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AFTA'S EFFECTS ON INTERNATIONAL TRADE

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วัตถุประสงค์ของการศึกษาวิทยานิพนธ์ฉบับนี้คือ การประเมินเขตการค้าเสรีอาซียน (AFTA) โดยเน้นผลกระทบที่มีต่อด้านการค้า ขอบเขตและการวิเคราะห์เริ่มจากปี ค.ศ. 1976 จนถึงปัจจุบัน (ค.ศ. 2006) โดยเน้นการศึกษาจาก 5 ประเทศผู้เริ่มก่อตั้งเขตการค้าเสรีอาซียน (ASEAN-5) เป็นหลัก แต่เนื้อหานั้นได้ศึกษาครอบคลุมไปจนถึงปีแรกของการเริ่มก่อตั้ง (ค.ศ. 1968) ข้อมูลการค้าที่นำมาศึกษาในครั้งนี้ประกอบไปด้วย (1) ข้อมูลการเปลี่ยนแปลงด้านผลิตภัณฑ์ต่างๆภายในประเทศจากปีเริ่มต้นจนถึงปัจจุบันว่ามีการเปลี่ยนแปลงอย่างไร (2) พิจารณาร่วมกับข้อมูลทิศทางการค้าส่งออก-นำเข้า (Direction of Trade) ของประเทศนั้นๆตามระยะเวลาดังกล่าวข้างต้น สิ่งสำคัญอย่างยิ่งในวิทยานิพนธ์ฉบับนี้คือ การวิเคราะห์ข้อมูลการค้าระหว่างประเทศแนวใหม่โดยการปรับเปลี่ยนวิธีการทางสถิติ และเศรษฐศาสตร์มาประยุกต์ใช้กับสมการถดถอย (Regression) ของแบบจำลองแรงดูด (Gravity Model) ซึ่งการปรับเปลี่ยนวิธีการดังกล่าวจึงเป็นเหตุผลสำคัญที่ทำให้วิทยานิพนธ์ฉบับนี้มีความน่าสนใจและมีมุมมองที่แตกต่างออกไปจากอดีตที่เคยปฏิบัติมา

จากการศึกษาพบว่าเขตการค้าเสรีอาซียน (AFTA) ก่อให้เกิดผลดีและเป็นตัวแปรสำคัญอย่างยิ่งทั้งในเรื่องของการค้าภายในและภายนอกกลุ่มอาซียน และจากข้อมูลที่ได้ยังเป็นการสนับสนุนว่า การจัดตั้งเขตการลงทุนอาเซียน (ASEAN Investment Area - AIA) และ การจัดตั้งประชาคมเศรษฐกิจอาเซียน (ASEAN Economic Community - AEC) นั้นเป็นการเดินมาถูกทางเพื่อบรรลุวัตถุประสงค์ของการจัดตั้งดังกล่าวข้างต้น

สาขาวิชาเศรษฐศาสตร์และการเงินระหว่างประเทศ ลายมือชื่อสิต.....

ปีการศึกษา 2549 ลายมือชื่ออาจารย์ที่ปรึกษา.....

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The main purpose of this study was to make an assessment of the ASEAN Free Trade Area (AFTA) in regards to its effects on members' trade. The scope of analysis is mainly limited to ASEAN-5 countries, but covers most of the history of the Association, from 1975 to the present. A review of trade statistics was performed with consideration for the dynamics of the product mix and direction of trade for this time period. In addition, innovative use of the gravity model of international trade was applied to regressions with careful consideration to potential trade determinates and related issues that are unique to the region. Comparisons of outputs are made across time periods and for both intra-regional and extra-regional trade samples and a comprehensive series of tests of AFTA's significance for trade determination are applied.

Evidence shows that AFTA is a positive and significant factor for ASEAN trade. Other findings of particular interest relate to the relationship between inward FDI and trade, trade growth in new manufacturing industries, and the clear differences in trade determination at different time periods and directions for ASEAN. Results also suggest that ASEAN's most recent declarations for the future, in the form of the ASEAN Investment Area (AIA) and the ASEAN Economic Community (AEC), are correctly designed and should be conducive to their expressed goals. These continuing ASEAN integration efforts appropriately utilize a market-based, trade and investment restriction reduction approach conducive to stimulating competition and scale productivity gains.

Field of Study: International Economics and Finance
Academic Year: 2006

Student's Signature.....
Advisor's Signature.....

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List of Abbreviations

AFTA: ASEAN Free Trade Area

APEC: Asia-Pacific Economic Community

ASEAN: Association of Southeast Asian Nations: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam.

ASEAN-5: The original 5 members of ASEAN: Indonesia, Malaysia, Philippines, Singapore, and Thailand.

ASEAN+3: ASEAN plus China, Japan, and South Korea (CJK)

CJK: China, Japan, and South Korea (see ASEAN+3)

CLMV: The four newest members of ASEAN: Cambodia, Lao PDR, Myanmar, and Viet Nam.

Dist: Geographic distance between two trading partners

EU: European Union

FDI: Foreign Direct Investment

FTA: Free Trade Area

GDP: Gross Domestic Product

MFN: WTO enforced Most-favored Nation framework for tariffs on international trade

NAFTA: North American Free Trade Area

NTB: Non-tariff Barrier

P.C. GDP Diff: Per Capita GDP Differential

POP: Total Population

PPP: Purchasing Power Parity

PTA: Preferential Trade Agreement

RIA: Regional Integration Agreement (e.g. ASEAN, EU, NAFTA, MERCOSUR, etc.)

Tff: Bilateral Tariff Rate

Chapter I

Introduction

The Association of Southeast Asian Nations (ASEAN) has been around since the late 1960s, making it one of the oldest surviving regional integration agreements (RIAs) in the world. However, only relatively recently has regional economic policy become an important part of the scope and focus of the Association. Real concerted effort for economic integration was virtually non-existent in ASEAN prior to the 1990s, and so information on such a movement's effects could not be previously evaluated. An evidence-based assessment of the consequences of ASEAN economic integration on member countries' trade is finally possible.

Assessments of free trade areas and regional groupings are valuable exercises for policy makers. *A priori* predictions on the effects of regional or bilateral agreements are made with imperfect information and are usually controversial. Follow-up assessments help present confirmations or refutations for the range of the arguments and counter-arguments in the literature. Furthermore, statistical analysis, *ex post*, may present new concepts for the effects of RIAs on trade.

There are several competing viewpoints on whether or not regionalism is a wise approach for ASEAN. In fact, regional and bilateral focuses for trade agreements in all parts of the world have spurred dramatic protests from both protectionists and free-traders, and both nationalist and global-oriented perspectives. Regional trade agreements

are controversial because their economic outcomes can be complex and may vary between stakeholders. ASEAN trade policy requires careful empirical analysis, in order to fully understand how it is ultimately affecting the member countries' trade and welfare situations.

The emerging trend of a regional, as opposed to global, scope for trade agreements is well recognized in the literature. The growth in RIAs is "one of the major international relations developments of recent years" (World Bank, 2000, p.1). Two major schools of thought have developed regarding this trend's relationship with world-wide free trade: one alleging that it is an obstacle to the wider, global goal; and the other claiming that it will be an important stepping stone towards it. Moreover, regional trade agreements are usually assessed based on two opposing outcomes. First, a regional focus may create competition distorting factors that divert trade from countries outside the region and hence result in welfare losses for both member and non-member economies. In contrast, a properly designed regional agreement could be net trade creating by reducing restrictions to the intra-regional flow of goods, without distortions to market forces. Furthermore, positive outcomes from regional integration may eventually convince countries of the benefits of trade liberalization with other regions, so that all countries can potentially gain. Conversely, negative outcomes may cause countries to switch to more protectionist measures.

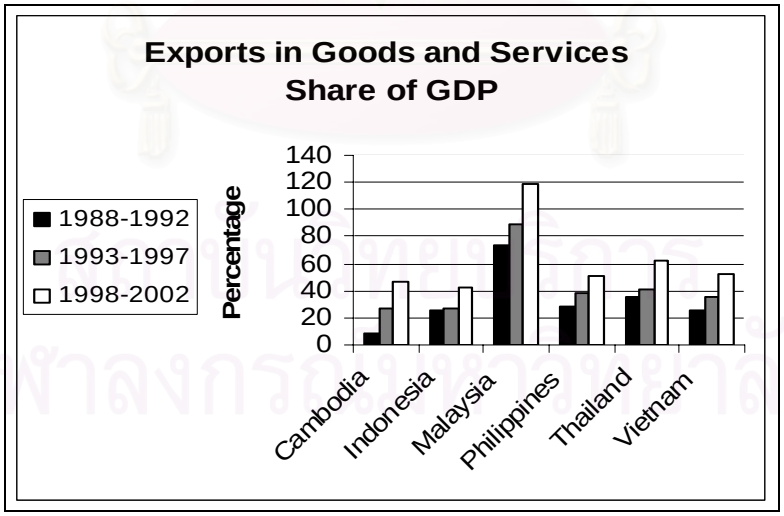
ASEAN has received criticism based on some arguments mentioned above, and based on assessments that claim that ASEAN initiatives are ineffective or otherwise

insufficient. Moreover, regional trade has not traditionally believed to hold a large enough share of individual ASEAN countries' trade to justify the trade bloc. The Association has received criticism that it may be a so-called "unnatural grouping", where "natural" blocs are defined based on their *a priori* intra-regional trade intensity rather than simply geographic proximity (see Krugman, 1998). These arguments require a fresh review, following the growth in ASEAN intra-regional trade over the last few decades, which corresponds with high growth in incomes and investment, greater international integration, and a rapidly evolving trade structure for the region.

Whether or not ASEAN is trade diverting or otherwise damages relations with the large markets outside the region is difficult to prove, and results from attempts are contradictory. It is not the objective of this report to make any conclusive rulings on the popular topic of trade diversion versus trade creation for specific sectors under the ASEAN Free Trade Area (AFTA) agreement. Instead, the approach will explore aggregated regional trade, performing more direct tests of questions such as: Is intra-ASEAN trade living up to its potential given the geographical proximity and sizes of its members, or are their factors that continue to impede upon the exchange of goods within the region? What are the similarities and difference in determinates for ASEAN intra-regional and extra-regional trade, and is there clear evidence that ASEAN cooperation itself is a significant and positive (or negative) determinant? A conceptual framework is introduced in this paper based on statistical evidence, which implies a close interdependence between intra-regional and extra-regional trade, suggesting that an intra-regional focus will complement extra-regional trade growth.

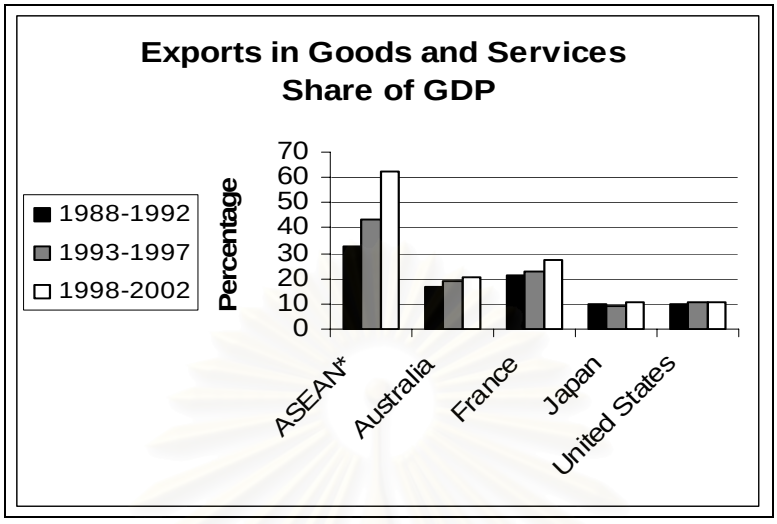
Analysis will cover the last three decades, or most of ASEAN's history, and will focus on the regional agreement's five original members (known as ASEAN-5). The trends and structural and directional dynamics of ASEAN international trade flows are examined within traditional and revised contexts, providing different perspectives for regional trade analysis than what is common in the literature. Such an analysis can provide support for the validity of ASEAN economic policy makers' current focus, and directions for the future. In general, this paper will contradict assumptions that ASEAN regional trade, and the group's trade initiatives, are relatively unimportant. Trade, in general, is especially crucial for ASEAN countries, as evident by the exports shares of GDPs for selected ASEAN economies as shown in Figures 1.1 and 1.2. Notice that the importance of exports for GDP increased drastically over time for the ASEAN countries in Figure 1.1, which was not the case for the developed countries in Figure 1.2.

Figure1.1: Selected ASEAN countries' exports shares of GDP



Source: World Bank *WDI 2005*
Notes: calculations are 5-year period averages

Figure 1.2: ASEAN and other countries' exports shares of GDP



Source: World Bank *WDI 2005*
Notes: calculations are 5-year period averages
*Brunei, Myanmar, Lao PDR, and Singapore are not included

Since 1980, ASEAN-5 countries have experienced growth in intra-regional exports at more that 2 ½ times the rate of GDP growth (821% intra-ASEAN nominal exports growth versus 308% nominal GDP growth). In comparison, exports to important non-ASEAN trading partners grew at about twice the rate of GDP. In terms of intra-ASEAN trade intensity, (regional trade relative to total trade) there is also clear evidence of growth.

Given Figures 1.1 and 1.2, understanding the dynamic factors of trade is of particular importance for ASEAN. Also, there are new concerns arising in the trade bloc, for example emerging fears of trade and investment competition from newly-opened China (i.e. a possible shift of FDI and export orientation towards China). ASEAN countries can not individually compete with the dragon economy if it continues on its current path. However, ASEAN, as a group, will have much more comparable qualities

with China, as well as other major world markets, in terms of diversity, market size, and productivity.

Baier and Bergstrand (2001) used the gravity model of trade to test various explanations given for observed disproportionate world trade growth relative to world GDP growth. Based on their model, the authors found that tariff reductions have had approximately three times the impact on OECD countries' bilateral trade relative to GDP growth compared to proxies for declining transport costs. Insignificant effects resulted from variables representing the potential factor of international income convergence. A similar type of analysis for the specific cases of intra-ASEAN versus extra-ASEAN trade was attempted in this research, while also considering some additional potential factors in trade growth such as inward FDI, ASEAN intra-regional cooperation, and technology and income differentials.

The conventional assumption in the literature is that the growth in trade and incomes in Southeast Asian countries is associated with their increased openness to integration with developed economies, particularly the EU, Japan, and USA. The so-called "Asian Miracle" of the late 1980s and early 1990s, in which East-Asian developing economies (including the ASEAN-5 countries) experienced rapid income and productivity growth, is commonly attributed to increased trade and FDI from the developed world. In contrast, intra-regional trade and integration, i.e. international trade and investment *among* the "miracle" economies (or within ASEAN), has received far less attention in this regard. I submit that the growth in ASEAN-5 trade can be attributed to a

cooperative decline in restrictions to trade and investment and increased attractiveness of a more united and stable Southeast Asia. The reduction in resistances to trade and increases in opportunities are observable for both inter-regional and intra-regional ASEAN trade.

To some, it may not seem likely that intra-ASEAN has much scope for growth, given the member economies' competitive context. Most ASEAN countries share the same comparative advantages relative to the rest of the world. Traditionally, ASEAN countries naturally tend to produce and trade many of the same commodities, relying on similar factors for production. Yet, even countries with nearly identical production factor intensities may develop huge opportunities for trade, provided barriers to trade are sufficiently reduced. These opportunities are especially viable when economies of scale benefits are present. In a region that is adequately integrated, companies can make strategic production location decisions that maximize economies of scale, which may involve international networking of the multiple stages of production. Developing a restriction-free environment conducive to this type of intra-industry, intra-ASEAN trade growth has been a major focus for ASEAN economic ministers in recent years.

In the next chapter, analysis of intra-regional trade significance is reviewed along with the history of ASEAN trade policy and the development of member economies. In addition, Singapore's potential role as a trade "entrepôt" is considered in the last section. Chapter 3 introduces a theoretical framework for assessing ASEAN cooperation in the light of competition, scale, and location factors at the level of the firm or industry, as well

as FDI and additional scale factors at the macroeconomic level. This framework is closely linked to the gravity model used in this research. A brief literature review on ASEAN policy and trade growth analyses follows at the end of the chapter. Chapter 4 explains the methodology for hypothesis testing and selecting data; the findings are then outlined in Chapter 5. Finally, Chapter 6 summarizes the conclusions and suggests some approaches to further study.

Chapter II

Intra-regional and Extra-regional ASEAN trade: Stylized Facts

2.1 Stages of Development of ASEAN Trade and Investment

The history of Southeast Asian economies in the last three decades includes "miracle" growth in the 1980s and 1990s, a crisis that overshadowed it in 1996-1997, and finally a full recovery with lessons learned and high expectations for a new millennium. It is convenient (and, in fact, proves important for regression analysis) to simplify our investigation by thinking about ASEAN development in terms of different stages. From the trade and investment perspective, we may consider four stages of ASEAN-5 economic history: (i) Early ASEAN (1975-1983)[1], (ii) "miracle" boom times (1984-1995), (iii) the crisis and recovery period (1996-1999), and (iv) the first half-decade of a new millennium with new growth prospects (2000-2005).

Early ASEAN is characterized by low growth in trade, which corresponds with practically zero commitment among ASEAN members towards reducing intra-regional trade barriers and stimulating integration. This stage represents the waning years for ASEAN import-substitution trade policy. By the early to mid 1980s, these protectionist policies were mostly reversed in Southeast Asia. Foreign investment in ASEAN-5 countries, during this initial period, was insignificant when compared to the levels of capital flows experienced a decade later. Most of intra-ASEAN trade was in competing

[1] Due to missing data, regression analyses for this stage cover 1978-1983 only

goods, and of low intensity. Note that, at the beginning of the 1980s, the biggest commodity performers in ASEAN exports and imports (besides petroleum) were land and labor-intensive agricultural products (specifically: rice and other cereals, natural rubber, and fish products). Also, Singapore was involved in an overwhelming share of intra-regional trade during this period; in some important commodities over 99% of intra-regional trade flows were exported or imported by Singapore.

Beginning in the 1980s, just before the "Miracle", a mainly extra-regionally oriented export-substitution policy shift occurred. Corresponding to these national policy changes, ASEAN economic policy makers also began focusing more attention inward, redefining the Association as an instrument for breaking down regional economic barriers.

After around 1984, the 5 core ASEAN countries all experienced economic boom periods. Economic growth was accompanied by large inflows of FDI from developed countries, increased importance of trade, and rapid development in manufacturing in more high-tech industries. The beginnings of an intra-regional production base comprised of industries relatively new to the region, such as automobile and electrical and computer parts manufacturing, was born at this time. In contrast to the previous stage, by the end of the 1980s manufacturing products eclipsed the traditional land and labor-intensive commodities in a dramatic shift of ASEAN's use of competitive advantage. Manufacturing in technologies suddenly showed unprecedented growth for ASEAN trade with especially notable growth in intra-regional trade (intra-ASEAN

exports and imports in these new manufacturing products grew even faster than with the large, developed country, non-ASEAN markets).

Trade structures, in terms of commodities, thus shifted dramatically for ASEAN between the first two stages proposed above. The Asian financial crisis and its recovery period is the third stage, distinct in that GDP growth was negative for many ASEAN economies, contrasting with the "miracle" growth experienced only a few years previous. Since the trends for the main supply and demand factors for trade proposed in this research (i.e. income levels, FDI, relative risk factors) changed sharply during the crises period, it is expected that trade determination may have some unique characteristics compared to the previous and later stages. Indeed, during the last half of the 1990s both intra-regional and extra-regional trade growth for ASEAN-5 countries declined, corresponding with capital flight and GDP contractions.

The fourth and final stage represents the post-recovery, and it is assumed to have begun around 2000. After 2000, even the ASEAN countries affected most significantly by the crisis (i.e. Thailand and Indonesia) had achieved their pre-crises GDP levels and were clearly looking forward towards new sources of economic development with more stable banking and financial systems. Despite an abundance of natural disasters and political uncertainty in Southeast Asia, ASEAN economies have rebounded with growth figures reminiscent of the pre-crises "miracle". This last stage has also demonstrated a continuation of the trend of shifting of regional trade structure from basic commodities to manufacturing and intra-regional production networking.

Evidence for the rather extreme structural changes to ASEAN trade over the last few decades is provided in Appendix A. Note that between the early 1980s to the present, trade figures in the SITC 7 commodities, e.g. electronic, computer, and automobile related manufacturing, show extraordinary growth for all ASEAN-5. But, even more remarkable, is the fact that within this extreme growth in trade in manufacturing, the percentage directed intra-regionally also grew at an unprecedented rate. As an example, consider Thailand's imports of SITC 75: office machines and related products. In 1980-1982, total intra-regional import value in this sector equaled about 570 thousand USD, less than half of one percent of total imports from all regions. Less than 10 years later, in 1988-1990, not only had imports grown dramatically, totaling about 1.3 billion USD, over 42% came from fellow ASEAN economies. Another important trend observable in these tables is that Singapore is generally losing its over-proportionate share of intra-regional imports and exports in these growing industries. Nearly 87% of the 42% of Thai intra-regional SITC 75 imports in 1988-90 came from Singapore. However, less than 15 years later, Singapore's share shrunk to about 16%. There are a multitude of other examples regarding these two issues clearly apparent for all ASEAN-5 from Appendix A.

Some of the stylized facts of the decade of Asian "Miracle" and Crisis, the second and third stages in our ASEAN development analysis, are summarized below.

Some Characteristics of the "Miracle" and "Crisis" for ASEAN-5

Asian Miracle (1990-1996)

- Inward foreign investment boom, but under financing by domestic savings (i.e. foreign debt growing too large). Foreign speculation is high. Inward FDI Stock grew by over 160% for ASEAN-5 over the period.
- Between 1990 and 1996, real GDP* growth for ASEAN-5 exceeded 65% (compared to a 25% decrease that followed, see below)

Asian Crisis (1996-1998)

- Gross capital formation (especially FDI) contracts suddenly in 1996-1998; investment fell by more than 50% in Indonesia, Malaysia, and Thailand and by 25% in the Philippines
- Between 1996 and 2000 real GDP* for ASEAN-5 dropped by 25% (compared to over 65% real GDP growth in the preceding 6 years, see above).
- Real effective exchange rates (REERs) moved sharply downward together in ASEAN, all trade-weighted rates (markets outside ASEAN) depreciated from 1996-1998.

Since the crisis "the region has settled on a lower and slower, but stable growth path".

*real GDP is UN GDP figures at 1990 USD converted with World Bank CPI index (calculations by author)

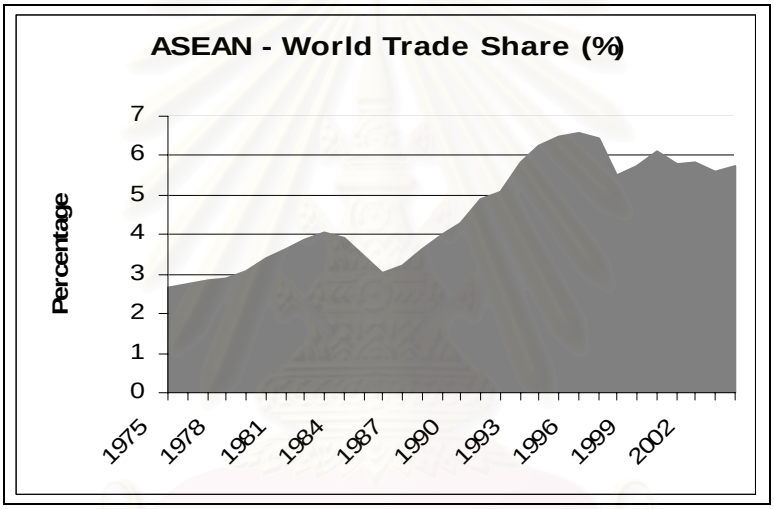
Sources: Branson & Healy, 2005; UNSTATS, 2006; UNCTAD, 2006

2.2 The Significance of Intra-ASEAN Trade

It is a well known fact that world trade has grown rapidly in recent decades. Indeed, growth in trade has been a common experience for nearly all regions. However, annual international trade growth for Southeast Asian countries has consistently exceeded

the global average since the early 1980s. Over this period exports from Southeast Asia expanded almost tenfold, while world exports grew just fivefold (Asian Development Bank, 2006) Therefore Southeast Asian countries have increased their share of world exports. In fact, ASEAN-5 countries have doubled their share in world trade from about 3% to 6% over the last two decades.

Figure 2.1: ASEAN-10 Growth in World Trade Share



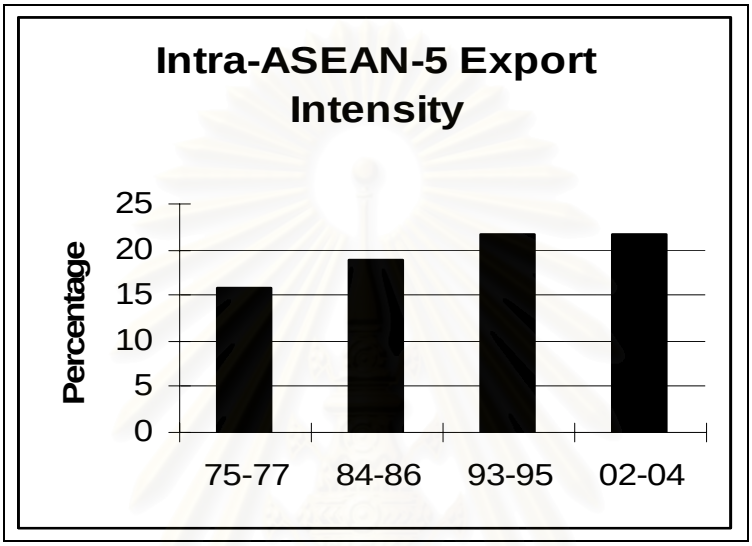
Source: UNCTAD, 2006

In Figure 2.1 above, trade is calculated as the simple average of export and import percentage shares (UNCTAD calculations). For ASEAN, exports and imports growth have had very similar trends. Looking at exports alone, Figure 2.2 below reveals how, along with ASEAN's relatively high growth rate in overall trade, the region has simultaneously experienced an increase in intra-regional trade significance, or intensity.[2]

[2] Export intensity is calculated as Xi*100/Xw, where Xi is total exports to the specific destination (in this case ASEAN-5 countries' exports to other ASEAN-5 countries), Xw is total exports to the world (or total ASEAN-5 exports). The export and import intensity calculations used in figures are period averages.

ASEAN intra-regional trade growth has exceeded growth in trade with other regions, including the large, developed markets (e.g. NAFTA, Japan, and EU); by consequence, ASEAN intra-regional export intensity has increased during this period (see Figure 2.2).

Figure 2.2: Intra-ASEAN 5 Export Intensity Time Trend

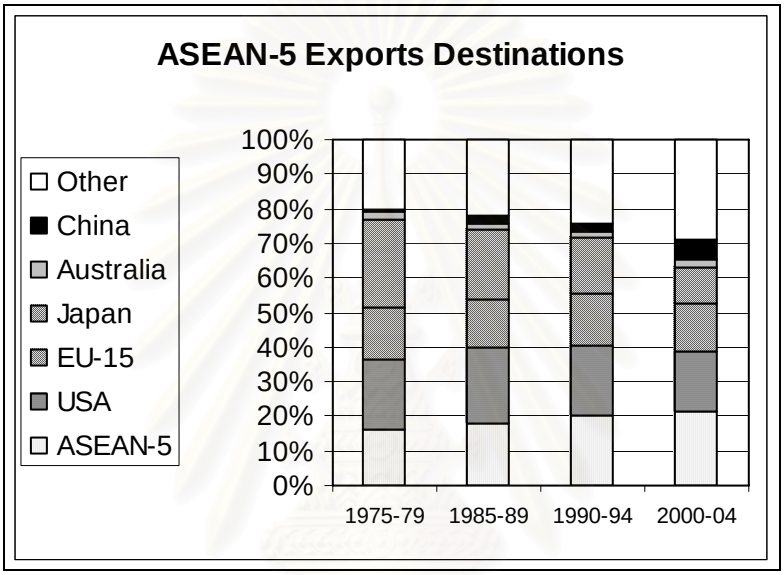


Source: IMF *DOTSY*, 2005 (calculations by author)

Most analyses of ASEAN tend to focus on a claim that ASEAN exports have become increasingly dependent on the large developed markets abroad. However, Figure 2.3 below tells a rather different story, as export intensity, especially to Japan and US, has reduced in intensity significantly. Besides intra-regional trade, some emerging destinations for ASEAN products include China and Australia, although these countries still represent a very small fraction of overall ASEAN exports. The intra-ASEAN and "Other" destinations (which especially include other developing economies in Asia and South America) now exceed the shares from each of the big three (US, EU, and Japan). One exception to this development is the case of final goods, for which extra-regional dependence with the EU, US, etc. is becoming relatively more extreme (Asian

Development Bank, 2006). In contrast, intra-regional trade growth has been composed especially of inputs, or unfinished products, and in it has been relatively more intensive than for extra-regional trade in aggregate.

Figure 2.3: Direction of ASEAN-5 Exports: Export Intensities Summary

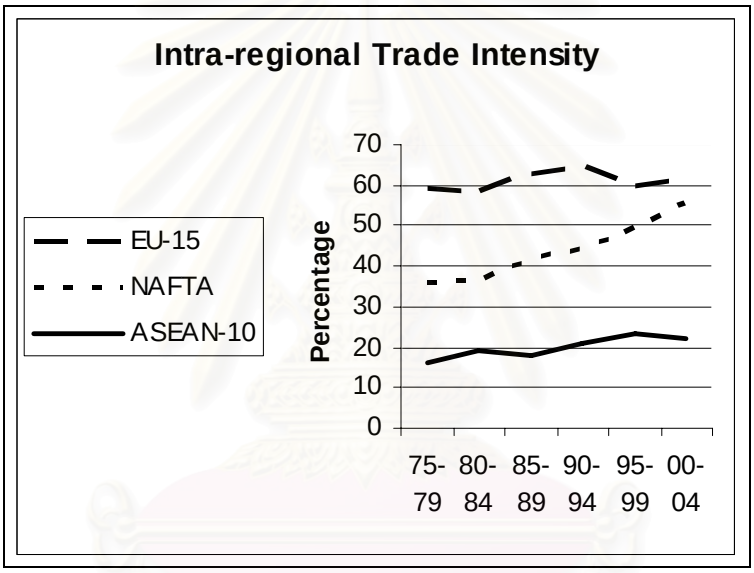


Source: IMF *DOTSY*, 2006 (calculations by author)

Despite this trend, arguments and laments that effectively challenge the relevance of ASEAN through the claim of relatively low intra-regional trade intensity are still very common in the literature. All of these assessments are implicitly made against the background of comparison to the developed world. That is, the analyses are made using implicit contrasts to the EU and NAFTA FTAs, where intra-regional trade intensity percentages are more than twice as high. The concept behind the "natural" and "unnatural" grouping label for RIAs is that allegedly "unnatural" regional groups, where *a priori* intra-regional trade intensity is relatively low, are more likely to result in net

trade-diversion effects, rather than welfare-improving, pure trade creation. The justification for this mainly relies on the idea that too much of an inward focus for RIAs that do not otherwise naturally conduct a high volume of intra-regional economic interaction will allow for less attention given to the economies outside the region that are apparently more important for members' overall trade.

Figure 2.4: ASEAN, EU, & NAFTA Intra-regional Trade Intensities



Source: UNCTAD, 2006

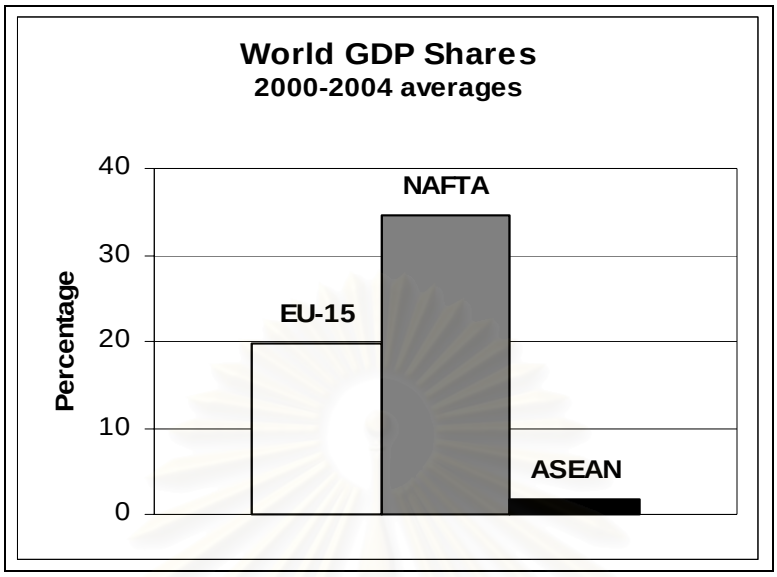
However, simply measuring trade intensity is not sufficient (or necessary) for determining trade diversion effects and comparisons to other regions must be made with attention to the context. Trade diversion (and conversely net trade creation) could potentially occur between countries regardless of their relationship prior to bilateral or multilateral preferential agreements. Whether the outcome is net trade diversion or creation is more likely to be affected by the nature and underlying objectives of the

agreements. Even when two countries have high *a priori* bilateral trade intensity, highly competition-distorting, or overly preferential, tariff reductions could still easily result in trade diversion or other welfare losses.

In the case of ASEAN, AFTA tariff reductions can hardly be described as excessively preferential since they are not much different from WTO-enforced most favored nation (MFN) rates, and because the MFN rates are actually more commonly used in intra-regional transactions anyway. In addition, virtually all proposed ASEAN initiatives that have had anti-competitive, or preferential treatment aspects, have been rejected by the national governments.

Furthermore, Intra-regional trade intensity calculation is not the proper approach for assessing the viability of a trade union when comparisons are made outside of the appropriate context. ASEAN regional trade intensity should not be compared directly with trade within the much larger economic areas of NAFTA and the EU. When considered in the context of the size of economies as supply and demand determinants, intra-ASEAN trade may not be as insignificant as is generally assumed. NAFTA and EU countries, on average, are much larger in market size and productive capability than ASEAN nations (see World GDP shares in Figure 2.5).

Figure 2.5: World GDP Share Comparisons

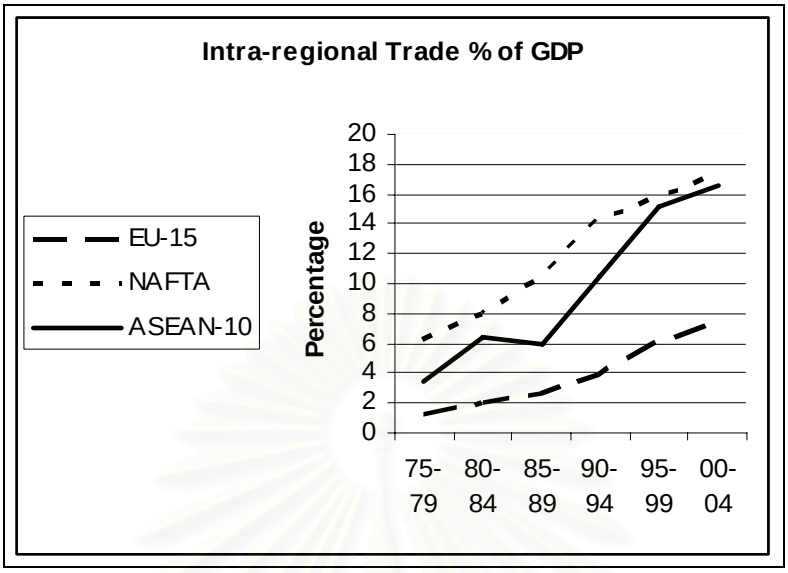


Source: World Bank *World Development Indicators*, 2005

In 2004, GDP for all of ASEAN was about $6.65x10^5$ billion USD compared to over $2x10^6$ billion USD in Germany and nearly $9x10^6$ billion in the United States.[3] Therefore, as far as the size of markets (as measured by GDPs) affects the supply and demand for trade, much lower intra-ASEAN trade intensity should be expected. EU and NAFTA countries are much larger economies, so all countries, both intra and extra-regional, naturally trade more with these markets than with smaller markets. Following this, lower intra-regional trade should be the expected norm for regions made up of relatively smaller economies. Thus, intra-ASEAN trade intensity below thirty percent perhaps should be an encouraging sign against trade diversion, not an indication that it is imminent. An alternative approach for comparisons of intra-regional trade significance across a diverse range of market sizes is trade intensity relative to GDP.

[3] calculated in constant 1990 USD, source: UNSTATS 2006

Figure 2.6: Intra-Regional Trade as Percentage of GDP



Source: UNCTAD and UNSTATS, 2006 (calculations by author)

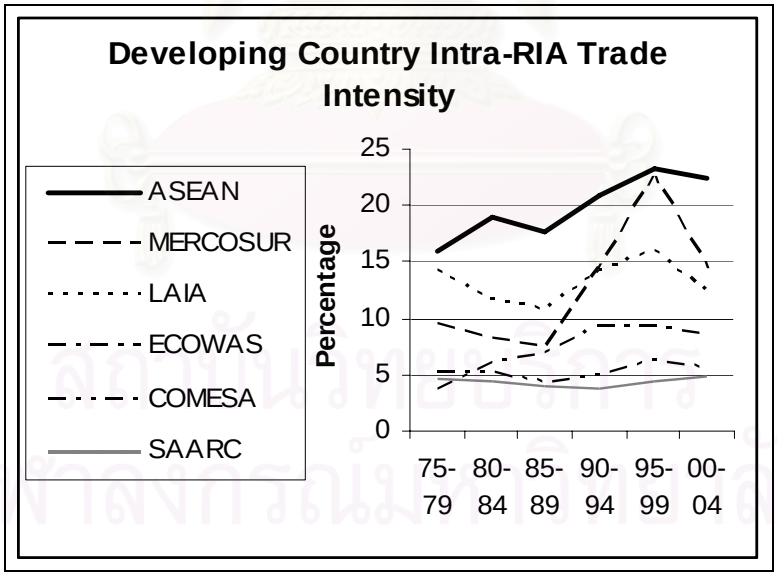
Put in the context of percentage of GDP, ASEAN intra-regional trade is far more important to the representative economies than intra-regional trade for EU members, and nearly equivalent when likewise compared with NAFTA (see Figure 2.6). Although the underlying trend of ASEAN trade is highly correlated with the levels of GDPs, trade growth (except perhaps in the early 1980s) has been considerably more rapid than growth in the member countries' incomes.

In the Introduction it was demonstrated that trade, in general, is more significant for ASEAN GDPs than other developed countries. Therefore extra-regional trade is more intensive for ASEAN than EU and NAFTA as well. Even higher significance for ASEAN extra-regional trade as a percentage of GDP compared to the other regions is

expected and observable from reported data.[4] However, Figure 2.6 shows how intra-regional trade for ASEAN is also highly significant to the region within the market size context, even when compared to NAFTA and EU.

When compared to other RIAs more similar to ASEAN in economic size and development stage, ASEAN regional trade intensity is the highest. Notice also that intra-ASEAN trade intensity has experienced a slow, relatively stable growth since the emergence of trade issues in the Association's negotiations, which suggests a possible modest effectiveness of ASEAN trade policy, without implications of any serious trade diversion.

Figure 2.7: Developing Country Intra-regional Trade Intensities



Source: UNCTAD, 2006

[4] EU-15 and NAFTA calculations range from about 2.3% to 5.9% and 4.3% to 9.9% respectively over the five time periods in Figure 2.6. In contrast, ASEAN-10 extra-regional trade as a percentage of GDP ranged from 18.2% in the late 1970s to nearly 58% in the most recent years calculated.

A separate argument that could be used to support the "unnatural grouping" hypothesis for ASEAN is the competitive, rather than complementary relative production advantages in the member countries. Branson & Healy (2005) showed that the geographic and commodity trade structures of ASEAN-5 countries are very similar, meaning that ASEAN-5 countries share very similar trade intensities measured by partner or by type of good. For example, Thailand and Malaysia trade with the EU with relatively similar intensities (for both imports and exports) in mostly the same commodities. The reason for this is that ASEAN countries share many important factor-endowments and competitive advantages in common relative to the EU or other non-ASEAN markets. According to Neo-Classical trade theory, ASEAN countries should have very little scope for specialization advantages that promote intra-regional trade, and lack the classical conditions for resulting welfare gains.

However, evidence suggests that ASEAN countries may still have a large scope for trade opportunities, and related welfare gains, under "new" trade theory assumptions of increasing returns (economies of scale) and international production networking. In reality, these "new" trade theory-based concepts for trade development have been the primary basis for ASEAN economic integration and its successes thus far. Recall that technology-related manufacturing sectors represent the makeup of ASEAN intra-regional trade growth (see Appendix A). These capital-intensive (generally sourced from FDI) sectors, as opposed to the traditional land and labor-intensive industries, are where economies of scale possibilities can more easily be demonstrated according to theory.

Trade in the traditional land and labor-intensive sectors have correspondingly decreased in significance over the time period.

In summary, growth in total trade for ASEAN-5 countries has significantly out-performed world trade growth in the last three decades. Along with this exceptional growth in ASEAN trade, intra-regional trade flows have become more significant, as opposed to trade with the large developed economies, which are typically given much more attention in the literature. Given ASEAN countries' similar endowments and production advantages, and small individual market sizes relative to the large, developed regions, relatively low intra-regional trade intensity should be expected. In fact, low intra-regional trade compared to NAFTA and the EU is a natural consequence of the laws of basic supply and demand economics more than a consequence of policy. Considered within the context of relevance to GDPs, intra-ASEAN trade intensity suddenly appears remarkably high. Furthermore, statistics on the commodity structure of trade clearly reveals that intra-industry trade in new manufacturing sectors is the main source for regional trade growth, which is better explained through imperfect competition assumptions (i.e. economies of scale) than classical factor endowment and production advantage relationships. In other words, simply considering intra-regional trade intensity and relative factor endowments is not sufficient to reject the significance of a regional grouping, particularly for the case of ASEAN.

2.3 Development of ASEAN Economic Cooperation and Trade Policy

Beginning in the 1950s (pre-ASEAN times), nearly every country in the Southeast Asia region (except Singapore and Brunei) pursued import-substitution trade policies. By 1975, the trade-weighted average effective rates of protection were over 100% in Thailand and the Philippines, and in some specific industries the effective rates were over 1000% (Tan, 1996). Similar figures on effective protection are observable for Indonesia and Malaysia. Starting in the early 1980s, ASEAN countries reversed this policy. While simultaneously initiating movement towards greater regional economic integration, ASEAN-5 economies removed the excessively high protective barriers to trade and began to pursue export-oriented policies.

During the time of import-substitution policies, ASEAN countries shifted the structure of imports from countries outside the region from final goods to inputs and raw materials. The import-substitution policies were generally successful in that the highly restrictive tariffs created opportunities for domestic producers to supply their own markets in the protected industries. However, new demand for machinery and raw materials for production was created in consequence, and it could not be sufficiently supplied locally. Hence, instead of importing fewer goods, ASEAN countries simply replaced the diverted trade in final products with larger amounts of imports of input or production-oriented goods. Statistics show that overall, aggregated import values did not decline as a result of the import-substitution policy.

In contrast, the export-oriented approach that followed did not have similarly negligible effects on overall levels of trade and investment. Because export-oriented trade liberalization strategies can more efficiently exploit comparative advantages and productivity factors for trade, ASEAN countries were able to experience a boom in international transactions and economic growth following their policy shift. Moreover, greater regional cooperation has created new opportunities for trade and investment exchanges both inter and intra-regionally through progress towards a large, integrated, and open Southeast Asian market.

As mentioned in the introduction, economic issues were a very minor part of ASEAN negotiations prior to the 1990s. Potential gains of economic cooperation were recognized as an important rationale for forming the group in 1967, but over two decades passed before real initiatives began to appear in ASEAN meetings. Only 10 out of 65 paragraphs in the "Joint Communique" issued in conclusion of the 1983 annual meeting refer specifically to cooperation in non-political matters, and only 2 contained the work of the Association's economic ministers (Indorf, 1984). In contrast, the topic of economic integration and harmonization of standards for trade and investment totally dominate the statements, press releases, and signed agreements produced from the most recent major ASEAN Summit in December 2005.

ASEAN regional trade policy first made an appearance in the form of the 1977 Preferential Trade Agreement (PTA), which provided the groundwork for an enhanced PTA a decade later, and eventually for AFTA, signed in 1992. The explicit goals of the

ASEAN PTAs and AFTA were to increase intra-regional trade, and improve the region's attractiveness to external investors by creating a single, region-wide, restriction-free market and production base for goods and services. The latter goal also represents the central rationale used in this study in defense of the significance and potential of ASEAN cooperation as a factor of both intra-ASEAN and extra-ASEAN trade.

The Two PTAs

From 1978-1987, there were few true tariff and non-tariff barrier reductions legislated by ASEAN despite the first PTA agreement having been signed. The original PTA "had little impact on regional trade because of its narrow commodity coverage and the half-hearted nature of the implementation process" (Prema-Chandra-Jayant, 1996, p.84). Similar statements could be made for the second PTA of 1987.

Because of a lengthy product exclusion list, the first PTA covered only 2 percent of intra-ASEAN trade, according to a study by Daquila (2002). Although a slight improvement on its predecessor, the revised PTA tariff reductions still only covered about 5 percent of total intra-ASEAN trade (Daquila, 2002). In practice, the PTAs, although important symbolically, had little or no effect on trade because the tariff lines addressed were so limited. Hence, the ultimate agreements "did not make economic sense" (Tan, 1996, p145). Although there was certainly a lack of commitment, the underlying concepts for regional trade integration were introduced in the PTAs, which created the basis for future ASEAN economic policy making. The PTAs also

corresponded with national movements from import-substitution to export-oriented trade strategies. Progress on national trade liberalization and regional integration were slow at first, during the late 1970s and early 1980s, and not always smooth. However, by the end of the 1980s most of the import-substitution era trade barriers had been removed.

AFTA

AFTA, in contrast to the PTAs, ambitiously aimed to virtually eliminate intra-regional tariffs in nearly all sectors through the Common Effective Preferential Tariff (CEPT) scheme. CEPT instituted gradual reductions to a maximum of 5% tariff rates for intra-regionally sourced imports, including (in contrast to the PTAs) product lines highly significant to regional trade. Just one year after AFTA was signed, in 1993, there were 41,000 tariff lines already published under the CEPT inclusion list, which accounted for 84% of intra-ASEAN trade (Tan, 1996). In 2000, the average CEPT tariff was 3.47% and tariffs on intermediate goods had been reduced to virtually zero (Feltenstein and Plassmann, 2005)

From the perspective of eliminating intra-regional tariffs, AFTA-CEPT was both highly ambitious and successful. Moreover, AFTA represented a hugely important new concept for ASEAN, in bringing attention to all types of barriers to trade, including non-tariff barriers (NTBs). NTBs, such as the lack of harmonization of rules and regulations (especially for competition policy), customs inefficiencies, and quotas were also targeted for elimination by AFTA, although progress in this area has been less substantial so far.

This illuminates one major problem with the CEPT scheme: it only covers *ad valorem* tariffs. Unfortunately, CEPT and tariffs evaluations are given by far the most attention in the literature. Meanwhile, NTBs are still potentially major restrictions to regional trade.[5] Due to the qualitative nature of NTBs, it is not practical to include them in most quantitative analyses. However, studies that focus on intra-regional trade in specific commodities or industries should utilize this information as potentially serious restrictions to the trade flows. The more NTBs that can be eliminated, the more effective AFTA will be at increasing regional trade.

Another important limitation of AFTA is the fact that reportedly less than 10% (or even less than 5% by some accounts) of all intra-ASEAN trade is actually conducted under the CEPT scheme (*The Economist*, 2004). This is not because the CEPT scheme is not wide enough in scope (as mentioned, over 80% of all existing tariff lines are technically covered by CEPT with maximum 0-5% rates); it is because the international businesses conducting transactions within ASEAN are simply choosing not to use CEPT. "Obtaining an AFTA certificate of origin is apparently difficult in terms of paperwork and costly because it necessitates face-to-face meetings with customs officials, so many ASEAN businesses just elect to pay the MFN tariff" (Asian Development Bank, 2006, p.274). Also, probably many businesses are simply unaware of the relevance of CEPT tariff reductions for goods in which they trade. ASEAN projects and progress on initiatives are not well covered in member countries' major national newspapers, and

[5] A recently completed database of ASEAN intra-regional NTBs is now available on the ASEAN Secretariat website (http://www.aseansec.org/16355.htm). This database represents some preliminary efforts for actually reducing NTBs, since they are now at least being identified.

there is an apparent lack of communication and coordination between ASEAN and the private sector stakeholders. This is a case where hard negotiation for lower regional tariffs is wasted by new non-tariff barriers that completely off-set the incentive to private sector international traders.

AFTA is an important venture with true regional liberalization commitments made by ASEAN members, especially compared to the much softer PTAs that preceded it. However, there are limitations yet to be addressed. It is difficult to predict the degree to which AFTA has truly influenced ASEAN trade, or whether there have been significant effects at all. The achievements of AFTA in terms of nominal tariff reductions have been described by some as "substantial" (Lim and Walls, 2004, p91). Less enthusiastic evaluations point out that there is still much more work that could be done to improve its effectiveness.

In Cuyvers/Lombaerde/Verherstraeten (2005, p6):

> *"…The most pressing issue…is the very limited use of the CEPT Scheme. Calculations show that only 5% of intra-ASEAN trade has been carried out using CEPT tariff rates (Reyes, 2004). Experts say that local enterprises do not bother to go through all the necessary formalities, or just do not know that their business transactions qualify for these preferential tariff rates. The authorities in countries still applying relatively high tariffs do not bother to inform the local*

business sector about the CEPT, as they do not want to loose tariff revenues. In other countries, levying relatively low tariff rates, the difference between the CEPT and the ordinary rate is just too small to take the trouble anyway…It is clear that it will take more time and effort, before a free flow of goods in the ASEAN region is reached."

Other ASEAN Economic Integration Efforts

The fact that most ASEAN countries have competitive trade structures has not prevented ASEAN from putting forth significant effort to create growth in intra-regional trade and consequently greater intra-regional interdependence. ASEAN leaders have been working for years to develop a regional strategy where production processes are vertically integrated, and hence boost intra-industry trade with increasing returns advantages. Implementation of this strategy began in 1980 with the creation of the ASEAN Industrial Complementation (AIC) Scheme. Unfortunately, attempts at legislation of intra-regional, vertical integration plans have not met the high expectations of their drafters. Over thirty AIC projects were introduced in the 1980s and 1990s, but only two were approved by countries – and both projects (which involved component parts production in the automotive industry) failed. (Tan, 1996) The concept's designers had not lost hope in possibilities for the automobile sector though, as evident from a follow-up plan known as the Brand to Brand Complementation (BBC) project. BBC

involved several foreign car manufacturers, including Volvo, Mercedes-Benz, Nissan, Toyota, and others, in a complex intra-regional parts production network.

Related projects under the ASEAN Industrial Joint Ventures (AIJV) program attempted to promote construction of large-scale production plants operating in at least two ASEAN countries. AIJV projects proposed special tariffs and uncompetitive advantages to interested companies. Yet, most of the member countries' governments eventually resisted AIJV because it threatened domestic businesses already operating in those industries.

Ultimately, the majority of ASEAN projects for industrial integration in the 1980s and 1990s failed. There are many factors which likely were partial causes to the failure, including the general precedence of national over regional interests, poor communication between ASEAN and the private sector (who were the true implementers and major stakeholders for the projects), and a lack of clear, sufficient benefits for the companies involved (Tan, 1996). The fundamentals of these trade-creation schemes were theoretically sound, matching with "new" trade theory concepts of welfare gains from intra-industry trade. However, not enough attention was given to the ultimate profitability of such projects and the basic microeconomic factors involved, including the costs and supply and demand for the products.

Despite the multitude of policy missteps, a regional, vertically-integrated, restriction-free, manufacturing area for ASEAN has been developing quite substantially.

Although specific ASEAN programs can not be given much credit for this, some of the growth in intra-regional, international investment and inputs trade can be attributed to the general improvement in cooperation and tariff reductions. Experience has shown that breaking down barriers to the exchange of goods between countries, rather than competition-distorting benefits offering like the approach of AIJV, is the best way to increase intra-industry trade. In recent years there were two new major ASEAN economic-cooperation ventures which have used a more market-based, trade and investment barrier reduction approach. These initiatives may soon prove to be far more effective than some previous efforts.

In 1998, realizing the importance of FDI to the region, the ASEAN Investment Area (AIA) framework agreement was signed at the Fifth ASEAN Summit in Manila. ASEAN countries experienced extremely high growth in inward-FDI earlier in the decade, and continue to be a major destination for international capital flows. The region's nations are among the top recipients of FDI for all developing countries (ASEAN Secretariat). In the 1990s, most ASEAN countries individually offered a wide variety of incentives for inward FDI. AIA has attempted to unify ASEAN's investment incentives measures with a common, market-based strategy. Besides stimulating greater cooperation and transparency, AIA has compelled member nations to expedite liberalization in international capital movement in all sectors.

Secondly, in the Bali Concord II, adopted on 7 October 2003 during the Ninth ASEAN summit, ASEAN leaders first formally announced their intention to create the

ASEAN Economic Community (AEC). The AEC is meant to be a “single market” and production base. The characteristics normally associated with this economic term are free movements of goods, services, investment, and labor. The single market concept for ASEAN is meant to create more equitable economic development in the region and reduce poverty. Originally, accomplishment of the AEC was targeted for the year 2020. The goals of this project have been re-emphasized many times over within ASEAN since the 9th Summit, and recently the target has been moved forward to 2015. However, as pointed out by Peter Lloyd (2005), a formal definition for a “single market” has not been made explicit by the ASEAN economic ministers (or by other regional associations who have similarly expressed single market ambitions, including the EU). A clear definition outlining what the “single market” goal entails for ASEAN is necessary in order to assess fully its feasibility and the possible effects on participant economies.

Realizing the benefits of creating a vast, single Southeast Asian market was one of the original justifications given for forming the ASEAN grouping in the first place (though real meaningful economic initiatives didn’t come until much later). The idea is that foreign parties will be more attracted by the possibility of entering a large, integrated Southeast Asian economic community, rather than investing in the much smaller, and perhaps riskier, individual countries alone. Moreover, capital owners can set up production centers of different components of products internationally throughout the region, without being subject to high costs in moving goods and inputs between countries. Hence, ASEAN members can mutually gain, both by attracting more investment and trade from outside the region, and by making it easier for businesses to

expand their markets within the region. Effective integration must include significant reductions of not only tariffs, but also other non-tariff barriers like inefficient regulations and "beyond the border" restrictions including non-unified trade policies. This is the strategy of these two latest ASEAN economic integration initiatives.

2.4 Singapore: Trade "Entrepôt" of ASEAN?

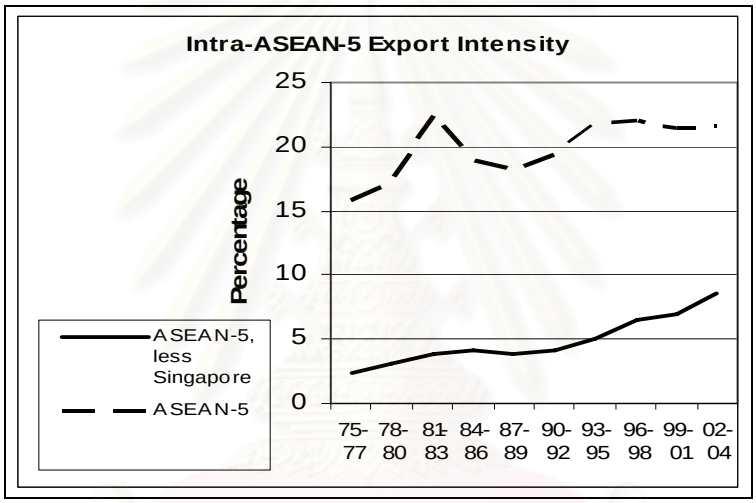
The city-state of Singapore has long been recognized as a unique case for international trade, not only within ASEAN, but globally as well. Economically speaking, the most obvious distinctive features of Singapore are the country's record of international openness and relatively liberal trade and investment policies[6], rapid economic development, and the fact that the entire nation occupies a small island with virtually no available land as a factor of production.

Yet, there is another, sometimes overlooked, distinction for the Singapore economy, which makes ASEAN trade analysis more complex and potentially misleading for those who ignore it. Singapore as an "entrepôt", or an effective port-of-entry and exit for trade for other Southeast Asian countries, has a historical background. Especially for goods to and from Malaysia and Indonesia, Singapore's previous colonial status and advantageous location caused the island to develop with the growth in world trade to become the main shipping point for inter-regional trade of ASEAN. During colonial times, it is reasonable to assume that the majority of goods shipped to or from Malaysia

[6] Singapore has virtually eliminated all tariffs on imports since the early 1990s

and Indonesia by sea, stopped in Singapore along the way. However, Singapore's "entrepôt" position has reduced in significance since, as the rest of ASEAN has opened further to the outside world and some general statistical indications of this from the available trade data are noted. Still, it is worth examining this unique case separately, especially given the over-proportionate share Singapore has on overall ASEAN trade.

Figure 2.8: Intra-ASEAN Export Intensity Excluding Singapore



Source: IMF *DOTSY*, 2005 (calculations by author)

Figure 2.8 above shows how intra-regional export intensity reduces significantly when Singapore is excluded from the calculation. This result can be at least partially accounted for by the fact that Singapore has a relatively high dependence on ASEAN trade since it is a small island with a condensed and high consumption population. Moreover, Singapore has by far the highest GDP in the region and has the comparatively most intense trade with Malaysia, the country with the second largest GDP. This suggests that, recalling the discussion above on intra-regional trade intensities, Singapore's

dominant role in intra-regional trade may be explained within the context of simple supply and demand factors.

In any case, it is not necessarily destructive to regional analysis or defense of the viability of a regional grouping if the RIA contains certain countries which are more intensive than others in participation in trade. However, reliability of conclusions may become damaged if, as may be the case for Singapore, a single RIA member's dominance in intra-regional trade intensity is caused by incorrectly reporting as intra-regional trade, transactions actually representing flows originating, or destined for, outside the region. Controlling for this problem is difficult since there is no way to know for sure the extent of Singapore's imports and exports that constitute so-called "entrepôt" trade, i.e. transactions that are links in an inter-regional chain. Although ASEAN has rules-of-origin policies in place, which theoretically prevents foreign companies from exploiting favorable intra-regional tariff rates, trade databases will likely have imperfect information and could misreport some "entrepôt" trade occurring regardless.

Trade data disaggregated by sector, particularly prior to the 1990s, gives considerable doubt that Singapore has been the true origin, or final source, of many of its reported intra-regional goods trade. This doubt arises from the irrationalism that this small island could solely produce or absorb the amount of specific exports and imports as reported in bilateral data between Singapore and other ASEAN countries (see statistics in Appendix A). Thus, Singapore's trade data may distort the true nature of its significance on overall regional trade.

In Anne Kruger's comparative study (1999) of the effects of NAFTA, she found that an ASEAN RIA dummy variable in gravity model bilateral trade estimation was the most significant of all RIA dummy variable coefficients used in a worldwide country sample. She attributed this unexpected result to a hypothesis that there are strong distorting effects from Singapore's "very significant role in entrepôt trade with both Malaysia and Indonesia" [7] (Kruger, 1999, p.20). Kruger also claimed in her paper that ASEAN could only be tested properly if accurate trade data was available prior to its formation. However, as discussed in the review of the region's economic cooperation above, ASEAN was not a trade or economic association, at least in terms of consequential agreements, until the 1990s. AFTA, signed in 1992, was the first regional agreement with any real significant trade liberalization features. Thus, ASEAN significance can be examined using data prior to AFTA (which is available and utilized in this research). Econometric analysis of the Singapore issue can be addressed by comparing intra-ASEAN trade estimation regressions with and without Singapore trade flows.

Referring once again to Appendix A, in the early 1980s Singapore's ASEAN trade share in several industries was overwhelming. However, there is a clear trend of dramatic reduction in Singapore's intra-ASEAN trade intensity in these sectors. For example, in 1980 to 1982 practically all Malaysian, intra-ASEAN telecommunications technology-related imports (99.53%) came from Singapore. In contrast, Singapore only supplied about 30% of this trade in the most recent figures for 2002-2004. The reason for

[7] The issue was raised again in Branson and Healy, 2005.

this change in intensity of trade direction may be due to growth in diversity of direction to ASEAN trade caused by the grouping's regional integration initiatives and the rapid economic development of the other four ASEAN-5 countries, rather than reduction of Singapore "entrepôt" effects. Still, the more diverse nature of intra-ASEAN trade directions observed post AFTA is a promising result both for the success of the integration efforts and for regional analyses, which may otherwise be viewing a distorted picture. Singapore is still the largest piece in the ASEAN, intra-regional trade puzzle. Therefore, although it may have some distorting effects on overall results, if left out it will be even more difficult to see the final ASEAN trade picture clearly.

One final point for optimism: the percentage growth in intra-regional trade intensity is almost identical for each export intensity trend line (6% more intra-sample trade relative to trade with other countries) in Figure 2.8. So, although the four country sample without Singapore has a much lower intra-regional intensity level, it has increased by the same amount relative to trade with other countries (which effectively includes Singapore). The implication is that the increase in intra-ASEAN-5 trade intensity that occurred over this time period can be accounted for by the four other countries of this sub-group, and not Singapore. Therefore, we can at least be confident that the growth of intra-ASEAN trade intensity observed is not attributable to Singapore "entrepôt" trade, since Singapore's trade has not been a major contributor to this growth.

Chapter III

Conceptual Framework and Literature Review

3.1 Competition, Scale, and Location

Productivity is the most universal and important factor of international competitiveness in trade. Productivity is important because it is a major factor for the supply of exports and as a root determinant for other relevant import and investment demand variables as well, since it partially determines employment and wages, return on investments, and the stability of national industries. There are a multitude of examples of countries that have experienced favorable competitive positions in world trade in important industries in absence of the macroeconomic conditions more commonly associated with national competitiveness. For example, many European nations have had export booms even while exchange rates have moved unfavorably (Porter, 1990). Singapore has had remarkable economic growth (from 3rd world to 1st world status within a generation) coupled with extraordinary growth in trade, even though the city-state has virtually no natural resources and had not employed protectionist measures. Finally, many of the most internationally competitive countries stay in their favorable position even while accommodating the most expensive labor forces in the world. Therefore, productivity, rather than these traditional macro-level factors, should be a central focus in trade policy analysis.

Increases in productivity usually come from microeconomic factors, such as technological or human capacity development, improved management, and increased specialization so as to reap economies of scale benefits. Unfortunately, these factors typically do not improve through a company's own initiative, competitive pressure is usually necessary. A nation or region's competition policy can be an important factor; however, natural competitive pressures are the more direct requirement to force industries, or individual companies, to make improvements in their processes. Therefore, the way to increase a country or region's competitiveness, quite naturally, is to ensure that businesses compete.

Greater ASEAN regional trade and economic integration increases such competitive opportunities, which can push companies into improving their productivity, and hence improve the global competitiveness of local industries. "If the RIA increases the intensity of competition, it may induce firms to eliminate internal inefficiencies (so called X-inefficiency) and raise productivity levels" (World Bank, 2000, p.31). Evaluating determinants of trade flows for ASEAN countries, hence, addresses this issue of ASEAN competitiveness and efficiency directly.[1] Moreover, inefficient competitive situations, such as monopolies, may be reduced by opening up competition internationally.

[1] One popular approach to analyzing international competitiveness is through trends in terms of trade. However, for this research this approach was not an option due to a critical lack of reliable data for ASEAN and a difficulty in controlling for other variables that may affect the terms of trade. Although prices are partially determined by the level of competition, trade – or transactions – *is* the competition. Thus, it should not come as a surprise that there is a general correlation between increased overall trade, or increased competition, and improved terms of trade.

Both intra-regional and extra-regional trade can provide a means for creation and diffusion of skills and technology (i.e. sources of efficiency), and especially to force industries into more productive systems, and potentially reduce monopoly power in some industries that had previously existed partially due to border barriers. Traditionally, theorists have stated that greater international trade for ASEAN requires greater focus on competitiveness. In reality, the causality also runs in the opposite direction; competitiveness improves as a result of increased international trade.

The overwhelming consensus in the literature, however, is that trade and FDI and associated technology transfers from the major developed economies abroad (i.e. USA, EU, and Japan) has been the driving force for observed economic growth in ASEAN-5 countries during the 1980s and 1990s, and again in post-crisis times. "It is a historical fact that extra-regional rather than intra-regional trade has been the engine of growth for ASEAN economies". (Prema-Chandra-Jayant, 1996, p.80) This statement may be more or less correct, but it does not speak to what determines this extra-regional trade that is deemed so important. In the past, the implication has been that since intra-ASEAN trade is comparatively insignificant as a factor for observed GDP growth in the country, intra-ASEAN integration efforts need not be given much attention. However, the mostly outward-focused approach of ASEAN trade policy suggests a rather different hypothesis. ASEAN economic integration initiatives have tended to emphasize potential gains from creating an image to the outer world economy of a large, united Southeast Asian production base and investment market. The implication of this policy approach is that further intra-regional integration will attract more trade and FDI opportunities from

outside the region. This assumption is conditional upon the effectiveness of regional integration for improving capabilities and profitability for international, intra-regional production networks, and creating fewer restrictions on the flow of goods and capital. In this sense, ASEAN appears almost as an oxy-moron organization in that it is a globally-focused, regional trade bloc. The conventional opinion that increased extra-regional, rather than intra-regional, economic integration is the primary policy-related source for growth in ASEAN countries, in this light, may be a misleading conclusion.

ASEAN can stimulate the volume of transactions with both intra and extra-regional economies by increasing the attractiveness of the region through integrating individual members into a single market. In addition, intra-regional integration can be an effective mode to realize potential economies of scale benefits and increases in productivity at the microeconomic level for traded goods and services. Eliminating border barriers within a region makes it more likely that production centers will expand the international scope of demand. There will also be fewer restrictions to establishment of clustering and networks for production in manufacturing sectors. In general, ASEAN as one large, single market is more conducive to development and growth in extra-regionally-sourced trade and investment than the small-market individual Southeast Asian countries acting separately.

Krugman (1979) has produced firm evidence for economies of scale in the production in most major industries. In fact, increasing returns benefits are evident all around, and they typically exist in two dimensions. First, at the level of the firm, where

larger scaled production is often marginally cheaper; second, at the level of a region (the most popular example being Silicon Valley, California), since production facilities clustered together can benefit from externalities. Within ASEAN, the former version of economies of scale is evident in the large-scale production networks, where different plants throughout ASEAN specialize and mass produce (and then trade) component parts for products like automobiles and computers. The latter economies of scale concept are observable in the pockets, or clusters, of specialized production which occurs within every industrialized country. Increasing returns to scale can provide sufficient rationale for trade with imperfectly differentiated products, even when factor proportions between countries are identical (Fillipini and Molini, 2003). Moreover, there are welfare gains from such trade even with products that have domestically-produced close substitutes that require identical inputs (Grubel and Lloyd, 1975).

The concepts discussed so far in this chapter may be referred to as "competition and scale" effects for RIAs. Competition effects are the benefits to productivity and so-called "national competitiveness" of industries. Scale effects come from expanding the size and scope of the market and of production at the factory or industry level. The "competition and scale" effects are identified by the World Bank as the primary sources of benefit for all trade blocs, though not all trade blocs have followed a strategy conducive to this theory. If regional FTAs are properly designed to avoid the fate of trade and technology transfer diversion, there are potential gains for all members by improving national competitiveness through increased competition, and inter-regional competitiveness as a unified and therefore larger and more attractive spot on the world

trade map. This is the accepted wisdom behind AFTA tariff reductions and the complimentary efforts of the AIA and AEC.

Highly related to competition and scale effects are theoretical location advantages that influence international corporations' production location and trade decisions. ASEAN will be most successful if it is able to increase its market potential as a region, and thus improve its appeal as a location for trade and investment. According to spatial economics, firms locate where market potential is high while also reducing transport costs. Of course, the causality could also behave in the opposite direction; market potential is high where many firms are located. Similarly, according to "high development theory", firms adopt modern (i.e. efficient and productive) techniques if the market is sufficiently large, and the market is sufficiently large if firms adopt modern techniques (Krugman, 1998, pp.47-8). Finally, in this research paper, it is important to recognize that trade and investment will increase with perceived increases in market size, and market size increases with trade and investment. In theory, ASEAN stands to gain most as a regional grouping by improving the region's market potential as perceived by international corporations and investors. These factors are best stimulated for ASEAN through greater economic integration and reductions of all intra-regional economic barriers. ASEAN nations can best take advantage of relatively low transport costs, implied by their collective geographic proximities, by reducing the avoidable costs to trade, such as tariffs and NTBs.

Figure 3.1: Diagram of Competition, Scale, and Location Effects for RIAs

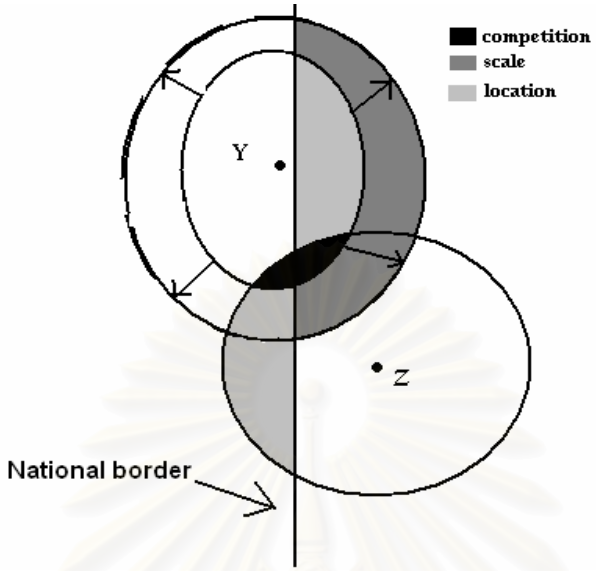


Figure 3.1 is an illustration of the competition, scale, and location concepts spoken to above. In the diagram, there are two factories (Y and Z) that produce slightly differentiated products, but in the same industry, and to the potential markets represented by the circle area around the two production centers. The factories are located in two different countries that share a border. The two factories will compete in the each other's markets where viable (see the area in black), but only if the national border is sufficiently unrestrictive. The location of the factories affects the market it will serve depending on transportation costs. If there are no extra costs to cross the national border, both Y and Z will improve sales by marketing to new sources of demand in the foreign country as well (see light gray area). The dark gray area represents an increased scale of production in Y, which may also occur with increasing returns. In fact, both Y and Z may benefit from increasing the scale of their operations, especially if they further specialize their products or processes. Note also, that, as the factories increase in scale, there is a multiplier effect

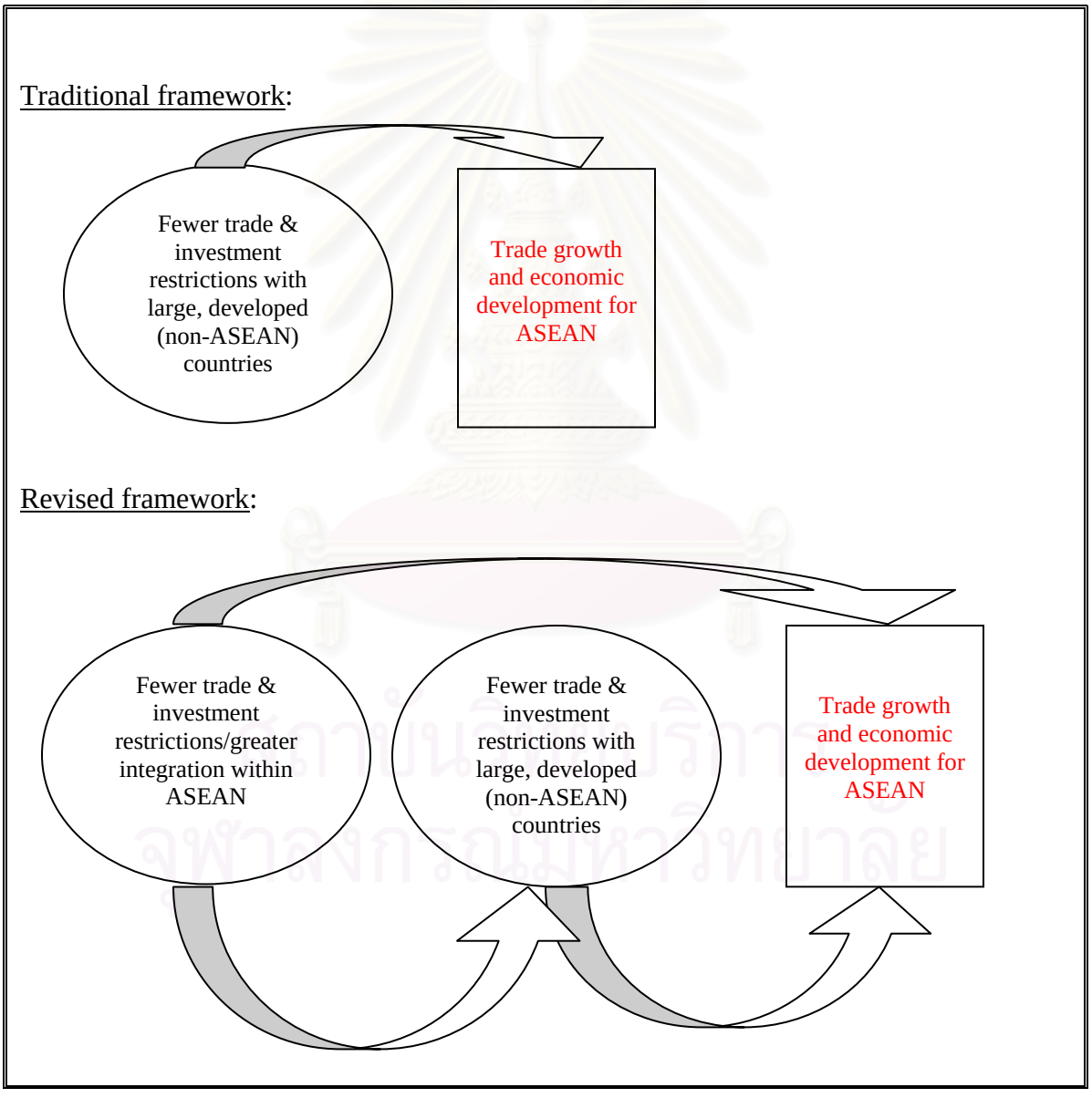
on location and competition gains. In the diagram, competition, scale and location effects complement each other and often overlap, provided the opportunity. If thenfl national border, conversely, is restrictive, the shaded areas will not be marketable.

The diagram, of course, is a simplification (some may say over-simplification) of reality. However, it helps visualize the theoretical justifications for ASEAN as a positive influence on trade, and such gains can really occur even in a more complex world where there is not a shared border and transportation costs is only one of many factors that affect the firm's decisions. Companies Y and Z may be locally owned, or funded through FDI from abroad. Furthermore, a factory from outside the region can also gain from lower intra-regional border barriers as it will also be able to enter the larger combined-market, rather than focus on one individual country at a time (extra-regional scale effects). In this case, similar scale and location gains could be illustrated with the concept of a network of production centers for a single, international firm, each location specializing in specific intermediate goods. As mentioned, such a development is evident particularly in ASEAN-5 countries for automobile and computer and electronics manufacturing (which also happen to be the sectors that have had the most dramatic trade growth for ASEAN).

Although FDI and new trade opportunities from outside the region are accredited as the main source for Southeast Asian economic growth (traditional framework), increased intra-regional integration may be a major stimulating factor attracting these extra-regional opportunities (revised framework), through competition and scale effects.

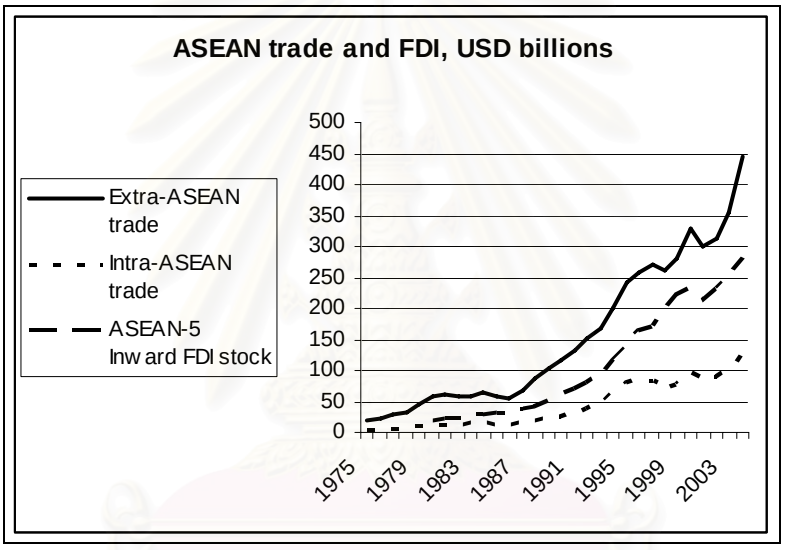
Conventional opinion states that extra-regional, rather than intra-regional, economic openness is the root cause for growth in trade and incomes for ASEAN countries. However, it is equally likely that this assumption is misconceived, if we include the fact that regional cooperation may be an important factor for extra-regional FDI and trade attractiveness.

Figure 3.2: Frameworks for ASEAN Trade Growth



Indeed, ASEAN extra and intra-regional trade is likely correlated as growth in trade in both directions has occurred simultaneously, along with increases in FDI from outside the region and greater economic integration within the region. Figure 3.3 illustrates this clearly, as the trends in these three economic variables are remarkably similar.

Figure 3.3: ASEAN intra and extra-regional trade and FDI trends



Source: UNCTAD, 2006

Analysts of ASEAN should rest their fears that AFTA will make the region overly introverted, especially given the emphasis the organization already gives for relations with the outside. Gains from increased integration with fellow Southeast Asian countries and with large developed markets abroad can both be achieved simultaneously through breaking down the regional restrictions to goods and capital flows. Of course, liberalization efforts with other regions will be important as well. ASEAN can further provide a mechanism for a common effort for extra-regional trade policy by developing a

common market, for example, in which extra-regional tariffs are equivalent for all members. Like the common market for investment strived for through AIA, a common market for trade can also help allay inadvertent NTBs caused by restrictive rules-of-origin and non-equivalent regulations among members.

A final consideration related to ASEAN regionalism effects are prices and the bargaining power of countries. As mentioned in the footnote above, terms of trade is another approach for evaluating a country's global trade position. The consideration of market power provides yet another scale-related justification for ASEAN cooperation, since strength in numbers will improve member states' position on the world stage. "Regional cooperation offers one route to overcome the disadvantages of smallness, by pooling resources or combining markets" (World Bank, 2000, p.30).

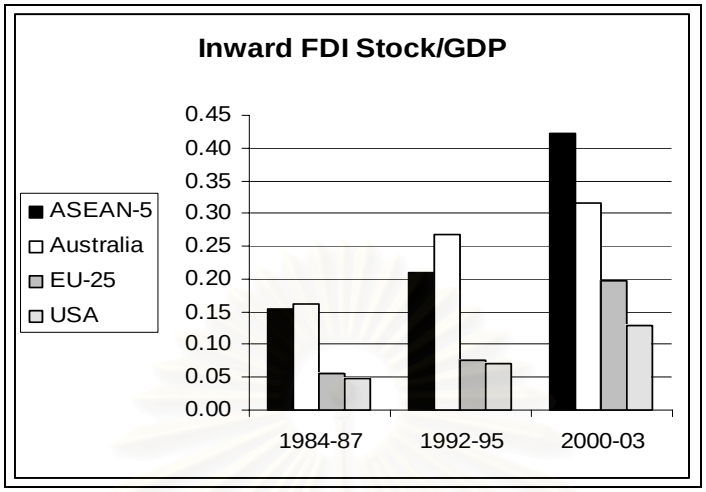
The United States represents large trade potential for ASEAN countries, for example, given its size. However, any single ASEAN member, being a small country, is limited in its ability to favorably influence price determination. In several important industries, USA has overwhelming market power as compared to Thailand or Malaysia, or any other ASEAN member. Although the market potentials are much less, small economies may find trade with other small economies beneficial as they may have greater power for pricing. Although large countries, like USA, will always be lurking third parties undermining small country market power, it is possible that trade between countries on a more equal playing field has some advantage in terms of bargaining fairness. Therefore, a wise strategy for ASEAN may be to conduct intra-regional

competition at the national (or even sub-national) level with as few restrictions as possible, and extra-regional competition as a group, thereby maximizing their collective position in terms of competition, scale, and location factors.

3.2 The Importance of FDI

The competition, scale, and location effects hypothesized above refer not only to trade, but also investment. Furthermore, FDI, via technology transfers, represents a complimentary fourth source for productivity gains in our framework of growth and improved competitiveness in trade. Inward investment levels for ASEAN-5 vastly exceeded the world average up until the time of the Asian financial crisis in 1996. The crisis caused negative FDI inflows in net for Indonesia and severe drops for Thailand. However, since 2000, FDI stock for all of ASEAN-5 is once again comparatively high and is a very important factor for the region's growth and stability. Figure 3.4 below demonstrates the disproportionately high significance of FDI stock relative to GDP levels for ASEAN.

Figure 3.4: Inward FDI Stock Relative to GDP



Source: UNCTAD, 2006 and World Bank *WDI*, 2005, calculations by author

It is expected that FDI is an important factor of both intra-regional and extra-regional ASEAN trade, though for slightly different reasons. Inward FDI is the source of funding for intra-regional production networks that has boosted intra-ASEAN trade in inputs. Moreover FDI has developed efficiency in certain industries, increasing productivity of goods that are demanded by the developed, non-ASEAN countries – which also happen to represent the original source of most of the inward investment. Intra-regional cooperation creates competition, scale, and location advantages, including production networks operating under increasing returns, which are developed primarily using capital in the form of FDI from outside the region. Production networks, which are observable in ASEAN especially in automobile, computer and electronics manufacturing, are the topic of many Southeast Asian development publications. FDI-driven production specialization creates trade in intermediate goods across ASEAN national borders and extra-regional trade in the component parts that each sub-region specializes in, and in the network's final products.

FDI is believed to be a fundamental driver of "miracle" economic growth experienced by Southeast Asian countries particularly in years prior to the Asian Crisis. From the mid-1980s to mid-1990s, Malaysia and Thailand "achieved double-digit growth in manufacturing as a result of large inflows of foreign investment" (Tan, 1996). FDI is also "the main mechanism which allows countries to move up the technological ladder" (Tan, 1996) and develop new comparative advantages and efficiency in important industries, which in turn positively affects international trade in goods. One of the main economic achievements of ASEAN regionalism has been to increase the attractiveness of the whole region to extra regionally-sourced FDI through easing restrictions of intra-regional flows of inputs and capital.

3.3 The Gravity Model and Its Assumptions

Gravity models have been used in economics since the 1960s for the purposes of testing possible trade determinants and making forecasts for bilateral trade flows. One of the most common uses of the gravity equation tool is testing of the effects of RIAs. The literature on the theoretical concepts behind the gravity model is extensive, and went through some controversial phases. Typically, studies that use the gravity model tend to focus their justification on the works of Anderson (1979), Bergstrand (1989), and others, who are the originators of mathematical proofs for the model specification. These frameworks utilize national expenditure functions and assumptions of increasing returns and differentiated products. Nowadays, these aforementioned publications, along with

advancements in understanding of spatial economics and increasing returns modeling, have softened the critics' voices that had previously accused the model of being conceptually unfounded.

The gravity model in economics applies the concept of attraction (or gravity) from physics to transactions and other interactions between two parties. Krugman (1998) has called the theories surrounding the model's development "social physics". Bilateral trade volume's gravity-type relationship with economic sizes and distance has been described as "normal" and "natural". Consequently, it has been mistakenly viewed as being perhaps coincidental – and absent of any real economic basis. The formula is very useful, however, for assessing how specific trade flows converge or diverge from the normal or natural expectations, and it potentially allows for inclusion of several interesting augmenting variables.

In his famous work on spatial economics, Walter Isard perhaps first suggested the relevance of relative income levels on international trade (Isard, 1956). This is an essential assumption of the pioneer econometric studies by Tinbergen (1962) and Linnemann (1966). The economic foundation for the model's other component, "distance", was more difficult to convince to the skeptics. But, when the "distance" concept is given a broader context to include any type of resistance (including non-geographic) factors, the variables gain value and prove to be integral determinants for explaining bilateral trade flows.

The gravity model methodology in this research is inspired, in particular, by the innovating work by Linnemann (1966) who provided an intuitive framework for the model by postulating that aggregated bilateral trade flows are universally determined mainly by three essential factors:

i. The total potential trade **supply of the exporter**, for which the economic "mass", or GDP, may serve as a proxy;

ii. The total potential trade **demand of the importer**, for which the economic "mass", or GDP, may serve as a proxy; and

iii. Any and all **"resistances"** to trade, which in its simplest form may be interpreted as geographic distance (as a proxy for transport costs), but for which other factors may also be included (e.g. tariffs and other trade-restricting costs).

Linnemann's important framework complements well with the expenditure function mathematical derivations by Anderson and others already mentioned. The relationship between the three broad gravity model trade factors and the competition, scale, and location concepts may have now already occurred to the reader. Whether at the level of the firm, country, or region, the supply and demand and resistance forces listed above are the essential considerations for trade analysis. Competition, scale, and location theories provide the theoretical background for determining the variables that represent these factors. Or, viewed another way, the resistance factors are the national border in Figure 3.1, while the total supply and demand proxies for each country

determines the degree to which competition, scale, and location factors will be potentially relevant.

An important assumption for the gravity model specification is differentiated products. Some version of this assumption is needed for the mathematical derivation of the model (see Baier and Bergstrand, 2001). Economists usually refer to two ways in which traded products may be differentiated: by quality and by style. In fact, these concepts often overlap. Stylistic differentiation is essentially a quality difference as perceived by consumers who consciously make choices between styles and are often willing to pay a little more for one style over another. Note that with a differentiated products assumption, there may still be close substitutes of imports produced domestically (i.e. differentiation need not be complete or perfect). However, consumers can distinguish between similar products from different sources, and they make decisions with a love-of-variety utility function. The differentiated products assumption is a reasonable simplification of reality, with solid empirical support. "There are large numbers of industries with high volume and value which are characterized by products differentiated in minor ways relevant to the consumers' satisfaction" (Grubel and Lloyd 1975, p.91).

Some economists have hypothesized that differentiated products assumptions apply well for final goods, but to a less extent for intermediate goods (which make up a significant portion of intra-ASEAN trade growth). However, as consumers are becoming more sophisticated, preferences are developing even for the brand or location of

production of the component parts inside their products, such as car engines and computer processing chips. Also, the direct consumers of intermediate parts, companies, usually have much more refined demands than individuals, and hence will be particularly conscious of minor differences when developing their sourcing preferences. Production clustering and increasing competition in intermediate products implies that some differentiation is present, at least in the processes, which assumedly affects the quality of the final output as well. Admittedly, a differentiated products assumption, from the viewpoint of final consumers, seems more applicable for final goods. Yet, this is not a moot point for including trade in intermediate goods in the model, as the international companies who directly consume the intermediate goods are most certainly aware and considerate of which production center their parts are coming from, and how it differs from the other options.

Differentiated products and the gravity factors for trade may also be complementary with the Linder hypothesis. The Linder hypothesis is an important part of the background for this study, as it is a simple and intuitive concept for trade particularly between countries with relatively similar factor proportions (like most ASEAN members). According to Krugman, goods are first produced in countries where there is a strong domestic demand, and are then exported to other countries with a similar demand pattern (Krugman, 1979). According to the Linder hypothesis, this situation of complementary demand will exist between countries with similar income levels. Lower income groups will inevitably have higher demand for lower quality and less intricate products, since they are cheaper. Consumers in rich countries are more likely to pay

more for products which are perceived to be of higher quality – and are more expensive to produce. Also, higher incomes, without exception, imply a higher level of development, and thus higher technology requirements. Countries with similar income levels should have a better match of patterns for both demand and production. If production tends to focus on the local market first and foremost, we should be able to observe high income countries producing products of distinguishably higher quality and level of technology than that of lower income countries, and subsequently exporting those goods mostly to other high income nations that can afford the extra costs implied. This point was neatly outlined in Grubel and Lloyd (1975), and provides one explanation for the prevalence of intra-industry trade.

An extension of the Linder hypothesis might be that as income levels grow, countries develop greater benefits from product differentiation and specialization, and so they will tend to conduct more intra-industry trade, and thus more trade overall (note that the gravity equation suggests a positive relationship between trade volume and income level). This is a likely explanation for some of the observed intra-ASEAN trade growth. The correlation between incomes and intra-industry trade has been tested intensively by Helpman (1987), and later by Hummels & Levensohn (1995). Helpman's theorem stated that the ratio of the volume of trade over GDP is proportional to the "size dispersion" of the two economies. The Linder hypothesis and the concept of the size dispersion between economies can easily be included in gravity model analysis as an additional resistance variable, through comparisons of per capita GDPs.

Helpman also pointed out that a per capita GDP differential variable in the gravity model (expected to be inversely related to trade according to Linder) can serve as a proxy for differences in relative factor endowments. Thus, given Helpman's assumption, Linder's theory may seem to be in contradiction with the Hecksher-Ohlin, comparative advantages concept of trade. Or, put another way, it may serve as an explanation for those cases where Hecksher-Ohlin theory doesn't quite fit the bill. In fact, as Linnemann (1966) eloquently outlined, comparative advantages from factor endowments do not contribute to explaining the size of most trade flows, with the possible exception of large comparative advantages in natural resources (which we do not generally observe within ASEAN except for Singapore). However, if there are cases where comparative advantage factors dominate the Linder effects (possibly in extra-ASEAN trade determination, for example) the relationship between per capita GDP differences and trade may be positive.

Similarly, an apparent contradiction of theory may also arise for the use of technology differentials in the gravity model. Technology levels may be included in the model for a deeper investigation into Krugman and Linder demand-orientation effects relative to the level of development. Perhaps the first gravity model study to include a technology differential variable was by Fillippini and Molini (2003), who claimed it represents a "distance", or equivalently a barrier of trade, between two economies. Thus, they predicted a negative relationship between the values of differences in technological development and trade. Their hypothesis claimed that countries will tend to exchange more when they are "nearer" from a technology perspective. As such, this variable may

again be in contradiction to Neo-Classical theory. However, even confirmed negative relationships between trade and technology or income differentials do not imply that the model is incompatible with Neo-Classical theory. It simply shows what is already commonly asserted in the literature, that the Neo-Classical frameworks are insufficient when standing alone for explaining bilateral trade volumes.

As mentioned, assessing the effects of regional agreements has traditionally been one of the main functions of the gravity model for international trade. The effects of a regional grouping can be effectively analyzed within the model after controlling for Linnemann's three broad trade factors. The methodology almost universally applied in the literature is an RIA dummy variable. However, this approach has been the subject of much criticism of late and results have often been unreliable.[2]

In a WTO-funded working paper that attempted to "demystify" modeling of trade and RIAs (Piermartini and Teh, 2005), the strong variance of significance found for RIA dummy variables in gravity models among different studies was explained with a few simple differences in approaches that were used by the various authors. One of these explanations given for the inconsistent results was that different country samples were used. The authors correctly argued that since country sets are usually chosen with some bias (i.e. not at random), the different samples will give different results (i.e. sampling bias). However, rarely in international trade regression analyses have researchers

[2] Most of the well-known gravity model studies that have used the RIA dummy variable approach for samples with a global scope have produced results for the significance of RIAs that do not match *a priori* expectations and tend to be inconsistent, i.e. not robust. See, for example, Frankel (1997) and Kruger (1999), among many others.

purposefully chosen different country group data samples and compared results using identical models to investigate the possible differences in factors between them. This sample comparison approach is the core idea behind the regression methodology in this research.

Several other econometric critiques of the gravity model have pointed out some more serious short-comings in the typical approach to gravity model estimation[3], which are more convincing explanations for the contradictory outcomes in RIA dummy variable analyses. The great majority of research utilizing the gravity formula failed to account for the models inherent restrictions and bias, thus creating questionable conclusions. This fact is particularly relevant for those studies which conducted dummy variable tests of the effects of RIAs. A simple OLS regression of the traditional gravity model without accounting for heterogeneity of countries and time periods will create disputable results. Furthermore, the gravity model equation creates an illusion of "phantom regions," or conversely "phantom anti-regions" (Polak, 1996, pp. 538-9), due to a bias created by the formula's emphasis on geographic distance.

Probably one reason for the wide-spread misuse of the gravity model for RIA analyses is that the relatively high explanatory power of gravity models for international trade has overshadowed the equation's inherent risk of omitted variables bias. Unavoidably, trade analysis suffers from a difficulty in controlling for the heterogeneity of country and time dynamics that affect international trade flows. A country pair and

[3] See especially Polak (1996), Matyas (1997), Egger and Pfaermayr (2001), Egger (2002), Kandogan (2004), and Benedictis and Vicarelli (2004)

time period fixed effects approach is a potential solution to this problem for the gravity model. However the new intercepts for country pair effects will be correlated to other time-invariant determinants, including RIA dummy variables, so that they can not be separately observed.

Moreover, the gravity specification for trade will generally underestimate RIA effects on trade for large distances (downward bias, or large, positive residuals) and overestimate (upward bias, or negative residuals) for close-in countries. In fact, theoretically, one could collect a random group of markets spread out around the globe and produce evidence for positive RIA effects between countries for which an RIA doesn't even exist (Polak's "phantom region") – especially for any group of countries that are relatively open to trade. This is the reason that Stone and Jeon (2000) and other studies found highly significant, positive effects for the geographically broad and mildly-integrated group of APEC, and insignificant effects for RIAs that are closer together such as the EU.

In summary, regional assessments in gravity models are particularly subject to spurious outputs because of distance bias, and the difficulty of controlling for all of the other country and time-specific factors of trade. For studies that use a worldwide country sample, attempting to represent the global trade situation, may be able to address the distance bias through a weighted system of relative distances, and by accounting for the possible remoteness effects of distant island nations. In this study, a small sample not representative of world trade was used to specifically study ASEAN only. Therefore, the

distance bias concern, and a more complicated determination of transport costs proxies, is not applicable.

3.4 Literature Review on ASEAN Policy and Trade Growth Analyses

Up until now, the nature of AFTA analysis, by necessity, has been of a predictive nature; and the bulk of the predictions made for AFTA can be described using a single word: cautious. One finds it difficult not to notice that a great many books and academic papers on AFTA contain a question mark in the title, for example: "AFTA – A Step towards Intensified Economic Integration?"[4] The content of many of these papers expresses uncertainty for making judgments on AFTA, leaving the questions open and unanswered. Concrete conclusions regarding how and to what extent ASEAN will affect its members' trade situations have eluded the bulk of the literature on the subject thus far.

There are a few exceptions though, for example, Imada (1993) predicted a 25% increase in intra-ASEAN trade, and declared that the structure of trade increases will correspond with the relative abundances of land, labor, and capital of participant nations. Following this idea, Thai and Indonesia should have increased regional exports especially in food and labor-intensive manufacturing, Malaysia in both labor and capital-intensive goods, and Singapore in heavy and high-tech industries. Statistics show, however, that

[4] This is the title used for multiple research publications included in *ASEAN: Future Economic and Political Cooperation*, Moellers and Mahmood (ed.), 1993

this prediction fell far short of actual overall growth in intra-ASEAN trade[5], and underestimated the importance of intra-industry trade and production networking. Productivity gains from increasing returns and international, intra-regional manufacturing networks have proven to be the major source for intra-ASEAN trade development. ASEAN-5 countries have experienced rapid economic growth through remarkably rapid acquisitions of new production technologies and capital. AFTA has complemented this process by eliminating restrictions between production centers in different ASEAN countries; "in general, AFTA was just the right policy for attracting the FDI-driven production networks" (Austria, 2004). The increases in intra-regional trade for all ASEAN-5 countries have mostly been in similar high-technology manufacturing sectors linked to the component parts production networking and not land or labor intensive goods (see Appendix for trends in ASEAN-5 commodity trade structure). One could hence speculate that Imada had failed to consider productivity dynamics in the AFTA assessment. Economists are now starting to realize that the real significant gains from international trade liberalization and integration come from capturing new efficient processes and related resources including inputs and capital more than allocating production factors to comparative advantage-based specialization. In fact, since general equilibrium models are often not able to predict, or even allow for, productivity changes, even highly optimistic trade agreement predictions have tended to underestimate subsequent trade growth in the end. The biggest source for trade growth for many RIAs, including ASEAN, lies in "accumulation and innovation, not allocation" (*Economist*,

[5] Intra-ASEAN-5 exports volume increased by about 162% in nominal terms from 1993 to 2004 (calculations based on IMF *DOTSY* data); the amount of real trade growth is not clear for this case, but it is unlikely that intra-regional export prices inflated at a rate high enough to account for all but a mere 25% of the nominal growth observed

2006). This point clearly corresponds with the competition, scale, and location framework developed in the previous chapter.

Besides the general tentative and uncertain nature of many previous AFTA analyses, another commonality is that intra-ASEAN trade significance (or intensity) is described as disappointingly low in almost all the published analyses reviewed. ASEAN has even been accused of being an "unnatural grouping" for trade based on the reported figures of relative trade intensities. The consequence of a so-called "unnatural grouping", according to the terms originators, is that it can be a potentially damaging institution to member economies by making them too "inward-looking" relative to the more intensive outward trade. However, ASEAN may be one of the most outward-oriented RIAs, since even intra-regional trade and investment liberalization is largely directed at attracting trade and investment from outside. None the less, ASEAN critics typically argue that extra-regional, developed country sources of investment and trade are where individual countries in the region should be focusing more attention instead. Quite understandably, economists in Southeast Asian countries appear much more comfortable with the idea of economic interdependence with the relatively stable mammoth economies, rather than their smaller and more volatile neighboring countries.

However, this viewpoint is misconceived as it misses the point to the "single market" – competition, scale, and location - framework behind ASEAN economic cooperation. Additionally, the Asian Financial Crisis showed that Southeast Asian countries (and even the entire world economy) are already heavily interdependent. It is

unlikely that shifting focus outside the region could reverse any single ASEAN nation's regional interdependence. The 1996-1997 financial crisis softened the voices against regional economic cooperation. However, an opposite form of ASEAN criticism has emerged, now claiming that ASEAN intra-regional trade intensity has underperformed its potential because trade barriers in the region are still far too high, and commitments among members for intra-regional tariff and non-tariff barrier reductions are insufficient.

There have been many other gravity model econometric tests of ASEAN and other regional agreements', usually focusing in particular on the possibility of trade diversion. Soloaga and Winters (1999) provided one of the most referenced analyses of RIA effects using a gravity model and regional agreement dummy variables for trade flows between a large, worldwide sample of countries. The authors found that ASEAN was the only regional agreement that showed positive effects on extra-regional trade. For this reason the paper concluded that ASEAN was very unlikely to have trade diversion effects, as extra-regional trade appeared to benefit from intra-regional liberalization even more than intra-regional trade! This finding provides tentative support for the outward-oriented competition, scale and location effects proposed above.

A 2003 Bank of Thailand report on intra-East Asian trade (Chai-anant, Dejtrakul, Pootrakool, and Punnarach, 2003) also employed the gravity model in an investigation as to whether intra-regional trade can create economic growth and development for Thailand. The authors asserted than one possible explanation for increased intra-regional trade is that ASEAN-5 countries have been developing steadily more sophisticated

production capabilities. As manufacturing productivity increases, the scope for intra-industry trade for the region also grows. This is an example of the competition and scale effects on productivity discussed in Section 3.1. I would argue further that the efficiency gain from intra-regional integration is also a factor for the growth of extra-regional trade.

Filippini and Molini (2003) conducted a study on trade between industrialized East Asia economies and other developed nations and tested a hypothesis that the degree of difference of technological development is a significant factor for this interregional trade. Four ASEAN countries, Indonesia, Malaysia, Singapore, and Thailand were included in the analysis. As expected, the authors found a negative relationship between technology "distance" and trade volume for the sample studied.

Heungchong Kim (2002) performed regressions of a gravity equation with cross-sectional data over five selected years in the 1980s and 1990s, and analyzed residuals *ex post*, similar to the original method of Tinbergen (1962). Kim's focus was on ASEAN+3, that is ASEAN plus China, Japan, and South Korea (CJK). Kim's main objective was to identify whether trade among CJK and between CJK and ASEAN have increased beyond the standard gravity expectations. In an expanded model, Kim also tested the significance of ASEAN. An important finding of this paper is that the ratios of actual trade volumes of bilateral flows for ASEAN nations relative to trade volumes predicted by the model (i.e. the regression residuals) have generally increased over the time period studied, so that by 1999 many of the intra-ASEAN trade flows were shown to outperform the sizes predicted by Kim's gravity model estimation.

Ikemoto and Elliott (2003) used an augmented gravity model estimation to measure ASEAN trade dynamics over time. In particular, the authors were concerned with how the model has changed before and after AFTA and the Asian Crisis. The authors hypothesized that the Asian crisis may have played a role in increasing a sense of urgency among ASEAN members for greater economic integration and intra-regional trade liberalization. The analysis included cross-sectional regressions for 5 year time periods covering most of the 1980s and 1990s. Ikemoto and Elliott's conclusions are that AFTA has probably not had any significant trade-diverting effects, and both extra-regional and intra-regional trade has increased in importance since the Asian crisis. The authors tentatively claim that AFTA legislation has gradually increased in impact on intra-ASEAN trade volumes.

In contrast, Stone and Jeon (2000) applied the same model and determined that ASEAN generally had an insignificant and even a negative impact for some periods, on intra-regional trade. In contrast, an APEC variable tested came up highly positive. The authors thus concluded that ASEAN integration has not been particularly successful for intra-regional trade. However, as mentioned, likely there are econometric and sampling errors affecting the reliability of this and other studies that use a restricted gravity specification and RIA dummy variables.

Chapter IV

Trade Modeling and Empirical Testing

4.1 Gravity Model Trade Determination and Hypothesis Testing

As outlined in the previous chapter, the gravity model provides an intuitive framework for evaluating transactions between two economies based on their distance, or resistance, variables and their sizes. The framework can be augmented, however, to test additional assumptions about more complex determinants of trade volume. The basic gravity model for trade is a multiplicative equation with bilateral trade flow volumes as the dependent variable.

$$T_{ij}=CY_i^{\alpha 1}Y_j^{\alpha 2}/D_{ij}^{\alpha 3} \qquad \textbf{(1)}$$

Where:

Y_i and Y_j are vectors representing the size or "mass" factors (usually GDP and population) of countries i and j;[1]

D_{ij} is a vector representing the relative "distance" between i and j;[2]

T_{ij} is the volume of trade from country i to j; and

C is a constant.

[1] In this research Y variables tested include GDPs, populations, and inward-FDI stock

[2] In this research D variables tested include geographic distance, technology and per capita income differentials, and tariff rates

The "mass" variables (Y_i and Y_j) are Linnemann's supply and demand factors for importer i and exporter j, while "distance" represents the resistances, or costs, for exports from i to j. Equation 1 can be conveniently modified into the log linear form for coefficient estimation:

$$\ln T_{ijt} = \alpha_0 + \alpha_1 \ln Y_{it} + \alpha_2 \ln Y_{jt} + \alpha_3 \ln D_{ij} + \varepsilon_{ijt} \qquad \textbf{(2)}$$

Where:

ln is the natural logarithm function; and

$\boldsymbol{\varepsilon_{ij}}$ is a white noise error term

Equation 2 (or a slight variation of it) forms the basis for numerous trade studies covering a wide variety of concepts, and indeed represents the "standard empirical framework used to predict how countries match up in international trade" (Rauch, 1999, p.10).

Equation 2 has been estimated using both cross-sectional (across country pairs) and time series data sets; and more recently pooled data set analysis has become the recommended approach. Panel, or pooled, data estimations is preferred because cross-section and time series regressions of equation 2 suffer from some rather extreme restrictions. The inherent restrictions in the models are that different country pair directional trade flows or different time periods share the same intercepts and coefficients, i.e. identical model structure (this is the heterogeneity problem discussed in

the last chapter). Assuming homogeneity in trade determination across countries and over time may be unreasonable, and could create biased results. Both these restrictions of course will also simultaneously apply to panel data regressions if they are not accounted for by using fixed effects or random effects controls. Equation 2, which is the more common approach to regional trade analyses in the literature, will thus be referred to hereafter as the restricted model.

Papers by Polak (1996), Matyas (1997), Egger (2002), and others have suggested the so-called "triple-indexed" gravity model, allowing for separate fixed effects across directional flows and time periods.

$$\ln T_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \eta_i + \theta_j + \lambda_t + \varepsilon_{ijt} \qquad \textbf{(3)}$$

Where:

$\boldsymbol{\eta_i}$ represents exporter fixed effects;

$\boldsymbol{\theta_j}$ represents importer fixed effects; and

$\boldsymbol{\lambda_t}$ represents yearly fixed effects

Egger and Pfaffermayr (2001) discovered that using bilateral interaction fixed effects can capture the importer and exporter variants just as well, without creating omitted variables bias. Bilateral, or country pair, effects represent different structures in the model for each bilateral trade flow observed. This is a more efficient approach since

the trading partner countries are viewed as a pair, rather than individual entities. Thus, we construct what we may call a double-indexed model:

$$\ln T_{ijt} = \gamma_0 + \gamma_1 \ln Y_{it} + \gamma_2 \ln Y_{jt} + \mu_{ij} + \lambda_t + \varepsilon_{ijt} \qquad \textbf{(4)}$$

Where:

$\boldsymbol{\mu_{ij}}$ represents bilateral interaction fixed effects

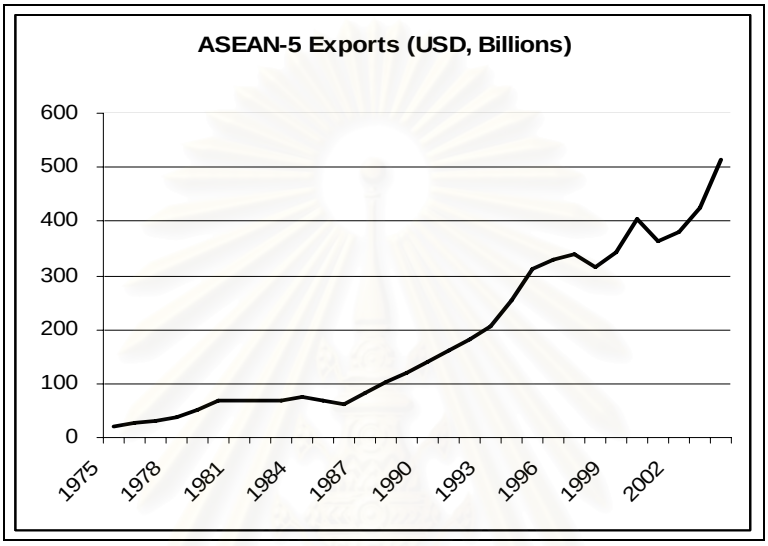
Fixed effects, rather than random effects, are used because it is the approach recommended in the econometric literature (see Cheng and Wall, 2005) and because the country sample used is not at all random or representative of the population.

The problem created by these fixed effects specifications for the gravity model is that the importer and exporter effects in equation 3, or the bilateral interaction effects in equation 4, will encompass all the country or country pair-specific effects, including resistance variables and an RIA dummy for testing the effects of ASEAN. If distance and ASEAN dummy variables were reviewed independently within equations 3 or 4, the model would suffer from multi-collinearity. Now we can understand why Polak (1996) named distance variables the “Achilles’ heel” of the gravity model.

It is expected that time variant effects will generally be positive because, on average, the values of bilateral trade flows for all sampled countries have grown each year due to real factors, such as increased openness, and from possible non-real

inflationary pressures. Nominal, aggregated intra-regional and extra-regional trade flows for ASEAN (Figure 4.1) show that there is a positive, non-stationary trend in the data.

Figure 4.1: ASEAN-5 Exports Time Trend



Source: IMF *DOTSY*, 2005

Most companies export goods to foreign markets conservatively at first. Then, the company will begin to export and invest more as confidence in the stability of the venture builds and the target market develops awareness and demand for the new product. Thus, supply and demand of goods in international trade often snowballs, creating a relatively consistent upward trend in aggregated trade figures, which will be disrupted only when trade resistance forces come about (e.g. new perceived risks to the economies, or unusually high tariffs or non-tariff barriers). This trend line also corresponds to nominal GDP growth, confirming a clear correlation (as hypothesized by the model) between the size of the economies and trade volume. From Figure 4.1, the most rapid growth for ASEAN-5 exports occurred in the early 1990s, directly after AFTA

was signed, and again in the most recent years reported. Moreover, the reader may have already noted how the ASEAN-5 exports volume trend corresponds nicely with the four stages of economic development proposed in the previous chapter.

Theoretically, the non-stationary trend for exports data can be accounted for in the model by yearly effects intercept variables (λ_t). However, if the coefficients for these time-variant intercepts are not of interest to the study, the first-order autoregressive, or AR(1), function may be a more efficient approach in this particular case, to account for the consistently positive time effects on the dependent variable data. The first-order autoregressive for equation 2, plus country pair effects (μ_{ij}) takes the form:

$$\ln T_{ijt} = \delta_0 + \delta_1 \ln Y_{it} + \delta_2 \ln Y_{jt} + \mu_{ij} + \ln T_{ijt-1} + \varepsilon_{ijt} \qquad \textbf{(5)}$$

Selecting figures to proxy vectors Y and D for ASEAN trade was made based on extensive literature review of studies that utilized or critiqued the model, and background research on the stylized facts of ASEAN intra-regional and extra-regional trade. The identified variables are discussed below.

GDP is the common “mass” variable for the model, yet it is usually augmented with additional supply and demand-oriented factors. Another “mass” variable tested in most studies is population, since it reflects a slightly different aspect of market size and production potential. Following the discussion in Chapter 3, it is expected that inward FDI is also a significant factor of both intra-ASEAN and extra-ASEAN trade supply and

demand. Thus, importer and exporter FDI inward stock may be included in the model as additional determinants. FDI inflows into the region often take the form of single corporations setting up production centers in multiple ASEAN nations. Hence, testing ASEAN inward FDI from developing economies as a determinant of intra-regional trade can be used to examine the significance of production networking and related increases in productivities.

In gravity studies of international trade, distance is not exclusively a location and transport costs concept; it is interpreted for a broader context, beyond geography. The distance, or resistance, effects are the extra costs associated with international trade. Trade costs are tariffs, transportation and information costs, administrative, border, language, and other cultural or political barriers, demand incongruities, security concerns, etc. There are ways in which ASEAN can promote policies to reduce trade costs besides just lowering *ad valorem* tariffs – and in fact, this is a necessary condition for achieving significant gains through AFTA. Still, tariffs are the most obvious resistance variables and perhaps the easiest for policy makers to control. Moreover, reductions in tariffs are shown to be a far more significant factor for worldwide, real trade growth compared with transport cost reductions and income convergence (Baier and Bergstrand, 2001).

Yet, tariff rates are almost always left out of the previous gravity model trade studies. This is an odd omission, since tariffs are clearly factors of trade resistance. One possible explanation is that reliable bilateral tariff rate data is often difficult to obtain. Tariff levels are applied at the highest level of specification (e.g. the six-digit

classification level). Unless the regression analysis is focused on only one, very specific product, some trade-weighted averaging of tariff rates is unavoidable. This is not an easy or straight-forward task. Even perfectly accurate trade weights probably will not precisely determine the relative significance of the tariffs for different industries. None the less, the available averages may serve as a sufficient proxy of relative tariff rates and should be included in analysis.

Geographic distance (kilometers between economic centers) serves as a proxy for transport costs and other correlated factors that may affect both exporters and importers' potentials on both sides of a transaction. Other studies have attempted to expand on the distance variable to include other transport cost considerations, such as a common border dummy variable, or a relative isolation index for island nations. Since this research relies on a small, non-representative country sample focusing on regional trade, and utilizes fixed effects specifications for country pair factors, additional transport cost proxies were not examined.

There are several other qualitative factors that can create resistance to a company's willingness to execute transactions in another country, some of which may be correlated with geographic distance in many cases. Anderson and Van Wincoope (2004) performed comprehensive analysis of the significance of additional barriers (cultural and geographic distance, information costs, etc.) on trade using the gravity model and demonstrated how the variables are equivalent, in effect, to nominal tariffs. When seeking profit opportunities, international corporations must always assess risk. There

should be an expected negative relationship between a country's imports and the level of market risk as perceived by foreign exporters. Some risks are difficult to quantify, but gravity "distance" variables can provide rough evaluations for the extra risk factors which exporters may be sensitive to in a particular market.

Since all ASEAN countries have distinct cultural traits, traditions, histories and languages, dummy variables on these issues would be superfluous. It is true that some countries in ASEAN are more similar to certain fellow members than others (e.g. Thailand clearly has more cultural similarity with Lao PDR, e.g. similar language and religion, as compared to Indonesia); but, for the purposes of this study, these differences in the level of differences are assumed to have negligible effects on trade or otherwise are encompassed within the geographic distance variable.

Relative income and technology levels may be worth consideration, following the Linder hypothesis concept discussed in Chapter 3, as factors of resistance to trade related to incongruous demand. The larger the gap in incomes or technological development between two economies, the less likely the two markets will have similar, or complimentary, demand structures. A region which is relatively advanced technologically and has high incomes will likely have a greater demand for high-tech goods on the very early stages of the product cycle.[3] In contrast, poor, less-developed countries demand relatively more survival-based, "inferior" goods that decrease in quantity demanded with rising incomes. The implication is that the more similar two economies in incomes and technological development, the more they should be expected

[3] See Vernon (1966) on product life-cycle theory and its relationship to trade and investment

to trade. This theory may be tested in our model using the absolute values of differentials between per capita incomes and technology level measurements.

With the exception of Singapore and Brunei, the core ASEAN group is relatively similar in population, land area, climate, and wages, i.e. production factors in general. However, national incomes are more diverse. South-East Asian scholar and founder of the Federation of ASEAN Economic Associations (FAEA) Lim Chong Yah (2001) uses the wording: “enormous differences” in describing the per capita GNP makeup of ASEAN. Technology levels also cover a wide spectrum of advancement throughout Southeast Asia. These relatively stark intra-regional differences may thus provide some insight into the determination of ASEAN trade.

Under our Linder hypothesis assumptions, the expected coefficients for income and technology differentials should be negative. However, positive coefficients may also result for either of these variables where correlations with Neo-Classical comparative advantages dominate. Therefore, the sign of the coefficients for these variables in different time periods and trade flow samples will be indicative of which of these effects are dominant for each case.

A final potentially important resistance variable not yet mentioned in this paper is the effects of exchange rates. Unfortunately, exchange rates do not have a clear application for this research or for the model in general. Exchange rate volatility,

assumedly, could affect the level of bilateral trade, but this determinant lacks a precedent for the model and there are data constraints.

A few previous gravity model studies have included real exchange rates and the importer's foreign currency reserves (Kanodgan, 2004). Real exchange rate figures are not available for the scope of countries and time periods of this research, so the variable could not be included in model estimations. As an alternative, foreign currency reserves can be used as a proxy for the importer's exchange rate stability. Typically, ASEAN countries attempt to stabilize home currencies relative to the US dollar. Furthermore, most international transactions involving ASEAN countries occur in US dollars. So, the relative accumulation of foreign reserves may be positively related to trade in two dimensions. First, higher reserves generally imply a more stable exchange rate, which reduces the risks associated with the importing country. Second, foreign currency (i.e. US dollars) is needed to conduct international transactions, thus importing countries should be expected to accumulate foreign reserves in correlation with increases in trade. However, the direction of causality is ambiguous as are the implications of the variable for ASEAN policy.

There are three main data samples (plus two combined samples) for which regression analyses are performed for each stage of development proposed in Chapter 2. Sample A is exclusively intra-ASEAN trade flows. Sample B is ASEAN trade to and from eight important trade partners outside of the region (extra-ASEAN trade). In this sample, no intra-ASEAN trade flows are included. For further investigation on

Singapore's role, estimations are made for Sample A minus trade to and from Singapore. Finally, Samples A and B are combined to perform certain tests of the significance of AFTA.

Table 4.1: Trade Direction Samples

Sample A	**Intra-ASEAN trade**; bilateral flows between ASEAN-5 countries only. Total trade flows observed: 20 per annum
Sample B	**Extra-ASEAN trade**; bilateral flows between ASEAN-5 and 8 non-ASEAN partners only (non-ASEAN countries included are Australia, mainland China, Hong Kong, EU, India, Japan, Republic of Korea, and USA). Total trade flows observed: 80 per annum
Sample C	**Intra-ASEAN trade less Singapore**; Sample A less trade flows to and from Singapore. Total trade flows observed: 12 per annum
Sample D	**Combined Sample**; Sample A plus Sample B. Total trade flows observed: 100 per annum
Sample E	**Combined Sample less Singapore**; Sample D less trade flows to and from Singapore. Total trade flows observed: 76 per annum

To summarize, the traditional gravity model of international trade is augmented and applied to ASEAN regional trade analysis using comparisons for different country and time period samples. Two serious issues of the gravity model approach to regional trade determination were also considered. First, as Singapore trade has been suspected of distorting regional assessments, due to its disproportionate share of regional trade and possible "entrepôt" status, estimations are also made for samples where trade to and from Singapore is omitted (Samples C and E). Second, because testing ASEAN effects may be biased by not controlling for heterogeneity of bilateral trade factors which are not implicit in the equation, fixed effects regressions with modified methods for RIA assessment are applied.

There are two components to hypothesis testing in this paper. First, the outputs across the trade direction samples are contrasted in terms of the goodness of fit of the model (adjusted-R^2) and the relevance (significance t and f tests) and signs of the coefficients. This analysis will also consider the variation of outputs between the four time periods and the different model specifications (i.e. fixed effects versus the restricted model).

Secondly, results are reviewed in the context of the significance of AFTA. An ASEAN dummy variable may be tested using regressions of Sample D. However, since it is believed that this approach may be misleading, fixed effects will be examined as well. The country pair fixed effects may show important differences for intra-ASEAN versus extra-ASEAN pairs. Finally, the individual samples of intra-ASEAN trade with and without Singapore and extra-ASEAN trade will each be analyzed and compared, particularly using Chow Breakpoint "regime change" tests as well as results from tariff rate coefficients.

Each of the AFTA evaluation methodologies has specific strengths and limitations. Put together, the approaches may provide a relatively comprehensive coverage of hypothesis testing for the regional agreement's effects on trade. For example, a disadvantage to the Chow Breakpoint test is that, although it provides an accepted test on whether trade determination structure under the model changed before and after AFTA, we are not able to determine whether the effects are positive or negative.

In contrast, although the reliability of significance for the ASEAN dummy variable may be questionable, the sign of the coefficient provides a clear indication of whether the effects are positive or negative. Also, evaluating fixed country pair effects is comprehensive, but less efficient, and may be less conclusive due to the wide scope of factors implied within each intercept value. Tariff variables, on the other hand, are an easy and direct approach to regional trade liberalization evaluation, except that tariff reductions are necessarily only one small aspect of regional integration.

4.2 Data

Exports or imports may be used in regression analysis to represent the volume of bilateral trade flows for the dependent variable in the gravity model equation. However, using their sum is not the appropriate choice for the gravity model for at least three important reasons. First, using total trade between partners automatically implies equality of coefficients for imports and exports between two countries. This is an unnecessary and unreasonable restriction on the model. So-called “indexing”, or analyzing regression outputs with consideration of separate effects for exporter and importer, is only possible when trade flows are specified, or disaggregated, as exports or imports. For example, review of the potentially different effects on the model of Thailand as an exporter *and* as an importer in trade with Malaysia can be accomplished if the two trade directions have separate cross-sectional observations. However, if there is only one observation of Thai-Malay trade, this type of analysis is not possible. Second, using exports or imports alone permits many more observations, which means more

degrees of freedom and hence more efficient results.[4] Third, export and import data for the same directional flow often comes from different sources (e.g. customs records from both countries), and is sometimes calculated using different methods (i.e. f.o.b. versus c.i.f.). Even when adjusted for consistency in f.o.b./c.i.f. representation, export and import values rarely match. Thus, choosing either exports or imports, instead of both, ensures greater consistency.

The decision to use exports instead of imports was based mainly on data availability (fewer gaps in the matrix). Although imports and exports data do not perfectly match due to the technical differences in custom's reporting, it's expected that using imports data would ultimately result in the same conclusions. Imports are usually recorded c.i.f., including costs related to the good's transport. Thus, without converting the import figures to f.o.b., the model would suffer from biased results caused by the correlation between c.i.f. and distance factors. Therefore, using exports instead of imports data for gravity model estimation saves the trouble of converting imports data to f.o.b. using imperfect estimations.

The perceptive reader may have just been struck by the thought that, given that the difference between c.i.f. and f.o.b.[5] represents transport costs, perhaps it could be included in the model instead of the rather crude proxy of distance in kilometers.

[4] By using imports or exports, any given two countries (A and B) will have two trade flow observations, one where A is exporter and one where A is the importer. In this way, bilateral export and import flows for all countries in the sample are included implicitly. In an N country sample size, using exports creates N*(N-1) trade flow observations, whereas if total trade is used (i.e. exports plus imports), total observations is [(N-1)+(N-2)+…+(1)]. The latter case is less than the former for all N>1.

[5] c.i.f.-f.o.b ratios are reported in the IMF *DOTSY*, see the introduction to 2000 edition, p. xii for calculation methodology

However, the c.i.f.-f.o.b. differential is not appropriate for this purpose because it is based on estimates rather than actual data, and, more importantly, only accounts for trade that actually occurs. The c.i.f./f.o.b. measure applies to goods actually traded only, neglecting any goods that could be traded but are not, at least partially due to transport costs that are too high, i.e. restrictive costs (Linnemann, 1966).

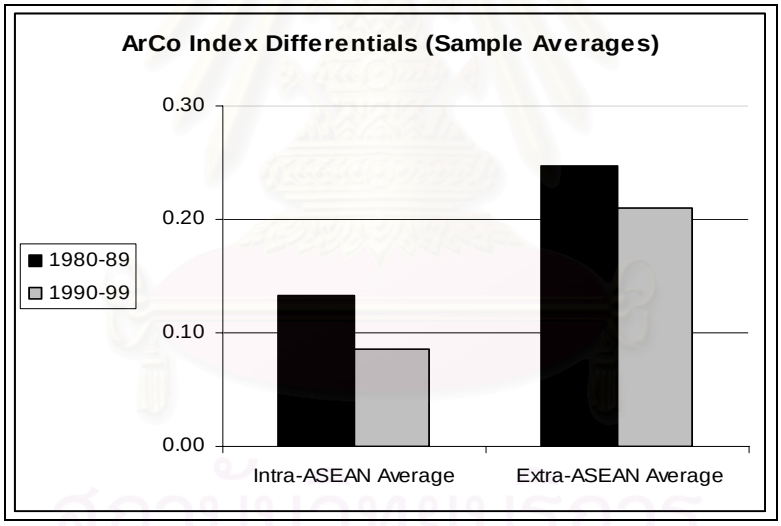
For this study, geographical distance is the great circle calculation in kilometers between the capital cities, assumed to be the national economic centers, with two exceptions. Since this study analyzes flows to and from ASEAN countries only, it makes no sense to use Washington D.C., or any east coast American city as the port of entry/exit. Hence, Los Angeles is used for flows with USA. Also, Beijing is not a major port for ASEAN. Guangzhou, historically and presently is the major trade center of mainland China.

GDP values are in current prices because PPP is not appropriate for the model. GDP figures need not be adjusted for PPP since it is a measurement of "how people live" based on domestic goods, and "is a poor proxy for export supply and import demand potential" (Kandogan, 2004, p.7). Preliminary testing revealed that nominal GDP was a better econometric fit (higher significance) for gravity model estimation than PPP calculations. Also, yearly fixed effects account for inflationary distortions anyway.

Technology differentials, or "distances", are calculated using the technology indicator developed by Archibugi and Coco (2004), known as the ArCo index. ArCo

index calculations have been published for 162 countries for two base years (1980 and 1990). The composite index represents the relative level of technology in a country, based on a comprehensive list of factors including educational attainment, R&T expenditure and output, prevalence of new patent registrations, etc. According to the data, ASEAN countries have experienced a moderate convergence in technological advancement, both with other ASEAN and non-ASEAN nations. From Figure 4.2, on average ASEAN countries are closer with each other in levels of technological advancement compared to the major trading partners abroad, and intra-regional convergence has been more profound.

Figure 4.2: Technology Indices Convergence

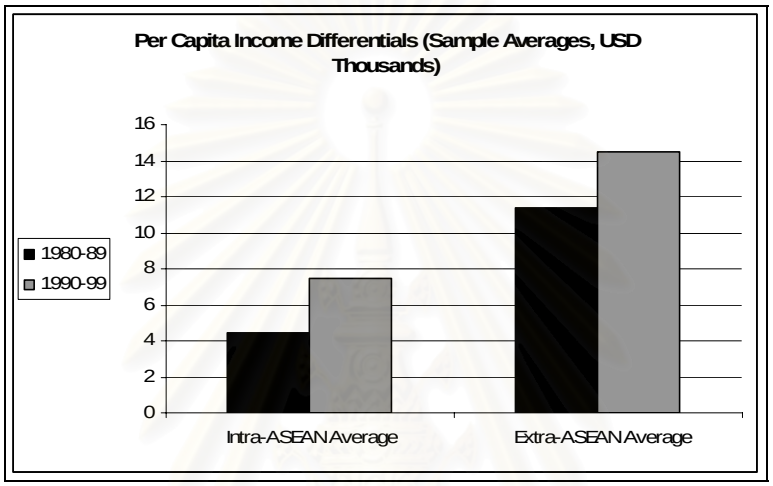


Source: Archibugi and Coco, 2004, calculations by author
Notes: calculations are simple averages of the absolute values of the difference between countries'

Comparing the analysis in Figure 4.2 with Figure 4.3 below reveals a distinct difference between technology level and per capital GDP differentials, both used in this study for potential demand-incongruence "distance" variables. As opposed to technological development, per capita incomes have diverged. Typically, it is expected

that incomes rise with technological development or vice versa. Apparently, this has not fully been the case in ASEAN; as technology levels have moved closer together, per capita GDPs have moved farther apart.

Figure 4.3: Per Capita Income Divergence



Source: World Bank, *WDI* CD ROM, 2005, calculations by author
Notes: calculations are simple averages of the absolute values of the difference between countries'

It is important to recognize that gravity model data can be subject to measurement errors. In this study, it was found that gravity model databases are rife with potential for missing or inaccurate figures. For example, as mentioned already, exports data is often inconsistent among sources as methodologies vary. Singapore decided many years ago to not publish information on the value and content of goods sent from Singapore into Indonesia. The two countries have had several public disputes regarding how much trade really exists between the two neighbors, and how much "illegal", or unreported, trading may be occurring. Hence, the IMF *DOTS* yearbooks, the source of import and export data for regression analysis, do not include figures for Singapore exports to Indonesia. This creates a gap in the data pool for regressions, and causes difficulty in intra-ASEAN

trade intensity index calculations since these trade flows make up an important portion of intra-ASEAN trade. As a solution, this research estimated Singapore exports to Indonesia by taking reported import figures and adjusting to f.o.b. values. This procedure was also used in a few other select cases where single year exports values for specific trading partners were absent. The Singapore and Indonesia statistical reporting dispute brings about an important problem for intra-ASEAN trade data in general. Most local scholars admit that a large amount of intra-ASEAN trade occurs informally or otherwise illegally. Naturally, when there is a relatively large portion of unobserved trade between two countries, their actual trade intensity and interdependence will be underreported.

Measurement errors can cause inefficient estimators, i.e. overly large standard deviations in coefficients. Therefore, it is possible that model estimation will give results implying non-significance for variables which are actually significant. (Piermartini and Teh, 2005)

A comprehensive list of data sources is included in Appendix B. Data for all variables were collected and tabulated for each year from 1978 to 2004.

Chapter V

Regression Comparisons and AFTA Effects

Analysis in this research is complicated by the fact that regression output comparisons are performed in two dimensions, i.e. across time periods and bilateral trade flow samples. The following summary of findings attempts to compare regression outputs across the country group samples in Table 4.1 and the four time periods of Section 2.1. This chapter will focus on the details believed to be especially relevant for the ideas and concepts introduced in early sections.

Results from Chow Breakpoint tests for the four stages for ASEAN covering the time period of 1978-2004 unanimously verified the presumption that there are significant structural differences to the model's trade determination for the four stages.[1] We accept the "regime change" hypothesis with over 99% confidence for all cases. The F-test calculations for each stage for both Samples A and B are included in Table 5.1 below.

[1] The four stages are 1978-1983, 1984-1995, 1996-1999, and 2000-2004, see Section 2.1 for explanation

Table 5.1: Chow Breakpoint Test Results

time periods	F-stat	Df
Sample A		
1978-83; 1984-95	3.08	7;326
1984-95; 1996-99	18.61	7;306
1996-99; 2000-04	8.93	7;166
1978-93; 1994-04 (AFTA test)	24.18	7;526
Sample B		
1978-83; 1984-95	3.50	7;1421
1984-95; 1996-99	3.59	7;1266
1996-99; 2000-04	2.02	7;706
1978-93; 1994-04 (AFTA test)	40.88	7;2141
Sample C		
1978-93; 1994-04 (AFTA test)	17.03	7;310

Notes: Df = degrees of freedom, (accept "regime change" hypothesis for all with 99% confidence)

Thus, there is justification to run separate regressions for the different stages of ASEAN trade and investment development – noting that a single, panel data analysis of the entire period will likely obscure important dynamics in the model that occur between the stages. One notable observation regarding comparisons across time periods is that the goodness of fit of gravity determination generally improves over time, especially for intra-ASEAN trade. The model's determinants are better at explaining ASEAN trade in 2000-2004 than 1978-1983.

The model's fit is also significantly reduced when Singapore trade is not included (Sample C) for all specifications and all time periods prior to 2000. In fact, remarkably, during earlier stages, Samples A and B are generally more similar in terms of the fit of gravity determinants than samples A and C. That is to say, intra-ASEAN-5 trade determination was relatively more similar in this regard to that of extra-ASEAN trade

(Sample B) than with the same intra-ASEAN sample less Singapore. Clearly, eliminating Singapore from intra-ASEAN trade significantly affects these model outputs. However, in the most recent time period (2000-04), this result is reversed. Both Samples A and C produce higher values for explanatory power (adjusted-R^2) than Sample B, and the difference between A and C is reduced considerably. This implies that the model's approach to trade determination is less affected by inclusion or exclusion of the unique case of Singapore since 2000.

For regressions of the restricted model (equation 2), the base coefficients (i.e. GDPs and distance) generally match expectations, and overall F-tests reject the hypothesis that all coefficients are insignificant with very high confidence in all samples. Population coefficients are significant in most outputs, but negative. This suggests that there are import and export substitution effects for the labor or consumer market sizes in each sample's trade determination. According to this model specification and holding the other factors of ASEAN trade constant, countries with larger populations import less (perhaps because of a greater labor-capacity to produce tradable goods domestically), but also export less (which may be a result of the greater attention needed for domestic demand). Geographic distance is negative as expected, but when Singapore is eliminated from the intra-ASEAN picture, the variable becomes insignificant in trade determination. Perhaps Singapore's strategic location in the middle of ASEAN-5 helps create the extra significance for Sample A regressions.

Table 5.2: Regression Outputs Summary – Restricted Model (equation 2)

Time Period	Country Sample	Adj.-R^2	GDPi	GDPj	POPi	POPj	Dist	P.C. GDP Diff.	Tech. Dist.	FDIi	FDIj	Tff
78-83	A	.728	+**	N/S	+**	N/S	-	N/S	N/S	-*	N/S	N/A
	B	.749	+	+	-	-	-	+	-	N/S	N/S	N/A
	C	.381	+**	N/S	-**	N/S	N/S	N/S	N/S	-	N/S	N/A
84-95	A	.906	+	+	-	-	-	+**	N/S	+	-	N/A
	B	.815	+	+	-	-	-	+	-	+	+	N/A
	C	.794	+	+	-	-	N/S	N/S	N/S	+*	-*	N/A
96-99	A	.912	+**	+**	-	-	-	N/S	-*	+	N/S	N/S
	B	.802	+	+	-	-	-	+*	-**	+*	+	-
	C	.786	N/S	N/S	-**	-*	N/S	N/S	N/S	+	+*	+
00-04	A	.932	+	+	-	-	-	+	-	+*	N/S	+*
	B	.806	+	+	-	-	-	+*	-	N/S	+	N/S
	C	.877	+	+	-	-	N/S	+*	N/S	N/S	N/S	+

Notes: If unmarked, coefficients are significant with 99% confidence,
* significant at 95% confidence level
** significant at 90% confidence level
N/S - coefficient was not significant at 90% confidence level
N/A – data unavailable for testing

FDI variables, on the whole, tend to confirm the expectations from the theoretical model formulated in the previous chapter. From the mid-1980s, when ASEAN-5 countries experienced high growth in inward investment, FDI suddenly became a significant determinant of trade. FDI's relationship with trade is positive, except the FDI of the importer in intra-ASEAN trade during 1984-1995. AS FDI increases, ASEAN countries tended to import less from fellow group members, but export more. FDI of the importer country was no longer negative or significant during the last two stages (1996-2004), while the exporter's FDI inflows remained a positive influence for intra-regional trade.

Per capita GDP differentials were either positive or insignificant for all three samples. Positive coefficients suggest comparative advantages effects from the different presumed capital and labor intensities. Insignificant per capita GDP variables may have also occurred where the Neo-Classical comparative advantages and Linder effects cancelled each other out. Technology level differentials, on the other hand, were negative and significant for both samples A and B in the most recent time periods. For the country samples tested, as the distance in technological advancement increases between two economies, there will be less total trade between them. In retrospect, this contradictory outcome for the income and technology level differentials is not entirely unusual for the ASEAN case, given the opposite trends in the data (see Figures 4.2 and 4.3). Further analysis on the underlying causes for these contrasting data movements may be necessary in order to fully understand this development.

One discouraging finding from this restricted model was that the augmenting coefficients tend to influence the significance of others. For example, if we remove the technology distance variable from the regression of Sample B in 2000-2004, the tariff variable coefficient becomes significant with 90% confidence. Remove FDI variables, and the tariff coefficient becomes significant with 99% confidence in this sample, while the per capita GDP differential coefficient becomes insignificant. This is puzzling since there is no *a priori* theoretical causality between these independent variables, and their correlations are found to be very low. It suggests that slightly different specifications for the model can result in very different conclusions, which is important given that all of the different distance variables are usually not included in other studies. In order to identify

potential bias to conclusions stemming from non-robust coefficient results for different model specifications, a number of regression runs were performed nearly exhausting the augmenting possibilities. It was found that the discrepancies were not the norm, and not extreme. Table 5.2 above gives the general situation using a consistent approach to model specification, while noting that the confidence levels may change slightly for certain coefficients when other variables are added or removed.

Durbin-Watson (D-W) statistics imply some serial correlation may be present in these regressions. This is expected for this restricted model, since it does not account for any time-variant effects. The autoregressive function, AR(1), is highly significant and increases adjusted-R^2 values dramatically in all three samples for this restricted model estimation. This provides some further indication of the relevance of time-effects in gravity model determination for trade. The explanatory power of the mass and distance variables is significantly reduced by controlling for the continuity of trade with the autoregressive, lagged dependent variable. This result is not surprising; by not controlling for the time and continuity element, trade volumes for a given year may be incorrectly attributed to other factors in the model. The outputs for ASEAN dummy variables (discussed again later in the chapter) are of no exception in this regard.

The D-W statistic outcomes and the instability of augmenting coefficients reveal the potential for inaccuracy of coefficient outputs for the restricted model. However, these two concerns are resolved in the unrestricted, fixed effects specification regressions, for which some contrasting results are notable.

Removing the restrictions from the model to allow for country-pair and annual heterogeneity increases the adjusted-R^2 values remarkably. Table 5.3 provides a summary of results for equation 4. During ASEAN's strongest period of trade and GDP growth (1984-1995), yearly effects (λ_t) are highly significant and positive. In other periods, yearly dynamics were less relevant for trade determination. The country pair effects (μ_{ij}) are always significant. The value and sign of μ_{ij} varies depending on the value of the base intercept.

Table 5.3: Regression Outputs Summary (equation 4)

Time Period	Sample	Adj.-R^2	μ_{ij}	λ_t	Significant Coefficients
78-83	A	.949	-	N/S	GDPi(+)
	B	.970	-	N/S	GDPi(+), GDPj(+), FDIi(-)
	C	.822	-	N/S	GDPi(+)
84-95	A	.948	+	positive, mostly significant	FDIi(+), FDIj(+)
	B	.955	+	positive, mostly significant	GDPj(+), POPi(-), FDIi(+), FDIj(+)
	C	.886	+	positive, mostly significant	GDPj(-), POPi(-), POPj(-), FDIi(+), FDIj(+)
96-99	A	.975	-	N/S	POPj(+)
	B	.979	-/+	N/S	GDPj(+), POPi(+)
	C	.940	-	N/S	POPj(+)
00-04	A	.988	-	negative, mostly insignificant	GDPi(+), GDPj(+), POPj(+), FDIi(+)
	B	.977	-	negative, mostly insignificant	GDPi(+), GDPj(+), POPi(+), FDIi(+)
	C	.971	-	N/S	GDPj(+)

Notes: N/S – coefficient was not significant at 90% confidence level

In early-ASEAN times (1978-1983) the country pair effects are highly negative, implying high significance of restrictive forces on intra-ASEAN and extra-ASEAN trade determination, while other gravity "mass" variables are less influential especially for

intra-ASEAN trade. In contrast, for the later periods, country pair effects become less negative, and more "mass" variables are significant. As in the restricted model, adjusted R^2 values are lower for Sample C throughout, but there is a convergence over time, as Sample C trade determination is consistently becoming more similar to Sample A.

The variance of coefficient outputs between samples and time periods remain very profound, as in the restricted model. Population variables are positive during the last two stages, which follows the expected supply and demand effects. Outputs for FDI changed little from the restricted model outcome in terms of coefficient sign and significance. The distance, or restrictive, forces are now encompassed by country pair effects.

Table 5.4: Country Pair Fixed Effects Sample Comparison (equation 4)

Time Period	Sample	Average	Max	Min	standard deviation
78-83	A	-49.63	-28.04 Singapore-Malaysia	-65.38 Indonesia-Thailand	11.32
	B	-10.59	-3.78 China-Singapore	-15.84 Singapore-USA	2.95
	C	-143.20	-110.63 Thailand-Malaysia	-175.72 Philippines-Indonesia	23.34
	D	-20.71	-12.88 Indonesia-Singapore	-28.10 Philippines-India	3.38
84-95	A	24.45	28.15 Thailand-Indonesia	19.95 Philippines-Singapore	2.56
	B	8.72	14.47 China-Singapore	3.61 Singapore-China	2.70
	C	65.42	74.06 Thailand-Indonesia	55.92 Philippines-Malaysia	6.23
	D	9.79	15.14 China-Singapore	5.41 Singapore-China	2.45
96-99	A	-19.16	-2.77 Malaysia-Singapore	-33.47 Philippines-Indonesia	8.80
	B	-9.04	1.99 Singapore-China	-19.98 India-Singapore	5.12
	C	-46.60	-36.53 Thailand-Malaysia	-58.00 Philippines-Indonesia	6.97
	D	-20.97	-3.17 Singapore-Hong Kong	-37.46 India-Indonesia	8.20
00-04	A	-32.87	-20.37 Malaysia-Singapore	-43.15 Philippines-Indonesia	7.23
	B	-11.49	-2.11 So. Korea-Hong Kong	-20.75 India-Philippines	4.98
	C	-14.94	-5.29 Indonesia-Malaysia	-24.39 Malaysia-Indonesia	5.92
	D	-10.62	-2.21 Singapore-Malaysia	-18.36 India-Philippines	3.85

Some basic statistics on the country pair effects for different samples and time periods are included in Table 5.4. Notice that in the first and last periods, the maximum values for samples A and B combined (Sample D), are actually intra-ASEAN trade flows

(between Singapore and Indonesia and Singapore and Malaysia). The implication is that in the combined sample (and after accounting for the supply and demand gravity effects), the least natural and unnatural restrictions occur for these trade flows. To some degree, this should be expected since these economies have the shortest geographical distances in the country sample, and therefore assumedly the lowest transport costs. However, ASEAN integration efforts for these trade partners may also be significant factors. For the extra-ASEAN sample (Sample B) Singapore with China and Hong Kong is least restrictive (highest value for country-pair fixed effects intercepts). Singapore shares close cultural ties with China, suggesting that cultural distance may be an important restrictive force for other trade flows (e.g. between ASEAN countries and the West). The most restrictive cases, in column 5 also follow expectations. The Philippines, as a relatively secluded island, appears to suffer from extra costs to trade with the ASEAN mainland and other developed markets around the world.

Column 6 in Table 5.4 provides information on the variance of country pair effects for the different time periods. Comparing the standard deviations of fixed effects values for the first and last time periods, it is apparent that the intra-ASEAN effects have converged, while extra-ASEAN has diverged. The specific effects on trade of each country-pair within ASEAN are more similar now, than prior to economic integration. In contrast, the country pair-specific effects for ASEAN trade flows to and from extra-regional partners now have a higher variance than observed in previous periods.

Table 5.5 provides an overview for the country pair fixed effects for the autoregressive specification, equation 5. AR(1) is significant for all outputs except for certain time periods for Sample C, and for Sample B in the 1996-99 period. The model's fit, measured by adjusted-R^2, is nearly identical between the equation 4 and equation 5 results. However, since using the auto-regressive function results in some specific differences in coefficient outputs, yearly effects intercepts (equation 4) remains the preferred approach.

Table 5.5: Regression Outputs Summary (equation 5)

Time Period	Sample	Adj.-R^2	μ_{ij}	Ar(1)	Significant Coefficients
78-83	A	.960	+	+	N/S
	B	.972	-	-	GDPi(+), GDPj(+), FDIi(-)
	C	.859	+	N/S	N/S
84-95	A	.959	+	+	GDPi(+), FDIi(+)
	B	.966	-	+	GDPi(+), GDPj(+), POPi(-), FDIi(+), FDIj(+)
	C	.891	+/-	+	GDPi(+), FDIj(+)
96-99	A	.976	-	+	GDPj(+)
	B	.979	-	N/S	GDPj(+), POPi(+)
	C	.934	-	N/S	POPj(+)
00-04	A	.976	-	+	GDPj(+)
	B	.987	+	+	GDPi(+), GDPj(+), POPj(-), FDIi(+)
	C	.973	-	N/S	GDPj(+), POPi(-), POPj(+)

The multiple methodologies to testing the significance of AFTA produced mostly consistent results between them. Following the traditional approach to gravity model RIA analysis, regressions of the restricted equation for Samples D and E were augmented with the ASEAN dummy variable. Coefficients came up positive and significant for all four periods. Also, the explanatory power of the ASEAN variable increased dramatically between the first two and last two time periods (i.e. before and after AFTA).

Table 5.6: ASEAN Dummy Variable Results Summary

Sample D				
	Sign	Coefficient	Std. Error	Adj.-R^2
78-83	+	.298	.138	.749
84-95	+	.281	.065	.814
96-99	+	.774	.092	.792
00-04	+	.773	.072	.809
Sample E				
	Sign	Coefficient	Std. Error	Adj.-R^2
78-83	+	.430	.189	.732
84-95	+	.303	.081	.812
96-99	+	.747	.118	.757
00-04	+	.791	.091	.785

In Table 5.6 above, results are given for samples that both include and exclude Singapore (Sample D and E respectively). Excluding Singapore appears to have very little effect on the results for this traditional approach to RIA testing for ASEAN. Therefore, in Kruger (1999), the claim that the possible Singapore trade "entrepôt" situation may cause overestimation in ASEAN dummy variable outputs is not convincing. If the dummy variable coefficient outputs were overestimated in Kruger's research, it was more likely the result of "phantom region" effects first proposed in Polak (1996)[2] or omitted variables bias from not accounting for the time or country-pair effects. "Phantom region" over-prediction is very improbable in this research though, given the biased sample of country trade flows (ASEAN countries are much closer together than they are to the extra-ASEAN partners, e.g. USA, EU, Japan, etc.). However, when the autoregressive, lagged trade figures, variable is included in restricted model regressions, the significance of ASEAN dummy variables is reduced. In fact, although all ASEAN dummy variable coefficients in Table 5.6 are significant, including the lagged dependent variable in these regressions leaves the dummy insignificant for all periods except 1996-

[2] See Section 3.3

1999. Therefore, our experiment with the autoregressive function in the gravity model has provided an interesting insight related to omitted variables bias in the many preceding regional trade analyses that have utilized dummy variables with the gravity model tool. The variances of coefficient outputs are not robust between the restricted, fixed effects, and fixed effects with autoregressive function specifications. A restricted model that includes an RIA dummy variable may create unreliable results since it does not account for heterogeneity in the two dimensions of the panel data set.

The Chow Breakpoint "regime change" test of ASEAN for Sample A passed with over 99% confidence (see Table 5.1). Gravity trade determination for ASEAN intra-regional trade flows clearly changed in structure before and after AFTA was instituted. Similarly, Chow Breakpoint tests confirmed a change in structure for trade determination for the extra-ASEAN sample (Sample B) and the intra-ASEAN sample less Singapore (Sample C).

On average, the country pair effects are less negative for intra-regional ASEAN trade than the extra-regional trade. This result may partially be explained given the greater geographical distance for extra-ASEAN trade flows. However, there is also evidence that the difference in country pair effects between the two samples became relatively larger since AFTA times (i.e. in the last two time periods, see Table 5.7). Generally, it is assumed that transport costs have decreased over time, not increased. Therefore, there must have been some other factors that have caused intra-regional trade to become relatively less restrictive in the more recent periods.

Table 5.7: Country Pair Fixed Effects AFTA Analysis (equation 4, Sample D)

Time Period	Sample	average	max	min	standard deviation
78-83	*Intra-ASEAN*	-19.30	-12.88	-23.90	3.27
	Extra-ASEAN	-21.06	-14.17	-28.10	3.33
84-95	*Intra-ASEAN*	9.02	12.76	5.97	1.76
	Extra-ASEAN	9.98	15.14	5.41	2.56
96-99	*Intra-ASEAN*	-17.94	-3.78	-27.68	7.24
	Extra-ASEAN	-21.73	-3.17	-37.46	8.29
00-04	*Intra-ASEAN*	-9.06	-2.21	-13.44	3.47
	Extra-ASEAN	-11.01	-3.23	-18.36	3.86

Tariffs are insignificant in regressions of intra-ASEAN trade during the initial stages of the gradual implementation of AFTA-CEPT. In more recent years, from 2000-2004, the variable is significant, but positive.[3] This goes against all logic, tariff reductions create diversion within the region? A likely explanation is that CEPT tariffs remain a relatively insignificant factor for intra-regional trade and the positive coefficient is spurious. Assumedly, the insignificance stems from the fact that CEPT rates are usually not utilized, and perhaps because high NTBs remain, which distort the tariff reduction effects. Also, there may be some inaccuracies in the data caused by averaging the intra-regional, CEPT tariffs across tariff lines. According to this model, AFTA tariff reductions alone have not had any trade creating effects for intra-ASEAN trade. On the other hand, AFTA in a broader context, including the effects of cooperation beyond *ad valorem* tariff reductions, appears to be a significant factor of intra-ASEAN trade growth based on results from the other three methods of evaluation used.

[3] This result applies to intra-regional trade both with and without Singapore. For extra-regional flows (Sample B), tariff coefficients are negative and significant in 1996-99 (see Table 5.2)

Chapter VI

Recommendations and Conclusions

What are the observable trends in ASEAN trade over the Association's different stages and what conclusions can be made about effects of regional integration on member countries' trade? Are the criticisms that focus on possible trade diversion, and the dangers of a low-trading "unnatural group" that is overly "inward-looking" valid for AFTA? When analyzed in the proper context, it was revealed how ASEAN has a relatively high intensity of intra-regional trade. Also, trade in general has vast importance for ASEAN-5 countries, as both intra-regional and extra-regional trade composes a very large share of their GDPs. In this report we have identified several sources of potential gain for intra-ASEAN integration, and examined them in light of trade statistics disaggregated both by direction and product mix, and in connection with shifts in other important macroeconomic variables as well as the productivity-related microeconomic factors that are often overlooked.

It has been shown in this report that ASEAN trade has grown at a faster rate than the economies' GDPs. The competition and scale related factors, stimulated through ASEAN initiatives, created the potential for this observed growth. Evidence of this fact is present from the shifts in production and trade structures of the ASEAN-5 members, and the outputs from the augmented gravity model regressions performed, particularly the significance of inward-FDI and technology differentials for the region.

Furthermore, there exists a large potential in ASEAN for even more competition and scale-related gains, though it will require continued movement towards deeper integration, beyond reductions of tariffs. So far, ASEAN agreements have been successful at reducing restrictions to trade and stimulating supply and demand potentials for exporters and importers, both intra-regionally and extra-regionally. However, a high potential for further gains are likely given that the more effectual strategies, i.e. NTB reductions, are where most of the future progress will necessarily be directed, since intra-regional tariff reductions are nearly complete.

For intra-ASEAN trade, although tariff reductions appear to be mostly insignificant, AFTA is a positive factor for trade growth based on the various methodologies applied to gravity model estimation. FDI inflows, predominantly from outside the region, increase intra-ASEAN trade through stimulating productivity and production networking. This development is only possible where the barriers for trade in goods and cross-border investment are sufficiently low. Furthermore, the overall explanatory power of the gravity model's supply and demand factors relationship to trade has improved, while country-pair coefficients reveal that restrictions have reduced, implying that the level of trade within the region has moved closer towards its full, restriction-free, "natural" potential. In general, it can thus be surmised that greater cooperation in political and economic themes has benefited trade for ASEAN. It also suggests that the new stated goals for further expanding the scope of ASEAN integration (namely through AIA and AEC) will increase the benefits for the member economies'

trade further, since these new initiatives follow an approach proven to be effective, building upon the sources of growth identified in this study.

For ASEAN trade with important, non-member economies, growth has occurred in correlation with AFTA as well. Although extra-ASEAN trade growth has not been as rapid, there is no evidence of trade diversion, and the overall trend of aggregated trade volumes looks very similar to intra-ASEAN figures. It is highly probable that intra-ASEAN integration has improved the image of the scale of the market and of production possibilities in the region from the perspective of economies abroad. Thus, rather than a private and exclusive club, ASEAN cooperation has become a mode for individual members to open up and improve trade and investment conditions with the rest of the world.

In past studies, the unique case of Singapore and the possibility of misreported trade data for this traditional trade "entrepôt" have caused speculation in the literature on whether this situation distorts the outputs in ASEAN trade analyses. However, separate regressions including and excluding Singapore in data samples resulted in mostly the same general conclusions for the hypotheses tested. Moreover, Singapore's disproportionate share of ASEAN trade, and the differences in outputs that were observed, has clearly reduced over time. The increased diversity in the directions of intra-regional and extra-regional trade is a very encouraging result for AFTA. It appears that ASEAN is helping to spread out trade and income growth of Southeast Asian countries so that gains can be experienced by all. Note also that there has also been a

strong convergence in technology levels among ASEAN countries relative to countries elsewhere, and this has positively affected intra-regional trade volumes. In fact, the variance in country pair effects in general (which will include technological distance and any other significant bilateral trade factors) showed clear convergence for intra-ASEAN samples. ASEAN integration has potentially played an important role in the convergence for member economies in trade restrictions and factors of productivity, such as technological development.

ASEAN's gradual expansion, which now includes ten countries, will likely continue improvement of the conditions for positive outcomes, by expanding the scope of the integrated, "single market" even further. Viet Nam will likely play an especially significant role in the expanded ASEAN, as it is now the fastest growing economy in the region in terms of trade and GDP.

Although some of the conclusions and underlying theoretical framework may differ, the methodologies used in this research could be applied to other RIAs around the world. Also, now that data is becoming more available for the other ASEAN member countries, the scope of this analysis could be expanded to include ASEAN-10 in the future. Several follow-up investigations have also presented themselves for ASEAN-5. The restrictive effects of non-tariff barriers that still exist within ASEAN should be given careful analysis, in light of the optimistic outcome of this study for ASEAN cooperation, in order to provide more specific guidance for continued ASEAN integration in the future. The tariff lines on the CEPT inclusion list are expected to be reduced further to

zero by 2015 for ASEAN-5 and Brunei, and by 2018 for CLMV countries. According to the regression analyses presented in this paper, this may not have a very significant affect on ASEAN trade without complimentary NTBs reductions.

Further study of the production factors in the region (i.e. labor and capital) may provide improved support for the competition and scale gains concepts as well. In general, it appears likely that any growth analysis for ASEAN will require this consideration of growth in productivity and factor endowments, and its relationship to inward-FDI from developed countries abroad. One possible mode for advancement in this area of research would be to analyze correlations between measurements of productivity, regional trade, FDI, and the sizes and amount of firms in specific industries in ASEAN. A more disaggregated approach is perhaps needed to develop further support for this thesis.

ASEAN cooperation is an important factor for growth in ASEAN trade and investment in all directions. ASEAN's response to the financial crisis in 1997 revealed that an "every-country-for-itself" economic policy is not the ideal approach (Beng, 2005). Cooperation can help diminish damage from financial troubles and vulnerability to the problems that cause them, while also improving the region's attractiveness and competitiveness for trade and investment.

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APPENDICES

Appendix A: ASEAN Trade Structure Tables

Notes:
I-A = total intra-ASEAN trade of commodity in millions of USD
A%tot = intra-ASEAN trade as a proportion of total trade for specific commodity
Sing%A (Malay%A) = proportion of intra-ASEAN trade in commodity to or from Singapore (Malaysia)
%tot = proportion of trade in commodity for total trade in all commodities with all regions
*Singapore exports table does not include exports to Indonesia
Source: UN COMTRADE Database (all calculations by author)

INDONESIA

IMPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot
33	Petroleum…	**3,975.70**	56.71	94.88	**17.11**	**1,416.67**	35.20	77.13	**7.82**	**3,433.35**	37.10	85.97	**8.01**	**9,694.22**	42.48	69.60	**21.37**
77	Electric machinery…	112.00	**6.91**	**85.95**	3.96	224.96	11.90	86.79	3.68	858.30	15.34	49.04	4.84	757.20	**23.42**	**30.37**	3.03
75	Office machines…	4.12	**2.13**	**96.34**	0.47	26.54	4.78	93.03	1.08	116.01	16.06	89.82	0.63	305.00	**30.16**	**57.41**	0.95
76	Telecommunications…	**30.27**	**5.20**	**97.57**	1.42	41.99	3.83	81.77	2.13	**272.62**	**7.55**	77.11	3.13	184.22	7.52	**43.28**	2.29
4	Cereals…	**489.29**	31.91	0.36	**3.74**	**118.71**	12.14	4.97	**1.90**	964.17	21.53	1.39	3.88	663.62	18.35	6.98	3.39
78	Road vehicles	**16.55**	**0.55**	**81.60**	7.35	51.03	1.69	51.34	5.88	161.05	2.02	50.03	6.92	**1,419.43**	**24.00**	**12.08**	5.54
74	General industrial machinery…	140.65	**5.06**	84.24	6.78	272.99	8.11	77.92	6.54	582.49	7.10	58.77	7.10	938.28	**16.08**	46.16	5.47

EXPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot
33	Petroleum…	5,636.13	13.20	85.01	64.26	581.87	3.12	88.27	27.87	2,379.30	12.08	81.94	14.55	3,223.84	15.90	59.01	11.10
77	Electric machinery…	**271.75**	**95.17**	**99.88**	0.43	**46.09**	**21.55**	**50.73**	**0.32**	965.01	38.48	86.55	1.85	**3,619.34**	**42.93**	**71.17**	**4.61**
75	Office machines…	**0.10**	66.76	100.00	**0.00**	0.97	42.07	89.37	0.00	821.22	51.28	74.13	1.18	**3,353.95**	49.16	86.69	**3.73**
76	Telecommunications…	1.25	**18.28**	83.23	**0.01**	61.29	35.20	95.64	0.26	1,457.77	28.17	91.44	3.83	1,952.59	**20.72**	75.21	**5.16**
23	Crude rubber…	895.79	**34.24**	**98.82**	3.94	695.10	22.33	99.39	4.65	590.96	11.45	97.30	3.82	251.35	**5.25**	**88.61**	2.62
78	Road vehicles	**4.85**	89.71	99.18	0.01	20.23	23.99	57.15	0.13	499.13	48.25	71.36	0.76	**1,091.34**	49.80	23.99	1.20
65	Textile yarn, fabrics…	29.51	23.49	97.37	0.19	758.45	27.05	77.43	4.19	1,254.62	15.47	50.00	5.99	1,290.71	14.31	14.24	4.94

MALAYSIA

IMPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot
33	Petroleum…	2,805.88	51.91	99.48	15.57	2,420.43	76.98	99.78	4.61	3,589.97	75.32	98.42	6.42	8,100.72	58.93	86.27	5.18
77	Electric machinery…	**702.94**	**15.90**	58.73	12.74	**2,836.58**	20.77	79.34	20.00	**14,012.55**	23.24	82.01	44.71	**21,874.09**	**22.86**	50.10	36.06
75	Office machines…	4.26	**1.84**	**98.86**	**0.67**	331.53	**24.65**	82.32	1.97	3,002.16	34.96	59.46	**9.43**	4,660.70	23.09	**49.04**	7.61
76	Telecommunications…	127.51	14.36	**99.53**	2.56	796.95	27.97	96.42	4.17	2,637.13	25.76	79.94	5.24	1,890.57	16.85	**31.61**	4.23
4	Cereals…	700.66	**59.26**	3.54	3.41	706.32	45.15	4.93	2.29	695.87	25.21	7.13	1.27	796.30	**29.34**	11.13	1.02
23	Crude rubber…	95.03	**78.52**	0.10	0.35	143.71	**56.17**	0.48	0.37	626.59	67.77	0.56	0.67	1,025.70	71.59	0.50	0.54
3	Fish, crustaceans…	112.64	50.82	9.76	0.64	275.51	68.33	3.64	0.59	579.87	62.42	4.46	0.56	706.48	58.80	6.94	0.45

EXPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
33	Petroleum…	4,534.57	46.53	79.24	26.55	4,903.06	47.74	63.95	13.58	5,577.74	50.59	44.73	5.23	8,123.66	39.18	44.44	6.37
77	Electric machinery…	**650.99**	**17.13**	86.33	**11.90**	**2,628.07**	19.43	87.65	17.89	**14,544.26**	**31.74**	86.10	21.73	**25,540.93**	30.62	74.99	**25.65**
75	Office machines…	**4.99**	53.74	93.17	**0.03**	533.27	53.94	95.33	**1.31**	6,401.11	30.17	79.28	**10.06**	**10,075.83**	18.31	71.66	**16.92**
76	Telecommunications…	91.17	25.91	91.60	2.32	2,296.89	33.36	97.26	9.11	8,159.40	23.83	90.60	16.23	5,171.01	15.42	81.63	10.31
3	Fish, crustaceans…	58.82	15.90	**84.05**	1.01	121.95	19.62	79.08	0.82	176.41	18.13	68.62	0.46	301.99	22.45	**56.23**	0.41
23	Crude rubber…	1,197.44	**24.60**	**99.98**	**13.26**	482.05	10.49	99.23	**6.07**	94.78	**2.29**	89.94	**1.96**	103.52	3.39	**46.79**	**0.94**

PHILIPPINES

IMPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot
33	Petroleum…	1,274.13	18.40	16.35	27.66	918.38	21.39	24.39	13.03	1,101.08	15.47	62.75	8.28	2,114.84	19.42	69.70	9.15
77	Electric machinery…	**22.24**	**2.86**	67.15	**3.11**	113.08	6.13	78.92	5.60	1,072.68	9.65	55.42	12.94	**7,118.51**	**15.65**	44.23	**38.23**
75	Office machines…	0.86	**0.53**	95.22	**0.65**	26.25	8.38	86.77	0.95	544.57	19.27	76.15	3.29	1,559.00	**13.51**	62.67	**9.69**
4	Cereals…	37.35	**4.56**	5.48	3.27	254.36	20.92	2.90	3.69	408.14	18.11	9.63	2.62	623.41	**25.53**	4.68	2.05
78	Road vehicles	4.24	**0.50**	**94.40**	**3.38**	17.68	1.35	90.43	3.97	139.31	3.11	18.44	5.22	856.81	**25.17**	**7.48**	**2.86**

EXPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
77	Electric machinery…	22.15	**9.55**	70.22	**1.53**	250.83	9.55	63.72	7.97	1,997.37	17.95	66.04	21.61	8,305.89	**19.71**	50.45	**37.93**
75	Office machines…	**0.45**	10.12	19.51	**0.03**	4.99	10.12	50.91	0.63	738.31	21.41	19.17	6.70	**2,703.67**	13.08	29.12	**18.60**
4	Cereals…	80.49	68.89	4.02	0.77	5.86	68.89	5.91	0.13	34.88	41.41	12.26	0.16	63.86	39.71	11.40	0.14
78	Road vehicles	**1.16**	1.30	35.63	0.59	26.69	**1.30**	17.26	**0.50**	235.10	31.26	0.86	1.46	**1,228.94**	**36.10**	2.72	**3.06**
6	Sugar, honey	240.39	17.97	**0.38**	**8.85**	7.81	17.97	32.86	1.50	24.22	7.30	2.63	0.64	49.13	18.99	0.91	**0.23**
3	Fish, crustaceans…	12.62	3.37	97.82	2.47	4.97	3.37	55.56	5.25	37.09	2.52	75.22	2.86	64.91	5.18	70.02	1.13
28	Metalliferous ores…	**0.84**	**0.04**	2.35	**15.21**	6.26	0.04	43.84	5.06	12.54	1.62	36.44	1.50	**74.29**	**10.63**	24.27	**0.63**

SINGAPORE*

IMPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Malay%A	%tot	I-A trade	A%tot	Malay%A	%tot	I-A trade	A%tot	Malay%A	%tot	I-A trade	A%tot	Malay%A	%tot
33	Petroleum…	4,414.62	17.04	83.37	32.49	3,477.69	15.32	91.63	14.71	4,105.21	13.06	65.13	8.77	8,654.00	15.20	42.34	13.99
77	Electric machinery…	**1,258.02**	**19.26**	66.30	**8.19**	4,092.77	18.81	80.27	14.10	21,778.38	26.27	72.87	23.12	**37,915.31**	**33.96**	73.81	**27.44**
75	Office machines…	**18.66**	**2.19**	93.60	**1.07**	1,947.11	19.85	34.00	6.35	15,004.29	39.06	43.82	10.72	**17,464.95**	**40.65**	61.99	**10.56**
76	Telecommunications…	158.64	5.95	98.56	3.34	3,826.10	35.41	95.86	7.00	**11,607.49**	**43.90**	86.27	7.37	**7,620.52**	**30.29**	85.39	6.18
23	Crude rubber…	2,370.95	99.17	90.59	**3.00**	1,790.52	87.63	79.80	1.32	1,031.64	84.25	62.53	0.34	441.92	76.90	31.47	**0.14**
3	Fish, crustaceans…	130.23	30.76	49.90	0.53	319.51	30.20	44.39	0.69	703.00	36.82	32.90	0.53	642.04	39.17	39.60	0.40

EXPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Malay%A	%tot	I-A trade	A%tot	Malay%A	%tot	I-A trade	A%tot	Malay%A	%tot	I-A trade	A%tot	Malay%A	%tot
33	Petroleum…	4,781.63	25.31	61.02	30.91	6,440.56	30.21	40.11	15.59	8,563.85	32.12	44.52	7.84	13,315.60	34.75	54.78	8.56
77	Electric machinery…	**1,169.43**	**21.62**	69.32	**8.85**	4,163.96	25.23	77.17	12.07	26,651.15	37.87	78.04	20.69	**40,229.83**	**29.69**	76.44	**30.27**
75	Office machines…	**90.64**	**14.21**	**78.90**	**1.04**	**1,583.17**	**7.39**	**33.47**	**15.66**	7,909.59	9.35	57.32	24.88	9,476.38	**12.01**	56.44	17.63
76	Telecommunications…	442.69	**11.31**	76.47	6.40	1,903.64	11.89	75.36	11.71	9,413.75	**25.43**	71.50	10.88	6,847.71	24.52	67.75	6.24
3	Fish, crustaceans…	76.36	20.04	82.91	0.62	117.16	10.52	47.87	0.81	350.33	20.80	57.89	0.50	273.42	27.13	76.00	0.23

THAILAND

IMPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot
33	Petroleum…	2,450.40	29.49	58.38	29.62	3,962.35	58.08	64.85	8.59	6,238.07	42.66	48.22	7.40	1,159.15	14.25	15.01	10.73
77	Electric machinery…	**55.64**	**3.71**	75.78	**5.34**	739.14	11.60	**81.58**	8.02	4,711.70	17.84	64.06	13.37	**2,985.06**	**23.54**	**37.66**	**16.73**
75	Office machines…	**0.57**	**0.40**	82.78	**0.51**	**1,297.70**	**42.15**	**86.99**	3.88	3,256.92	38.31	43.76	4.30	1,379.48	31.47	**16.16**	**5.78**
76	Telecommunications…	20.43	**5.89**	**95.71**	1.24	190.66	8.62	72.37	2.78	1,193.08	**18.00**	**46.95**	3.36	422.79	14.80	23.90	3.77
3	Fish, crustaceans…	42.31	58.32	8.33	0.26	263.17	12.86	47.20	2.58	349.05	16.84	12.42	1.05	226.44	21.36	0.82	1.40
24	Cork and wood	209.40	**99.17**	**1.24**	0.75	1,141.78	98.11	**60.06**	1.47	2,638.95	89.05	63.63	1.50	335.44	77.92	**0.02**	0.57

EXPORTS

sitc		1980-1982				1988-1990				1994-1996				2002-2004			
		I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot	I-A trade	A%tot	Sing%A	%tot
77	Electric machinery…	494.78	**51.61**	**75.04**	**4.68**	570.59	**19.53**	73.65	6.77	5,390.78	30.26	77.54	11.32	2,354.94	19.57	**38.29**	**14.98**
75	Office machines…	**0.72**	**12.95**	20.57	**0.03**	922.84	35.09	92.97	6.10	7,273.41	43.17	92.54	10.71	**2,210.30**	**26.66**	79.26	**10.32**
76	Telecommunications…	3.18	12.18	69.18	**0.13**	139.20	8.72	89.05	3.70	1,741.68	19.84	73.86	5.58	830.83	17.02	53.80	**6.08**
3	Fish, crustaceans…	59.71	5.50	31.98	5.30	227.01	5.40	52.54	9.74	**654.17**	5.13	**77.26**	8.10	142.98	3.66	50.78	4.86
23	Crude rubber	194.93	12.85	69.97	**7.40**	331.98	17.00	**83.70**	4.53	657.91	9.91	32.67	4.22	509.70	17.59	**14.84**	**3.61**
4	Cereals…	1,338.46	30.02	28.29	**21.75**	845.27	25.38	27.70	7.72	1,569.35	25.62	24.50	3.89	585.05	26.68	18.11	**2.73**
78	Road vehicles	**26.89**	**69.71**	**55.76**	**0.19**	64.00	16.30	29.69	0.91	**1,280.35**	**54.21**	**26.32**	1.50	1,053.19	25.57	11.79	**5.13**
65	Textile yarn, fabrics…	168.49	16.49	54.81	4.98	230.05	13.24	60.91	4.03	927.85	16.55	29.96	3.56	405.09	18.45	13.29	2.73

Appendix B: Data Sources

Gravity Model Regressions Database	
variable	source
Bilateral Export Flows	Direction of Trade Statistics (DOTS) Yearbooks, IMF, 1984-2006
GDP	World Development Indicators (WDI) CD ROM, World Bank, 2005
Population	World Development Indicators (WDI) CD ROM, World Bank, 2005
Geographic Distance	USDA Great Circle Distance Website, www.wcrl.ars.usda.gov/cec/java/capitals.htm
Technology Indicator	ArCo Index, Archibugi, D. and A. Coco (2004)
FDI Stock	UNCTAD Common Online Database, http://www.unctad.org/Templates/Page.asp?intItemID=1888&lang=1
Tariffs	ASEAN Secretariat, www.aseansec.org; UNCTAD TRAINS Online Database, http://www.unctad.org/Templates/Page.asp?intItemID=1888&lang=1

Other Data Sources:

Statistical Yearbook for Asia and the Pacific (SYAP), UNESCAP 2005

UN COMTRADE Database, UNSD 2006

Biography

Daniel W. Clarke was born in 1980 in Washington State, USA. He received a Bachelor's Degree from the Alber's School of Business and Economics at Seattle University in 2002. He completed Master's degree studies in International Economics and Finance at Chulalongkorn University in Bangkok, Thailand in 2005-2006. Currently, Daniel is employed with the United Nations Economic and Social Commission for Asia and the Pacific, working primarily for projects on statistical capacity development for national governments in the region.