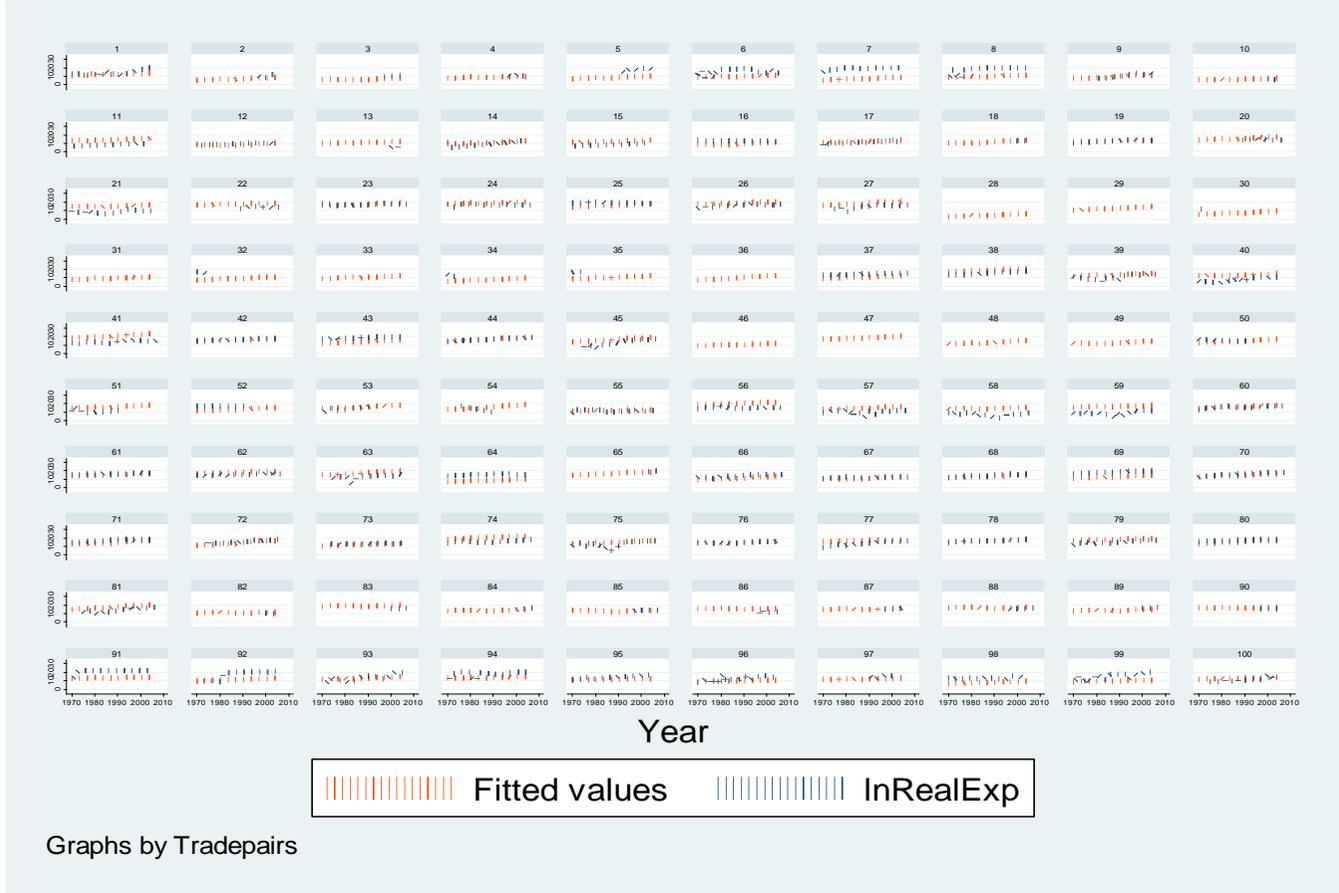


Figure 4.4: The Estimation of the 'Gravity Model' for Intra-ASEAN and Extra-ASEAN Trade Flows; Represented by Trade-Pairs (1-100 trade-pairs)

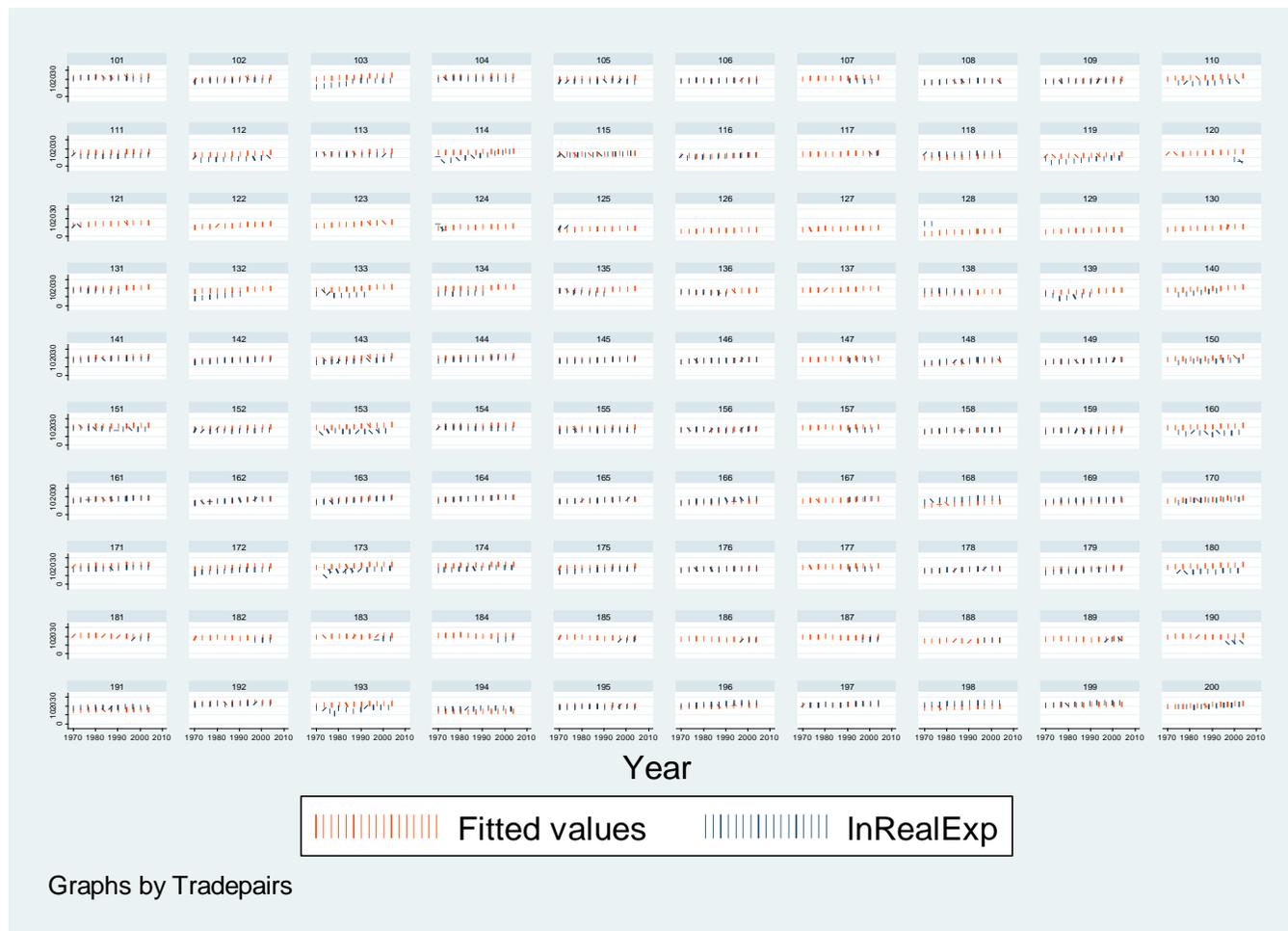


Figure 4.5: The Estimation of the ‘Gravity Model’ for Intra-ASEAN and Extra-ASEAN Trade Flows; Represented by Trade-Pairs (101-200 trade-pairs)

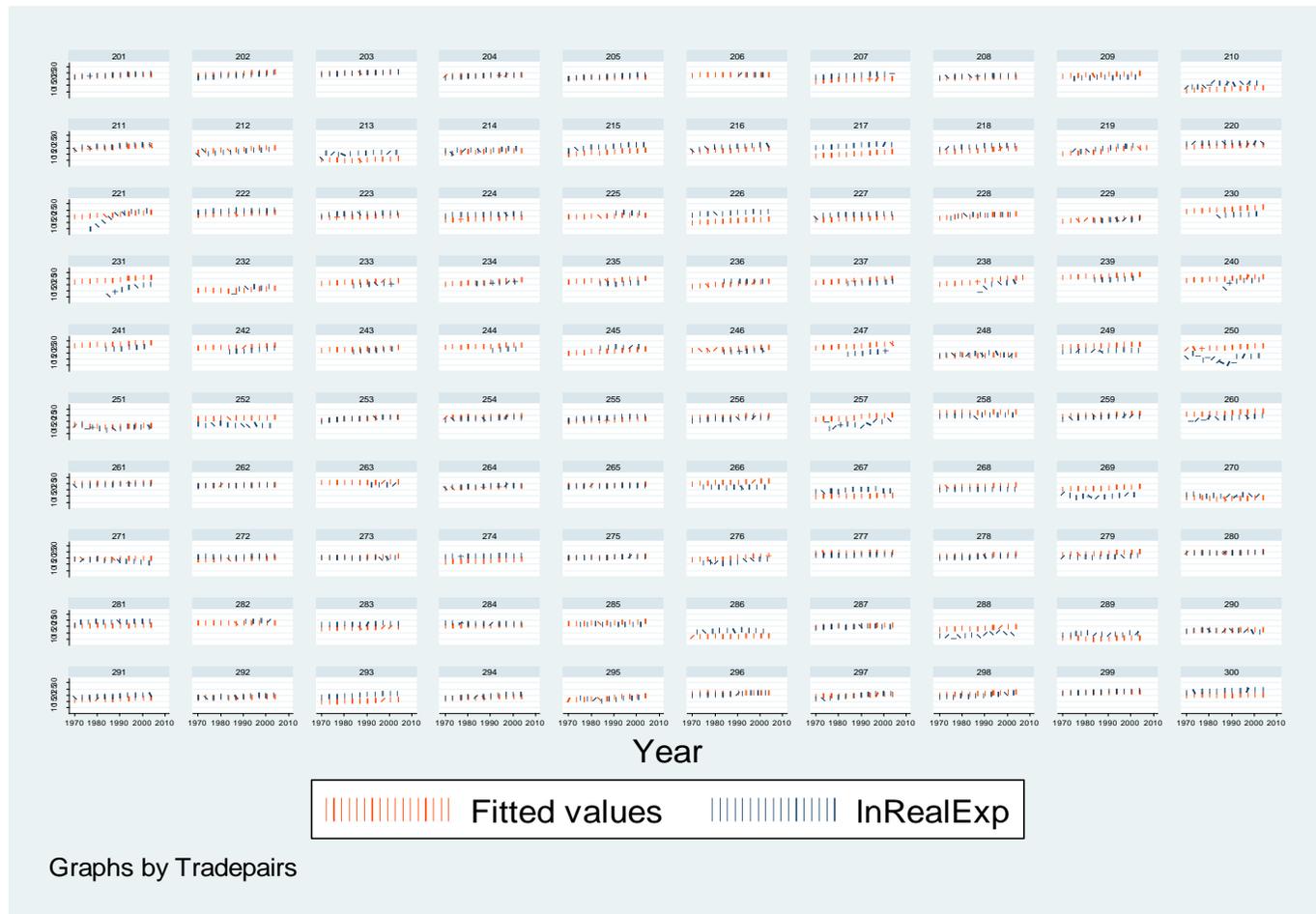


Figure 4.6: The Estimation of the ‘Gravity Model’ for Intra-ASEAN and Extra-ASEAN Trade Flows; Represented by Trade-Pairs (201-300 trade-pairs)

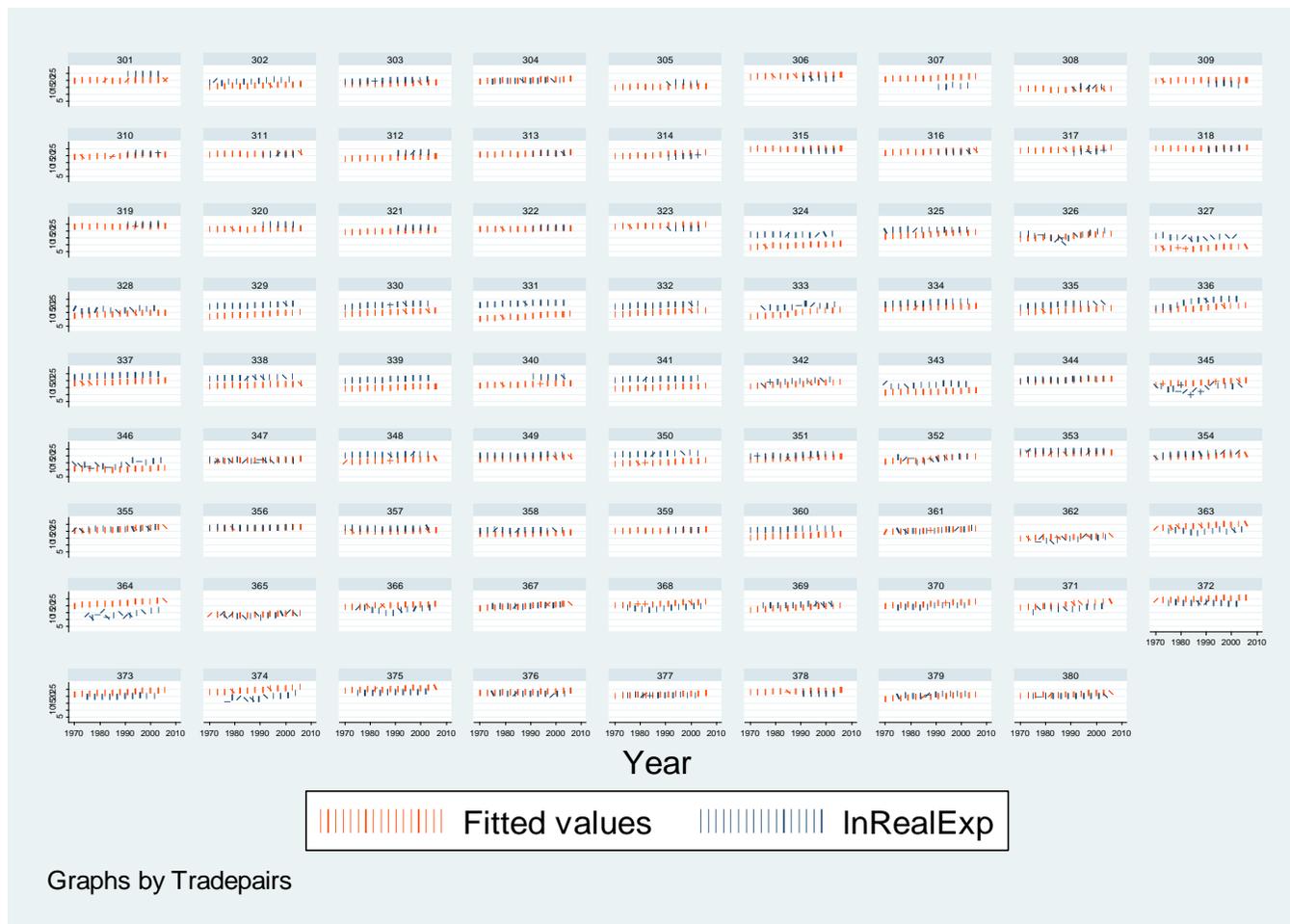


Figure 4.7: The Estimation of the ‘Gravity Model’ for Intra-ASEAN and Extra-ASEAN Trade Flows; Represented by Trade-Pairs (301-380 trade-pairs)

Given the images of trade patterns above, it can be said that trade flows have been slightly improved over time especially during the post-AFTA period.

Considering results from all 2-way FEM's specifications, they can be seen to imply that ASEAN countries could work as an integrated region via AFTA, continuing to maintain existing trade ties as well as generating new trade relationships with outside trading partners. As AFTA had been joined by all the countries in the region, tariff preferences which earlier AFTA members conceivably used to enjoy from trading with delayed members, CLMV countries, are no longer applicable. In order to exploit plausible trade opportunities, increasing intra-ASEAN trade volume, AFTA members ought to search for larger markets outside the region. As the result in the last column of Table 4.4 portrays, one of possible explanations for the positive and highly significant '*AFTA-effects*' is likely perceived to be the expansion of AFTA members' exports to key traders outside the region. This is so because while extra-export bias or '*export-effects*' work to capture trade benefits occurring for membership traders, extra-import bias or '*import-effects*', on the contrary, detect the reduction in the membership's imports from outsiders which probably were the most efficient (cheapest) producers pre-AFTA²⁷. This increase in the extra-export bias of AFTA has, in addition, been accompanied by the least amount of AFTA-membership's import diversion. As the flows of external trade generated are deemed to outweigh the flows of trade diversion in this application, the trade effects of AFTA are therefore concluded to be positive: being beneficial to its membership. Hence as long as AFTA countries keep expanding extra-regional trade

²⁷ This point is derived from the traditional concepts on trade creation and trade diversion introduced by Viner (1950). In principle, this concept states that if a particular RTA's members increase membership trade but this is at the expense of outsiders or the rest of the world, this change in trade is perceived as if there is no new trade created. If the trade diversion is large, this specific RTA may end up being a trade diverting RTA.

without diverting much trade, especially on non-members' imports, the positive trade effects from AFTA should be sustainable and probably will be improved, *ceteris paribus*.

Nevertheless, the findings found in this chapter remind us of the fact that the formation of AFTA was initiated as well as governed by political factors. Thus, even though AFTA was established in 1992, trade relationships, especially with outside traders, have not been altered much at all. On the one hand, we have seen improvement in the effectiveness of AFTA; though the amount of trade created had not been extensive, it is larger than the amount of trade diversion, resulting in the overall beneficial effects of AFTA. On the other hand, this result also implies that AFTA members have not exploited the free trade status effectively, especially in increasing external trade flows with these important trading destinations who have shared a trading history for a long time. In conclusion, it can be said that the signing of AFTA was thus a part of the regionalism process rather than a true regionalization action of membership countries.

4.4 Conclusion

The empirical analysis in this chapter examines the independent '*AFTA-effects*' on both intra-ASEAN and extra-ASEAN trade flows using the renowned gravity framework. The panel data structure is, once again, proposed to control for several biases commonly observed in the cross-section gravity specification. As the research covers a long time frame, the '*time effects*' are incorporated into the estimating '*Gravity Model*' in order to control for any influence of '*time*' that could affect sample countries' trade flows. Thus,

the 2-way fixed effects model (2-way FEM) is, in conclusion, perceived to be the most appropriate estimation in this application. The *'dynamic regional dummies'* are, in addition, incorporated to capture the fact that AFTA was gradually formed and to see whether any special events have brought noticeable impacts to AFTA's trade at all.

As the domain of this research is expanded to include key external traders, the estimated *'AFTA-effects'*, in contrast to Chapter 3's findings, portray a positive sign. This result confirms that, first of all, the choice of countries included in the *'Gravity Model'* does influence estimated results, especially on the *'AFTA-effects'* which are the interest of this paper. It can, in addition, be said that the negative *'AFTA-effects'* previously obtained in Chapter 3 are suppressed within the ASEAN border. In the gravity specification in which all specific types of *'dynamic regional dummies'*: $AFTA_{ijt}$, $I-AFTA_{ijt}$ and $J-AFTA_{ijt}$ are included, *'AFTA-effects'* give the expected positive sign and are highly significant. By considering each regional dummy's estimate, the paper finds that such positive and significant *'AFTA-effects'* are deemed to be driven by *'export-effects'* or extra-export bias that $I-AFTA_{ijt}$ captures, implying that ASEAN countries have expanded their trade (exports) to outside traders and delayed members post-AFTA. This result can be seen to imply that if ASEAN countries continue to exploit AFTA further as an integrating production centre, and a regional marketplace to supply the rest of the world's demand, the intra-ASEAN trade could therefore be increased. If ASEAN countries, however, aim to increase intra-ASEAN trade by only focusing on trading among themselves, it will be difficult to observe positive and significant *'AFTA-effects'* as expected. The latter is certainly what Chapter 3 has presented. As this chapter considers top traders outside the region, trading patterns estimated by the gravity

framework imply that ASEAN countries can certainly use AFTA as an export base to access larger markets. It can also be said that if AFTA brings about the increase in extra-export bias without much diversion in extra-import bias, the larger positive '*AFTA-effects*' are not far reaching. However, these results, in general, imply that since AFTA's formation in 1992, ASEAN countries have not been effective in utilizing AFTA to increase intra-ASEAN trade. That is because, despite the positive and significant '*AFTA-effects*' estimates obtained, the coefficient values are still considered minimal. At this point, in the face of minimal positive benefits among members, as AFTA has been completed and continues to work as an integrated region, it can, in conclusion, be perceived as a successful integration politically but not yet so economically.

Part III : Theoretical Analysis

5: On the Course of RTA Expansion: Implications from the Gains from Trade and Welfare Effects

5.1 Introduction

The objective of this chapter is to construct a theoretical framework explaining the incidence of RTA-membership's expansion. In principle, given that the particular RTA is already formed, the paper aims to evaluate the economic effects that this RTA probably has on outside relevant countries. These economic impacts from the RTA that each country receives are then compared if a country opts to be another bloc member versus the case in which she continues trading without bloc-membership. As the key theoretical concept focuses on the economic aspect of the bloc's expansion, any gains or losses from trade that the country experiences from the existing RTA are thus related to why a country should follow into the existing bloc or, in other words, whether joining the existing bloc is a cost-effective action.

Nevertheless, before laying out any discussions, first of all, it is worth recalling the empirical framework that was employed in previous chapters; under the renowned '*Gravity Framework*', the so-called '*AFTA-effects*' were examined under the assumption that AFTA dummy variable is treated as an exogenous factor. Although this assumption is deemed rather strong, it is certainly the norm in gravity-based studies that seek to measure trade effects of RTA(s) on relevant countries' trade flows. Given that the RTA of interest existed with a specific number of members, researches usually go on to investigate whether this particular RTA benefits relevant countries' trade: both

members and non-members. Taking into consideration this norm, however, the chapter not only attempts to evaluate RTA-effects on relevant countries' economies but also intends to discuss underlying forces that conceivably drive this particular RTA to expand. As a consequence, the chapter needs to relate how these non-membership countries are influenced by the existing RTA with their incentives towards RTA-membership application. Given that the economic impact of the RTA is the most important factor in this situation, these outside countries should become the next RTA-members only if they perceive that trading with membership status benefits them more than doing so without it. Provided these relationships, it can be seen that RTA-membership is allowed to be endogenous in this dialogue as countries can choose whether to engage in the existing RTA or continue to trade without RTA-membership. Outside countries do not necessarily have to follow into the bloc if it is not economically feasible to do so.

Despite the fact that an endogenous RTA-membership assumption seems to be contradictory to the exogeneity assumption on the AFTA-membership dummy earlier hypothesized in Chapter 3 and Chapter 4, this paper perceives that both conjectures are acceptable as they certainly serve different purposes. However, it is important to state here that this paper does not intend to claim that RTA-membership has to be endogenous all the time. The endogeneity of RTA-membership is aimed at easing the discussion in which economic reasons are the cause of RTA-membership expansion in this chapter specifically. Nevertheless, with regard to AFTA, for some, the theoretical examinations on RTA-membership expansion provided here may look as if they are connected to the AFTA context as the zone was not completed at once but gradually

expanded over time. From the historical note provided in Chapter 1, it is, however, evident that AFTA is a politically driven RTA. Countries have to join into this regional format as long as they are located in the South East Asia region, confirming that they have no escape from AFTA-membership. The exogenous assumption of AFTA-membership is thus valid in their case as AFTA was not an economically formed or trade-driven RTA. Notwithstanding the fact that the endogeneity assumption of RTA-membership may not directly relate to AFTA, the theoretical analysis in this chapter is yet able to provide an alternative viewpoint if ASEAN countries have had the opportunity to choose to engage in AFTA at all. It is plausibly feasible that '*AFTA-effects*' on each member's trade could have turned out to be more profitable than currently observed if economic outcomes had been directly prioritized. Even so, one shall not forget that the true intention of this chapter is not to discuss the proliferation of AFTA in particular, but to offer theoretical discussions to scrutinize the course of RTA-membership expansion in the general context. Any theoretical outlines that this study aims to develop are therefore new and independent from any previous work.

5.2 Related literature

5.2.1 Intuitive accounts

In the realm of discussions which address the occurrence of RTA-membership expansion, it is interesting to observe that they are predominantly determined by intuitive notions. The study theorizes that there are 2 major schools of thoughts in this regard. The first one is known as the '*static*' approach, associating the '*static*' trade

bloc-effects taking place on members' trade flows, with non-members' incentives on whether to follow into the bloc. This approach is, in fact, comprised of 2 fundamental concepts that have been derived from 1) the '*net trade effects*' by Viner (1950) and 2) the '*gross trade effects*' by Balassa (1967). This '*static*' idea was celebrated during the so-called '*first wave*' era of regionalism as it was the period in which countries were interested in taking part in preferential liberalization, especially in the form of regional trade liberalization. The formation of the European Economic Community¹ in 1958 together with its enlargement were, for instance, key events of the era. Conversely, the second approach is known as the '*dynamic*' analysis, attempting to scrutinize directly countries' incentives that lead to the formation and the proliferation of the RTA. This notion was, in fact, developed during the so-called '*second wave*' of regionalism or as Bhagwati et al. (1999) named it as the '*second regionalism*'. To be precise, it was the period during which many economists and politicians started to raise concerns over whether RTAs are building blocs or stumbling blocs to multilateral trade liberalization. As regionalism was largely practiced during that period, researchers were in doubt that multilateralism or the world's free trade ideology would be able to achieve anything at all. In addition, there seemed to be more than a few occasions where trade benefits generated from RTAs were limited to within the membership. As this implies that benefiting RTAs could still be harmful to relevant non-members, these non-membership countries would, therefore, be safer or better off if following into a particular RTA as well. Thus, given that relevant countries' decisions as well as their incentives in joining the particular RTA were examined, these were linked further to explain the incidence of

¹ It is now the European Union (EU).

RTA(s)-membership expansion at the same time. The following sections, for these reasons, elaborate these 2 intuitive notions in detail.

The ‘static’ approach towards RTA-membership expansion

The most primitive discussion that touched upon the incidence of RTA-membership expansion is the ‘*net trade effects*’ approach. It relates the ‘static’ RTA-effects on trade originated by Viner in 1950, which traditionally examines trade creation and trade diversion of a particular RTA, with how non-members make decisions towards joining a particular bloc. Given that the RTA is already established, it is worth recalling a circumstance in which RTA-membership traders have redirected their trade within the integrated area as a result of tariff liberalization. This includes the redirection of trade from higher-cost members to lower-cost ones and the creation of new trade ties due to improvements in each member's comparative advantage. This, according to Viner (1950), can be inferred as trade creation. Even though the concept of trade creation is deemed to be beneficial to RTA-membership countries, this does not confirm that a particular RTA is overall benign or economically efficient. One therefore has to examine further whether such increases in members’ trade are actually compensated for by the diversion of trade that RTA members have previously conducted with the more cost-efficient traders during the pre-RTA period to the less cost-efficient ones which however become RTA members post-RTA formation. If this takes place, it indicates that trade diversion certainly occurred. As this relationship is not easy to distinguish, in empirical analyses concerning RTA-effects on trade flows, one usually relies on the traditional ‘*Gravity Model*’ to find trade effects during the pre-RTA and the post-RTA

trading situations to see whether there are any reductions in the trade that these current RTA members conduct with non-RTA traders or the rest of the world, post-RTA. By combining the effects of trade creation and trade diversion together, one is able to obtain Viner (1950)'s '*net trade effects*' which are used to conclude the overall effects of a particular RTA. When trade creation exceeds trade diversion, a particular RTA is thus perceived as a cost-effective integration, benefiting the membership as a whole. If, however, trade diversion ends up outweighing trade creation, an economic integration is instead concluded to be not so benign in general and, in particular, harmful to relevant non-member traders².

Similarly, the so-called '*gross trade effects*' of Balassa (1967) are linked to non-RTA members' incentives to join the existing RTA, although this concept actually examines RTA-effects on the membership's trade flows in particular. Once again, the renowned '*Gravity Model*' is usually employed to measure any trade effects that member countries received from the RTA. When the '*gross trade effects*' of a particular RTA are trade creating, this is deemed to boost non-members' incentives to seek RTA-membership status. Joining the existing RTA is, once again, seen as a safe haven strategy as these non-membership countries are believed to aim for similar gains to those that the current RTA members have received as part of a particular bloc. Moreover, it is likely that these non-member countries are concerned about losing existing trade ties as well as any negotiating power in international markets if they continue to trade from outside the integrated zone while everyone else is participating. The situation could be worse in principle if this particular RTA increases further in size. Hence, following into the bloc

² As noted in an overview by Bhagwati et al (1999), that according to the definition given by Viner (1950), a trade diverting FTA can still benefit the membership's welfare even though it implies that non-member countries' welfare is damaged in general.

is, in comparison to standing still, regarded as a secure path to protect oneself from being left out *a priori*. On the contrary, if a particular RTA is concluded to be a trade diverting one, as earlier explained, it implies that the memberships' trade ties - *ex-post* - have been switched from the most cost-efficient non-members to the less cost-efficient members. Nevertheless, it is not possible to separate effects of trade creation and trade diversion from one another in this case, as this '*gross trade effects*' approach only accounts for effects of a particular RTA on its intra-bloc trade. One has to keep in mind that there is no direct examination of the RTA-effects on non-members' trade flows in this matter. Thus, in such an application, a trade diverting RTA plausibly means that there is not much trade created among RTA members in general or the particular RTA has failed to increase trade flows within the membership overall.

From the economic intuitions abovementioned, it can be summarized that both '*net trade effects*' and '*gross trade effects*' concepts do focus on the positive trade impacts of the RTA in explaining bloc-membership expansion. As long as the '*net trade effects*' illustrate that a particular RTA is net trade creating, outside (non-RTA) countries are recommended to seek RTA-membership status as this could be regarded as a safe haven strategy: especially when others are doing so. In a similar vein, research that employs the '*gross trade effects*' concept focuses on the positive effects of an RTA. Provided that the RTA of interest has arrived at '*gross trade creation*', it is concluded that the RTA is relatively beneficial to its membership and hence it is suggested that non-membership countries follow into the RTA in order to obtain a similar outcome. Although the '*net trade effects*' notion does address the negative upshot of the RTA via trade diversion, such an outcome is seen as an additional force driving non-members

towards RTA-membership. To be precise, the size of the trade diversion, diverted from non-RTA members or the rest of the world, additionally implies that non-members should be inclined to join the bloc as participating in the RTA is considered one of the ways to avoid encountering further losses. Given this explanation, the underlying forces that drive a bloc to expand remain ambiguous.

The '*dynamic*' approach towards RTA-membership expansion

It was briefly aforementioned that the '*dynamic*' analysis was actually created to clarify the concerns whether RTAs are building blocs or stumbling blocs to multilateral trade liberalization, this approach, by and large, explains RTA-membership expansion in the political economy framework. The following questions are disentangled : What incentives cause countries to want to engage in the existing RTA? What incentives cause members to allow new entries? What are the incentives for members to seek multilateral liberalization?. As this involves politics, countries' decisions are, in general, assumed to be responding to special interest groups that support politicians. As one of the most common objectives of politicians is to get re-elected, policies are aimed at satisfying the supporting groups with the strong anticipation of receiving their votes in return. Considering this view point, a country's decision on whether to participate in an existing RTA of interest is nothing but another set of policies that the government exercises to meet such an objective. Analogous intuitions are also applicable for the current RTA members deciding whether to accept newcomers or to prevent them from coming in the bloc. Even though this '*dynamic*' notion was later developed into some theoretical literature, it is somewhat surprising that the majority did focus specifically on causes of regionalism i.e. how the RTA is formed, rather than seeking explanations

of how the bloc expands³. Another group of theoretical accounts that claimed to elaborate on the proliferation of the RTA in fact viewed the RTA and multilateral trade liberalization as 2 distinct kinds of trade agreement i.e. on regional versus multilateral levels⁴. In such cases, research does not directly explain the mechanisms underlying the proliferation of a particular RTA but illustrates a country's incentive structure in choosing between the regional form of trade liberalization and the multilateral liberalization separately. Indeed, this is done in order to maximize the political support of the governing parties. As this '*dynamic*' approach was intended to provide answers for the '*second wave issues*', general discussions have therefore been focused on analysing current RTA members' incentives specifically on whether to take a step forward to multilateral free trade or to continue trading under the regional liberalization scheme. For these reasons, there seems to be limited research that touches directly upon non-members' incentives or the so-called '*third country effects*' in this matter.

5.2.2 Theoretical accounts

Apart from the intuitive notions abovementioned, to the extent that theoretical assessments are concerned, there are also a few accounts that uniquely discuss the incidence of bloc-membership expansion by looking at non-members' incentives to join the bloc. Within this limited amount of research, Baldwin (1995)'s was the first account that studied non-members' incentives theoretically. Since this chapter's interest also lies within this realm of research, attempting to scrutinize what drives non-members' decisions to integrate into the bloc, Baldwin (1995)'s work is worth describing in detail

³ See Grossman and Helpman (1995), Baldwin (1997), Yi (1996), Freund (2000), Aghion et al. (2007).

⁴ See Levy (1997), Krishna (1998).

here. Similar to other research at the time, his study was another account that aimed to elucidate the '*second wave issues*'. In particular, the research attempted to explain the scenario whereby countries appeared to liberalize regionally rather than multilaterally, hence, enlarged RTAs existed in different parts of the world. Given that a particular RTA has already been formed, Baldwin (1995) examined 2 fundamental scenarios which were assumed to influence non-member countries to seek bloc-membership status. In doing so, Baldwin (1995) observed that the growth of regionalism, which was widespread in many parts of the world during the 1980s and 1990s, was caused by sequential lobbying for RTA-membership in each country or, as Baldwin (1995) named this, the so-called '*domino effects*'. Starting with a positive model of RTA-membership, a country is assumed to be indifferent to the choice between staying still and acquiring membership status from this RTA initially. With the focus on politics, the political equilibrium in which the pro-RTA membership and the anti-RTA membership forces are in balance is in addition presumed to exist in each country. The pro-RTA membership force is linked to the country's exporting sector which is expected to gain from preferential tariffs and privileged access if it joins the existing RTA, and, on the contrary, to suffer from tariff barriers and other kinds of discrimination if it stays out. The anti-RTA membership force is associated with a country's import competing sector wherein increases in competition are foreseen to come from RTA-member competitors. Other non-economic objections against joining the RTA are also added into this anti-RTA membership force. Furthermore, an equilibrium in which the economic benefits of membership to the last member of the bloc equal its non-economic costs is assumed to exist within the RTA itself. Thus, when there is a deepening of an existing integration, this is considered to violate this equilibrium as closer integration signals more

profitability to be generated within the bloc. While the RTA members could enjoy tariff preferences and enlarged market access, non-members face additional discrimination after the integration is tightened. Such change disrupts not only an initial political equilibrium within the bloc but also equilibria among non-members.

Similar relationships can be observed at the country level. The deepening of integration within an existing bloc is perceived as an idiosyncratic shock to the country's political equilibrium. The pro-RTA agents as well as the anti-RTA ones lobby the government in order to protect the sector in which each associates. As Baldwin (1995) assumed further that the size of a trading sector is positively linked to the political power, and since, in general, the export sector is systematically larger than the import sector, the shock will raise the pro-membership force more than the anti-membership force. If the pro-RTA force wins, the country ends up lobbying the government to apply for RTA-membership even though she was indifferent to the RTA connection previously. When one of the non-RTA members decides to join the existing RTA in the end, this additional member in the bloc heightens discrimination against remaining non-members. As previously, new political economy forces among non-RTA members will be formed as each country's political equilibrium is now disturbed. Considering what is perceived to be an increase in discrimination coming from this enlarged bloc, together with the assumption that the export sector is usually larger than the import equivalent, the pro-RTA membership force in this particular non-RTA country will be increased more than the anti-RTA membership force. Basically, as long as a country's pro-RTA movement outweighs the costs associated with the anti-RTA membership force, the bloc is able to expand and the so-called '*domino effects*' persist. On the condition that the bloc is opened, this single incident of regional liberalization plausibly triggers a series of RTA-

membership expansions. These '*domino effects*' keep rolling until the RTA obtains a new political equilibrium. Such domino-like relationships in RTA-membership expansion have been acknowledged by many trade scholars and political economists hence it being referred to formerly as the '*domino theory of regionalism*'.

However, it should not be forgotten that, according to Baldwin (1995), RTA-membership expansion is acknowledged as a political process. Whether or not a country follows into any existing RTA, her decision is based on gaining (maximizing) political support rather than a country's profits and welfare. Thus, it is not surprising that important features stated in traditional trade and regional integration research such as analyses on the terms of trade changes, examination of regional effects in different forms of trade creation and trade diversion, were not directly emphasized in the domino theory.

With reference to the '*domino effects*', Bhagwati (1991) and Harvie et al. (2006) had also shed light on these issues. In summary, RTA-membership expansion is regarded as being a result of the way in which relevant non-RTA countries respond to major global events such as economic crises as well as cases in which large economies form a RTA. This is because such events are perceived as '*idiosyncratic shocks*', playing a vital role in influencing countries that are without RTA-membership status to engage in the existing RTA, or even to form their own. These actions are, once again, seen as a sort of security for non-RTA countries: avoiding or minimizing any negative consequences that are expected to occur from such idiosyncratic events.

Bhagwati (1999) is another account that underlines non-members' incentive structure toward bloc membership. In the overview of his book, *'Trading Bloc'*, he looks at relevant countries' incentives in forming and expanding trade blocs as a part of the so-called *'dynamic time-path question'* and asserted that such incentives require a study in the political economy framework:

“A meaningful examination of the incentives to form and to expand trade blocs will therefore have to be in the new and growing field of political economy-theoretic analysis” (Bhagwati, 1999, p.19).

With regard to the incidence of bloc-membership expansion, in summary, one needs to observe the relationships between 3 major forces which Bhagwati (1999) called *'agents'*. They are 1) governments of member countries 2) interest groups in member countries and 3) interest groups and the government of outside countries. In order for the bloc to be successfully expanded, it was discussed that apart from a willingness to accept new members by RTA members' governments and interest groups, another force that is essentially required is a readiness to participate in the bloc on the part of governments and interest groups in potential member countries. Although the discussion was alleged to be based around political economy factors, Bhagwati (1999) actually stated an economic reason, fear of trade diversion, to be one of the reasons that outside countries plausibly use to seek bloc-membership eventually.

A recent international relations study by Solis et al. (2009) can also be classified under this research category. Despite the paper focussing exclusively on the case of FTA proliferation, the ideas concerning non-member's incentives were likewise mentioned. The incidence of FTA expansion was perceived to be driven by the so-called

'bandwagon effects' that are generated once major traders signed any new FTAs. Basically it was discussed that, because of the novel FTA formation, new diffusions and positive attitudes toward the FTA or regionalism in general are said to be created among non-FTA countries. It can be seen that this view is similar to Baldwin(1995)'s *'domino theory of regionalism'* in the area, in that the prior actions of their peers are the key factor affecting outside countries' views and decisions on whether to follow into any existing regional blocs. Still, the term, *'bandwagon effects'* is rather subjective as there were no explicit details stating its underlying relationships.

Last but not least, the slackness of WTO negotiating processes as well as problems found in multilateral talks are another area that previous research has claimed to be driving growth and expansion of RTAs across the globe. Basically a global phenomenon whereby regionalism appears to have increased occurs because, in comparison to the multi-national level, it is easier for countries to achieve mutual agreements at a regional level⁵.

As can be seen thus far, intuitive notions as well as theoretical accounts concerning RTA-membership expansion have been stressed strictly within the political economy and international relations frameworks. This was the case because, as previously mentioned, during the time that this literature emerged, global concerns were aimed at finding out whether regionalism would, in the end, harm multilateralism. Such doubt was basically viewed as a political problem rather than an economic one. Thus, this could be perceived as the major reason why there has not been much discussion

⁵ See Krugman (1991), Bhagwati (2008).

concerning RTA-membership expansion in terms of pure economic analysis in general. It is, in fact, worse if one considers the analyses on RTA-membership expansion via the *'domino effects'* or non-members' decision in particular. Moreover, economic literature that studied regional trade liberalization mainly focused on finding economic effects of the integration. That research, for this reason, often assumed or took for granted that the studied RTA expands. Empirical examinations in Chapter 3 and Chapter 4 are indeed within this category.

Even though political economy research has been valuable, this chapter perceives that analyses are partial as discussions are subverted to satisfy political goals such as maximizing the votes from supporting groups. On top of that, most political economy research does not analyse regional trade agreements (RTAs) in particular, but investigates preferential trade agreements (PTAs) which are not necessarily regional. When the latter is the case, it is not surprising if politics were deemed to play the most important role in influencing the expansion of such blocs. Nevertheless, it is important to remind the reader that this chapter aims to analyse regional trade blocs and their expansions specifically. Thus, key economic principles exhibited within the study of international trade such as profit and welfare-maximizing trading strategies will be discussed and emphasized. In addition to political economy perception, this chapter aims to point out that a pure economic theoretical viewpoint would certainly be a useful supplement to the discussion of the issues.

5.2.3 Empirical accounts

With emphasis on assessing non-members' decisions towards bloc-membership, another group of researchers explained this concept via an empirical approach: combining '*net trade effects*' found under the conventional gravity framework and '*domino effects*' of Baldwin (1995) together. Sapir (2001) employed the standard '*Gravity Model*' to estimate 16 Western European countries' trade flows in order to investigate the European Community (EC) expansion during 1960–1992. The results indicated that, as the EC expanded, members' trade flows were increased while non-members' ones decreased. These trade effects from the EC were measured in the form of trade creation and trade diversion in the traditional way. Even so, the study used the term '*domino effects*' to characterize the corollary of trade diversion on non-EC countries' decisions towards becoming bloc members; it appears that non-member countries did apply for EC-membership afterwards. The study, in consequence, concluded that the so-called '*domino effects*' had influenced outside countries to follow into the bloc:

The empirical findings of the study support the hypothesis that “domino effects” have played an important role in Europe. These effects may be partly responsible for the successive enlargement of the European Community from its original 6 to its present 15 members (Sapir, 2001, p.386).

In a similar vein, Roland (2006) applied the gravity framework to the study of the European Union's (EU) expansion during 1962 – 2004. Notwithstanding the amount of trade diversion found (on non-members) as the bloc expanded, in this application, it was not concluded to be the basis for '*domino effects*' *per se*. The research was finished with the result of the discrete choice model which was employed to access effects of the

domino variables⁶ on a country's decision whether to join the bloc. Roland (2006) stated that:

Our gravity analysis has revealed that the expansion and deepening of the EU had a negative impact on non-members by causing trade diversion. This is a necessary condition for the domino effects, but it is not sufficient...we need to assess the impact of domino variables on the probability that a particular country applies for EU membership (Roland, 2006, p. 23).

In conclusion, his empirical findings suggested that as the bloc size increases, the likelihood of non-members' participation in the bloc likewise increases. The so-called '*domino effects*' were, as a result, considered valid to explain the case of the EU expansion in this application.

The more recent research by Baldwin and Jaimovich (2010) also supported the view that the so-called '*domino effects*' are an important force for FTA-membership expansion⁷. In addition to the gravity framework employed to assess trade effects of the RTA of interest, this research went further to form an empirical index: known as '*contagion effects*', to describe how contagious an FTA is with respect to third nations. As trade diversion is perceived to be a major trigger for the '*contagion effects*' of the FTA, this is where there is a similarity to the '*domino effects*' of Baldwin (1995). Nevertheless, the fundamental idea of the '*contagion effects*' is actually simpler: given that a representative country is not yet a member of the FTA, the importance of this nation's trading partners as well as the number of FTAs that trading partners have

⁶ These variables are: (a) the size of EU bloc (b) degree of EU integration (c) trade uncertainty and (d) multilateral backlash.

⁷ This study extends the domino theory to allow for FTAs as the original work by Baldwin (1995) only focused on customs unions. Basically, the aim of the paper was to test for the '*domino effects*', given the number of bilateral FTAs signed in the data set.

signed are a means to measure how contagious a particular FTA is to this nation. In brief, the contagious hypothesis stated that:

“A pair of countries should be more likely to sign a new FTA if either of them has recently signed FTAs with the third nations that are the pairs’ exporting rivals” (Baldwin and Jaimovich, 2010, p.2).

By applying the spatial econometric techniques to the development of the structure of spatial interdependence in the contagion index, the research’s main findings confirmed that the index correctly captures the ‘*contagion effects*’ among the FTAs provided in the data set⁸.

Even though these empirical accounts are insightful, it is evident that analyses were limited to findings found by the traditional ‘*Gravity Model*’, relating volumes and quantities of trade for relevant countries affected by a particular RTA with non-RTA members’ decisions towards applying for RTA-memberships. Relying solely on the trade-effects of RTAs, (trade creation and trade diversion) these analyses have been criticized as incomplete, especially when terms of trade as well as welfare effects are concerned⁹. This is mainly because a major component for welfare discussion, the information on ‘*price*’ or the so-called ‘*price effects*’, were not directly referred to in the empirical accounts aforementioned. According to Winters and Chang (2000) and Chang and Winters (2002) which both aimed to investigate RTA-effects on non-members’ welfare, the ‘*price effects*’ were pinpointed as a better indicator to explain that matter. Beginning in Winters and Chang (2000), economic impacts from Spanish accession to

⁸ The data on FTAs comes from Hufbauer and Schott (2009). Data collection was limited to the year 2005 for the completion of data on all variables.

⁹ See Winters (1997a), Winters (1997b)

the EC were observed on prices of Spanish imports of goods from major OECD countries¹⁰. Pricing games in which relevant suppliers compete within the Spanish market were used to indicate effects from the EC on both members' and non-members' trade flows. In principle, this can be explained in a Bertrand setting: when a foreign firm exports, its price depends not only on tariffs but also on other exporters' prices. Thus, compared to the RTA-membership exporters which have received tariff preferences, *ceteris paribus*, the non-RTA exporters would have to reduce their prices accordingly in order to maintain their competitive edge. The degree of price change after the RTA has been established or expanded therefore implies how much non-RTA members' terms of trade or welfare have been affected. Even though the study had difficulties acquiring data on prices and tariffs, their results suggested that tariff reduction on the EC's exports to Spain reduced the pre-tariff prices of US and Japanese exporters in consequence¹¹. With a better data set, Chang and Winters (2002) repeated the same procedures studying the '*price effects*' of the MERCOSUR on non-members' terms of trade. The results confirmed that the prices of non-members' exports to the integrating market declined following the point at which the MERCOSUR granted tariff preferences to membership countries. In this instance, one can therefore conclude that, without raising any additional trade barriers on non-members, their terms of trade would still be negatively affected as a result of MERCOSUR nonetheless.

Even though the importance of the '*price effects*' was emphasized, it is however important to note that Winters and Chang (2000) and Chang and Winters (2002) did not go further to examine how the bloc expands. Given related literature reviewed thus far,

¹⁰ The United States, Japan, France, West Germany, Italy and the United Kingdom

¹¹ The model II shows that for every 1% reduction in EC costs, including tariffs, the US/EC post-tariff price increases by 0.56% and the Japanese /EC relative by 0.42% (Winters and Chang, 2000, p. 374).

it is evident that the majority of the pure economic analyses were conducted empirically. Theoretical literature in this field is, as a result, in demand. Considering related literature abovementioned as a guideline, this paper perceives that theoretical developments could be carried out by incorporating the volume or quantity effects of the RTA that is impacting on trade as well as implications of the '*price effects*' into the discussion. To the best knowledge of the author, such matters have not been narrated formally in explaining bloc-membership expansion: hence this is the contribution of this chapter.

5.3 Theoretical frameworks

In order to explain RTA-membership expansion, one way to simplify the matter is to assume that a country's decision is driven solely by economic impacts from this particular trade bloc. Here, the analysis conforms to Baldwin (1995)'s theory in that the study works on a positive model of RTA; the gains from trade of members and non-members are compared when the RTA of interest is already established. Even though this concept can be applied to study other RTAs of different types and sizes, the chapter starts to formalize the analysis in the case where there is only one RTA. The key principle is that whether or not a country is in the bloc, her gains and losses vary, given that her trading partners are members or non-members of the specific RTA at the same time. It is thus possible for a country to foresee the gains and losses that will occur if she decides to be another bloc member or if she continues to trade from outside the zone without bloc-membership. By the same token, the chapter aims to apply the same principle to examine the welfare effects of a representative country. Given these

assumptions, this paper somewhat perceives the connection with the AFTA case. Even though AFTA was known to be a politically driven RTA, the fact that AFTA was gradually expanded plus the empirical evidence on the '*AFTA-effects*' that have been found to be positive on members but not so on non-members (delayed members) bring about ideas that AFTA's impacts especially on non-members' trade flows could potentially be a factor that drives AFTA to be completed eventually as planned. However, one should not forget that, as abovementioned, this paper does not attempt to study the case of AFTA-membership expansion exclusively but aims to provide theoretical explanations for RTA-membership expansion that could be observed in general. Hence, by constructing the theoretical analysis in this way, any policy implications drawn in this analysis can, more or less, be applied to any endogenously formed RTA.

5.3.1 The model

Albeit inspired by the '*domino effects*' concept by Baldwin (1995), the theoretical model which will be developed in this section is original. It combines standard profit maximizing ideology on the social utility function in order to derive the optimal set of outputs that a country could potentially produce and export. Assuming that every country is equal and the tariffs are symmetric worldwide, this output level is a vital factor to determine a country's profits as well as welfare levels. Thus, suppose that there are $i = 1, 2, \dots, N$ countries involved in international trade. For simplicity, all of these countries are assumed to be symmetric in size. In this setting, the importance of product differentiation is emphasized; the assumption in which all goods are differentiated by

place of origin is imposed. This can be seen as a sort of specialization and, to avoid complications in the calculation, it is assumed further that there is only one good produced in each country¹². In addition, every country in the model is comprised of 2 industries: tradable and non-tradable ones. Each country has identical homothetic preferences of a constant elasticity of substitution (CES) type. If C_{ij} is country j 's consumption on country i^{th} product, consumers in country j maximize social utility function given by:

$$U_j = \sum_{i=1}^N \frac{1}{1-\sigma} C_{ij}^{1-\sigma} + Z \quad ; \mathbf{0} < \sigma < \mathbf{1} \quad (5.1)$$

where σ is elasticity of substitution, Z denotes the set of non-tradable goods. When country i is the home country (i.e. $i=j$), the utility function represents a country's utility on her own domestic consumption.

Consumers in country j maximize Eq. (5.1) subject to the budget constraint given as:

$$\sum_{i=1}^N P_{ij} C_{ij} + Z \leq Y_j \quad (5.2)$$

To solve this utility maximization problem, the associated *Lagrangian* is formed:

$$\mathcal{L}(C_{ij}, Z, \lambda) \equiv \sum_{i=1}^N \frac{1}{1-\sigma} C_{ij}^{1-\sigma} + Z + \lambda (Y_j - \sum_{i=1}^N P_{ij} C_{ij} - Z)$$

¹² This is similar to Anderson and Van Wincoop (2003) in the area that each region is assumed to be specialized in the production of only one type of goods. This assumption is conducted to suppress finer classifications of goods.

To get the result, the first-order *Lagrangian* conditions and the following equations must hold at the solution values C_{ij}, Z, λ :

$$\frac{\partial \mathcal{L}}{\partial C_{ij}} = C_{ij}^{-\sigma} - \lambda P_{ij} = 0 \quad (5.3)$$

$$\frac{\partial \mathcal{L}}{\partial Z} = 1 - \lambda = 0 \quad (5.4)$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = Y_j - \sum_{i=1}^N P_{ij} C_{ij} - Z = 0 \quad (5.5)$$

From the first-order condition stated above, rearrange Eq. (5.3) and Eq. (5.4). As $\lambda = 1$, that implies :

$$C_{ij}^{-\sigma} = P_{ij} \quad (5.6)$$

Eq. (5.6) is, in fact, the inverse demand curve.

And, the price elasticity of demand is:

$$\varepsilon = \frac{1}{\sigma} \quad (5.7)$$

In this economy, let's assume for simplicity that labour is the only factor of production, and it can be used to produce either tradable or non-tradable goods. Assuming further that each unit of non-tradable goods (Z) requires 1 unit of labour: which its wage

normalizes as unity. What follows is wage in the economy is also unity. This is a partial-equilibrium setting in which wages are fixed. Applying the symmetric-country assumption, this allows the analysis to perceive all goods (N varieties from N countries) to be produced with the same cost function. In addition, this paper supposes that in each country, the industry cost of producing the goods is simply denoted by the constant return to scale production technology.

$$TC_j = l_j = m \sum_{i=1}^N C_{ji} \quad (5.8)$$

where $\sum_{i=1}^N C_{ji}$ represents country j 's total production which comprises of country j 's consumption on her own products (i.e. when $i = j$) as well as country i 's consumption on country j 's products, m is the labour input requirement per unit of output. And, l_i is labour used in producing total goods: $\sum_{i=1}^N C_{ji}$.

Before proceeding to an examination of how the RTA affects trade relationships of members and non-members, the pre-RTA situation is worth looking at. This study starts from the situation where countries trade with some costs on tariffs. Let's first assume that each country imposes tariffs; t , on all foreign imports. Treating tariffs as exogenous and symmetric, this simplifies the scenario as, for example, country i 's tariffs which are imposed on country j 's goods will be equal to the tariffs that country j applies on goods imported from country i . Thus, in this paper, one gets:

$$t_{ij} = t_{ji} = t \quad (5.9)$$

According to the representative social utility function mentioned earlier in Eq. (5.1), it represents how country j imports from country i . As tariffs are prevalent in the pre-RTA situation, the tariffs: t , are applied by country j on country i^{th} goods. Consumer's price in country j is therefore:

$$P_{ij} = P_{ij}^* + t \quad (5.10)$$

where P_{ij} stands for the price of country i^{th} product in country j , P_{ij}^* is the price that country i^{th} actually receives for its exports to country j . In the similar vein, the consumer's price of country j 's product in country i^{th} will be:

$$P_{ji} = P_{ji}^* + t \quad (5.11)$$

where P_{ji} is the price of country j 's product in country i^{th} , P_{ji}^* is the price that country j actually receives for its exports.

Gains from trade/RTA

Profits

In this situation, let's further assume that some countries are already RTA members. Given this assumption, it means that the import tariffs among members are waived while ones with non-RTA traders are still applied unchanged. As the world is comprised of N symmetric countries in this application, let's impose M countries to be members of the particular RTA. In case country j is one of the bloc members, country j 's profits

(from selling her products in the tariff-free zone and in the rest of the world markets) can be written as:

$$\pi_j^{RTA} = \sum_{i=1}^M P_{ji} C_{ji} + \sum_{i=M+1}^N (P_{ji} - t) C_{ji} - (m \sum_{i=1}^N C_{ji}) \quad (5.12)$$

The first term is the country's revenue from trading with bloc members inclusive of her own domestic market and the second term is revenue from trading with the rest of the world. This form of profit function is also applied to other RTA-membership traders in the same way.

Next, substitute the market price derived in Eq. (5.6) into the profit function above. Country j 's profit function when she is a part of the existing RTA is simplified as:

$$\begin{aligned} \pi_j^{RTA} &= \sum_{i=1}^M C_{ji}^{-\sigma} C_{ji} + \sum_{i=M+1}^N (C_{ji}^{-\sigma} - t) C_{ji} - (m \sum_{i=1}^N C_{ji}) \\ &= \sum_{i=1}^M C_{ji}^{1-\sigma} + \sum_{i=M+1}^N C_{ji}^{1-\sigma} - \sum_{i=M+1}^N (t C_{ji}) - (m \sum_{i=1}^N C_{ji}) \quad (5.12.A) \end{aligned}$$

From the profit function above, maximizing over the choice of C_{ji} , one can get the first-order condition. Country j 's profit maximizing outputs or, in other words, the optimal set of exports that are sold to another RTA-membership trading partner are:

$$C_{jj} = C_{ji} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{\sigma}} \quad (5.13)$$

However, when a trading partner is not a member of the RTA, country j 's profit maximizing outputs exported turn into:

$$C_{ji} = \left(\frac{t+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \quad (5.14)$$

Substituting amounts of outputs derived in Eq. (13) and Eq. (14) back into the profit function stated in Eq. (12.A) gives:

$$\pi_j^{RTA} = \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left(\frac{m\sigma}{1-\sigma}\right) + \sum_{i=M+1}^N \left(\frac{t+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\frac{(t+m)\sigma}{1-\sigma}\right] \quad (5.15)$$

Rearrange Eq. (5.15). One gets:

$$\begin{aligned} \pi_j^{RTA} &= \sigma \left[\sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} + \sum_{i=M+1}^N \left(\frac{t+m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} \right] \\ &= \sigma \left[M \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} + (N-M) \left(\frac{t+m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} \right] \end{aligned} \quad (5.15.A)$$

Certainly, this equation also represents all RTA-membership countries' profits written in terms of output levels in this application.

In the case that a representative country: country j , is not in the RTA, her profit function therefore becomes:

$$\pi_j^{No-RTA} = P_{jj}C_{jj} + \sum_{i=1, i \neq j}^N (P_{ji} - t)C_{ji} - (m \sum_{i=1}^N C_{ji}) \quad (5.16)$$

The first term is country j 's revenue from trading in the domestic market; the second term is the revenue from trading with other trading partners. Because country j is now outside the bloc, it can be observed that, in this instance, tariffs are imposed on all country j 's exports regardless of whether their trade partners are members of the particular RTA.

Following procedures conducted previously when country j is a member of the RTA, the market price derived in Eq. (5.6) is thus substituted into Eq. (5.16). Country j 's profit function when she is a non-RTA trader is thus derived as:

$$\begin{aligned}\pi_j^{No-RTA} &= C_{jj}^{-\sigma} C_{jj} + \sum_{i=1, i \neq j}^N (C_{ji}^{-\sigma} - t) C_{ji} - (m \sum_{i=1}^N C_{ji}) \\ &= C_{jj}^{1-\sigma} + \sum_{i=1, i \neq j}^N (C_{ji}^{1-\sigma}) - \sum_{i=1, i \neq j}^N (t C_{ji}) - (m \sum_{i=1}^N C_{ji}) \quad (5.16.A)\end{aligned}$$

Finding the first-order condition, one gets the profit maximizing outputs that are sold to the domestic market as:

$$C_{jj} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (5.17)$$

And amounts of products exported to each foreign market are:

$$C_{ji} = \left(\frac{t+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (5.18)$$

In this case, the profit maximizing outputs exported to the RTA-membership trading partners and the non-RTA ones are equal as these destinations impose symmetric tariffs equal to t . Substituting these quantities of outputs back into Eq. (5.16.A), the profit function of country j when she is a non-RTA trader is therefore :

$$\pi_j^{No-RTA} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{m}{1-\sigma}\right) - m\right] + \sum_{i=1}^N \left(\frac{t+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{t+m}{1-\sigma}\right) - (t+m)\right] \quad (5.19)$$

Rearranging the above equation, one gets:

$$\begin{aligned} \pi_j^{No-RTA} &= \sigma \left[\left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} + \sum_{i=1, i \neq j}^N \left(\frac{t+m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} \right] \\ &= \sigma \left[\left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} + (N-1) \left(\frac{t+m}{1-\sigma}\right)^{\frac{1-\sigma}{1-\sigma}} \right] \end{aligned} \quad (5.19.A)$$

Now, one is able to compare a country's profits if she decides to join the RTA to a case where she prefers to stay out. Given that M countries are in the RTA, a representative country: country j , decides to join the bloc if the profits that are foreseen to be received from participation are higher than the profits to be obtained from standing still. Thus, from Eq. (5.15.A) and Eq. (5.19.A), the proof to be carried out is finding that:

$$\pi_j^{RTA} - \pi_j^{No-RTA} > 0 \quad (5.20)$$

To do so, the paper simply conducts:

$$\begin{aligned}
\pi_j^{RTA} - \pi_j^{No-RTA} &= \sigma \left[M \left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} + (N-M) \left(\frac{t+m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} - \sigma \left[\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} + (N-1) \left(\frac{t+m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} \right] \right] \\
&= (M-1) \left[\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} - \left(\frac{t+m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} \right] \tag{5.21}
\end{aligned}$$

Considering Eq. (5.21), it is clear that $M \geq 2$ because in order for the RTA to be established, it requires, as a minimum, 2 countries to form the agreement. As a result, the first term: $(M-1)$ is guaranteed positive. In addition, as $\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} > \left(\frac{t+m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}}$, the second term: $\left[\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} - \left(\frac{t+m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} \right]$ is also proven to be positive. Since the RHS of Eq. (5.21) is confirmed to be positive, therefore it is true to state that:

$$\pi_j^{RTA} > \pi_j^{No-RTA} \tag{QED}$$

In this setting, it is evident that there are basically 2 types of traders: the RTA members and the non-RTA traders: having tariffs as the only factor that differentiates the cost of trade among them. A representative country's profit function changes depending on the trading status that she obtains: RTA member versus non-RTA member. With RTA-membership status, a country's profit function is accounted for by trading within the bloc and trading with the rest of world. When, as shown above, tariffs are exempted within the bloc, it can be seen that the amount of goods exported to each bloc member are larger, in comparison to the amount of goods that are exported to each the rest-of-the-world country. On the contrary, without RTA-membership status, a country's profit function is simply derived from trading in the domestic market and trading with the rest of the world. Apart from its own domestic market, this indicates that in all destinations

those goods are exported, a country has to pay for tariffs. Thus, comparing between these 2 instances; the amount of goods that the non-RTA country trades is definitely less than the RTA-membership case. In this framework, the amounts of goods traded directly reflect the revenues that these countries receive from trade. Therefore, it is unambiguous to conclude that the country's profits when trading under the RTA-membership status are higher than they would be if she traded from outside the zone.

Welfare effects

In this section, the study aims to analyse welfare effects when a representative country decides to join the existing RTA and compares that to the case in which she continues to trade without RTA-membership from outside the zone. As presented in Eq. (5.1) and Eq. (5.2), after the optimal set of consumptions has been consumed, a representative country: country j , spends the remaining income on non-tradable goods. Accordingly, one can define a representative country's welfare as:

$$W(p, Y) \equiv U_j = \sum_{i=1}^N \frac{1}{1-\sigma} C_{ij}^{1-\sigma} + Y_j - \sum_{i=1}^N P_{ij} C_{ij} \quad (5.22)$$

which after rearranging, it is simply equal to :

$$W(C_{ij}^{-\sigma}, Y) \equiv U_j = \sum_{i=1}^N \frac{\sigma}{1-\sigma} C_{ij}^{1-\sigma} + Y_j \quad (5.22.1)$$

where national income (Y_j) is assumed to be consisted of 1) factor payments 2) profits from trading or, in other words, the return to the fixed factors of production and 3) tariff revenue.

Therefore, one can write:

$$Y_j = L + \pi_j^* + t_j \quad (5.23)$$

where L denotes factor payments or cost of labour, π_j^* presents profits from trade and t_j signifies the tariff revenue, respectively. Thus, in case country j is a member of the RTA, by substituting profits as previously derived in Eq. (5.12.A) and the tariff revenue accrued from imports into the above equation, her national income can then be derived as:

$$Y_j^{RTA} = L + [\sum_{i=1}^M C_{ji}^{1-\sigma} + \sum_{i=M+1}^N C_{ji}^{1-\sigma} - \sum_{i=M+1}^N t C_{ji} - m \sum_{i=1}^N C_{ji}] + \sum_{i=M+1}^N t C_{ji} \quad (5.24)$$

It can be seen that the tariff revenue received is cancelled by the tariffs paid whilst exporting to other non-RTA members at the same time. Rearranging the above equation gets:

$$Y_j^{RTA} = L + \sum_{i=1}^M C_{ji}^{1-\sigma} + \sum_{i=M+1}^N C_{ji}^{1-\sigma} - m \sum_{i=1}^N C_{ji} \quad (5.24.1)$$

Substitute the national income (Y_j^{RTA}) as derived above back into the social welfare function in Eq. (5.22.1). As a result, country j 's welfare when she is a RTA member is derived as:

$$\begin{aligned}
W^{RTA}(C_{ij}^{-\sigma}, Y) &\equiv U_j^{RTA} = \sum_{i=1}^N \frac{\sigma}{1-\sigma} C_{ij}^{1-\sigma} + L + \sum_{i=1}^M C_{ji}^{1-\sigma} + \sum_{i=M+1}^N C_{ji}^{1-\sigma} - m \sum_{i=1}^N C_{ji} \\
&= \sum_{i=1}^M \frac{1}{1-\sigma} C_{ij}^{1-\sigma} + \sum_{i=M+1}^N \frac{1}{1-\sigma} C_{ji}^{1-\sigma} - m [\sum_{i=1}^M C_{ji} + \sum_{i=M+1}^N C_{ji}] + L \\
&= \frac{1}{1-\sigma} [\sum_{i=1}^M C_{ij}^{1-\sigma} + \sum_{i=M+1}^N C_{ji}^{1-\sigma}] - m [\sum_{i=1}^M C_{ji} + \sum_{i=M+1}^N C_{ji}] + L
\end{aligned} \tag{5.25}$$

The above equation can be elaborated further. By substituting optimal sets of consumption (as now a representative country is observed when she imports) into the equation, country j 's welfare level is:

$$W^{RTA}(t) = \frac{1}{1-\sigma} [\sum_{i=1}^M (\frac{m}{1-\sigma})^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N (\frac{t+m}{1-\sigma})^{\frac{1-\sigma}{\sigma}}] - m [\sum_{i=1}^M (\frac{m}{1-\sigma})^{\frac{1}{\sigma}} + \sum_{i=M+1}^N (\frac{t+m}{1-\sigma})^{\frac{1}{\sigma}}] + L \tag{5.26}$$

We can apply the same procedures to the case whereby country j trades without RTA-membership status. The country's income is therefore derived as:

$$Y_j^{No-RTA} = L + \pi_j^{No-RTA} + t_j$$

$$\begin{aligned}
&= L + [C_{jj}^{1-\sigma} + \sum_{i=1, i \neq j}^N C_{ji}^{1-\sigma} - \sum_{i=1, i \neq j}^N t C_{ji} - m \sum_{i=1}^N C_{ji}] + \sum_{i=1, i \neq j}^N t C_{ji} \\
&= L + C_{jj}^{1-\sigma} + \sum_{i=1, i \neq j}^N C_{ji}^{1-\sigma} - m \sum_{i=1}^N C_{ji} \tag{5.27}
\end{aligned}$$

Substituting country j 's income stated above and the amount of tariff revenue received from imports into the social welfare function in Eq. (5.22.1). The country j 's welfare when she is not a member of the RTA thus becomes:

$$\begin{aligned}
W^{No-RTA}(C_{ij}^{-\sigma}, Y) &\equiv U_j^{No-RTA} = \sum_{i=1}^N \frac{\sigma}{1-\sigma} C_{ij}^{1-\sigma} + L + C_{jj}^{1-\sigma} + \sum_{i=1, i \neq j}^N C_{ji}^{1-\sigma} - m \sum_{i=1}^N C_{ji} \\
&= \frac{1}{1-\sigma} C_{jj}^{1-\sigma} + \frac{1}{1-\sigma} \sum_{i=1, i \neq j}^N C_{ij}^{1-\sigma} + L - m [C_{jj} + \sum_{i=1, i \neq j}^N C_{ji}] \\
&= \frac{1}{1-\sigma} [C_{jj}^{1-\sigma} + \sum_{i=1, i \neq j}^N C_{ij}^{1-\sigma}] - m [C_{jj} + \sum_{i=1, i \neq j}^N C_{ji}] + L \tag{5.28}
\end{aligned}$$

Next, the above equation can be elaborated further by substituting optimal sets of consumption into the social welfare function. Doing so gets:

$$W^{No-RTA}(t) = \frac{1}{1-\sigma} \left[\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} + \sum_{i=1, i \neq j}^N \left(\frac{t+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} \right] - m \left[\left(\frac{m}{1-\sigma} \right)^{\frac{1}{-\sigma}} + \sum_{i=1, i \neq j}^N \left(\frac{t+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} \right] + L \tag{5.29}$$

At this instant, one is able to measure a representative country: country j 's, social welfare when she is in the RTA against the case whereby she is out of the zone. To

simplify the calculation, let's denote that $x = \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}}$ and $y = \left(\frac{t+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}}$. Substitute these values into Eq. (5.26) and Eq. (5.29). One gets:

$$W^{RTA}(t) = \frac{1}{1-\sigma} [M(x) + (N - M)(y)] - m[M(x) + (N - M)y] + L \quad (5.30)$$

and,

$$W^{No-RTA}(t) = \frac{1}{1-\sigma} [x + (N - 1)(y)] - m[x + (N - 1)y] + L \quad (5.31)$$

Considering Eq. (5.30) and Eq. (5.31), in order to prove that country j 's welfare is larger when she obtains the RTA-membership status, one has to show that:

$$M(x) + (N - M)(y) > x + (N - 1)(y) \quad (5.32)$$

To do so, one simply sets:

$$M(x) + (N - M)(y) - [x + (N - 1)(y)] > 0 \quad (5.33)$$

Rearranging, that is:

$$(M - 1)(x - y) > 0 \quad (5.34)$$

As $M \geq 2$ because of the assumption that it requires at least 2 countries to establish the RTA in this setting, this accordingly implies that $(M - 1)$ is positive. In addition, as $\left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} > \left(\frac{t+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}}$ thus $x > y$, referring that the second term $(x - y)$ is also positive.

Undoubtedly, it is proven that $M(x) + (N - M)(y) > x + (N - 1)(y)$ as Eq. (5.32) suggests. Applying this proof to the welfare functions previously derived in Eq. (5.30) and Eq. (5.31), the result indicates that: $W^{RTA}(t) > W^{No-RTA}(t)$. **QED**

Thus, in comparison to the case where the representative country trades from outside the zone, her welfare is definitely larger when she has RTA-membership status. *Ceteris paribus*, as far as both symmetric-country and symmetric-tariff assumptions apply, it can thus be implied that the welfare level of the RTA-membership country is higher than the non-RTA one in this application.

5.3.2 An extension of the model: asymmetric tariffs

The model above is simple yet informative enough to shed light on the basic structural effects of the RTA on the rest of the world. Even though it is built upon a symmetric assumption of countries' size and tariff level, it seems that a tariff-free trade zone matters much more for the profits and welfare levels of relevant trading countries. In summary, it appears that there are always positive incentives for those nations who are left behind to join the existing bloc in order to avoid loss due to the existing integration. This result can plausibly be regarded as one of reasons to explain why new RTAs are

prevalent and more than a few RTAs across the globe have kept on expanding their memberships further. This is indeed similar to what Baldwin (1995)'s '*domino theory of regionalism*' has suggested. Given that the RTA is formed, if outside countries perceive that joining this RTA is more beneficial than staying still, *ceteris paribus*, they should participate in this bloc as long as it is opened. Even though they cannot be certain about how much better off they would be, by being a part of the bloc, this more or less guarantees that they will not incur further losses from tariff discrimination. In this scenario, the potential member does not need to consider what will be occurred if other countries join the bloc. The analysis in this chapter only aims to explain what could have happened to profits and the welfare level if that particular country herself decides to take part in the existing RTA versus the case that she does nothing. It is true that in reality these outside countries may not necessarily join the existing blocs but form their own ones. This is, however, beyond the scope of this paper. To simplify the discussion, countries' decisions are limited to the question of whether they should join the existing RTAs or not, given that the supply of RTA-membership is unconstrained.

Nevertheless, one should keep in mind that, according to article XXIV of the General Agreement on Tariffs and Trade (GATT), it is stipulated that countries that join a preferential tariff reducing agreement must not raise tariffs (or common external tariffs, if any) afterward. In the case of the Free Trade Area (FTA), membership countries eliminate tariffs among themselves yet are allowed to keep their initial tariffs against the rest of the world individually. A similar concept is applied to the Custom Union (CU) setting, but membership countries can adopt a common external tariff against the rest of the world in this case. Even so, the CU must not impose a common external tariff higher

than the members' average pre-CU level. Considering this piece of information, the theoretical analysis provided thus far reasonably explains why article XXIV is essentially required to govern RTAs in general. At least in the symmetric (tariffs and countries' size) setting demonstrated earlier, it is unambiguously detected that any gains from trade in the form of profits and welfare levels that RTA-membership countries have enjoyed appear to be literally paid for by non-members' losses¹³. RTA-memberships certainly improve the terms of trade of participating countries, but deteriorate those in the rest of the world as long as the tariff rates of the zone toward the rest of the world remain constant. In addition, it can be said that the GATT's provisions which generally prohibit an increase in external tariffs post-RTA, are not sufficient to thwart terms of trade effects that are generated by the RTA. Not only is trade diversion confirmed to exist but the welfare effects that non-RTA countries experience have also been proved to be negative. Even though symmetric country size and identical tariff rates are rather strong assumptions, the unchanging external tariffs towards outside countries are, at least, realistic.

Before discussing the extension of the model, recall that in the fundamental setting, every country has imposed symmetric tariffs: the import tariffs equal to t are assumed: $t_i = t \forall i, i = 1, \dots, N$. Because of this rigid assumption, it drives tariff revenue that the country receives from imports to be equal to the tariffs that the country has to pay to the rest of the world in order to get products exported. This affects the country's income (Y) because in finding the total earnings as stated in Eq. (5.23), these 2 effects from tariffs simply cancel out. The income of a representative country is, as a result, left to depend

¹³ This plausibly explains the situation that a reduction of tariff rates toward the rest of the world was proposed after an economic integration is formed. See, for instance, Bhagwati (1993).

on factor payments (L) and profits from trading (π_j) only. Even though income (Y) is a part of the country's social welfare $W(C_{ij}^{-\sigma}, Y)$, by applying this symmetric tariff assumption, the effects from tariffs are deemed to be obscured in this case. One of the more realistic conjectures would be to relax such an assumption. Indeed, cases whereby tariff rates are different across countries and there is a disparity between a country's tariff revenue and the amount of tariffs paid to get products exported are more often than not prominent.

Following previous assumptions that there are N countries in this trading world having M countries engaged in the RTA that is exogenously formed, this section aims to elaborate the model further by making it more general than the initial setting. The paper does so by assuming that, in this situation, there are 2 countries: country a and country b , where their import tariffs imposed are different from the rest of the world. Basically, while assuming that the rest of the world's countries impose import tariffs equal to t_w individually, there are 2 specific countries: country a and country b that do impose import tariffs individually at t_a and t_b respectively. In addition, it is worth specifying further that $t_a > t_b$ in order to simplify the calculation. To be precise, this study imposes the tariff rates of country a and country b this way as to distinguish the terms of trade effects which occur to the high-tariff country and the low-tariff country in differing circumstances. Figure.5.1 illustrates this fundamental situation below.

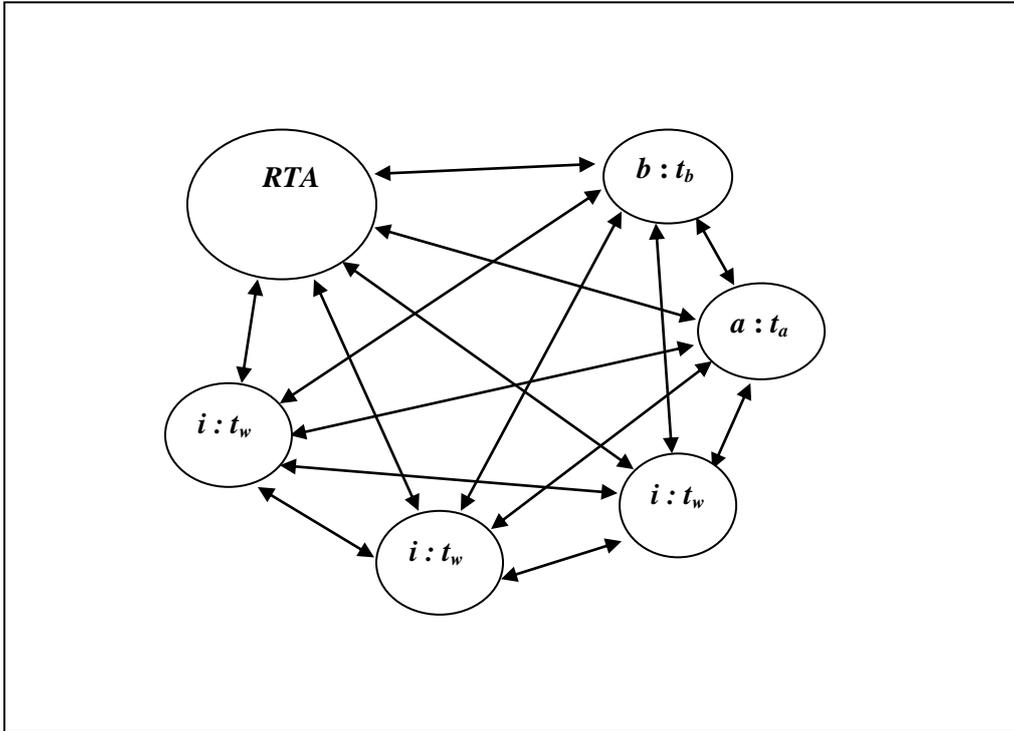


Figure 5.1: The Framework Illustrates the Scenario in which All Countries Trade Post-RTA

With such alterations, this study is able to draw a step closer to reality in explaining how countries with different tariff rates would be affected if they participated in the existing RTA. In order to provide a clear examination covering the necessary discussions, the analysis starts off criticizing this general asymmetric tariff setting. This part is, in fact, similar to an examination conducted earlier in the symmetric tariff context as the study once again aims to prove whether the RTA is beneficial to its participating countries. By doing so, the study also aims to compare the results of this general asymmetric tariff model to the symmetric tariff one directly.

Even though it is suggested in Figure 5.1 that there are now 3 asymmetric tariff rates in this trading world, the study chooses to examine country *a* as an example here. This study perceives it is possible to do so since the calculation procedures are the same even

if one considers other representative countries in this case. Hence, when this representative country: country a , decides to join the existing RTA, trade relationships can be drawn as Figure 5.2 illustrates.

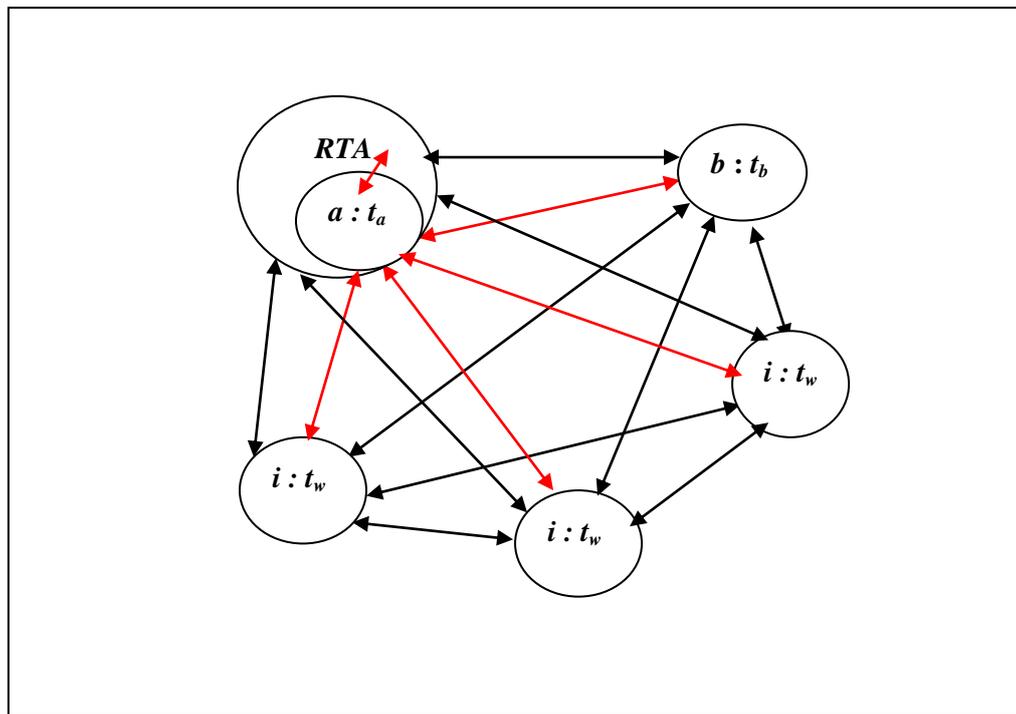


Figure 5.2: The Framework Illustrates the Scenario in which Country a Joins the Existing RTA¹⁴

As far as economic effects are considered as a key influence driving a country's decision to join an existing RTA, a representative country : country a 's profits and welfare effects if joining into the particular RTA are then compared to her profits and welfare effects when she continues to trade without any RTA-membership. Details are elaborated below:

¹⁴ The red arrows represent country a 's trade relationships while the black arrows represent trade relationships of other trading countries.

Gains from trade/RTA

Profits

Country a 's profit function is written in a similar vein to Eq. (5.12). When country a is an RTA member, the profit function can be written as:

$$\pi_a^{RTA} = \sum_{i=1}^M P_{ai} C_{ai} + \sum_{i=M+1}^N (P_{ai} - t_{ai}) C_{ai} - (m \sum_{i=1}^N C_{ji}) \quad (A.1)$$

As the market price remains the same as previously derived in Eq. (5.6), substituting this value into the above equation, country a 's profit function when she is one of the RTA members is derived as:

$$\begin{aligned} \pi_a^{RTA} &= \sum_{i=1}^M C_{ai}^{-\sigma} C_{ai} + \sum_{i=M+1}^N (C_{ai}^{-\sigma} - t_{ai}) C_{ai} - (m \sum_{i=1}^N C_{ai}) \\ &= \sum_{i=1}^M C_{ai}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N (t_{ai} C_{ai}) - (m \sum_{i=1}^N C_{ai}) \end{aligned} \quad (A.2)$$

Considering Eq. (A.2), it is important to state that $t_{ai} = t_w, \forall i, i \neq b$. That is because when $i = b, t_{ai} = t_{ab} = t_b$.

Given the profit function above, in order to find country a 's optimal set of exports, one has to maximize over the choice of C_{ai} : obtaining the first order condition. By doing so, country a 's optimal set of exports to another trader within the bloc equal:

$$C_{aa} = C_{ai} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \quad (A.3)$$

And, country a 's optimal set of exports to a non-RTA trader is:

$$C_{ai} = \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (\text{A.4})$$

Substituting amounts of output derived in Eq. (A.3) and Eq. (A.4) back into the profit function given in Eq. (A.2), country a 's profits when she is one of RTA members is:

$$\begin{aligned} \pi_a^{RTA} = & \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{m}{1-\sigma}\right) + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{t_{ai}+m}{1-\sigma}\right) - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \\ & - m \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} - m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \end{aligned} \quad (\text{A.5})$$

and, the above equation can be simplified as:

$$\begin{aligned} & = \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{m}{1-\sigma}\right) - m \right] + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right] \\ & = \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{m\sigma}{1-\sigma}\right) + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\frac{(t_{ai}+m)\sigma}{1-\sigma}\right] \end{aligned} \quad (\text{A.5.1})$$

Rearrange the above equation. One finally gets:

$$\pi_a^{RTA} = \sigma \left[\sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} \right] \quad (\text{A.5.2})$$

On the other hand, when country a does not join the RTA, her trade relationships are basically illustrated by Figure. 5.1, having the profit function written as:

$$\pi_a^{No-RTA} = P_{aa}C_{aa} + \sum_{i=1; i \neq a}^N (P_{ai} - t_{ai})C_{ai} - (m \sum_{i=1}^N C_{ai}) \quad (A.6)$$

Again, substitute the market price derived in Eq. (6) into the above equation. Country a 's profit function becomes:

$$\begin{aligned} \pi_a^{No-RTA} &= C_{aa}^{-\sigma} C_{aa} + \sum_{i=1; i \neq a}^N (C_{ai}^{-\sigma} - t_{ai})C_{ai} - (m \sum_{i=1}^N C_{ai}) \\ &= C_{aa}^{1-\sigma} + \sum_{i=1; i \neq a}^N C_{ai}^{1-\sigma} - \sum_{i=1; i \neq a}^N t_{ai}C_{ai} - (m \sum_{i=1}^N C_{ai}) \end{aligned} \quad (A.7)$$

From Eq. (A.7), with regard to tariffs, one has to note that $t_{ai} = t_w, \forall i, i \neq b$. That is because as when $i = b, t_{ai} = t_{ab} = t_b$.

Taking Eq. (A.7) into consideration, the first-order condition is thus conducted in order to find the country's profit maximizing outputs. As a result, the profit maximizing outputs that country a sells to the domestic market are derived as:

$$C_{aa} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (A.8)$$

whereas the amount that she exports into each foreign market, regardless of whether it is the RTA member is:

$$C_{ai} = \left(\frac{t_{ai} + m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (A.9)$$

As Eq. (A.9) suggests, it can be seen that when country a trades without having RTA-membership status, her profit maximizing outputs exported to RTA-membership traders and non-RTA ones are directly determined by the import tariffs that each country imposes individually.

Next, substituting the optimal sets of exports as derived in Eq. (A.8) and Eq. (A.9) back into Eq. (A.7). Country a 's profits become:

$$\begin{aligned} \pi_a^{No-RTA} &= \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{m}{1-\sigma}\right) + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{t_{ai}+m}{1-\sigma}\right) - \sum_{i=1; i \neq a}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \\ &\quad - m \left[\left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \right] \end{aligned} \quad (A.10)$$

Rearrange the above equation. One gets:

$$\begin{aligned} &= \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{m}{1-\sigma}\right) - m \right] + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right] \\ &= \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{m\sigma}{1-\sigma}\right) + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{(t_{ai}+m)\sigma}{1-\sigma}\right) \end{aligned} \quad (A.10.1)$$

Rearranging the above equation gets:

$$\pi_a^{No-RTA} = \sigma \left[\left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} \right] \quad (A.10.2)$$

Next, profits of a representative country: country a , when she is one of RTA members versus when she is not in the RTA, are compared. Following procedures conducted in

the symmetric tariff case, in order to prove whether $\pi_a^{RTA} > \pi_a^{No-RTA}$, one compares Eq. (A.5.2) and Eq. (A.10.2) finding that $\pi_a^{FTA} - \pi_a^{No-FTA} > 0$ or not. After doing algebra, this can be observed as:

$$\pi_a^{RTA} - \pi_a^{No-RTA} = (M - 1) \left[\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} - \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} \right] \quad (A.11)$$

From the above equation, as it requires at least 2 countries to negotiate the RTA, this implies that $M \geq 2$. The term $(M - 1)$ is, thus, positive. In addition, it is evident that $\left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} > \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$ therefore Eq. (A.11) is confirmed as a positive term. As it is so, one is able to state that $\pi_a^{RTA} > \pi_a^{No-RTA}$. This implies that in comparison to the case whereby the country trades without RTA-membership status, *ceteris paribus*, the RTA-membership country's profits are proved to be larger in this asymmetric tariff situation.

QED

Welfare effects

In a similar vein, when a representative country, country a , decides to join the existing RTA, her welfare is expected to alter. The following section therefore compares and contrasts welfare effects when a country decides to join the existing RTA, with the case that she continues to stay outside the zone.

In order to derive the social welfare function in the form of Eq. (5.22.1), one first needs to find country a 's national income: Y_a^{RTA} . In this case, it is:

$$Y_a^{RTA} = L + \sum_{i=1}^M C_{ai}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N t_{ai} C_{ai} - m \sum_{i=1}^N C_{ai} + \sum_{i=M+1}^N t_{ia} C_{ia} \quad (\text{A.12})$$

Substitute the value of national income: Y_a^{RTA} , as derived in Eq. (A.12) back into the social welfare function in Eq. (5.22.1). Country a 's welfare function when she is in the RTA is:

$$\begin{aligned} W_a^{RTA}(C_{ia}^{-\sigma}, Y) &\equiv U_a^{RTA} = \sum_{i=1}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=1}^M C_{ai}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N t_{ai} C_{ai} \\ &\quad - m \sum_{i=1}^N C_{ai} + \sum_{i=M+1}^N t_{ia} C_{ia} + L \\ &= \sum_{i=1}^M \frac{1}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N t_{ai} C_{ai} \\ &\quad - m \left[\sum_{i=1}^M C_{ia} + \sum_{i=M+1}^N C_{ai} \right] + \sum_{i=M+1}^N t_{ia} C_{ia} + L \end{aligned} \quad (\text{A.13})$$

Again, considering Eq. (A.13), one has to take note that $t_{ai} = t_w, \forall i, i \neq b$ and when $i = b, t_{ai} = t_{ab} = t_b$.

Next, substitute optimal sets of consumptions as well as exports as previously derived in Eq. (A.3) and Eq. (A.4) into the above equation. One gets:

$$\begin{aligned} W_a^{RTA}(t_a) &\equiv \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{m}{1-\sigma} \right) + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left[\left(\frac{t_{ia}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{t_{ia}+m}{1-\sigma} \right) \right] \\ &\quad + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{t_{ai}+m}{1-\sigma} \right) - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \end{aligned}$$

$$- m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} + \sum_{i=M+1}^N t_{ia} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} + L \quad (\text{A.14})$$

Rearranging the above equation, country a 's welfare can be derived as:

$$\begin{aligned} W_a^{RTA}(t_a) &= \sum_i^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{1}{1-\sigma}\right) \left(\frac{m}{1-\sigma}\right) - m \right] + \sum_{i=M+1}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{ia}+m}{1-\sigma}\right) + t_{ia} \right] \\ &+ \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right] + L \end{aligned} \quad (\text{A.14.1})$$

In order to find country a 's welfare if she decides to trade from outside the bloc, by the same token, one has to have derived country a 's national income first. In this situation, Y_a^{No-RTA} is defined as:

$$Y_a^{No-RTA} = L + C_{aa}^{1-\sigma} + \sum_{i=1; i \neq a}^N C_{ai}^{1-\sigma} - \sum_{i=1; i \neq a}^N t_{ai} C_{ai} - m[C_{aa} + \sum_{i=1; i \neq a}^N C_{ai}] + \sum_{i=1; i \neq a}^N t_{ia} C_{ia} \quad (\text{A.15})$$

Substitute the value of Y_a^{No-RTA} into the social welfare function as stated in Eq. (5.22.1).

If country a chooses to trade without RTA-membership status, her welfare is of this form:

$$\begin{aligned} W_a^{No-RTA}(C_{ia}^{-\sigma}, Y) &\equiv U_a^{No-RTA} = \sum_{i=1}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + C_{aa}^{1-\sigma} + \sum_{i=1; i \neq a}^N C_{ai}^{1-\sigma} - \sum_{i=1; i \neq a}^N t_{ai} C_{ai} \\ &- m[C_{aa} + \sum_{i=1; i \neq a}^N C_{ai}] + \sum_{i=1}^N t_{ia} C_{ia} + L \\ &= \frac{1}{1-\sigma} C_{aa}^{1-\sigma} + \sum_{i=1; i \neq a}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=1; i \neq a}^N C_{ai}^{1-\sigma} - \sum_{i=1; i \neq a}^N t_{ai} C_{ai} \\ &- m[C_{aa} + \sum_{i=1; i \neq a}^N C_{ai}] + \sum_{i=1; i \neq a}^N t_{ia} C_{ia} + L \end{aligned} \quad (\text{A.16})$$

Next, substitute optimal sets of consumptions and exports as formerly derived in Eq. (A.8) and Eq. (A.9) into the social welfare equation above. Country a 's welfare can be written in the form of consumption levels as:

$$\begin{aligned}
W_a^{No-RTA}(t_a) &\equiv \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left(\frac{m}{1-\sigma}\right) + \sum_{i=1; i \neq a}^N \frac{\sigma}{1-\sigma} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left(\frac{t_{ia}+m}{1-\sigma}\right) \\
&\quad + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left(\frac{t_{ai}+m}{1-\sigma}\right) - \sum_{i=1; i \neq a}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} - m \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \\
&\quad - m \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} + \sum_{i=1; i \neq a}^N t_{ia} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} + L \tag{A.17}
\end{aligned}$$

Rearranging the above equation gets:

$$\begin{aligned}
W_a^{No-RTA}(t_a) &= \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{1}{1-\sigma}\right) \left(\frac{m}{1-\sigma}\right) - m \right] + \sum_{i=1; i \neq a}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{t_{ia}+m}{1-\sigma}\right) \left(\frac{\sigma}{1-\sigma}\right) + t_{ia} \right] \\
&\quad + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right] + L \tag{A.17.1}
\end{aligned}$$

Next, compare Eq. (A.14.1) and Eq. (A.17.1) in order to find whether $W_a^{RTA} > W_a^{No-RTA}$. In order to do so, let's first denote $X = \left[\left(\frac{1}{1-\sigma}\right) \left(\frac{m}{1-\sigma}\right) - m \right]$, $Y = \left[\left(\frac{t_{ia}+m}{1-\sigma}\right) \left(\frac{\sigma}{1-\sigma}\right) + t_{ia} \right]$ and $Z = \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right]$ in order to facilitate the calculation.

Accordingly, equation (A.14.1) can thus be simplified as:

$$W_a^{RTA} = \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} [X] + \sum_{i=M+1}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} [Y] + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} [Z] + L \tag{A.18}$$

Eq. (A.17.1) is likewise simplified as:

$$W_a^{No-RTA} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X] + \sum_{i=1; i \neq a}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}}[Y] + \sum_{i=1; i \neq a}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}}[Z] + L \quad (A.19)$$

Comparing Eq. (A.18) and Eq. (A.19), since labour forces in both countries: L , are equal by the assumption, one only requires to observe the remaining terms. Let's start comparing between $\sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X]$ and $\left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X]$. One simply conducts:

$$\sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X] - \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X] = (M-1) \frac{X}{\left(\frac{m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \quad (A.20)$$

Considering Eq. (A.20), as it needs at least 2 countries to form the RTA, this implies that $M \geq 2$. The term $(M-1)$ is as a result positive. In addition, the term $X = \left[\left(\frac{1}{1-\sigma}\right)\left(\frac{m}{1-\sigma}\right) - m\right]$ is confirmed to be positive therefore this further implies that $\sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X] > \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}}[X]$.

Next, consider another remaining term finding if,

$$\sum_{i=M+1}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}}[Y] > \sum_{i=1; i \neq a}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}}[Y].$$

One of ways to prove the above condition is to conduct whether:

$$\sum_{i=M+1}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}}[Y] - \sum_{i=1; i \neq a}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}}[Y] > 0$$

By doing so, one gets:

$$\begin{aligned} \sum_{i=M+1}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Y] - \sum_{i=1; i \neq a}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Y] &= \frac{Y}{\left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} - \frac{MY}{\left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} \\ &= \frac{Y}{\left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} (\mathbf{1} - M) \end{aligned} \quad (\text{A.21})$$

Considering Eq. (A.21), as $M \geq 2$, the term $(\mathbf{1} - M)$ is confirmed as a negative term.

As $Y = \left[\left(\frac{t_{ia+m}}{1-\sigma}\right) \left(\frac{\sigma}{1-\sigma}\right) + t_{ia}\right]$ is proven to be positive therefore this term:

$\frac{Y}{\left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} (\mathbf{1} - M)$ has become negative. This implies that $\sum_{i=M+1}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Y] <$

$$\sum_{i=1; i \neq a}^N \left(\frac{t_{ia+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Y].$$

Lastly, one has to consider whether $\sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z] > \sum_{i=1; i \neq a}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z]$. In

the same manner, this is to prove that $\sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z] - \sum_{i=1; i \neq a}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z] > \mathbf{0}$.

By doing so, one gets:

$$\begin{aligned} \sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z] - \sum_{i=1; i \neq a}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z] &= \frac{Z}{\left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} - \frac{MZ}{\left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} \\ &= \frac{Z}{\left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} (\mathbf{1} - M) \end{aligned} \quad (\text{A.22})$$

From Eq. (A.22), as $M \geq 2$, the term $(1 - M)$ is confirmed to be negative. The Z term which is denoted as $\left[\left(\frac{t_{ai+m}}{1-\sigma}\right) - t_{ai} - m\right]$ is as well confirmed to be positive thus the term: $\frac{Z}{\left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}}$ $(1 - M)$ is in conclusion a negative term. This therefore implies that

$$\sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z] < \sum_{i=1}^N \left(\frac{t_{ai+m}}{1-\sigma}\right)^{\frac{1}{-\sigma}} [Z].$$

In this case, it is ambiguous to confirm that $W_a^{RTA} > W_a^{No-RTA}$, *vice versa*. Certainly, the size of the RTA as represented by M as well as tariff asymmetries of the home country and her trading partners have influenced the result such that it is inconclusive. In contrast to the findings in the symmetric tariff assumption setting, it is not straightforward to conclude that a country would have larger welfare gains with RTA-membership status than when she trades without such membership. By relaxing the symmetric tariff assumption, the country needs more information in order to conclude that joining the existing RTA is definitely beneficial. From results obtained above, it is evident that even though this scenario suggests that the RTA member would still benefit more in terms of profits (as she could export to and consume more outputs from other RTA-membership countries), she would at the same time lose a certain amount of tariff revenue that could be obtained if she continued to trade from outside the zone. From the profit function stated, this is so simply because trading within the RTA is tariff-free. On the other hand, although being a non-RTA trader would bring in inferior profits to the country, *ceteris paribus*, her tariff revenue would still be larger than a case where she trades with RTA-membership status. As can be seen, these 2 effects from tariffs work in opposite directions; the conclusion on the terms of trade effects or welfare effects is inconclusive in this case. **QED**

As the model suggests, more information on the size of the RTA, exporting destinations' tariffs as well as the numbers of countries are required in order to figure out the definite outcome on the welfare effects in this scenario. This therefore suggests a need for the empirical analysis in which, besides fundamental data on the bloc's size and market price of products, tariff data in each product category is required if one is interested in determining the whole economy's impacts from joining or not joining this particular RTA. However, this can be difficult to implement in reality as requirement on data is high. In addition, each country has classified their products differently plus each may not even produce or trade the same product categories at all, thus, to consider the whole economy's gains and losses from trade, is definitely not an easy task. In this scenario, a researcher may study the gains and losses from trade via a product-by-product approach or within specific product categories as this would less data in general.

As far as theoretical explanations are concerned here, in the following section, this study divides this asymmetric tariff case further into 3 sub-sections. First of all, the study plans to scrutinize further whether a higher import tariff country, in comparison to a lower import tariff one, would incur higher gains (or losses) from becoming part of the existing RTA. Likewise, these countries' profits as well as welfare levels are compared pre- and post-RTA in order to derive the answer. On top of that, the study takes a closer look at the case in which these countries are asked to conform to a single common tariff rate, (i.e. the rate which is equal to the rest of the world's tariffs) instead of imposing exclusive rates of import tariffs individually, after the RTA-membership status is obtained. The study lastly investigates whether it is better for a RTA-

membership country to conform to the common tariff approach or if it is better for her to continue to impose her own tariffs separately. For these reasons, profits as well as welfare levels of countries where common import tariffs are strictly imposed have to be measured up against the case in which countries are free to keep import tariffs at the pre-RTA levels independently. Details of the discussion are narrated in the sequence below.

5.3.2 (A) In this case, in order to find out whether a higher-tariff country would benefit more from engaging in the RTA than a lower-tariff one, profits and welfare levels of representative countries: country *a* and country *b*, have to be compared and contrasted. Recall that in this setting, the only differences between these 2 representative countries: country *a* and country *b* are the rates of import tariffs they impose. Even so, this change does not affect the fundamental setting of the model as long as the rest of the world's tariffs are kept unaltered post-RTA period. The situation is illustrated below.

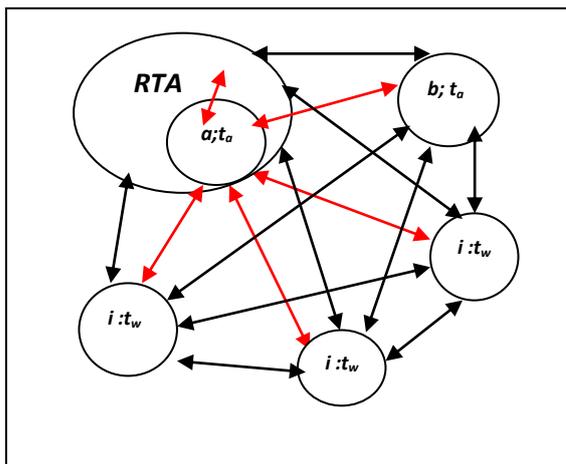


Figure 5.3: The Framework Illustrates the Scenario in which Country *a* Joins the Existing RTA

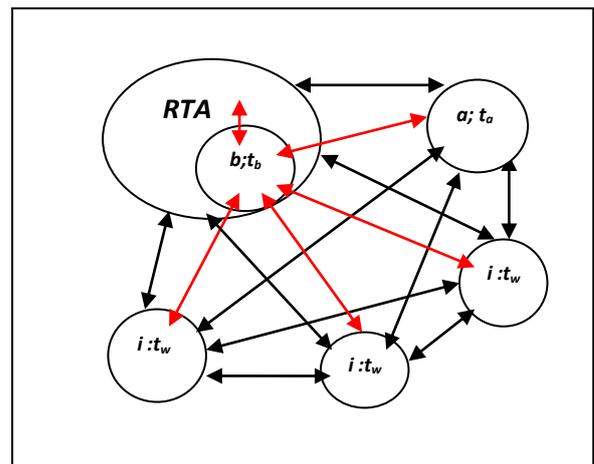


Figure 5.4: The Framework Illustrates the Scenario in which Country *b* Joins the Existing RTA

Gains from trade/RTA

Profits

If country a decides to join the existing RTA, her profits can be derived as:

$$\pi_a^{RTA} = \sum_{i=1}^M P_{ai} C_{ai} + \sum_{i=M+1}^N (P_{ai} - t_{ai}) C_{ai} - (m \sum_{i=1}^N C_{ai}) \quad (\text{A.23})$$

Repeating the procedures previously conducted in Section 5.3.2 [Eq. (A.2) to Eq. (A.7)], country a 's profits when she is a member of the RTA have been derived in Eq. (A.8). It is in this form:

$$\pi_a^{RTA} = \sigma \left[\sum_{i=1}^M \left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1-\sigma}{\sigma}} \right] \quad (\text{A.24})$$

Considering the above equation, one needs to keep in mind that $t_{ai} = t_w, \forall i, i \neq b$ as when $i = b, t_{ai} = t_{ab} = t_b$.

Subsequently, country b 's profits are to be observed accordingly. If country b decides to join the existing RTA, her profits can be written as:

$$\pi_b^{RTA} = \sum_{i=1}^M P_{bi} C_{bi} + \sum_{i=M+1}^N (P_{bi} - t_{bi}) C_{bi} - (m \sum_{i=1}^N C_{bi}) \quad (\text{A.25})$$

As every country is assumed to have identical homothetic preferences of the CES type, one is thus able to put the market price derived in Eq. (5.6) into country b 's profit

function above. If country b has obtained RTA-membership status, her profit function is therefore indicated as:

$$\begin{aligned}\pi_b^{RTA} &= \sum_{i=1}^M C_{bi}^{-\sigma} C_{bi} + \sum_{i=M+1}^N (C_{bi}^{-\sigma} - t_{bi}) C_{bi} - (m \sum_{i=1}^N C_{bi}) \\ &= \sum_{i=1}^M C_{bi}^{1-\sigma} + \sum_{i=M+1}^N C_{bi}^{1-\sigma} - \sum_{i=M+1}^N (t_{bi} C_{bi}) - (m \sum_{i=1}^N C_{bi}) \quad (A.26)\end{aligned}$$

Ceteris paribus, $t_{bi} = t_w, \forall i, i \neq a$. That is because when $i = a, t_{bi} = t_{ba} = t_a$.

Obtaining the first-order condition, country b 's profit maximizing outputs exported to the RTA member are derived accordingly as:

$$C_{bb} = C_{bi} = \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (A.27)$$

And, country b 's profit maximizing outputs exported to each non-RTA partner is:

$$C_{bi} = \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \quad (A.28)$$

From sets of profit maximizing outputs above, substitute them back into the profit function stated in Eq. (A.26). Country b 's profits when she is one of the RTA members are therefore:

$$\pi_b^{RTA} = \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{m\sigma}{1-\sigma}\right) + \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\frac{(t_{bi}+m)\sigma}{1-\sigma}\right]$$

$$= \sigma \left[\sum_{i=1}^M \left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{bi+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} \right] \quad (\text{A.29})$$

Considering profits of country a and country b as defined in Eq. (A.24) and Eq. (A.29) respectively, it is evident that consumptions within the RTA area are identical in both equations. Therefore, the only difference between them is the term; $\sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$ in country a and $\sum_{i=M+1}^N \left(\frac{t_{bi+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$ in country b .

According to the fundamental assumption that country a has higher import tariffs than country b : $t_a > t_b$, this further implies that $t_{ba} > t_{ab}$. Thus, considering the terms $\sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$ and $\sum_{i=M+1}^N \left(\frac{t_{bi+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$, as both representative countries trade with every country in this setting and the fact that the first term contains t_{ab} while the second term contains t_{ba} , this therefore makes $\sum_{i=M+1}^N \frac{1}{\left(\frac{t_{ai+m}}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}} > \sum_{i=M+1}^N \frac{1}{\left(\frac{t_{bi+m}}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}}$.

For these reasons, it can be said that $\sum_{i=M+1}^N \left(\frac{t_{ai+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} > \sum_{i=M+1}^N \left(\frac{t_{bi+m}}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$. One is thus able to conclude that, *ceteris paribus*, $\pi_a^{RTA} > \pi_b^{RTA}$. The profits of a higher-tariff country i.e. country a is larger than the profits of the lower-tariff country i.e. country b in this circumstance. **QED**

Welfare effects

This section observes what happens to a country's welfare if the symmetric tariff assumption is violated. Recall that country a 's welfare when she is the member of the RTA is derived in Eq. (A.13). That is:

$$W_a^{RTA}(C_{ia}^{-\sigma}, Y) \equiv U_a^{RTA} = \sum_{i=1}^M \frac{1}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N t_{ai} C_{ai} - m[\sum_{i=1}^M C_{ia} + \sum_{i=M+1}^N C_{ai}] + \sum_{i=M+1}^N t_{ia} C_{ia} + L \quad (A.30)$$

After substituting optimal sets of consumption and exports into the above equation, country a 's welfare is written as previously observed in Eq. (A.14.1) as:

$$W_a^{RTA}(t_a) = \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{1}{1-\sigma}\right) \left(\frac{m}{1-\sigma}\right) - m \right] + \sum_{i=M+1}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{ia}+m}{1-\sigma}\right) + t_{ia} \right] + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{1-\sigma}} \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right] + L \quad (A.31)$$

Next, one has to find country b 's welfare level when she decides to join the existing RTA. In order to do so, one first needs to observe country b 's income which is:

$$Y_b^{RTA} = L + [\sum_{i=1}^M C_{bi}^{1-\sigma} + \sum_{i=M+1}^N C_{bi}^{1-\sigma} - \sum_{i=M+1}^N t_{bi} C_{bi} - m \sum_{i=1}^N C_{bi}] + \sum_{i=M+1}^N t_{ib} C_{ib} \quad (A.32)$$

Substituting country b 's income into the social welfare function formerly stated in Eq. (5.22.1), one gets:

$$\begin{aligned}
W_b^{RTA}(C_{ib}^{-\sigma}, Y) \equiv U_b^{RTA} &= \sum_{i=1}^M \frac{1}{1-\sigma} C_{ib}^{1-\sigma} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} C_{ib}^{1-\sigma} + \sum_{i=M+1}^N C_{bi}^{1-\sigma} \\
&\quad - \sum_{i=M+1}^N t_{bi} C_{bi} - m \left[\sum_{i=1}^M C_{ib} + \sum_{i=M+1}^N C_{bi} \right] + \sum_{i=M+1}^N t_{ib} C_{ib} + L
\end{aligned} \tag{A.33}$$

Substitute optimal sets of consumption as well as exports as derived in Eq. (A.27) and Eq. (A.28) into the above equation. Country b 's welfare when she is in the RTA is:

$$\begin{aligned}
W_b^{RTA}(t_b) &= \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{1}{1-\sigma}\right) \left(\frac{m}{1-\sigma}\right) - m \right] + \sum_{i=M+1}^N \left(\frac{t_{ib}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{ib}+m}{1-\sigma}\right) + t_{ib} \right] \\
&\quad + \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{t_{bi}+m}{1-\sigma}\right) - t_{bi} - m \right] + L
\end{aligned} \tag{A.34}$$

In order to compare welfare levels of both representative countries, Eq. (A.31) and Eq. (A.34) are observed accordingly. It can be seen that the first term: $\sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{1}{1-\sigma}\right) \left(\frac{m}{1-\sigma}\right) - m \right]$, which represents consumption levels among RTA-membership countries, are identical in both equations. Also, by assumption, these 2 representative countries have the same size of labour force: L . One, therefore, needs to consider the remaining terms in both equations only.

Let's first denote $W_a^{RTA}(t_a) = \widehat{W}_a$. For these reasons, in country a , one considers the remaining terms:

$$\widehat{W}_a = \sum_{i=M+1}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{ia}+m}{1-\sigma}\right) + t_{ia} \right] + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{t_{ai}+m}{1-\sigma}\right) - t_{ai} - m \right]$$

$$= \sum_{i=M+1}^N \left[\frac{\left(\frac{\sigma}{1-\sigma}\right)\left(\frac{t_{ia}+m}{1-\sigma}\right)+t_{ia}}{\left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right] + \sum_{i=M+1}^N \left[\frac{\sigma\left(\frac{t_{ai}+m}{1-\sigma}\right)}{\left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right] \quad (\text{A.35})$$

Simplifying the above equation further one gets:

$$\widehat{W}_a = \sum_{i=M+1}^N \left[\frac{\left(\frac{\sigma}{1-\sigma}\right)\left(\frac{t_{ia}+m}{1-\sigma}\right)+t_{ia}}{\left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right] + \sum_{i=M+1}^N \sigma \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} \quad (\text{A.35.1})$$

Similar procedures are conducted for country b . Let's first denote that $W_b^{RTA}(t_b) = \widehat{W}_b$.

One therefore observes remaining terms:

$$\begin{aligned} \widehat{W}_b &= \sum_{i=M+1}^N \left(\frac{t_{ib}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right)\left(\frac{t_{ib}+m}{1-\sigma}\right) + t_{ib} \right] + \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left[\left(\frac{t_{bi}+m}{1-\sigma}\right) - t_{bi} - m \right] \\ &= \sum_{i=M+1}^N \left[\frac{\left(\frac{\sigma}{1-\sigma}\right)\left(\frac{t_{ib}+m}{1-\sigma}\right)+t_{ib}}{\left(\frac{t_{ib}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right] + \sum_{i=M+1}^N \left[\frac{\sigma\left(\frac{t_{bi}+m}{1-\sigma}\right)}{\left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right] \end{aligned} \quad (\text{A.36})$$

And, the above equation can be rearranged as:

$$\widehat{W}_b = \sum_{i=M+1}^N \left[\frac{\left(\frac{\sigma}{1-\sigma}\right)\left(\frac{t_{ia}+m}{1-\sigma}\right)+t_{ia}}{\left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right] + \sum_{i=M+1}^N \sigma \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} \quad (\text{A.36.1})$$

One is able to compare welfare levels in both equations via Eq. (A.35.1) and Eq. (A.36.1). According to the assumption given that country a has higher import tariffs than country b : $t_a > t_b$, this can as well be referred as $t_{ia} > t_{ib}$. Therefore, by

considering the first term of both Eq. (A.35.1) and Eq. (A.36.1), *ceteris paribus*, it can

$$\text{be stated that } \sum_{i=M+1}^N \left[\frac{\left(\frac{\sigma}{1-\sigma} \right) \left(\frac{t_{ia}+m}{1-\sigma} \right) + t_{ia}}{\left(\frac{t_{ia}+m}{1-\sigma} \right)^{\frac{1}{\sigma}}} \right] > \sum_{i=M+1}^N \left[\frac{\left(\frac{\sigma}{1-\sigma} \right) \left(\frac{t_{ib}+m}{1-\sigma} \right) + t_{ib}}{\left(\frac{t_{ib}+m}{1-\sigma} \right)^{\frac{1}{\sigma}}} \right].$$

Next, one has to compare whether $\sum_{i=M+1}^N \sigma \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} > \sum_{i=M+1}^N \sigma \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}}$ in order

to conclude that $\widehat{W}_a > \widehat{W}_b$. For simplicity, let's rewrite these terms as $\sum_{i=M+1}^N \frac{\sigma}{\left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}}$

and $\sum_{i=M+1}^N \frac{\sigma}{\left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}}$, respectively. According to the same fundamental assumption

given that country *a* has higher import tariffs than country *b*: $t_a > t_b$, this indeed

implies that $\sum_{i=M+1}^N \frac{\sigma}{\left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}} > \sum_{i=M+1}^N \frac{\sigma}{\left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}}$. Hence, it is evident to conclude that

$\widehat{W}_a > \widehat{W}_b$. Bringing $W_a^{RTA} > W_b^{RTA}$. It is therefore proven that the welfare level in the higher-tariff country is higher than that which the lower-tariff country receives in this setting. **QED**

5.3.2 (B) As opposed to allowing the representative countries: country *a* and country *b*, to set import tariffs individually, this section aims to analyze gains from trade as well as welfare effects when these countries are required to set common tariffs equal to t_w which is in fact equal to the tariffs in the rest of the world. Nevertheless, the question to be answered remains the same: which country benefits more from being a part of the RTA in this situation? Before analyzing countries' profits and welfare outcomes, the frameworks below illustrate trade relationships in this scenario.

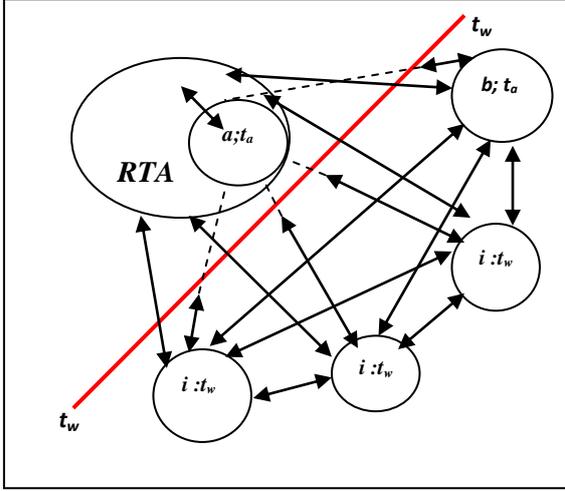


Figure 5.5: The Framework Illustrates the Scenario in which Country a is Asked to Set the Import Tariffs at t_w

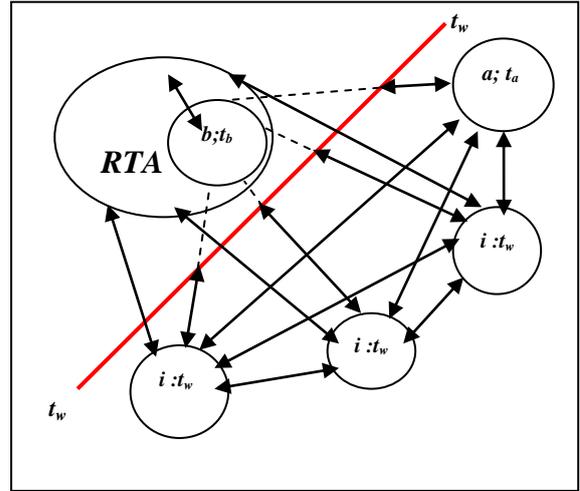


Figure 5.6: The Framework Illustrates the Scenario in which Country b is Asked to Set the Import Tariffs at t_w

As in the previous case, one needs to compare these representative countries' gains from trade, which are written in terms of profits and welfare levels in order to find out who benefits more from receiving RTA-membership status. Hence, we shall begin by considering countries' profit functions first.

Gains from trade/RTA

Profits

Recall that the profit function when country a decides to join the existing RTA is:

$$\pi_a^{RTA} = \sum_{i=1}^M P_{ai} C_{ai} + \sum_{i=M+1}^N (P_{ai} - t_{ai}) C_{ai} - (m \sum_{i=1}^N C_{ai}) \quad (\text{A.37})$$

while country b 's profit function is:

$$\pi_b^{RTA} = \sum_{i=1}^M P_{bi} C_{ai} + \sum_{i=M+1}^N (P_{bi} - t_{bi}) C_{bi} - (m \sum_{i=1}^N C_{bi}) \quad (\text{A.38})$$

Considering countries' profit functions stated above, it is evident that, when these countries are asked to set common import tariffs equal to t_w post-RTA, their profits are actually unaffected. Both profit functions remain the same as indicated in Section 5.3.2 (A). It is certainly so because, as Eq. (A.37) and Eq. (A.38) present, tariffs in all destinations where goods are exported still remain the same: unchanged.

It should not be forgotten that the assumption concerning common import tariffs only applies to goods entering the RTA area. Thus, when countries' profits, which are derived from trading in both domestic and foreign markets, are considered, import tariffs do not play a role here. For these reasons, as country a and country b export to all trading partners in the world in this setting, *other things being equal*, country a would gain larger benefits from joining the existing RTA when compared to country b . However, this outcome is observed under the condition that each obtains RTA-membership status independently. This is because country a would still be able to export more in total given that country b 's tariffs have been lower than country a 's since the pre-RTA period. This section simply compares the outcomes of Figure 5.5 and Figure 5.6 in this regard. In conclusion, the results are unaltered as the high-import tariff country's profits are larger than what the low-import tariff country obtains:

$$\pi_a^{RTA} > \pi_b^{RTA} \quad \text{QED}$$

Welfare effects

Next, these 2 representative countries' welfare levels are to be observed. As derived previously in Eq. (A.13), country a 's welfare function when she joins the RTA is:

$$\begin{aligned}
 W_a^{RTA}(C_{ia}^{-\sigma}, Y) &\equiv U_a^{RTA} \\
 &= \sum_{i=1}^M \frac{1}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N t_{ai} C_{ai} \\
 &\quad - m[\sum_{i=1}^M C_{ia} + \sum_{i=M+1}^N C_{ai}] + \sum_{i=M+1}^N t_{ia} C_{ia} + L \tag{A.39}
 \end{aligned}$$

The above equation can be written in terms of consumption level, that is:

$$\begin{aligned}
 W_a^{RTA}(t_a) &\equiv \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{m}{1-\sigma}\right) + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{t_{ia}+m}{1-\sigma}\right)\right) \\
 &\quad + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \left(\frac{t_{ai}+m}{1-\sigma}\right) - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{-\sigma}} \\
 &\quad - m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} + \sum_{i=M+1}^N t_{ia} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} + L \tag{A.40}
 \end{aligned}$$

In this case, country a is asked to impose import tariffs equal to the rest of the world.

This implies that other countries' exports to country a are now responsible to pay for the tariff at the rate equal to $t_{ia} = t_w$. Thus, the above welfare function can be rewritten

as:

$$W_a^{RTA}(t_w) \equiv \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\frac{t_w+m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1-\sigma}{-\sigma}}$$

$$\begin{aligned}
& - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \\
& - m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} + \sum_{i=M+1}^N t_w \left(\frac{t_w+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} + L
\end{aligned} \tag{A.41}$$

Next, country b 's welfare has to be considered. Let's recall W_b^{RTA} from Eq. (A.33).

That is:

$$\begin{aligned}
W_b^{RTA}(C_{ib}^{-\sigma}, Y) & \equiv U_b^{RTA} = \sum_{i=1}^M \frac{1}{1-\sigma} C_{ib}^{1-\sigma} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} C_{ib}^{1-\sigma} + \sum_{i=M+1}^N C_{bi}^{1-\sigma} \\
& - \sum_{i=M+1}^N t_{bi} C_{bi} - m \left[\sum_{i=1}^M C_{ib} + \sum_{i=M+1}^N C_{bi} \right] + \sum_{i=M+1}^N t_{ib} C_{ib} + L
\end{aligned} \tag{A.42}$$

Rewriting the above equation in terms of consumption level gets:

$$\begin{aligned}
W_b^{RTA}(t_b) & = \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{m}{1-\sigma} \right) + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\left(\frac{t_{ib}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{t_{ib}+m}{1-\sigma} \right) \right) \\
& + \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \left(\frac{t_{bi}+m}{1-\sigma} \right) - \sum_{i=M+1}^N t_{bi} \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} \\
& - m \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} + \sum_{i=M+1}^N t_{ib} \left(\frac{t_{ib}+m}{1-\sigma} \right)^{\frac{1}{1-\sigma}} + L
\end{aligned} \tag{A.43}$$

As country b is as well asked to impose import tariffs equal to the rest of the world's tariffs, this further implies that $t_{ib} = t_w$. The above welfare function is thus rewritten again as:

$$W_b^{RTA}(t_w) = \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma} \right)^{\frac{1-\sigma}{1-\sigma}} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\frac{t_w+m}{1-\sigma} \right)^{\frac{1-\sigma}{1-\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1-\sigma}{1-\sigma}}$$

$$\begin{aligned}
& - \sum_{i=M+1}^N t_{bi} \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma} \right)^{\frac{1}{-\sigma}} \\
& - m \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} + \sum_{i=M+1}^N t_w \left(\frac{t_w+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} + L
\end{aligned} \tag{A.44}$$

In order to find whether $W_a^{RTA} > W_b^{RTA}$, one can simply compare Eq. (A.41) and Eq. (A.44). As it is evident that consumption levels in the RTA area are identical for both cases, their import tariffs are equal at t_w and their labour forces: L , are also equivalent, these 2 equations can thus be reduced to:

For country a , one can observe:

$$\begin{aligned}
\widehat{W}_a^{RTA} &= \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} - m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} \\
&= \frac{1}{\left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}} - \left[\sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} (t_{ai} + m) \right]
\end{aligned} \tag{A.45}$$

And, for country b , it is:

$$\begin{aligned}
\widehat{W}_b^{RTA} &= \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1-\sigma}{-\sigma}} - \sum_{i=M+1}^N t_{bi} \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} - m \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} \\
&= \frac{1}{\left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{\sigma-1}{-\sigma}}} - \left[\sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma} \right)^{\frac{1}{-\sigma}} (t_{bi} + m) \right]
\end{aligned} \tag{A.46}$$

By comparing Eq. (A.45) and Eq. (A.46), one is able to prove whether $\widehat{W}_a^{RTA} > \widehat{W}_b^{RTA}$.

In order to do so, let us consider the first term in both equations. Because of the

fundamental assumption given that country a has higher import tariffs than country b :

$t_a > t_b$, this further implies that $t_{ba} > t_{ab}$ bringing $\frac{1}{\left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{\sigma-1}{-\sigma}}} > \frac{1}{\left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{\sigma-1}{-\sigma}}}$ in

conclusion.

Next, one needs to compare remaining terms finding whether $\sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} (t_{ai} + m) > \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} (t_{bi} + m)$. It is evident that the term: $\sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} (t_{ai} + m)$

contains t_{ab} while $\sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} (t_{bi} + m)$ involves t_{ba} . As far as the same

assumption in which country a has higher import tariffs than country b : $t_a > t_b$

applies, this clearly suggests that $\sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} (t_{ai} + m) < \sum_{i=M+1}^N \left(\frac{t_{bi}+m}{1-\sigma}\right)^{\frac{1}{-\sigma}} (t_{bi} + m)$

in this application. Considering above relationships, this as a result indicates

$\widehat{W}_a^{RTA} > \widehat{W}_b^{RTA}$. As this is so, it can be stated further to conclude that $W_a^{RTA} > W_b^{RTA}$

in this case. When the common import tariffs are set, for example, to be equal to those

in the rest of the world, countries that initially have higher import tariffs would still

benefit more from participating in the RTA than ones that impose lower import tariffs,

ceteris paribus. This section has proven that this is true in terms of profits as well as the

welfare levels¹⁵ of relevant countries.

QED

5.3.2(C) Given that the preceding section has addressed gains from trade and welfare

effects when representative countries are asked to conform to the rest of the world's

tariffs, the last question that this chapter aims to clarify is whether it is better for the

¹⁵ According to trading relationships stated thus far, it can be seen that, *other things being equal*, the higher-import tariff country pays smaller amounts of tariffs to the rest of the world in comparison to the lower-import tariff country when trade is conducted.

representative countries: country a and country b , to do so. Or, it is yet better for them to continue imposing individual tariff rates: t_a and t_b , independently post-RTA.

Gains from trade/RTA

Profits

Let's start by comparing the profits of both representative countries. Once again, recall that the profit function when country a decides to join the existing RTA is:

$$\pi_a^{RTA} = \sum_{i=1}^M P_{ai} C_{ai} + \sum_{i=M+1}^N (P_{ai} - t_{ai}) C_{ai} - (m \sum_{i=1}^N C_{ai}) \quad (\text{A.47})$$

and, country b 's profit function is:

$$\pi_b^{RTA} = \sum_{i=1}^M P_{bi} C_{bi} + \sum_{i=M+1}^N (P_{bi} - t_{bi}) C_{bi} - (m \sum_{i=1}^N C_{bi}) \quad (\text{A.48})$$

Considering these 2 representative countries' profit functions separately, it is evident that each country's profits would remain unaltered, though there are changes in the import tariffs imposed within each country. Basically, as long as one keeps all the previous assumptions: that every country trades in this scenario, and import tariffs imposed by the rest of the world are unchanged, these representative countries would have to pay the same amount of tariffs in order to get their products exported. As previously observed in sections 5.3.2 (A) and 5.3.2 (B), the profits of country a and country b are not affected by this assumption. Thus, in each country, there is no

alteration in the gains from trade in terms of profits even if a country changes its import tariffs post-RTA. QED

Welfare effects

Even though each country's profits are unaffected post-RTA, one needs to consider welfare levels. To avoid repetitions, the study chooses to focus on country a as an example. Recall that country a 's welfare function as previously derived in Eq. (A.13) is:

$$\begin{aligned}
 W_a^{RTA}(C_{ia}^{-\sigma}, Y) &\equiv U_a^{RTA} \\
 &= \sum_{i=1}^M \frac{1}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} C_{ia}^{1-\sigma} + \sum_{i=M+1}^N C_{ai}^{1-\sigma} - \sum_{i=M+1}^N t_{ai} C_{ai} \\
 &\quad - m[\sum_{i=1}^M C_{ia} + \sum_{i=M+1}^N C_{ai}] + \sum_{i=M+1}^N t_{ia} C_{ia} + L \quad (A.49)
 \end{aligned}$$

When country a is assumed to impose import tariffs equal to t_a , her welfare function can thus be written in the form of consumption levels as:

$$\begin{aligned}
 W_a^{RTA}(t_a) &= \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} \\
 &\quad - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{\sigma}} - m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} \\
 &\quad + \sum_{i=M+1}^N t_{ia} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} + L \quad (A.50)
 \end{aligned}$$

Similarly, when country a is assumed to impose import tariffs at t_w , her welfare is written in terms of consumption levels as:

$$\begin{aligned}
W_a^{RTA}(t_w) &= \sum_{i=1}^M \frac{1}{1-\sigma} \left(\frac{m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\frac{t_{iw}+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} \\
&\quad - \sum_{i=M+1}^N t_{ai} \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} - m \sum_{i=1}^M \left(\frac{m}{1-\sigma}\right)^{\frac{1}{\sigma}} - m \sum_{i=M+1}^N \left(\frac{t_{ai}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} \\
&\quad + \sum_{i=M+1}^N t_{iw} \left(\frac{t_{iw}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} + L
\end{aligned} \tag{A.51}$$

One needs to compare Eq. (A.50) and Eq. (A.51) in order to find which case produces larger welfare effects for country a . As consumption levels within the RTA area are identical in both equations, one can observe the remaining terms which are stated below.

Considering the circumstance in which import tariffs equal to t_a are imposed, the remaining terms are:

$$\begin{aligned}
\widehat{W}_{t_a} &= \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} \\
&= \sum_{i=M+1}^N \left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{ia}+m}{1-\sigma}\right) + t_{ia} \right]
\end{aligned} \tag{A.52}$$

Rewriting the above equation gets:

$$\widehat{W}_{t_a} = \sum_{i=M+1}^N \left\{ \frac{\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{ia}+m}{1-\sigma}\right) + t_{ia}}{\left(\frac{t_{ia}+m}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right\} \tag{A.53}$$

while, if country a imposes import tariffs equal to t_w . One considers the remaining terms which are:

$$\begin{aligned}
\widehat{W}_{t_w} &= \sum_{i=M+1}^N \frac{\sigma}{1-\sigma} \left(\frac{t_{iw+m}}{1-\sigma}\right)^{\frac{1-\sigma}{\sigma}} + \sum_{i=M+1}^N \left(\frac{t_{iw+m}}{1-\sigma}\right)^{\frac{1}{\sigma}} \\
&= \sum_{i=M+1}^N \left(\frac{t_{iw+m}}{1-\sigma}\right)^{\frac{1}{\sigma}} \left[\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{iw+m}}{1-\sigma}\right) + t_{iw} \right]
\end{aligned} \tag{A.54}$$

The above equation can thus be rewritten as:

$$\widehat{W}_{t_w} = \sum_{i=M+1}^N \left\{ \frac{\left(\frac{\sigma}{1-\sigma}\right) \left(\frac{t_{iw+m}}{1-\sigma}\right) + t_{iw}}{\left(\frac{t_{iw+m}}{1-\sigma}\right)^{\frac{1}{\sigma}}} \right\} \tag{A.55}$$

In order to find which case is the larger between \widehat{W}_{t_a} and \widehat{W}_{t_w} , one has to compare Eq. (A.53) and Eq. (A.55). In order to conclude, one has to know the value of t_{ia} and t_{iw} . That is because if $t_{ia} > t_{iw}$, it suggests that $\widehat{W}_{t_a} > \widehat{W}_{t_w}$. However, in practice, this condition may not be easily observed.

In order to answer whether the country should choose to impose import tariffs individually or to conform to the rest of the world's tariff rate after becoming an RTA member, the country actually needs to find out what type of RTA she is going to participate in first. That is because the key point here is that, in reality, forms of RTA are moderated by Article XXIV of the WTO. In this study, 2 famous forms of RTA: 1) the Free Trade Area (FTA) and 2) the Custom Union (CU) are selectively analysed as an example. In addition, given exporting destinations' tariffs, the country has to consider her import tariffs at the pre-RTA period too whether it is lower or higher by the world's tariffs and by how much. That is because by knowing the type of RTA and

her import tariffs pre-RTA, the country could use this information to estimate any gains versus losses that could occur to her terms of trade before making a decision whether to join any particular form of RTA.

According to Article XXIV, if the RTA is actually in the FTA format, the country is not allowed to raise their post-FTA tariffs to a level higher than the pre-FTA situation. If the CU is, however, being considered, after the country has become a part of the bloc, membership countries are not allowed to raise tariffs to a level higher than members' average pre-CU level. Applying these restrictions to the basic settings of the model above, this simply means that, if the FTA is considered and initially $t_{ia} > t_{iw}$, country a is able to raise post-FTA's tariff as high as the t_{ia} level. If this is the case, country a 's welfare, when she continues to impose import tariffs at t_a post-FTA, would definitely be higher than the case where she decides to conform to the common tariff rate at t_w . As it is evidently suggested, undoubtedly, country a will be better off if imposing her own import tariffs individually in this circumstance. On the other hand, if initially $t_{ia} < t_{iw}$, in principle, the country could be better off by conforming to the rest of world's tariffs at t_{iw} after participating in the RTA. Nevertheless, this is not possible in reality because of the restriction stated in Article XXIV which says that the country is not allowed to raise post-FTA's tariffs to a point higher than the pre-FTA level. As country a 's post-RTA tariffs cannot be increased above the current stage, which is t_{ia} , she will not benefit as much as the case in which she had higher tariff rates than the rest of the world to begin with.

This notion can be employed to discuss a country's welfare effects under the CU setting in the same way. Article XXIV prevents membership countries from increasing a common tariff rate to point higher than the members' average pre-CU level, thus if the representative country has very low import tariffs at the outset i.e. $t_{ia} < t_{iw}$, the country is able to increase post-CU tariffs as high as t_{iw} in this case. Contrary to the FTA setting, in this circumstance, the country would be better off conforming to the common tariff rate after joining the CU, compared to imposing individual tariffs. Nevertheless, if the country has high import tariffs to begin with, i.e. $t_{ia} > t_{iw}$, the country could not increase post-CU tariffs to be higher than t_{iw} as long as Article XXIV applies. In fact, the country has to reduce tariffs in order to conform to the average CU-members' tariffs at t_{iw} . The country has to lose tariff revenue in this regard if it aims to be a part of this CU. Thus, in the case that a country has high import tariffs initially, it might be better if she engages in a form of FTA as initial tariffs could still be imposed. As is evident, the impact on a country's welfare is dependent on the differing liberalization requirements between FTA and CU settings.

5.4 Conclusion and policy implications

This chapter has attempted to provide a theoretical note explaining the incidence of bloc-membership expansion. Having the political economy framework: '*domino theory of regionalism*' of Baldwin (1995), as an inspiration, this paper however addresses the pure economic perspective, focussing on non-members' decisions towards bloc-membership. Given a positive model of the RTA, economic effects are compared if a potential member succeeds in becoming a part of the bloc versus the case that she

continues to trade from outside the liberalized zone. These effects are described in the form of gains/ losses from trade as well as changes in welfare levels that this particular country foresees receiving in such cases. In order to explain this issue, the chapter develops the basic model assuming countries' size and import tariffs are symmetric. In conclusion, the findings suggest that, *ceteris paribus*, a country's gains from trade and welfare effects are superior when they have bloc-membership status, in comparison to the case where they trade without it. This implies that, even without any political motives i.e. to maximize key supporting groups in order to get votes in return, the pure economic reasons developed within this context also provide similar outcomes to Baldwin(1995)'s '*domino theory of regionalism*' which states that a country should join the existing RTA as long as it is possible to do so. This theoretical explanation, though uncomplicated, does provide the essential mechanisms of a country's economic incentives towards RTA-membership. If the country foresees earning more in terms of profits and welfare by being a part of the RTA, why should they stay outside? It is not reasonable to do so in this context where the world is driven by the economic motives. Despite relying on different frameworks, the findings in this symmetric case indeed support Baldwin (1995)'s work in the sense that the formation of the RTA does generate a positive vibe or the so-called '*domino effects*' to relevant countries to follow into the existing bloc.

When the symmetric tariff assumption is relaxed, the results are, however, not as straightforward. While the RTA-membership country's profits are still proved to be larger than the non-RTA trader in the asymmetric tariff setting, their welfare effects are ambiguous. Information concerning the bloc's size as well as the degree of difference in

tariffs between countries is essentially required to draw the final conclusion in this regard. It is important to note that when a country becomes an RTA trader, though her profits are larger than the pre-RTA situation, she would have to lose a certain amount of income that would otherwise be obtained since trading within the RTA is tariff-free. By the same token, when a country continues to trade from outside the bloc, though her profits would be less than what would be obtained if she participated in the RTA, her income in the form of tariff revenue would be higher. Without explicit information being given, it is thus impossible to state which case should cause a country to have larger welfare gains.

The chapter has also compared gains/losses from trade as well as welfare levels of high-tariff and low-tariff countries in the case where each participates in the RTA versus the case where each trades without any RTA-membership. *Ceteris paribus*, a higher-tariff country will definitely have higher profits and welfare levels as compared to a lower-tariff country if the RTA-membership is attained. This is true in both cases 1) when the country is able to keep import tariffs individually post-RTA and 2) when the country is asked to conform to the rest of the world's tariff rates post-RTA. Because of this result, the chapter also extends the analysis to evaluate these 2 cases, in particular, aiming to find which case is better if a country manages to join the RTA. The result identifies that import tariffs do not play a role in altering a country's profits as long as the rest of the world's tariffs are constant. However, for welfare effects, the tariff rates do play a significant role here. The country's welfare effects are larger when the tariff rate that the country has, conforms to the rest of the world: t_w is higher than the individual tariff rate, t_a . Even so, this outcome may not be reached in reality as Article XXIV prohibits a

membership country from increasing tariffs post-RTA to be higher than the pre-RTA situation. Nevertheless, the results from this theoretical framework imply that even if Article XXIV does not allow RTA-members' tariffs to increase post-RTA, it is not enough to keep non-members from incurring a loss when they engage in international trade, especially when others have obtained RTA-membership. The asymmetric tariff assumption can thus be regarded as a merit rather than a restriction of the model because, to a certain extent, this assumption is not far from reality. The findings in this model could also be perceived as an incentive or economic motivation for outside countries to join the existing RTA in order to compensate for such loss or to avoid encountering it. In spite of some rigidity in the model, this theoretical framework facilitates the understanding of the effects of RTAs on relevant outside countries or their potential members. The paper believes that this type of analysis is needed and can be applied further to measure the realistic motivation for a nation to decide whether to participate in any existing blocs.

In conclusion, despite limited information, countries should always estimate potential economic outcomes before joining any form of RTA if the aim is to maximize the country's profits and welfare gains. In practice, this can be done by constructing empirical studies and finding averaged forecasts on trade effects from the RTA, given all other relevant trading partners' information. Otherwise, there is no guarantee whether joining the bloc will be as beneficial as expected theoretically. In reality, not only countries' sizes and their tariffs are asymmetric but also other specific issues such as non-tariff barriers which are tough to impose any specific value. Thus, on top of having RTA-membership or not, countries are required to consider other dominant

factors which potentially alter gains from trade at the same time. Last but not least, the country should know its relative position in terms of tariff levels: whether its tariffs are lower or higher than the rest of the world's averaged tariffs and if possible, by how much. This information could assist the country in choosing the most appropriate form of RTA in the sense that trade benefits from RTA are maximized.

6: Concluding Remarks

This thesis basically covers 3 major studies. The first has evaluated the trade effects of ASEAN's Free Trade Area, the so-called AFTA, which has been existence since 1992. The renowned '*Gravity Model*' is selected as an empirical tool in this fashion. As the independent effects of AFTA are the focus, the thesis includes only AFTA members in the empirical examination. In contrast to numerous gravitational studies which are usually employed in the cross-section setting, the fixed effects panel data model is constructed here; the thesis perceives it is able to correct for numerous estimating biases commonly observed in traditional cross-sectional research. The thesis has also specified the '*time-effects*' in the estimating gravity equation. That is because, considering the period of study, from 1970-2007, this long time span should be controlled for; otherwise any special events which occurred could affect trade flows within the region and bring about bias on the '*AFTA-effects*' estimated. The thesis is, in addition, very careful to specify AFTA-membership dummies. As AFTA is unique in the sense that it was gradually expanded, the '*dynamic regional dummies*' has thus been implemented to capture any '*AFTA-effects*' that could happen to each member at a particular time. In brief, the new empirical work outlined in Chapter 3, in general, suggests that the correct specification of the estimating '*Gravity Model*' does matter estimated results. Nevertheless, in contrast to numerous RTAs that have been found to benefit members, the empirical investigation in this application shows that AFTA has not done so as negative and significant effects on the AFTA dummy variables are observed. Part of the reason for this negative finding is the rigorous statistical test that has been applied to

choose the correct estimating gravity framework. In the past, this was assessed, at best, using intuitive notion or relying on the point estimates from cross-sections.

With the focus on policies, such unsatisfactory findings on the '*AFTA-effects*' therefore suggest that member countries perhaps need to improve if not to reform their international trade strategies. In fact, this piece of empirical evidence reminds us that there are benefits as well as costs associated with being AFTA and the latter have been shown to outweigh the former in this application. While the benefits from being RTA(s)-members are largely covered, the costs associated with trade and investment liberalization are not usually spelled out in any research. This can consequently be considered as an area for future research. In reality, these costs can refer to any social issues and adjustment problems which occur during the integration processes. For the case of ASEAN countries, the similarity of products produced, different levels of economic development and priorities among member countries have been key factors behind this substandard progress of AFTA. In addition, the enlargement of ASEAN/AFTA with the entry of CLMV countries makes it more difficult to arrive at agreements that will bring mutual benefits to everyone as economic conditions and political orientation within this group of countries are very different from those of early AFTA members. This further suggests that AFTA countries indeed require other alternatives, if increasing intra-ASEAN trade is one of the key objectives. Apart from using tariff liberalization to boost trade within the region directly, countries need to look beyond the ASEAN's territory as outside markets are certainly larger than their own. By enjoying tariff preferences initiated by AFTA, member countries are able to develop into cost-effective producers more easily than previously. With approximately 500

million people, ASEAN is indeed a good source of labour. This factor plus the fact that the region has abundant natural resources, means they can straightforwardly complement the world's demand, especially in manufacturing and agricultural products. However, ASEAN countries should put their dependence on extra-ASEAN trade regionally instead of individually if maximizing the potential economic benefits from AFTA is the ultimate objective. For this reason, commitments in strengthening regional economic cooperation need to be turned into action urgently.

This point therefore brings us to the second empirical study which investigates trade effects of AFTA on both intra-region and extra-region trade flows. In this instance, the '*Gravity Model*' is, once again, employed as an empirical tool. As the thesis perceives that the choice of countries included in the gravity estimation is another influential factor shaping the '*AFTA-effects*', instead of including many countries and various RTAs into the gravity estimation, only key external traders are selected. Hence, in addition to 10 ASEAN members, the thesis chooses another 10 external traders, the top 10 in terms of trade volume, which have been trading consistently with ASEAN since 1970, to be included in the estimating gravity equation. It is interesting to observe that AFTA has been relying on the same group of trading destinations for a long period of time. Other empirical issues are, in addition, controlled for in the same fashion as in the first empirical study. With the focus on '*AFTA-effects*' estimated, this study, in contrast to the first empirical chapter, finds the positive effects on AFTA dummy variables. This result implies that AFTA still stands a chance to benefit its members if they keep their dependence on external trade ties. In this application, ASEAN countries can utilize AFTA as a production base in order to produce products supplying the world's demands

at competitive prices. However, in this instance, the value of the '*AFTA-effects*' estimated are still minimal which can be interpreted as suggesting that AFTA members have not actually utilized this form of regional cooperation properly. Any external trade ties that membership countries have relied on are aimed at serving individual interests rather than regional ones. Even though these major trading partners have been trading with the region for almost 4 decades, there have not been substantive changes occurred in this time. In addition, the year 1992, which was the time of AFTA's establishment, did not show any great impacts on intra-ASEAN trade flows.

Nonetheless, as AFTA countries continue to share a market-oriented philosophy and implement export-oriented trading policies, their economic relations with developed and developing countries will continue to be strong. This can facilitate the region in achieving overall economic developments as planned, if the region works harder as a group to promote extra-regional trade further. ASEAN members could work via tariff preferences within AFTA so as to increase the international competitiveness of ASEAN industries, making the whole region an integrated investment location. In principle, regional economic integration in the form of a free trade area allows member countries to keep their respective policies towards the rest of the world. Thus, by abolishing intra-regional trade barriers, these countries can promote the tariff preferential zone to attract local or foreign investors directly. As a result, this action will make AFTA's manufacturing sector more efficient and more competitive internationally. As more trade and investments move towards the region, other positive benefits are thus expected to follow. Among these are, exploitation of economies of scale and competition-induced efficiency as well as greater consumer surplus from a greater

variety of products being produced. The empirical findings in this instance, however, suggest that tariff liberalization alone is not sufficient to bring such desired economic outcomes to the region. AFTA members need to liberalize if not eliminate other non-tariff barriers. Moreover, harmonization of product standards, macroeconomic consultations, coordination of foreign investment policies and cooperation in transport and logistics systems are essentially required to promote the free trade zone further. These measures are, in fact, perceived to help by speeding up regional economic cooperation and, in consequence, enhancing intra-ASEAN trade flows. Nevertheless, as earlier mentioned, AFTA members need to keep working together as a region to promote trade with outsiders. This is another challenging task for members as they, once again, need to put regional priorities in front of their own ones. The choice between regional liberalization and unilateral liberalization undoubtedly requires a different political context as greater commitments and efforts are accordingly required from member states to implement regional trade policies or to arrive at any reciprocal agreements.

Apart from the 2 interconnected empirical studies that examine trade effects of AFTA and ASEAN's trade flows, specifically; the last assessment provides an independent theoretical research discussing the incidence of RTA-membership expansion in the general framework. The study is, in fact, inspired by the famous theoretical work of Baldwin (1995): the so-called 'domino theory of regionalism'. Nevertheless, while Baldwin (1995)'s theory perceives RTA-membership expansion as a political process, this study treats the procedure as an economic one. Given that a particular RTA is formed, it is reasonable that relevant non-members, before joining the bloc, estimate

gains versus losses from trade that this RTA may have produced on their terms of trade. These outcomes are, in consequence, derived in the form of profits and welfare effects. In order to do so the thesis, in fact, divides the analysis further into 2 major sections: symmetric tariffs and asymmetric tariffs. As the supply of RTA-membership is assumed to be unconstrained and economic motives are the only factor that countries rely on in order to decide whether to follow into the existing RTA, the theoretical findings suggest that countries should always engage in the existing bloc as long as their gains from trade with the bloc-membership status outweigh their losses from not having it. In the symmetric tariffs setting, this outcome is true in both profit and welfare terms. Under the asymmetric tariffs assumption, welfare effects are inconclusive, though the upshot on profits confirms that joining the RTA benefits participating countries more than otherwise. Even though this theoretical outline is a standalone chapter examining RTA-membership expansion in general, with the concern on AFTA, the findings developed here may help in explaining its unimpressive conclusion. That is because ASEAN members' decisions are driven by political rather than economic concerns thus all have to join AFTA eventually. In order to meet one of the regional cooperation's requirements, ASEAN countries do not have a choice as to whether they become bloc members. Regardless of whether they can maximize gains from trade from being a part of the bloc, ASEAN countries have to engage into the zone eventually. Yet, as the objective of this theoretical study is to investigate any expanding RTAs, as long as the data on the bloc's size, countries' profit and production functions and each country's tariff rates are available, the research should be able to calculate the country's potential gains and losses from having RTA-membership.

Besides aiming to fill the gap in this field of research, in summary, the author certainly wishes that the empirical evidence and theoretical framework developed in this thesis will be useful for anyone who is interested to learn about the only formal form of economic integration of ASEAN: AFTA. The research highlights the importance of using the correct specification of the '*Gravity Model*' and other related empirical methodologies in evaluating '*AFTA-effects*'. This ideology, in fact, can also be applied to other literature that aims to measure any RTA(s)-effects in the same fashion. As aforementioned, even though the theoretical framework developed in the Chapter 5 is not directly applied to AFTA, its findings can still be used to explain the empirical results found in Chapter 3 and Chapter 4. With regard to the AFTA context, the theoretical findings remind us that far sighted policies are required if the best economic outcome is to be expected. In designing any international trade-related policies, countries need to focus on pursuing economic success whilst perhaps keeping their political motives to a minimum. The trade outcome from ASEAN countries, though with the formation of AFTA, certainly underlines the fact that political stability alone may not necessarily bring success to intra-regional trade growth. There are other underlying mechanisms that need to be improved in order to achieve remarkable success for the whole region via this long-established free trade zone.

Appendices

Appendix I

The Common Effective Preferential Tariff Scheme is a cooperative arrangement among ASEAN members that would reduce intra-regional tariffs and remove non-tariff barriers. It is the main instrument for making ASEAN a free trade area. This means that ASEAN members shall have common effective tariffs among themselves in AFTA, but the level of tariffs with non-ASEAN countries shall continue to be determined individually. In principle, AFTA covers all manufactured and agricultural products. The products covered under the CEPT are categorized as:

- 1) The Inclusion List (IL) refers to products that have to undergo immediate liberalisation through reduction in the CEPT, removal of quantitative restrictions and other non-tariff barriers.
- 2) The Temporary Exclusion List (TEL) refers to products that can be excluded from trade liberalisation for a temporary period of time. These products will have to be transferred to the IL eventually.
- 3) The Sensitive List (SL) contains mainly unprocessed agricultural products. These products are given a longer time frame to be included in the liberalization process.
- 4) The General Exception List (GE) refers to products that are permanently excluded from the liberalization process. These products are deemed important to a nation security, public morals, human, animal, plant life and health, and articles of artistic, historic and archaeological value.

Appendix II

Key elements of the ASEAN Trade in Goods Agreement (ATIGA)

i) ATIGA consolidates and streamlines all the provisions in the CEPT-AFTA, and formalizes several ministerial decisions. As a result, the ATIGA becomes a single legal instrument for government officials who implement and enforce the Agreement, as well as for private sector who are the beneficiaries.

ii) The ATIGA annex provides the full tariff reduction schedule for each Member State and spells out the tariff rates to be applied on each product for each year up to 2015. This makes tariff reduction schedules transparent and predictable for the business community. A single legal enactment to effectively implement the stipulated reduction schedule up to 2015 is also expected.

iii) The ATIGA comprise elements to ensure the realisation of free flow of goods in ASEAN, including the following: tariff liberalisation, removal of non-tariff barriers, rules of origin, trade facilitation, customs, standards and conformance, and sanitary and phyto-sanitary measures. The ATIGA contains comprehensive coverage of commitments related to trade in goods, and mechanisms of its implementation as well as institutional arrangements. This would allow for synergy of actions being undertaken by the various ASEAN sectoral bodies.

iv) With the objectives of eliminating non-tariff barriers, the provisions on non-tariff measures (NTMs) in the ATIGA have been enhanced further through codification of measures, as well as establishment of a mechanism to monitor the committed elimination of non-tariff barriers.

v) The ATIGA places emphasis on trade facilitation measures by including the ASEAN Framework on Trade Facilitation. Subsequently, ASEAN has developed the Trade Facilitation Work Programme for the period of 2009-2015.

Appendix III

Results of the '*Gravity Model*' Estimates: the Two-Way Fixed Effects Model (2-Way FEM) with Robust Standard Errors

Dependent Variable : Real Exports	AFTA-context (2-way FEM)
Exporter's GDP (Y_{it})	1.2153623*** (0.4604465)
Importer's GDP (Y_{jt})	0.73517878 (0.5116873)
Exporter's Population (P_{it})	0.79549044 (1.153098)
Importer's Population (P_{jt})	-1.0911003 (2.143607)
Distance (D_{ij})	-
Real Exchange Rate (REX_{ijt})	0.20079673*** (0.0619948)
Common Language ($Lang_{ij}$)	-
AFTA-effects ($AFTA_{ijt}$)	-0.35077028 (0.2732298)
Constant	-28.379009 (45.38853)

Note: *** denotes significant at 99%, ** and * denotes significant at 95% and 90%, respectively

Robust standard errors are given in parentheses.

The time-effects are not included here in order to save space.

The estimates are, however, available upon request.

Appendix IV

Results of the ‘Gravity Model’ Estimates: 2-Way FEM

Dependent Variable :	AFTA-context
Real Exports	(2-way FEM)
Exporter's GDP (Y_{it})	0.75870505*** (0.2073276)
Importer's GDP (Y_{jt})	0.73148512*** (0.1508567)
Exporter's Population (P_{it})	1.4290107** (0.639968)
Importer's Population (P_{jt})	0.57072289 (0.4475124)
Distance (D_{ij})	-
Real Exchange Rate (REX_{ijt})	0.17658444*** (0.0337136)
Common Language ($Lang_{ij}$)	-
AFTA-effects ($AFTA_{ijt}$)	0.08101158 (0.1800355)
Constant	11.92325***

Note: *** denotes significant at 99%, ** and * denotes significant at 95% and 90%, respectively

Robust standard errors are given in parentheses.

The time-effects are not included here in order to save space.

The estimates are, however, available upon request.

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