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The Impact of AFTA on Intra-AFTA Trade

Misa OKABE
Wakayama University, Japan.

Shujiro URATA
*Waseda University and Economic Research Institute for ASEAN and East
Asia (ERIA)*

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Abstract: ASEAN countries have liberalized intra-ASEAN trade over the last 20 years by establishing the ASEAN Free Trade Area (AFTA). This paper aims to examine the impact of trade liberalization under AFTA on intra-ASEAN trade. By applying a gravity model, we find positive and significant trade creation effects from the tariff elimination for a wide range of products. We also find that the elasticity of tariff reduction on imports tends to be much larger than that on exports. Trade creation effects for the new ASEAN members are relatively small compared to those for the old members. Our results show that AFTA has been successful in promoting intra-AFTA trade, but we argue that further expansion may be achieved by increasing the use of AFTA and by reducing/removing non-tariff measures (NTMs) through such ways as improving customs procedures and harmonizing/mutually recognizing product standards.

Keywords: ASEAN Free Trade Area; Intra-regional trade; Gravity model, Trade creation effect.

JEL Classification: F13; F15; O19.

1. Introduction

The member countries of the Association of Southeast Asian Nations (ASEAN) embarked on the formation of a free trade agreement (FTA) under the name of ASEAN Free Trade Area (AFTA) in 1993.¹ Several motives behind the establishment of AFTA may be discerned. First, ASEAN policy makers thought that an expansion of intra-ASEAN trade would promote economic development of the ASEAN countries as the expansion of exports would result in output growth and the expansion of imports would improve productive efficiency. In particular, the creation of a large unified ASEAN market through AFTA would enable producers in ASEAN to exploit the benefits arising from the economies of scale. Second, a rising trend of regional trade agreements (RTAs), which include FTAs and customs unions, in the world put pressure on ASEAN members to form an FTA, as they saw that such a trend would result in discrimination against their products in their export markets. Faced with difficulties in multilateral trade negotiations in the Uruguay Round of trade negotiations under the auspices of the General Agreement of Tariffs and Trade (GATT), many countries in the world including European countries and the United States turned to RTAs with like-minded countries in order to obtain the benefits of trade liberalization. Third, the rise of China as an economic force was seen as a strong threat to the ASEAN members in terms of export competition and attracting foreign direct investment, which would contribute to economic growth. The formation of AFTA was considered effective for dealing with this threat. AFTA began with six ASEAN members, namely Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand, and then it was joined by Vietnam in 1995, Lao PDR and Myanmar in 1997, and Cambodia in 1999. At the time of writing, AFTA has 10 members.

A pillar of trade liberalization under AFTA is the Common Effective Preferential Tariff (CEPT) Scheme to eliminate tariffs on intra-AFTA trade, which have been in effect since January 1993. The AFTA members set the target years for tariff elimination to be completed under the CEPT, as will be explained in detail in the following section. By 2010, more than 99% of the tariff lines in the CEPT inclusion

list had been eliminated in the six original AFTA members, while around 95–99% of the tariff lines had been brought down to the 0–5 percentage tariff range for the new members.

In the light of notable achievements in trade liberalization under AFTA, we attempt to analyse the impact of AFTA on trade among the AFTA member countries. Specifically, we are interested in whether AFTA has promoted trade among the AFTA member countries, as was expected before the establishment of AFTA. We undertake the analysis using two approaches – descriptive and econometric approaches. First, we examine the changing patterns of intra-regional trade in ASEAN from the 1980s to 2010 by using regional trade data at both aggregated and disaggregated levels. Second, we conduct regression analyses by applying a gravity model to bilateral trade flows in order to examine the impact of the elimination of tariffs under the CEPT Scheme for AFTA on trade flows at product level by controlling the factors other than tariff elimination such as transportation cost, and the economic environment of exporters and importers.

The remainder of this paper is composed as follows. Section 2 reviews the process and the current status of the tariff eliminations under the CEPT Scheme for AFTA. In section 3, the changing patterns of intra-AFTA regional trade flows are examined by using aggregated and disaggregated trade statistics, in order to set the stage for the statistical analysis. Section 4 examines the impact of the elimination of tariffs under the CEPT Scheme on bilateral exports and imports of AFTA members by applying a gravity model using trade data at product level. We mainly focus on the trade creation effect of tariff elimination under the CEPT. Section 5 provides some concluding comments including policy implications.

2. Tariff elimination under the CEPT Scheme for AFTA

Tariff reduction by the AFTA member countries proceeded along the lines of the CEPT Scheme. Under the CEPT Scheme, products are initially classified into two groups; Inclusion List (IL) and Exclusion List (EL). Those products in IL were subject to tariff elimination while those in EL were excluded from tariff elimination.

The Exclusion List was later subdivided into a Temporary Exclusion List (TL) and Sensitive List (SL) in 1995. The products in TL will become subject to tariff reduction or elimination in the future, and will be shifted to IL. The products under SL were exempted from tariff elimination.

For the original AFTA members, initially, tariff rates on the products in IL were scheduled to be reduced to between 0% and 5% by 2008. The tariff reduction schedule was revised in 1994 and 1998, and the due date of tariff reduction to the 0–5% range for the products in IL was moved forward to 2002. For the new AFTA members the due dates were set as follows: 2006 for Vietnam, 2008 for Lao PDR and Myanmar, and 2010 for Cambodia. Products in TL have been shifted to IL annually from 1996. For the products in SL, including unprocessed agricultural products, the tariff rates were to be reduced to the 0–5% range by the year 2010 for the original six members and by the period 2013–2017 for the new members.

The ASEAN–CEPT agreement was revised significantly by the ASEAN Trade in Goods Agreement (ATIGA) signed in December 2008. In the revised schedule, the tariff rates of the products in IL were to be reduced to 0% by the year 2010 for the original six members and by the year 2015 for the new members. ATIGA also redefined the detailed schedule of tariff reduction.²

Intra-regional tariff rates in ASEAN have been reduced or eliminated steadily under the CEPT Scheme, which was revised several times. By 2010, the share of the total number of products with the 0% tariff rate, in terms of tariff lines, was around 99% for the original six countries, while the share of products with the 0–5% tariff rates was around 99% for Cambodia, Myanmar and Vietnam and 95% for Lao PDR. Table 1 shows the progress of tariff elimination in each member country. Judging from these figures, one may confirm that the process of regional tariff reduction or elimination in the ASEAN member countries has proceeded strongly in the last 20 years, and has almost been completed.

Table 1: Progress of Regional Tariff Elimination in ASEAN by 2010

Share of tariff lines at 0%		Share of tariff lines within 0-5%	
Brunei	99.03	Cambodia	98.53
Indonesia	98.66	Lao PDR	95.18
Malaysia	98.68	Myanmar	99.28
Philippines	98.63	Vietnam	99.68
Singapore	100.00		
Thailand	99.84		

Source: Calculated by authors based on tariff schedule under the ATIGA of each member published by ASEAN secretariat.

Table 2 shows the share of the total number of products in terms of tariff lines in the detailed tariff elimination schedules for ATIGA in 2010. By 2017, tariffs for more than 98% of all products will be eliminated for the new members, and thus the level of tariffs on intra-ASEAN trade will become virtually zero for both original and new members. Having noted significant progress the AFTA members have made in tariff elimination, it is important to note that some tariffs and/or quotas remain for all AFTA members, with the exception of Singapore, which has eliminated tariffs completely.

Table 3 shows the simple average differences between the most-favoured nation (MFN) tariff rates and the CEPT tariff rates for the products at SITC 1-digit level for the 1993–2010 period. The increasing trends of the differences over time for almost all the products indicate a reduction in the CEPT tariff rates. The increasing trends are particularly notable for food and live animals (SITC section 0), beverages and tobacco (SITC section 1), machinery (SITC section 7) and manufactured articles (SITC section 8), reflecting sharp reductions in the CEPT tariff rates. A closer examination at SITC 2-digit level reveals notably large reductions in CEPT rates vis-à-vis MFN rates for coal, petroleum and gas (SITC 52), transport equipment (SITC 73), iron and steel (SITC 67), footwear (SITC 85) and perfume materials (SITC 55).

Table 2: Tariff Elimination Schedule for ATIGA in 2010 (Unit: %)

Schedule (A to H)	A	B	C	D	E	F	G	H
product				Original sensitive list	Original highly sensitive list	Out-quota tariff rate	Petroleum Products	General exception
member	ASEAN6 (2010) CLMV (2015)	CLMV (2010)	CLMV (2012)	ASEAN6 (2010) CLMV (2013-17)	MFN	Thailand & Vietnam	Cambodia & Vietnam	
Brunei	98.88	-	-	0.19	-	-	-	0.93
Indonesia	98.72	-	-	-	0.18	-	-	1.1
Malaysia	98.45	-	-	0.67	0.1	-	-	0.78
Philippines	98.6	-	-	0.89	0.21	-	-	0.3
Singapore	100	-	-	-	-	-	-	-
Thailand	99.04	-	-	0.06	-	0.9	-	-
Cambodia	90.37	2.22	5.52	0.72	-	-	0.22	0.95
Lao PDR	61.16	4.67	30.48	2.65	-	-	-	1.04
Myanmar	99.28	-	-	0.13	-	-	-	0.59
Vietnam	62.49	4.64	30.05	1.02	-	0.21	0.38	1.2

Notes: Schedule A: tariff elimination by 2010 for the six members and by 2015 for Cambodia, Lao P.D.R., Myanmar and Vietnam (CLMV),
Schedule B: for information and communication technology equipment,
Schedule C: for priority integrated sectors products for CLMV by 2012,
Schedule D and E: for unprocessed agricultural products,
Schedule F: for the out-quota tariff for Thailand and Vietnam,
Schedule G: for petroleum products for Cambodia and Vietnam,
Schedule H: for general exceptions

Source: Calculated by authors based on tariff schedule under the ATIGA of each member published by ASEAN secretariat.

**Table 3: Tariff Reduction under AFTA, Difference between MFN and CEPT
(Unit: %)**

Year	SITC	0	1	2	3	4	5	6	7	8
		Food & Live animals	Beverages & Tobacco	Crude materials	Mineral fuels	Animal and vegetable	Chemicals	Manufact. goods	Machinery	Manufact. articles
1993		0.54	0.53	0.41	0.04	0.44	0.29	0.85	0.26	2.43
1994		0.78	0.73	0.45	0.05	0.61	0.33	1.05	0.47	2.62
1995		1	0.78	0.57	0.05	1.13	0.54	1.4	0.64	3.39
1996		1.84	2.6	0.99	1.15	1	1.41	1.85	1.43	4.07
1997		1.79	2.36	0.76	1.36	1.07	1.57	2.12	1.26	4.03
1998		2.81	3.03	1.36	1.39	1.96	2.01	3.08	1.92	5.72
1999		3.84	3.18	2.19	2.58	2.11	3.39	4.33	3.96	8.49
2000		3.36	5.03	1.27	0.46	1.32	1.38	3.05	2.73	4.76
2001		4.07	5.47	1.39	0.45	1.57	1.5	3.16	2.99	5.82
2002		4.2	5.5	1.4	0.64	2.17	1.51	3.43	3.43	6.08
2003		5.36	8.95	2.11	1.07	3.43	2.24	4.94	4.6	7.85
2004		5.12	9.6	1.88	0.82	3.5	1.72	3.55	3.54	7.4
2005		6.09	12.04	2.29	0.9	4.21	2.34	4.82	4.8	9.03
2006		6.56	13.07	2.63	1.26	4.78	2.59	5.28	5.23	9.47
2007		7.45	14.09	3.06	1.38	5.41	2.98	6.02	6.13	10.77
2008		7.48	14.08	3.22	1.74	5.1	3.08	5.94	6.54	10.45
2009		7.82	14.73	3.45	1.78	5.22	3.17	6.15	6.7	10.68
2010		8.42	15.09	3.45	2.01	5.46	3.57	6.48	7.03	11.78

Source: Calculated by authors based on tariff schedule under the CEPT and ATIGA of each member published by ASEAN secretariat.

We have observed that the AFTA members have made substantial progress in tariff reduction or elimination under the CEPT Scheme, which began in 1993. As a consequence, the degree of tariff preference under the CEPT Scheme over the MFN tariff rates increased for many products. This pattern is particularly notable for energy materials and their products, materials, and machinery and equipment. These findings indicate that intra-ASEAN trade for these products should have grown faster compared to extra-ASEAN trade, *ceteris paribus*. We will investigate the validity of this observation in the following sections.

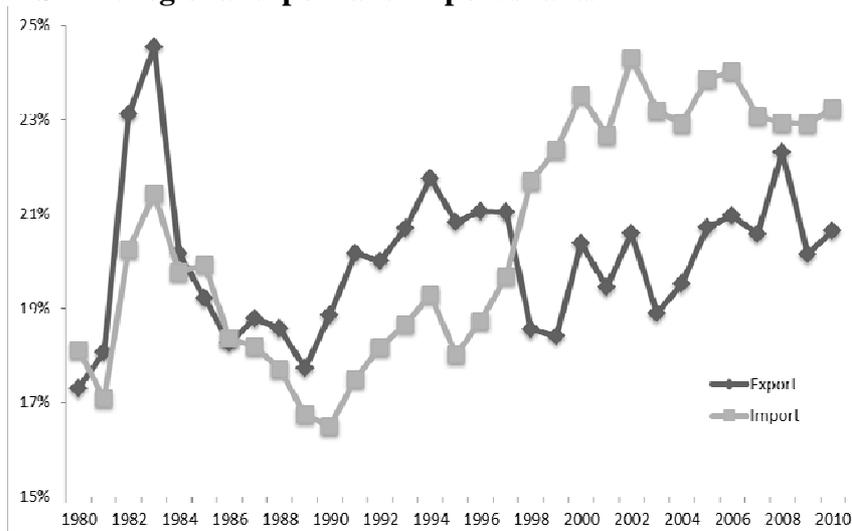
3. Intra-regional trade for ASEAN member countries

3.1. Intra-ASEAN trade by product

This section presents the changing patterns of intra-ASEAN trade for the 1980–2010 period. Figure 1 shows the shares of intra-ASEAN exports and imports in overall ASEAN trade (intra-ASEAN export and import shares, hereafter) from 1980 to 2010.³ From 1980 to 1994, these shares exhibited similar patterns, as they increased sharply from 1980 to 1984 before they started to decline. They continued to decline from 1984 to 1989/1990 and then they increased continuously until 1994. Throughout the 1980–1994 periods, the intra-ASEAN export share was generally higher than the corresponding import share.

Intra-ASEAN export and import shares started to diverge in the mid-1990s. The import share, which started to increase in 1990, continued to rise throughout the mid-2000s. Specifically, the intra-ASEAN import share increased from around 16% in 1990 to over 24% in 2004, and then stayed around that level. By contrast, the intra-ASEAN export share declined from 22% in 1994 to around 18% in 1998, and then it increased gradually to reach 20–22% in the late 2000s, but did not exceed the corresponding import share. In the light of the start of the AFTA process in 1993, it is interesting to observe a sharp increase in the intra-ASEAN import share from 1995, although a similar pattern cannot be found for the intra-ASEAN export share.

Figure 1: ASEAN regional export and import shares



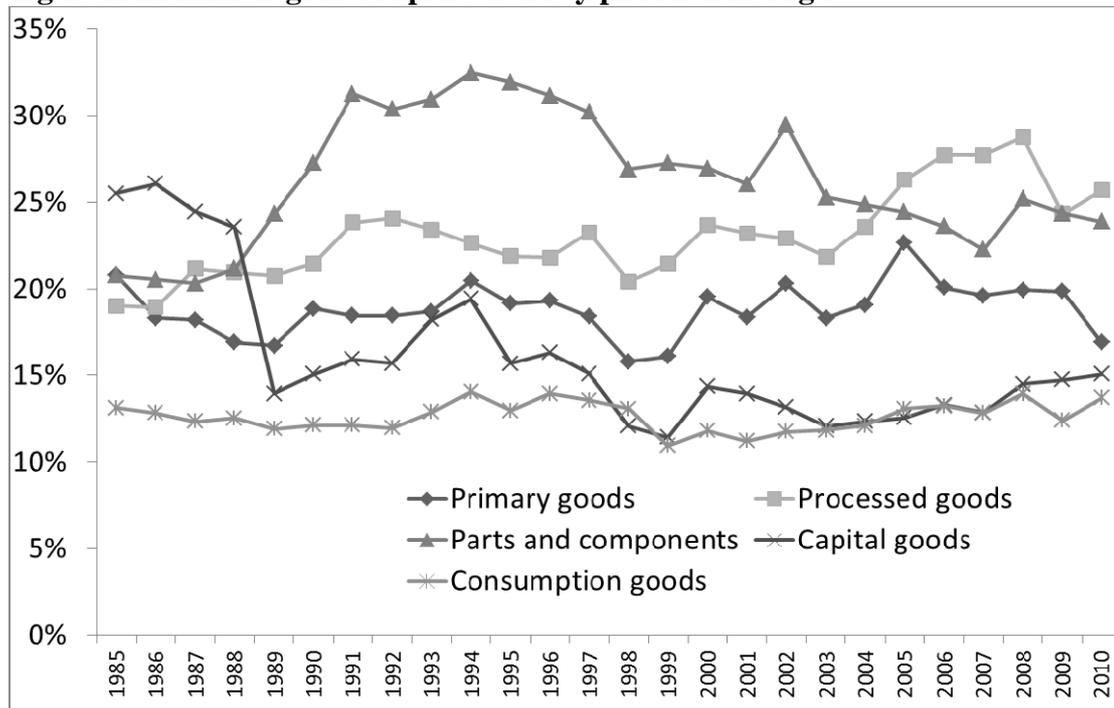
Source: RIETI-TID database

Intra-ASEAN export and import shares in Figure 1 mask variations in these patterns for different products. To see these variations, we calculate intra-ASEAN export and import shares for five different product groups, namely, primary goods, processed materials, parts and components, capital goods, and consumption goods. Figures 2 and 3 show the export and import shares of these five product groups, respectively.

An examination of Figure 2 shows no clear rising trend of intra-ASEAN export share for the groups of products except for the processed goods in the 2000s. Indeed, declining trends are clearly discerned for parts and components and capital goods, while intra-ASEAN export shares for primary goods and consumption goods remain more or less constant through the 1985–2010 period. The ranking of these product groups in terms of intra-ASEAN export shares in 2010 was as follows in descending order: processed goods, parts and components, primary goods, capital goods, and consumption goods.

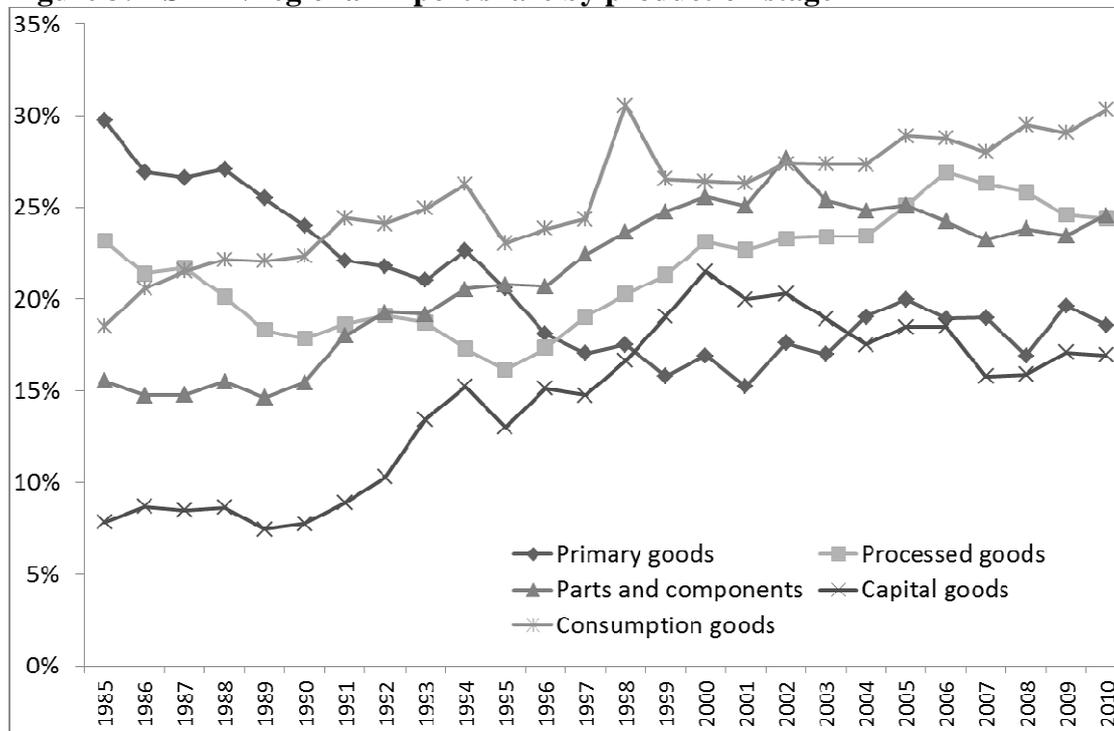
The changing patterns of intra-ASEAN import shares are quite different from those for exports. Figure 3 reveals that intra-ASEAN imports of parts and components and capital goods contributed to the rise of the intra-ASEAN import share from the early 1990s to the mid-2000s, as the share for parts and components increased from 15.5% to 27.7% over the period from 1990 to 2002 and the share for capital goods rose from 7.7% to 21.4% during the 1990–2000 period. However, these shares began to decline slowly in the mid-2000s. One observes a rather noticeable increase in the intra-ASEAN import share for processed materials from the mid-1990s until the mid-2000s. The import share for the consumption goods increased slowly over the 1985–2010 period. By contrast to other products, the share for primary goods declined notably from the mid-1980s until 2000 before rising very slowly. As a result of these changes, the gaps between the intra-ASEAN import shares for these five categories of products narrowed over the 1985–2010 period. The gap between the highest and lowest shares was more than 20 percentage points in 1985 but declined to less than 15 percentage points in 2010. In 2010 the ranking of these product groups in terms of intra-ASEAN import shares was as follows in descending order: consumption goods, processed materials, parts and components, primary goods, and capital goods.

Figure 2: ASEAN regional export share by production stage



Source: RIETI-TID database.

Figure 3: ASEAN regional import share by production stage



Source: RIETI-TID database.

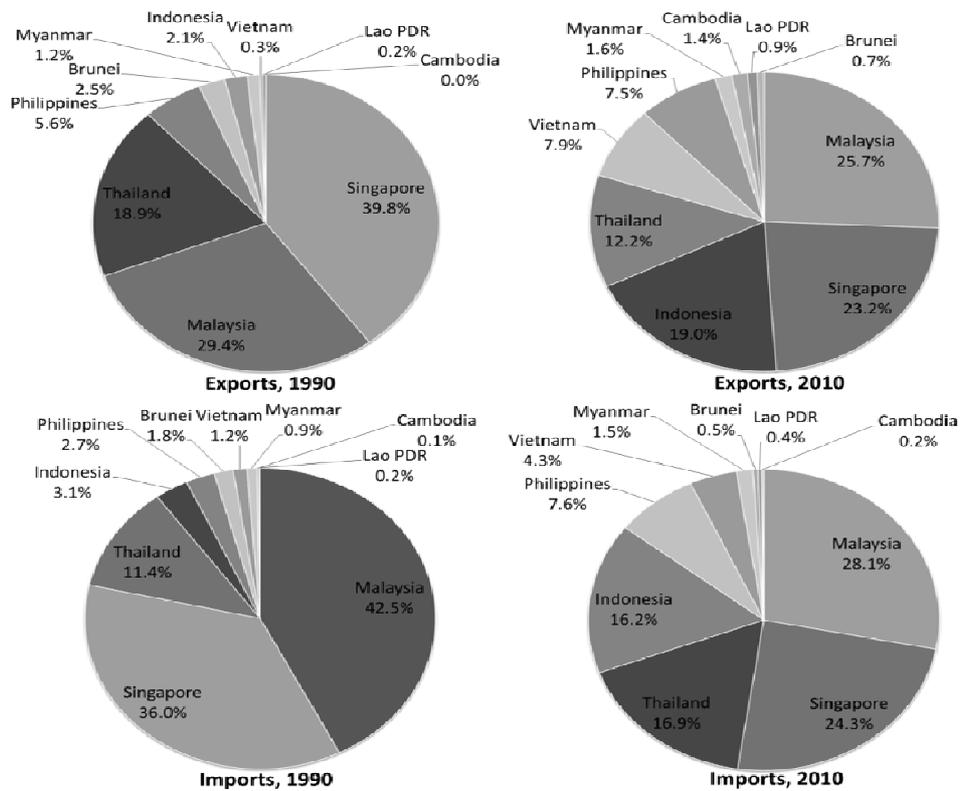
Our findings on the patterns of intra-ASEAN export and import shares appear to reflect several important changes in production patterns taking place in ASEAN and its trading partners. First, an increasing trend in the intra-ASEAN import shares in parts and components, and capital goods, indicate the formation of regional production networks in ASEAN, under which procurement of these intermediate products is sourced within ASEAN. Second, recognizing that China has become an increasingly important destination of ASEAN exports in parts and components and capital goods, a declining trend in intra-ASEAN exports in these intermediate goods indicate the presence of a production network involving ASEAN and China.⁴ Putting these two findings together, one finds that regional production networks involving ASEAN and China have been created. Coming back to the impacts of AFTA on intra-ASEAN trade, one may tentatively conclude from the findings in this section that AFTA is likely to have contributed to the expansion of intra-ASEAN trade, particularly intra-ASEAN imports.

3.2. Intra-ASEAN trade by country

A notable characteristic of intra-ASEAN trade is the dominance of Malaysia and Singapore. Figure 4 shows the country composition of intra-ASEAN trade in 1990 and 2010. The shares of Singapore and Malaysia in intra-ASEAN exports were 39.8% and 29.4%, respectively, in 1990, while the corresponding shares in intra-ASEAN imports were 36.0% and 42.5%. The combined shares of Singapore and Malaysia for intra-ASEAN exports and imports in 1990 were 69.2% and 78.5%, respectively.

The shares of Singapore and Malaysia in intra-ASEAN trade declined substantially after 1990. The shares of these two countries in intra-ASEAN exports in 2010 were 23.2% and 25.7%, respectively, while the corresponding shares in intra-ASEAN imports were 24.3% and 28.1%, respectively. The combined shares of Singapore and Malaysia for intra-ASEAN exports and imports were 48.9% and 52.4%, respectively in 2010, both showing a substantial decline from 1990. Despite a significant drop in their shares, Malaysia and Singapore still account for a large portion of intra-ASEAN trade.

Figure 4: Shares of export destinations and import sources in regional trade in ASEAN



Source: UN Commodity Trade Statistics.

A large amount of intra-ASEAN trade conducted by Singapore is partly due to its role as a transportation and distribution hub in the region, resulting in a large amount of entrepôt trade. Free trade policies adopted by Singapore as well as a well-developed transportation infrastructure such as sea ports and airports contributed to its becoming a hub in regional trade. In addition, the relatively high per capita income of Singaporean people has played a role in promoting its trade with other ASEAN countries, especially with Malaysia, another relatively high income country. This is because demand for imports tends to increase with rising income. Indeed, as shown clearly in Tables 4 and 5, bilateral trade between Singapore and Malaysia accounts for a large portion of ASEAN's intra-regional trade.

Table 4: Top five country pairs in regional exports

1990			2010		
Total export value \$26,678,296,344			Total export value \$244,412,503,630		
Exporter	Importer	Share	Exporter	Importer	Share
Singapore	Malaysia	25.72%	Singapore	Malaysia	16.97%
Malaysia	Singapore	25.13%	Singapore	Indonesia	13.50%
Singapore	Thailand	13.08%	Malaysia	Singapore	10.82%
Indonesia	Singapore	6.83%	Indonesia	Singapore	5.52%
Thailand	Singapore	6.35%	Singapore	Thailand	5.18%

Source: UN Commodity Trade Statistics.

Table 5: Top five country pairs in regional imports

1990			2010		
Total import value: \$23,796,394,534			Total import value: \$207,284,985,222		
Importer	Exporter	Share	Exporter	Importer	Share
Singapore	Malaysia	34.81%	Singapore	Malaysia	17.46%
Malaysia	Singapore	17.11%	Indonesia	Singapore	9.75%
Thailand	Singapore	10.37%	Malaysia	Singapore	8.84%
Singapore	Thailand	6.92%	Singapore	Indonesia	7.72%
Indonesia	Singapore	5.34%	Thailand	Malaysia	5.08%

Source: UN Commodity Trade Statistics.

While the combined shares of Singapore and Malaysia in ASEAN's regional exports and imports declined from 1990 to 2010, many other ASEAN countries increased their shares. As for ASEAN's regional exports, Indonesia and Vietnam increased their shares notably, while for ASEAN's regional imports, Thailand, Indonesia, and Vietnam increased significantly. Large increases in their shares of regional trade by these countries reflect rapid economic growth of these countries and their involvement in the regional production network.

4. Estimation of impact of tariff elimination under the CEPT Scheme

In this section we apply a standard gravity model to discern the impact of tariff elimination under the CEPT Scheme on trade flows at product level. A gravity model has been used extensively to explain international trade patterns for over 50 years since the pioneering studies by Tinbergen (1962) and Poyhonen (1963). Efforts to provide a theoretical explanation for a gravity model were begun by Anderson (1979),

and these efforts are still actively underway.⁵

A number of studies have analysed the trade effect of RTAs by applying a gravity model. Several studies attempt to examine the effects of AFTA on intra-ASEAN trade. Most of these studies found that AFTA has had a positive effect on intra-ASEAN trade⁶. Meanwhile, there are still few empirical studies which focus on the trade effects of AFTA. Elliot and Ikemoto (2004) estimated a modified gravity model including three types of dummy variables to capture the trade creation effect and import and export diversion effects. According to their results, all three dummies are significantly positive. Their findings indicate that not only trade among AFTA members but also imports and exports between members and non-members have been increased by AFTA. By using a panel dataset, Kien (2009) applied the Hausman-Taylor estimation to the gravity model in order to avoid problems of possible correlation between unobserved effects in errors and the explanatory variables. Similar to Elliot and Ikemoto (2004), he found that AFTA has had trade creation effects and no export and import trade diversion effects. Bun, *et al.* (2009) examine several models with various alternative specifications of the AFTA effect. Contrary to the previous studies referred to above, their results show that the trade creation effects of AFTA have not always been positive.

Most previous studies on AFTA have applied the gravity model use dummy variables to test the presence or absence of trade creation and diversion effects. However, a dummy variable does not capture accurately the impact of trade liberalization by tariff elimination under AFTA since tariff elimination is usually implemented with a phased approach. Also the tariff elimination schedules vary among the countries. Therefore, a preferable variable to measure the effect of AFTA is the preferential tariff rates, namely the CEPT rates. Manchin and Pelkmans-Balaoing (2007) utilized the preferential AFTA tariff rate and MFN tariff rate at aggregate and disaggregate levels. Although their dataset is limited to four members of the ASEAN during 2001–2003 due to data availability, they examined the impact of different preferential margins on trade, which is defined as the difference between the MFN rates and the preferential AFTA rates. Their estimated results show that the positive effects of preferences are significant when the preferential margin is higher than 25%. They infer that the cost of using AFTA is

higher than the benefit from obtaining the preferential treatment when the difference between the MFN tariff rate and the preferential AFTA tariff rate is small.

Similar to Manchin and Pelkmans-Balaoing (2009), we utilize the ASEAN tariff database to apply the difference between the MFN and CEPT rates to capture the effect of tariff reduction under AFTA. The ASEAN tariff database has been further improved and expanded. Based on the ASEAN tariff database, we construct the preferential AFTA tariff and MFN tariff rates from 1992 to 2010 for all ASEAN members. Our main focus is on the effect of AFTA by product and by member country. By applying the Hausman-Taylor estimation to panel data as with Kien (2009), we estimate a gravity model by product. Also country dummies are interacted with the variable of tariff reduction under AFTA in order to examine the effect of AFTA by country.

4.1. The estimation methodology

For the gravity model estimation at product level, the theory-based gravity model by Anderson and van Wincoop (2004), namely “class of trade separable general equilibrium model” at product level is often used. This model assumes that the firms operate under monopolistic competition and two-stage budgeting, i.e. the allocation of expenditure across product classes in the first stage, and the allocation of expenditure within a product class in the second stage. This setting makes it possible to suppose that firms import products within a class from various countries of origin. The demand function at product level, derived from the theory-based gravity model, is used as the gravity equation for the estimation. The explanatory variables are production and expenditure of a product, world production, trade costs such as transportation costs and tariffs, and price indices of the product.

Similarly to many previous studies, we apply the following equation for bilateral export and import flows of product k between each AFTA member country (country i) and its trade partner (country j) in the world. As for the explanatory variables, we use GDP and GDP per capita of country i and j ; geographical distance between countries i and j ; the range of tariff cuts under the CEPT Scheme applied for trade between AFTA members; FTA dummies other than AFTA; country dummies as a proxy for multilateral resistance terms; and time dummies. The estimated equation is

expressed as follows;

$$\begin{aligned} \ln(\text{Trade}_{ijt}^k) &= \beta_1^k \ln(Y_{it}) + \beta_2^k \ln(Y_{jt}) + \beta_3^k \ln(y_{it}) + \beta_4^k \ln(y_{jt}) + \beta_5^k \ln(\text{Distance}_{ij}) \\ &+ \phi^k \text{Tariffreduction}_{ijt}^k + \sum_n \phi_n^k \text{FTA dummy}_{ijt} \\ &+ \sum_i \gamma_i \text{reporter dummy} + \sum_j \eta_j \text{partner dummy} + \varepsilon_{ijt} \\ \varepsilon_{ijt} &= \alpha_i + \lambda_t + u_{it} \end{aligned}$$

where Trade_{ijt}^k denotes bilateral export/import value of product k between countries i and j in year t , and Y and y denote GDP and GDP per capita, respectively. Y and y are proxies for economic size and income level, respectively. Y and y are expected to have positive impacts on bilateral trade. Distance_{ij} indicates the flight distance in kilometres between the largest cities of countries i and j . The distance variable reflects both tangible and intangible trade costs other than the costs of customs duties. The sign of the estimated coefficient is expected to be negative as the longer the distance the larger the cost. Y , y and Distance are expressed in natural logarithmic form.

$\text{Tariffreduction}_{ijt}^k$ is the difference between the MFN tariff rate and the tariff rate under the CEPT Scheme of each AFTA member country i to country j for product k in year t . This variable takes a positive value or zero if both country i and j are members of AFTA. In other words, in the case of import flows, this variable is the difference between the MFN tariff rate and the CEPT rate of country i (importer) if country j (exporter) is a member of AFTA, while this variable is zero if country j is not a member of AFTA. In the case of export flows, this variable takes the difference between the MFN tariff rate and the CEPT rate of country j (importer) which is an export destination if both country i (exporter) and country j (importer) are members of AFTA. This variable takes zero if country j is not a member. If the estimated coefficient on $\text{Tariffreduction}_{ijt}^k$ is positive, we can interpret the presence of the trade creation effect from tariff reduction under the CEPT Scheme on export or import flows between the AFTA members. The larger the coefficient, the greater is the positive impact of tariff reduction on intra-regional trade flows.⁷

FTA dummy_{ijt} is a dummy variable which takes a value of one if country i forms an FTA with country j in year t . Other than AFTA, there are 28 FTAs notified to the

WTO, of which some AFTA members were members during the sample period.⁸

With regard to price indices, called ‘multilateral resistance terms’ (MRTs, hereafter), most studies based on the constant elasticity of substitution (CES) monopolistically competitive general equilibrium model deal with this endogenous variable as a function of income share, trade cost and elasticity of substitution of import goods. Feenstra (2002) examined the methods used to estimate MRTs and found that country fixed effects estimation produces consistent estimates. We utilize reporters’ and partners’ country dummies as country fixed effects for MRTs.

Besides the above estimation, we estimate an additional equation which replaces $Tariffreduction^k_{ijt}$ with $Tariffreduction^k_{ijt}$ interacted with the AFTA member country dummies. This additional estimation is conducted to examine the impact of tariff reduction under the CEPT Scheme for individual AFTA member countries.

With regard to the problem of endogeneity biases, which are possibly caused by some endogenous variables on the right-hand side such as GDP, we applied the Hausman-Taylor estimation for error-components models to a panel dataset, as it allows the covariates to be correlated with the unobserved individual effect. The fixed effect (FE) model is often used to estimate a gravity model since unobserved individual effects are correlated with regressors. However, the FE model drops some important time invariant variables, such as distance that captures transportation costs. We applied the Hausman test for choosing either the FE or random effect model. The null hypothesis, which assumes that individual effects are not correlated with explanatory variables, is rejected in all cases. Hence the FE model is chosen. Likewise, as for the Hausman test for the FE model vs. Hausman-Taylor estimation, the null hypothesis is accepted in all cases, and therefore we choose the Hausman-Taylor estimation.

The Hausman-Taylor estimation by Hausman and Taylor (1981) is based on the instrumental variable method that assumes that some of the explanatory variables are correlated with individual random effect α_i . For the time-variant endogenous variable, the deviation from the mean of their own variable is used as an instrumental variable. As for the time-invariant endogenous variable, the mean of their own variable is set as an instrument. We treat the log of GDP_i , GDP_j , per capita GDP_i and per capita GDP_j as endogenous variables.

4.2. Data

For bilateral trade flows, we use import and export values in US dollars at SITC 2-digit level taken from UN Commodity Trade Statistics (UN COMTRADE). The data cover 31 years from 1980 to 2010, and 193 countries. We use SITC version 1 since this version covers the maximum number of observations compared to all newer versions of SITC and all versions of HS code. However, with respect to Lao PDR, COMTRADE only covers the period 1962–1974. Therefore we are not able to estimate the coefficient of the country dummy for Lao PDR.

Regarding explanatory variables, real GDP and real GDP per capita are taken from the World Development Indicators of the World Bank. Flight distance in kilometres is used for the distance between the largest cities, and is calculated by the World Atlas flight Mileage Calculator.⁹ In order to convert import and export values to those in real terms, we use the US consumer price index from International Financial Statistics of the International Monetary Fund. Table 6 shows the summary statistics of the data.

Table 6: Summary Statistics of Pooled Data

	Number of observations	Mean	Standard deviation	Minimum	Maximum
ln (import)	25171	15.05170	3.93361	-0.35668	24.04838
ln (GDP) _i	25171	24.88679	1.02033	22.01910	26.77591
ln (GDP) _j	24251	23.77814	2.27724	16.23634	30.08812
ln (GDP percap) _i	25171	7.74658	1.30592	5.68222	10.39016
ln (GDP percap) _j	24230	7.88152	1.62097	2.68102	11.19516
ln (Distance)	25142	8.98993	0.69250	5.38326	9.89385
Tariff gap btw CEPT& MFN	25171	0.18541	1.32288	0.00000	29.33277
	Number of observations	Mean	Standard deviation	Minimum	Maximum
ln (Export)	26137	15.65323	3.43861	-0.26966	24.11678
ln (GDP) _i	26137	24.95336	0.91743	22.01910	26.33775
ln (GDP) _j	25117	23.56974	2.35688	16.23634	30.08812
ln (GDP percap) _i	26137	7.63344	1.24738	5.68222	10.39016
ln (GDP percap) _j	25096	7.83062	1.61693	2.68102	11.19516
ln (Distance)	26137	9.00354	0.68462	5.38326	9.89385
Tariff gap btw CEPT& MFN	26137	0.14273	1.06612	0.00000	14.93467

4.3. Estimation results

(1) Trade creation effect by tariff elimination under the CEPT Scheme

We examine the trade creation effect by tariff reduction under the CEPT for 54 products at SITC 2-digit level. Table 7 shows the estimation results for the cases of both imports and exports of each product.

Table 7: Estimation Results

SITC	Description	Imports						Exports							
		AFTA Tariff elimination	GDP_i	GDP_j	GDPcapita_i	GDPcapita_j	Distance	Number of obs	AFTA Tariff elimination	GDP_i	GDP_j	GDPcapita_i	GDPcapita_j	Distance	Number of obs
00	Live animals	0.081 (2.89) ***	2.737 (3.45)	-0.922 (2.35)	-2.063 (2.85)	0.475 (1.13)	-2.240 (3.16)	2,750	-0.186 (4.76) ***	3.830 (3.21)	-0.354 (0.59)	-5.204 (4.81)	0.847 (1.49)	-2.424 (5.01)	1,813
01	Meat and meat preparations	0.000 (0.05)	-3.427 (5.48)	-0.156 (0.41)	3.685 (6.24)	-0.178 (0.44)	-0.266 (0.37)	4,666	0.030 (2.86) ***	-5.340 (7.58)	1.008 (3.25)	4.744 (6.63)	-0.291 (1.00)	-1.588 (1.95)	4,242
02	Dairy products and eggs	0.032 (2.34) **	-0.533 (0.89)	1.544 (4.03)	0.348 (0.62)	-1.664 (4.08)	-0.568 (0.93)	5,951	0.103 (7.45) ***	-2.351 (3.66)	2.570 (8.62)	1.851 (2.82)	-2.251 (7.91)	-0.961 (1.85)	5,848
03	Fish and fish preparations	0.027 (2.90) ***	-2.047 (4.91)	-0.227 (1.12)	3.203 (8.03)	0.961 (4.83)	-0.913 (1.58)	8,898	0.046 (5.83) ***	-6.437 (19.90)	0.795 (5.12)	6.295 (20.10)	0.609 (4.09)	-1.334 (3.09)	12,196
04	Cereals and cereal preparations	0.094 (7.73) ***	-2.587 (4.47)	0.173 (0.66)	2.452 (4.48)	0.733 (2.76)	0.846 (1.10)	7,036	0.051 (4.90) ***	4.914 (13.94)	0.305 (1.93)	-5.167 (15.26)	0.841 (5.68)	-0.566 (1.16)	12,270
05	Fruit and vegetables	0.049 (8.77) ***	-6.250 (16.37)	1.054 (5.72)	5.528 (15.19)	-1.008 (5.45)	-0.843 (1.46)	9,486	0.041 (7.51) ***	-5.216 (18.93)	0.247 (1.95)	5.756 (21.71)	0.700 (5.76)	-1.797 (4.10)	13,310
06	Sugar, sugar preparations and honey	0.063 (4.89) ***	-5.222 (8.43)	0.069 (0.18)	4.902 (8.25)	0.435 (1.09)	0.605 (0.81)	5,933	0.093 (7.99) ***	0.315 (0.62)	1.079 (4.58)	1.754 (3.47)	-0.537 (2.39)	-0.605 (1.18)	8,136
07	Coffee, tea, cocoa, spices & manufacs. thereof	0.100 (10.75) ***	-2.384 (5.42)	-1.342 (6.19)	1.858 (4.40)	1.088 (5.08)	-0.275 (0.47)	8,574	0.113 (13.72) ***	-1.489 (4.37)	1.300 (8.12)	3.874 (11.07)	-0.571 (3.65)	-1.018 (2.36)	12,008
08	Feeding stuff for animals excl. unmilled cereals	0.119 (3.38) ***	-4.843 (-9.25)	-0.407 (-1.40)	4.434 (9.00)	0.322 (1.05)	-0.422 (0.72)	6,579	0.210 (4.93) ***	0.136 (0.22)	0.205 (0.65)	0.755 (1.25)	1.641 (5.43)	-0.563 (0.86)	5,270
09	Miscellaneous food preparations	0.028 (3.91) ***	-2.192 (4.72)	-0.930 (3.26)	1.912 (4.38)	1.742 (5.81)	-0.342 (0.61)	7,119	0.007 (1.25)	-6.622 (20.48)	-0.277 (1.99)	6.193 (19.44)	1.235 (9.53)	-1.452 (3.24)	11,902
11	Beverages	0.033 (8.25) ***	1.612 (3.55)	1.227 (4.41)	-0.700 (-1.64)	-0.749 (-2.55)	-0.458 (-0.69)	7,317	0.026 (6.91) ***	-4.065 (8.15)	-0.002 (0.01)	5.053 (10.09)	0.856 (4.17)	-1.256 (2.90)	7,915
12	Tobacco and tobacco manufactures	0.055 (6.40) ***	2.385 (3.33)	0.613 (1.44)	-2.026 (2.91)	0.171 (0.37)	-0.063 (0.10)	5,474	0.038 (5.36) ***	4.925 (7.35)	1.216 (4.76)	-3.363 (5.37)	-0.522 (2.18)	-1.014 (1.38)	6,906
21	Hides, skins and fur skins, undressed	0.017 (0.77)	-1.721 (2.25)	-0.081 (0.24)	5.455 (7.24)	-0.411 (1.19)	-1.298 (2.22)	3,456	-0.036 (1.28)	11.082 (12.31)	-0.323 (0.45)	-9.668 (10.81)	2.037 (2.58)	-0.119 (0.20)	2,281
22	Oil seeds, oil nuts and oil kernels	0.008 (0.55)	-6.936 (8.42)	0.663 (1.83)	5.440 (6.82)	-0.964 (2.70)	0.343 (0.51)	4,242	0.101 (6.59) ***	-4.570 (6.40)	-0.180 (0.47)	3.672 (5.08)	0.467 (1.34)	-1.145 (2.08)	4,254
23	Crude rubber including synthetic and reclaimed	0.038 (2.19) **	-2.523 (4.42)	-0.129 (0.56)	3.489 (6.28)	0.881 (3.95)	-0.719 (1.18)	4,829	0.068 (3.91) ***	-12.119 (32.54)	1.901 (9.66)	11.418 (27.93)	-0.679 (3.37)	-0.878 (1.84)	9,026
24	Wood, lumber and cork	-0.107 (5.07)	-2.199 (3.97)	-0.697 (2.47)	2.974 (5.44)	1.009 (3.54)	-1.778 (4.07)	6,410	-0.040 (2.20) **	-3.996 (8.78)	-0.372 (1.70)	7.086 (15.21)	1.666 (7.96)	-0.707 (1.18)	7,599
25	Pulp and paper	-0.097 (1.26)	-1.755 (2.85)	-0.350 (0.98)	2.769 (4.77)	0.520 (1.37)	-1.363 (2.62)	4,578	-0.020 (0.24)	-0.306 (0.28)	-0.536 (0.86)	-0.299 (0.26)	1.923 (3.12)	-1.555 (2.00)	2,954
26	Textile fibres, not manufactured, and waste	0.072 (2.85) ***	-1.327 (2.81)	0.245 (1.10)	1.549 (3.45)	0.246 (1.10)	-0.524 (1.04)	9,047	0.103 (3.39) ***	-4.898 (8.59)	1.596 (5.45)	5.381 (9.79)	-0.607 (2.10)	-1.137 (1.97)	7,201
27	Crude fertilizers and crude minerals	0.091 (2.53) ***	-0.975 (2.22)	0.501 (2.09)	1.606 (3.89)	0.605 (2.47)	-1.352 (2.33)	8,164	0.023 (0.63)	-1.747 (3.28)	1.011 (3.79)	1.048 (2.00)	0.723 (2.85)	-1.023 (2.36)	6,349
28	Metalliferous ores and metal scrap	0.074 (1.22)	1.972 (3.67)	1.644 (6.50)	-0.546 (-1.03)	-1.591 (-6.39)	-0.804 (-1.55)	7,229	0.066 (0.93)	-1.464 (1.95)	2.458 (6.48)	1.734 (2.38)	0.536 (1.43)	-1.416 (1.91)	4,221
29	Crude animal and vegetable materials	0.024 (2.18) **	-3.081 (8.05)	-0.933 (4.89)	2.615 (7.20)	0.715 (3.78)	-0.751 (1.42)	8,166	0.042 (3.22) ***	-3.008 (9.29)	0.865 (5.59)	1.003 (3.18)	0.117 (0.80)	-1.774 (3.53)	10,668

Table 7: Estimation Results (continued)

SITC	Description	Imports						Exports							
		AFTA Tariff elimination	GDP_i	GDP_j	GDPcapita_i	GDPcapita_j	Distance	Number of obs	AFTA Tariff elimination	GDP_i	GDP_j	GDPcapita_i	GDPcapita_j	Distance	Number of obs
32	Coal, coke and briquettes	0.036 (1.35)	0.475 (0.45)	3.342 (3.63)	0.299 (0.29)	-2.090 (2.04)	-0.264 (0.38)	2,302	0.023 (0.70)	-16.085 (13.33)	3.116 (4.40)	11.250 (8.02)	-2.008 (3.05)	-0.015 (0.02)	1,969
33	Petroleum and petroleum products	-0.003 (0.08)	0.739 (1.15)	-0.253 (0.87)	0.829 (1.35)	1.154 (4.06)	-1.036 (1.39)	7,682	0.012 (0.33)	-5.032 (6.82)	3.332 (9.88)	4.971 (6.79)	-1.206 (3.74)	-2.217 (2.88)	7,115
34	Gas, natural and manufactured	-0.089 (2.01)	8.617 (7.28)	2.269 (4.20)	-9.754 (8.69)	-1.424 (2.72)	-1.570 (2.06)	2,264	0.089 (1.24)	13.735 (8.69)	5.205 (5.47)	-11.838 (7.21)	-2.736 (2.88)	-1.534 (1.60)	1,992
41	Animal oils and fats	-0.020 (0.72)	-1.346 (1.80)	-1.292 (1.73)	1.584 (2.21)	1.011 (1.17)	0.167 (0.28)	3,075	0.106 (3.27)***	2.758 (2.39)	1.042 (1.48)	0.069 (0.06)	0.412 (0.57)	-0.825 (1.43)	1,722
42	Fixed vegetable oils and fats	-0.056 (3.07)***	-0.574 (0.78)	0.441 (0.90)	1.026 (1.47)	-0.092 (0.17)	0.153 (0.25)	4,420	-0.003 (0.21)	-4.232 (8.46)	1.608 (7.20)	4.804 (9.15)	-0.842 (3.85)	-1.233 (1.86)	8,994
43	Animal and vegetable oils and fats, processed	0.046 (2.47)***	0.171 (0.28)	-0.189 (0.41)	-1.102 (1.89)	1.509 (3.08)	-0.411 (0.67)	4,163	0.072 (4.24)***	-3.664 (6.97)	-0.319 (1.29)	3.064 (5.18)	0.982 (4.14)	-0.911 (1.79)	7,771
51	Chemical elements and compounds	0.051 (2.31)**	3.329 (9.24)	1.643 (10.15)	-1.829 (5.39)	-0.137 (0.82)	-0.446 (0.98)	10,838	-0.027 (1.29)	-2.215 (6.17)	0.450 (2.69)	4.630 (12.56)	0.505 (3.09)	-1.494 (3.46)	10,886
52	Crude chemicals from coal, petroleum and gas	-0.003 (0.06)	-4.045 (3.33)	-1.141 (1.51)	5.967 (5.17)	4.052 (4.96)	-1.027 (1.34)	2,203	0.072 (1.57)	8.878 (3.73)	3.409 (2.97)	-1.782 (0.70)	-0.916 (0.90)	-0.278 (0.38)	1,276
53	Dyeing, tanning and colouring materials	0.071 (3.43)***	0.568 (1.48)	1.570 (8.25)	0.661 (1.84)	-0.631 (3.28)	-0.330 (0.68)	8,436	0.045 (1.86)*	0.746 (1.68)	0.255 (1.17)	1.443 (3.18)	0.943 (4.55)	-1.232 (2.55)	8,849
54	Medicinal and pharmaceutical products	0.016 (0.71)	1.619 (5.03)	0.292 (1.64)	-1.034 (3.44)	0.407 (2.11)	-0.502 (0.91)	9,843	0.025 (0.89)	0.989 (2.44)	-0.210 (1.11)	0.377 (0.93)	1.670 (9.27)	-0.423 (0.84)	10,122
55	Perfume materials, toilet & cleansing preparations	0.051 (5.57)***	-0.773 (1.98)	0.223 (1.06)	0.742 (2.00)	0.534 (2.47)	-0.732 (1.59)	9,147	0.030 (3.62)***	-3.275 (9.76)	0.176 (1.14)	3.399 (9.79)	0.373 (2.48)	-1.454 (3.55)	12,553
56	Fertilizers, manufactured	-0.109 (3.35)***	0.941 (1.39)	2.166 (6.67)	-0.853 (1.32)	0.192 (0.55)	-0.660 (0.78)	5,322	0.007 (0.21)	-0.514 (0.47)	0.469 (0.89)	-0.288 (0.25)	-0.582 (1.19)	-0.616 (0.93)	2,782
57	Explosives and pyrotechnic products	-0.017 (1.13)	0.326 (0.43)	2.230 (3.59)	-0.293 (0.41)	-2.274 (3.29)	-0.286 (0.44)	3,169	-0.033 (1.96)**	4.692 (3.33)	-0.049 (0.09)	-4.583 (3.17)	-0.098 (0.17)	-0.580 (1.02)	2,101
58	Plastic materials, etc.	0.091 (7.40)***	0.781 (1.98)	2.957 (15.67)	-0.261 (0.70)	-1.225 (6.10)	-0.713 (1.86)	9,907	0.020 (1.59)	-5.511 (15.53)	0.329 (1.84)	8.149 (22.52)	0.698 (4.03)	-1.249 (3.27)	12,439
59	Chemical materials and products	0.033 (1.90)*	0.853 (2.34)	0.996 (5.58)	0.224 (0.66)	0.196 (1.07)	-0.882 (2.03)	9,804	0.030 (1.63)*	-3.476 (10.37)	-0.553 (3.49)	6.346 (18.58)	1.795 (11.78)	-1.372 (3.40)	11,942
61	Leather, leather. manufs., nes & dressed fur skins	0.014 (0.90)	-5.169 (10.29)	-0.186 (0.68)	6.497 (13.50)	1.380 (4.77)	-1.284 (2.62)	7,130	0.120 (8.12)***	0.943 (1.91)	0.254 (0.98)	1.467 (2.89)	1.273 (5.02)	-1.198 (2.37)	7,292
62	Rubber manufactures	0.079 (9.69)***	-1.584 (4.04)	-0.065 (0.31)	2.290 (6.23)	0.727 (3.32)	-0.792 (1.87)	9,045	0.039 (5.11)***	-4.913 (19.52)	-0.206 (1.63)	4.371 (17.00)	1.058 (8.62)	-0.895 (2.47)	14,782
63	Wood and cork manufactures excluding furniture	0.037 (3.48)***	-3.189 (6.80)	0.116 (0.47)	3.335 (7.48)	0.964 (3.79)	-0.910 (2.05)	7,572	0.058 (6.00)***	-6.360 (18.83)	0.243 (1.48)	6.384 (19.44)	1.168 (7.46)	-1.899 (3.99)	13,419
64	Paper, paperboard and manufactures thereof	0.089 (6.78)***	-0.019 (0.04)	1.562 (7.62)	-0.201 (0.51)	-0.688 (3.27)	-0.483 (0.90)	9,628	0.044 (3.44)***	-6.825 (19.25)	0.739 (4.39)	6.012 (16.58)	0.350 (2.15)	-1.232 (3.04)	13,480
65	Textile yarn, fabrics, made up articles, etc.	0.038 (5.49)***	-3.595 (9.99)	0.915 (5.56)	3.411 (10.02)	0.070 (0.42)	-0.478 (1.11)	12,128	0.017 (2.19)**	-7.126 (24.93)	0.371 (2.64)	6.800 (24.75)	0.291 (2.15)	-1.017 (2.47)	17,370

Table 7: Estimation Results (continued)

SITC	Description	Imports						Exports							
		AFTA Tariff elimination	GDP_i	GDP_j	GDPcapita_i	GDPcapita_j	Distance	Number of obs	AFTA Tariff elimination	GDP_i	GDP_j	GDPcapita_i	GDPcapita_j	Distance	Number of obs
66	Non-metallic mineral manufactures	0.057 (6.29) ***	-0.514 (1.43)	0.508 (2.95)	0.865 (2.56)	0.551 (3.20)	-0.808 (1.51)	11,256	0.003 (0.36)	-5.231 (16.64)	-0.341 (2.43)	5.917 (19.50)	1.572 (11.80)	-1.356 (3.39)	15,549
67	Iron and steel	0.122 (5.97) ***	2.227 (4.75)	1.330 (5.57)	-1.149 (2.60)	-0.598 (2.41)	-1.451 (3.09)	9,741	0.008 (0.34)	-2.746 (5.56)	-0.414 (1.67)	4.404 (8.79)	1.135 (4.73)	-1.102 (2.31)	9,701
68	Non-ferrous metals	0.058 (1.98) **	0.124 (0.30)	1.925 (9.33)	1.252 (3.18)	0.040 (0.20)	-0.833 (1.86)	9,391	0.086 (2.35) **	-3.190 (6.44)	2.199 (9.06)	3.906 (7.78)	-0.872 (3.72)	-1.095 (1.85)	8,376
69	Manufactures of metal	0.107 (10.33) ***	0.476 (1.34)	0.582 (3.44)	0.202 (0.60)	0.263 (1.54)	-0.797 (2.10)	12,368	0.017 (1.55)	-2.135 (7.19)	-0.832 (5.62)	2.573 (8.78)	1.996 (14.00)	-1.504 (4.51)	15,896
71	Machinery, other than electric	0.115 (6.25) ***	2.439 (7.13)	0.739 (4.99)	-1.092 (3.37)	0.642 (4.37)	-0.808 (2.15)	14,866	-0.016 (0.90)	-6.305 (21.24)	-0.345 (2.72)	7.234 (24.77)	1.828 (15.30)	-1.196 (3.59)	17,410
72	Electrical machinery, apparatus and appliances	0.099 (7.78) ***	1.694 (4.71)	0.101 (0.63)	-0.956 (2.79)	1.455 (9.06)	-0.544 (1.40)	14,425	0.029 (2.61) ***	-7.518 (26.63)	-0.370 (2.82)	7.514 (26.87)	1.926 (15.05)	-1.848 (5.14)	18,153
73	Transport equipment	0.117 (11.14) ***	1.286 (2.56)	1.100 (4.81)	-1.439 (3.02)	0.111 (0.48)	-0.762 (1.57)	10,571	0.030 (3.02) ***	-11.616 (31.54)	-0.061 (0.35)	12.132 (33.59)	1.070 (6.22)	-1.081 (2.42)	14,453
81	Sanitary, plumbing, heating and lighting fixt.	0.060 (5.56) ***	-0.988 (2.29)	0.265 (1.10)	1.182 (2.90)	0.761 (3.02)	-0.534 (1.14)	7,101	0.022 (1.99) **	-4.387 (10.77)	0.752 (3.69)	5.011 (12.07)	0.252 (1.26)	-1.606 (3.62)	9,697
82	Furniture	0.040 (6.71) ***	-1.662 (3.85)	1.120 (5.38)	1.669 (4.07)	0.305 (1.40)	-0.441 (0.83)	8,023	0.008 (1.53)	-2.483 (8.13)	0.255 (1.75)	3.986 (13.45)	1.187 (8.41)	-1.617 (4.65)	15,567
83	Travel goods, handbags and similar articles	0.012 (2.19) **	-5.661 (11.06)	0.809 (2.78)	6.081 (12.39)	0.513 (1.65)	-0.254 (0.58)	5,893	0.044 (8.03) ***	-2.694 (7.10)	-0.737 (3.98)	3.691 (10.06)	2.021 (11.29)	-1.572 (3.05)	11,391
84	Clothing	0.004 (0.92)	-2.482 (5.89)	0.850 (3.83)	2.078 (5.18)	0.285 (1.23)	-0.615 (1.39)	9,929	0.010 (2.26) **	-1.655 (5.86)	0.261 (2.04)	3.369 (12.58)	1.310 (10.71)	-1.158 (2.80)	18,891
85	Footwear	0.028 (4.68) ***	-3.609 (6.51)	1.521 (4.69)	3.296 (6.22)	0.016 (0.05)	-0.563 (1.20)	5,911	0.046 (8.93) ***	-3.824 (11.05)	-0.791 (4.87)	6.446 (19.18)	1.835 (11.85)	-1.536 (3.39)	13,954
86	Scientific and control instrument, photographic supplies, clocks	0.086 (5.77) ***	2.025 (5.86)	0.279 (1.71)	-1.095 (3.34)	0.914 (5.55)	0.000 (0.00)	11,339	0.044 (2.89) ***	0.371 (1.20)	-0.685 (4.61)	0.529 (1.73)	1.813 (12.73)	-0.993 (2.36)	13,819

Note: figures in parentheses are z-values. *, ** and *** denotes 1%, 5% and 10% significance level respectively.

Positive and significant coefficients are found in 39 and 35 products in the case of imports and exports, respectively, out of 53 products. Trade creation effects on both imports and exports are found in the cases of agricultural products (SITC 02–08); beverages and tobacco (SITC 11–12); materials such as crude rubber (SITC 23); textile fibres (SITC 26); crude animal and vegetable materials (SITC 29); processed animal and vegetable oils (SITC 43); some chemical products such as plastics and perfumes (SITC 53 and 55); manufactured materials such as rubber manufactures, wood manufactures, textile yarn and fabrics, non-ferrous metals (SITC 61–65 and 68); and electrical machinery (SITC 72); transportation equipment (SITC 73); and other manufactured articles (SITC 81, 83 and 85–86). Meanwhile, tariff reduction has had no effect on either imports or exports in the case of wood, pulp and paper (SITC 24–25); mineral fuels (SITC 32–34); crude chemicals and coal (SITC 52); medical and pharmaceutical products (SITC 54); and fertilizers and explosives (SITC 56–57).

As for energy minerals such as petroleum, gas and coals, the number of countries exporting these products is limited. There is huge and stable demand from all over the world for these natural resources, therefore tariff elimination in the region would not cause an increase in regional imports or exports. Also the demand for energy is affected by economic conditions in the world, hence a tariff reduction in the AFTA members is considered to have little impact on trade in energy minerals in the region. As for medical and pharmaceutical products, there are still various non-tariff barriers such as clearance and registration requirements in these products in the AFTA member countries; therefore the impact of tariff reduction may be limited.¹⁰

When it comes to the elasticity of tariff reduction for imports and exports, namely the percentage change of import or export volume resulting from a 1% tariff reduction, the simple average elasticity for the imports, at 0.38%, is slightly larger than for the exports, at 0.36%.¹¹ A possible reason for this is the difference in response time for the demand and supply to the price change, namely the time for adjustment for imports and exports to tariff elimination. Compared with import demand, adjustment for the supply of exports in response to tariff elimination takes more time.

Elasticities of tariff reduction for exports of several agricultural products such as dairy products, sugar, coffee and feedstuffs, and processed materials such as oil seeds, crude rubber, textile fibres, and animal and vegetable oils are higher than the elasticities of tariff reduction for imports of these products. As the regional market for agricultural products and processed materials grows rapidly, production and consumption of these products may become more responsive to tariff elimination.

The tariff reduction elasticities for imports of electrical machinery and transport equipment are much greater than their elasticities for exports. As we saw in section 3.1, intra-regional export share has been stagnant since the latter half of the 1990s. In other words, growing demand from outside the region seems to negate or weaken the effect of tariff reduction under the CEPT for the intra-regional exports. Meanwhile, tariff reduction under the CEPT has had a stronger impact on imports from member countries in the sectors that have formed production networks in the region, such as electrical machinery and transport equipment.

To sum up, the tariff elimination under the CEPT Scheme has increased imports and exports in the AFTA region in a wide range of products. Tariff elimination facilitates the regional export of agricultural products and processed materials, while it promotes imports in electrical machinery and automobile equipment, for which regional production networks have been set up. These findings suggest that the impact of regional tariff elimination on regional trade depends on the characteristics of products such as the magnitude and patterns of production and demand.

(2) Trade creation effect for individual AFTA member countries

With respect to the estimation of an additional equation with interaction terms between country dummies and the tariff reduction variable, positive and significant coefficients are found for a wide range of products for both exports and imports in the case of Indonesia, Malaysia, the Philippines and Thailand (Table 8). However, new AFTA members such as Cambodia, Myanmar and Vietnam have fewer numbers of products for which the trade creation effect is detected. Domestic markets in these countries are still smaller than other countries; hence tariff elimination in these countries causes relatively little trade creation effect on their regional trade.¹² Even in 2010 the total shares of Cambodia, Myanmar and Vietnam's imports and exports

in intra-ASEAN imports and exports were still low, at 6.0% and 10.9%, respectively. Both competitiveness in exports and purchasing power of these four countries are still low in the region; therefore trade volume may not increase rapidly even if the tariffs are reduced steadily.

Table 8: Estimation Results with Country Dummy

SITC Description	Imports									Exports							
	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	Brunei	Cambodia	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
00 Live animals		0.126 (0.37)	-0.018 (0.11)			-0.074 (1.49)		0.150 (4.52)	-0.129 (0.42)		-0.388 (1.41)	-0.215 (3.09)	-0.255 (4.38)	-0.122 (0.87)	0.146 (0.71)	-0.047 (0.54)	-0.030 (0.10)
01 Meat and meat preparations		-0.015 (0.54)	-0.020 (0.29)	0.274 (0.95)	0.772 (2.35)	-0.015 (0.58)		0.007 (0.59)	0.001 (0.03)	-3.778 (3.41)	0.370 (1.21)	-0.028 (0.73)	0.071 (3.98)	0.161 (2.52)	-0.052 (3.25)	0.167 (6.99)	-0.021 (0.53)
02 Dairy products and eggs		0.139 (3.53)	0.421 (6.24)	0.182 (1.60)	0.935 (1.32)	-0.232 (2.52)	0.051 (0.07)	0.006 (0.35)	0.052 (1.49)	-0.896 (2.41)	0.026 (0.20)	0.086 (2.85)	0.106 (4.34)	0.168 (4.62)	0.075 (3.15)	0.146 (3.81)	0.048 (0.65)
03 Fish and fish preparations		0.061 (1.54)	0.329 (5.20)	0.020 (0.38)	0.213 (0.62)	0.121 (2.65)		0.007 (0.62)	0.062 (2.69)	-0.114 (0.82)	-0.004 (0.06)	0.073 (4.48)	0.073 (4.26)	0.080 (3.97)	0.010 (0.60)	0.051 (2.60)	-0.057 (2.08)
04 Cereals and cereal preparations		-0.073 (0.70)	-0.064 (0.59)	0.113 (0.68)	-0.201 (0.02)	0.148 (2.87)	-0.762 (-0.70)	0.099 (7.07)	0.076 (2.92)	-0.487 (4.24)	0.018 (0.25)	0.116 (4.96)	0.038 (1.84)	0.057 (2.63)	-0.027 (1.31)	0.202 (6.37)	-0.051 (0.98)
05 Fruit and vegetables		-0.011 (0.21)	0.042 (0.83)	-0.008 (0.09)	2.784 (0.18)	0.136 (4.04)		0.046 (7.62)	0.060 (3.94)	-0.446 (3.01)	0.026 (0.59)	0.061 (5.16)	0.053 (4.77)	0.064 (5.57)	-0.021 (1.89)	0.101 (6.63)	-0.078 (2.91)
06 Sugar, sugar preparations and honey		0.189 (1.29)	0.081 (0.78)	0.267 (2.09)	-2.082 (0.65)	0.419 (8.01)	-1.104 (0.42)	0.032 (2.32)	0.141 (3.77)	-0.080 (0.62)	-0.122 (1.40)	0.132 (4.76)	0.086 (4.04)	0.125 (5.17)	0.029 (1.33)	0.229 (5.39)	0.074 (1.20)
07 Coffee, tea, cocoa, spices & manufacs. thereof		0.065 (1.76)	0.131 (2.70)	0.232 (4.57)		0.371 (8.31)	-0.180 (0.09)	0.094 (8.72)	0.057 (2.50)	0.478 (3.06)	0.076 (1.17)	0.179 (10.87)	0.130 (7.66)	0.070 (3.30)	0.038 (2.26)	0.201 (9.87)	-0.070 (2.11)
08 Feeding stuff for animals excl. unmilled cereals		0.655 (3.75)	-0.178 (0.95)	-0.514 (0.34)		0.327 (4.30)		0.024 (0.56)	0.194 (1.88)		-0.601 (2.16)	0.403 (3.99)	0.268 (3.33)	0.067 (0.59)	0.030 (0.38)	0.441 (4.16)	0.197 (1.19)
09 Miscellaneous food preparations		0.045 (1.09)	0.056 (0.72)	0.114 (3.47)	3.406 (2.93)	0.237 (5.57)		0.025 (3.02)	0.001 (0.09)	-0.079 (2.97)	-0.137 (2.24)	-0.011 (0.91)	-0.004 (0.31)	0.036 (2.66)	0.007 (0.61)	0.065 (3.90)	0.003 (0.09)
11 Beverages		0.028 (1.07)	0.218 (1.38)	0.390 (4.78)		0.222 (5.35)		0.058 (9.16)	0.015 (2.89)	0.002 (0.07)	-0.010 (0.42)	-0.008 (0.95)	0.047 (6.08)	0.038 (4.97)	0.019 (2.46)	0.039 (3.95)	0.003 (0.10)
12 Tobacco and tobacco manufactures		0.052 (1.28)	0.009 (0.20)	0.950 (4.31)		0.150 (1.76)		0.055 (6.23)		0.104 (0.11)	-0.035 (0.83)	0.055 (3.73)	0.055 (3.86)	0.126 (7.52)	-0.033 (2.50)	0.049 (1.71)	0.003 (0.10)
21 Hides, skins and fur skins, undressed		0.202 (1.55)	-0.711 (2.02)	-57.507 (0.64)		0.050 (0.46)		0.013 (0.56)		0.039 (0.15)	-1.461 (1.49)	-0.017 (0.28)	0.035 (0.61)	0.259 (0.51)	-0.081 (1.44)	-0.284 (2.73)	-0.016 (0.28)
22 Oil seeds, oil nuts and oil kernels		-0.173 (1.91)	-0.199 (2.36)	-0.605 (1.11)		-0.031 (0.35)		0.013 (0.93)	-0.012 (0.18)	-0.082 (0.02)	-0.029 (0.32)	0.148 (4.41)	0.183 (7.01)	-0.079 (1.02)	0.020 (0.80)	0.224 (4.74)	-0.098 (1.85)
23 Crude rubber including synthetic and reclaimed		-0.288 (1.07)	0.444 (3.31)	0.087 (3.26)		0.005 (0.12)		-0.017 (0.64)	0.615 (3.13)		-0.116 (1.22)	-0.062 (1.61)	0.206 (5.09)	0.083 (1.84)	0.112 (3.25)	0.112 (2.37)	-0.062 (1.13)
24 Wood, lumber and cork	-0.184 (4.65)	-0.212 (2.22)	1.244 (3.48)	-0.017 (0.41)	-0.715 (0.76)	0.185 (1.23)		-0.114 (3.55)	0.606 (1.82)	0.393 (2.21)	-0.680 (1.60)	-0.109 (2.20)	0.089 (2.13)	-0.045 (0.73)	-0.035 (0.97)	-0.082 (2.30)	-0.110 (2.08)
25 Pulp and paper		0.109 (0.35)	0.323 (1.46)	0.007 (0.01)		0.000 (0.00)		-0.229 (2.15)	-0.498 (1.37)	-5.726 (2.22)	0.261 (0.22)	0.111 (0.45)	-0.069 (0.31)	-0.397 (1.38)	-0.033 (0.19)	-0.007 (0.06)	0.208 (0.90)
26 Textile fibres, not manufactured, and waste	-7.127 (1.28)	0.531 (2.44)	0.008 (0.13)	8.827 (5.58)		0.308 (3.16)		0.050 (1.68)	0.161 (1.86)	-1.744 (0.92)	-0.217 (1.08)	0.171 (2.56)	0.087 (1.37)	-0.033 (0.47)	0.221 (3.26)	0.293 (3.36)	-0.100 (1.14)

Table 8: Estimation Results with Country Dummy (Continued)

SITC Description	Imports									Exports								
	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	Brunei	Cambodia	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	
27 Crude fertilizers and crude minerals		-0.003 (0.02)	0.318 (2.99)	0.441 (1.84)		0.284 (2.19)		0.022 (0.50)	0.214 (1.88)	-0.950 (1.42)	0.365 (1.13)	0.006 (0.07)	0.211 (2.79)	-0.037 (0.38)	-0.197 (2.55)	0.261 (2.88)	-0.167 (1.56)	
28 Metalliferous ores and metal scrap		-1.024 (2.52)	0.600 (3.82)	0.280 (0.77)	-4.435 (0.29)	0.084 (0.58)		-0.021 (0.29)	1.443 (1.82)	0.620 (0.55)	0.846 (1.22)	-0.077 (0.42)	0.168 (1.10)	0.088 (0.50)	-0.195 (1.28)	0.540 (3.22)	-0.320 (1.48)	
29 Crude animal and vegetable materials		-0.111 (1.67)	0.184 (3.27)		1.150 (0.37)	0.239 (3.40)		0.017 (1.51)	0.121 (1.60)	-0.045 (0.05)	0.094 (0.63)	0.035 (1.27)	0.072 (2.71)	0.089 (3.24)	-0.059 (2.21)	0.214 (4.61)	-0.038 (0.80)	
32 Coal, coke and briquettes			-0.274 (1.85)	-0.233 (0.70)		-0.079 (0.30)		0.047 (1.69)	0.082 (0.52)	1.537 (0.21)		0.097 (1.96)	0.667 (3.46)	-0.869 (0.78)	-0.011 (0.18)	-0.424 (2.38)	-0.059 (0.98)	
33 Petroleum and petroleum products		0.207 (1.62)	0.667 (4.03)	0.217 (2.27)		0.287 (1.04)		-0.078 (1.93)	-0.604 (2.68)	-0.172 (1.11)	-0.152 (0.25)	0.018 (0.20)	0.020 (0.24)	0.126 (1.47)	-0.202 (2.66)	0.379 (3.67)	-0.037 (0.37)	
34 Gas, natural and manufactured			0.476 (3.05)	0.391 (1.06)		0.570 (3.15)		-0.199 (4.17)	-0.141 (0.06)	0.358 (0.22)		0.808 (2.17)	0.729 (2.65)	0.270 (0.68)	-0.082 (1.02)	1.005 (3.78)	0.113 (0.23)	
41 Animal oils and fats		0.274 (0.71)	-0.032 (0.33)	0.107 (1.10)		-0.016 (0.15)		-0.040 (1.23)	0.020 (0.30)	1.154 (1.45)		-0.030 (0.43)	0.142 (2.05)	0.375 (2.75)	0.098 (2.15)	0.171 (2.37)	0.227 (1.51)	
42 Fixed vegetable oils and fats		-0.322 (1.15)	0.289 (2.45)	0.960 (3.63)	1.861 (0.30)	0.089 (1.20)		-0.082 (4.11)	0.016 (0.38)	-2.542 (2.78)	-0.039 (0.16)	0.009 (0.28)	0.065 (2.51)	-0.277 (4.92)	-0.067 (2.49)	0.160 (3.10)	-0.005 (0.06)	
43 Animal and vegetable oils and fats, processed		0.106 (0.40)	0.096 (1.53)	1.228 (8.20)		0.447 (5.24)		0.015 (0.69)	0.042 (1.25)	2.275 (2.27)	-0.015 (0.07)	0.136 (3.92)	0.156 (4.65)	-0.163 (3.77)	0.008 (0.22)	0.200 (4.71)	-0.112 (1.20)	
51 Chemical elements and compounds		0.226 (1.37)	0.281 (3.35)	0.768 (2.54)		0.220 (2.56)	-0.944 (1.60)	0.017 (0.70)	0.073 (0.19)	0.022 (0.15)	0.634 (1.86)	0.001 (0.01)	0.032 (0.70)	-0.057 (1.15)	-0.150 (3.21)	0.130 (1.48)	-0.017 (0.32)	
52 Crude chemicals from coal, petroleum and gas		-0.550 (1.48)	0.159 (1.18)	3.246 (2.47)		-0.065 (0.30)		-0.019 (0.38)	1.300 (1.54)			0.114 (1.42)	0.035 (0.27)	-0.777 (1.41)	0.039 (0.64)	0.486 (2.04)	-0.426 (0.75)	
53 Dyeing, tanning and colouring materials		0.098 (1.78)	0.111 (1.50)	0.153 (2.98)	0.548 (0.97)	0.543 (5.85)		0.004 (0.17)	0.084 (0.63)	-0.636 (3.37)	0.095 (0.37)	0.081 (1.56)	0.190 (3.53)	0.192 (3.36)	-0.146 (2.96)	0.036 (0.55)	-0.005 (0.06)	
54 Medicinal and pharmaceutical products		0.442 (0.21)	0.450 (3.96)	-2.192 (1.26)		0.368 (3.80)		-0.014 (0.61)	-0.658 (1.69)	-0.465 (0.43)	-0.777 (1.87)	0.059 (0.97)	-0.014 (0.24)	-0.029 (0.48)	0.024 (0.40)	0.379 (2.75)	0.034 (0.45)	
55 Perfume materials, toilet & cleansing preparations		0.600 (3.02)	0.063 (2.63)	0.319 (6.86)	0.293 (3.42)	4.612 (2.24)	0.552 (9.89)	0.014 (1.23)	0.057 (2.85)	-0.201 (1.33)	-0.191 (2.01)	0.030 (1.66)	0.016 (0.96)	0.068 (3.68)	-0.005 (0.26)	0.140 (6.30)	-0.095 (3.34)	
56 Fertilizers, manufactured			33.740 (1.30)	-0.123 (0.63)		-0.533 (2.20)		-0.100 (3.02)	-0.059 (0.03)	-0.136 (0.19)	0.303 (0.95)	0.020 (0.30)	0.112 (1.68)	-0.213 (2.16)	-0.097 (1.49)	0.475 (2.43)	0.265 (1.30)	
57 Explosives and pyrotechnic products			0.893 (3.06)	0.802 (4.50)	-0.011 (0.32)		-0.002 (0.01)		-0.012 (0.73)				-0.068 (1.07)	0.049 (1.56)	-0.026 (0.92)	-0.087 (3.30)	-0.033 (0.42)	-0.186 (1.53)
58 Plastic materials, etc.		10.093 (4.03)	0.342 (1.20)	0.111 (2.87)	0.171 (6.72)		0.590 (9.57)		0.035 (2.32)	0.288 (3.42)	-0.048 (0.80)	-0.594 (4.47)	0.058 (2.03)	0.085 (2.92)	0.120 (4.41)	-0.086 (3.17)	-0.003 (0.08)	-0.066 (1.70)
59 Chemical materials and products		-0.043 (0.73)	0.299 (3.29)	0.179 (2.14)	17.314 (1.73)	0.350 (4.50)		0.008 (0.40)	0.070 (0.92)	-0.112 (0.81)	0.208 (1.35)	0.082 (2.06)	0.024 (0.63)	0.085 (2.01)	-0.075 (1.98)	0.103 (1.82)	0.003 (0.06)	

Table 8: Estimation Results with Country Dummy (Continued)

SITC Description	Imports									Exports							
	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	Brunei	Cambodia	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
61 Leather, leather, manufs., nes & dressed fur skins	4.754 (1.93)	0.004 (0.09)	0.149 (1.89)	0.219 (3.70)	4.594 (1.82)	0.070 (1.14)		-0.011 (0.63)	0.043 (0.87)	-0.036 (0.10)	-0.105 (0.86)	0.167 (5.46)	0.168 (4.75)	0.040 (0.95)	0.014 (0.48)	0.288 (8.79)	0.009 (0.22)
62 Rubber manufactures	0.351 (3.88)	-0.028 (0.65)	0.155 (3.65)	0.109 (8.07)		0.219 (3.64)		0.055 (5.01)	0.092 (2.89)	-0.077 (2.42)	-0.040 (0.88)	0.070 (4.19)	0.018 (0.97)	0.121 (7.24)	-0.035 (2.22)	0.092 (4.28)	0.020 (0.70)
63 Wood and cork manufactures excluding furniture	-0.199 (3.99)	-0.009 (0.16)	0.108 (2.63)	0.055 (3.31)	2.378 (1.35)	0.407 (7.14)		0.025 (1.60)	0.017 (0.51)	0.063 (1.07)	-0.011 (0.18)	-0.045 (2.17)	0.234 (10.09)	0.011 (0.45)	-0.010 (0.48)	0.139 (6.88)	0.012 (0.37)
64 Paper, paperboard and manufactures thereof		0.539 (1.80)	-0.026 (0.28)	0.062 (2.66)	31.329 (3.98)	0.652 (10.59)		0.052 (2.44)	0.103 (4.21)	-0.231 (3.95)	-0.021 (0.34)	0.026 (0.92)	0.124 (3.97)	0.141 (4.81)	-0.026 (0.96)	0.066 (2.05)	0.031 (0.57)
65 Textile yarn, fabrics, made up articles, etc.	0.078 (0.36)	-0.016 (0.16)	0.061 (2.41)	0.146 (7.23)	4.379 (4.32)	0.145 (4.29)	-1.538 (0.36)	0.011 (1.21)	0.035 (2.47)	-0.066 (1.97)	-0.008 (0.21)	0.037 (2.16)	0.068 (3.97)	0.042 (2.48)	-0.035 (2.06)	0.011 (0.48)	-0.025 (0.93)
66 Non-metallic mineral manufactures	1.198 (1.01)	-0.040 (0.47)	-0.009 (0.17)	0.069 (4.02)	4.808 (2.90)	0.351 (6.73)		0.049 (4.11)	0.033 (1.43)	-0.022 (0.62)	-0.145 (2.24)	-0.012 (0.58)	0.062 (2.75)	0.042 (2.05)	-0.067 (3.28)	0.053 (2.03)	-0.027 (0.68)
67 Iron and steel		0.428 (1.67)	0.333 (5.64)	0.118 (4.81)		0.548 (4.82)		-0.085 (1.81)	0.506 (3.77)	-0.069 (0.70)	-0.071 (0.57)	-0.008 (0.15)	0.200 (2.48)	-0.078 (1.47)	-0.148 (2.78)	0.203 (3.69)	0.073 (0.92)
68 Non-ferrous metals		-0.247 (1.40)	0.072 (1.13)	0.111 (1.42)	3.256 (3.76)	0.132 (1.21)		0.041 (1.10)	1.650 (3.49)	-0.085 (0.32)	-0.463 (1.29)	0.176 (2.05)	0.257 (3.35)	0.165 (2.02)	-0.162 (2.08)	0.005 (0.05)	0.127 (1.00)
69 Manufactures of metal	0.370 (0.12)	0.058 (1.19)	0.060 (1.99)	0.123 (6.04)	3.001 (2.57)	0.162 (4.25)		0.124 (8.07)	0.055 (2.11)	-0.062 (1.67)	-0.052 (0.98)	0.063 (2.62)	0.051 (2.02)	0.022 (0.91)	-0.059 (2.49)	0.077 (2.80)	-0.005 (0.11)
71 Machinery, other than electric	0.180 (2.55)	0.100 (1.70)	0.384 (2.36)	0.520 (5.76)	77.419 (1.91)	0.766 (5.97)		0.080 (3.85)	-0.019 (0.16)	-0.718 (5.00)	-0.229 (1.65)	0.082 (1.93)	-0.035 (0.89)	0.127 (3.13)	-0.138 (3.48)	-0.090 (1.61)	0.017 (0.33)
72 Electrical machinery, apparatus and appliances	-0.010 (0.26)	0.010 (0.31)	0.154 (2.74)	0.159 (4.21)	1.177 (1.16)	0.335 (4.08)		0.127 (7.11)	0.093 (2.36)	-0.200 (3.01)	0.191 (2.36)	0.094 (3.55)	0.019 (0.78)	0.106 (4.18)	-0.048 (2.00)	-0.008 (0.28)	0.056 (1.40)
73 Transport equipment	0.120 (0.37)	0.085 (1.62)	0.232 (7.74)	0.167 (5.77)	45.177 (1.45)	0.338 (7.35)		0.097 (7.60)	-0.007 (0.22)	-0.024 (0.70)	-0.040 (0.81)	0.046 (2.09)	0.051 (2.38)	0.142 (6.53)	-0.075 (3.47)	0.012 (0.40)	0.036 (0.81)
81 Sanitary, plumbing, heating and lighting fixt.	0.177 (0.89)	-0.012 (0.12)	0.193 (4.48)	0.047 (1.71)	0.751 (0.42)	0.320 (6.79)		0.044 (3.16)	0.042 (1.95)	-0.154 (2.53)	-0.035 (0.34)	0.026 (1.15)	0.124 (5.35)	-0.032 (1.34)	-0.004 (0.17)	0.031 (1.10)	-0.119 (1.50)
82 Furniture	-0.020 (0.13)	0.010 (0.46)	0.031 (1.03)	0.051 (3.12)		0.190 (7.41)	0.150 (1.03)	0.033 (4.24)	0.030 (2.13)	-0.021 (0.66)	0.003 (0.06)	0.002 (0.14)	0.042 (3.52)	0.040 (3.11)	-0.040 (3.48)	0.028 (2.09)	-0.027 (1.36)
83 Travel goods, handbags and similar articles		0.017 (0.67)	-0.058 (1.84)	0.094 (2.69)	-0.044 (0.10)	0.208 (6.20)	0.529 (1.88)	0.006 (0.91)	0.014 (1.00)	-0.006 (0.12)	0.002 (0.03)	0.024 (1.87)	0.065 (5.95)	0.026 (2.08)	0.055 (5.54)	0.051 (3.13)	0.016 (0.75)
84 Clothing	-0.020 (0.13)	-0.022 (1.16)	0.065 (2.97)	0.033 (2.02)	1.432 (1.20)	0.066 (2.85)	0.085 (0.91)	0.007 (1.38)	-0.024 (2.47)	-0.038 (1.61)	0.023 (0.91)	0.011 (1.11)	0.031 (3.28)	0.029 (2.95)	-0.014 (1.44)	0.006 (0.45)	-0.022 (1.11)
85 Footwear	0.065 (0.39)	0.094 (1.81)	0.122 (6.00)	0.085 (4.92)	0.855 (1.76)	0.178 (6.18)		0.015 (2.05)	-0.012 (1.01)	0.037 (0.81)	-0.020 (0.72)	0.058 (5.18)	0.080 (7.11)	-0.004 (0.31)	0.056 (5.25)	0.067 (4.78)	0.001 (0.05)
86 Scientific and control instrument, photographic supplies, clocks	0.214 (1.80)	-0.015 (0.39)	0.281 (4.39)	0.712 (4.10)	1.020 (1.44)	0.290 (3.79)		0.086 (4.80)	0.029 (0.62)	-0.642 (6.66)	0.303 (2.41)	-0.005 (0.13)	0.095 (2.96)	0.096 (2.62)	-0.059 (1.79)	0.200 (4.71)	0.082 (1.70)

Note: figures in parentheses are z-values. Cells coloured in grey are statistically significant and positive. Estimates of GDP, GDP per capita and distance are omitted.

Compared to exports, more positive and significant signs are found in the case of imports, such as in manufacturing materials and products (SITC 58–69), machinery and transportation equipment (SITC 71–73), and clothing, footwear and scientific instruments (SITC 84–86). As was found in the previous section, tariff elimination under the CEPT Scheme seems to have had greater impacts on regional imports than exports. In addition, the effects of tariff elimination on imports in these products are also found in the new members, similar to the case for the original members. For example, the positive impacts on imports of these products (SITC 55–82) for Vietnam were as large as those observed for Thailand.

The results of the estimation with country dummy variables suggest that tariff elimination under the CEPT Scheme facilitates the formation of production and sales networks for the AFTA original member countries such as Indonesia, Malaysia and Thailand. Intra-regional imports have been promoted by tariff elimination for some new member countries including Vietnam.

(3) Other related issues

Tariff elimination under the CEPT Scheme has contributed to the expansion of intra-AFTA trade in many products. However, there are other factors that influence intra-AFTA trade. We examine some important factors in this section, in order to establish what could potentially promote further intra-AFTA trade.

First, the utilization of AFTA should be improved to promote intra-ASEAN trade. Kohpaiboon (2010) reports the FTA utilization rates in Thailand for its exports to Indonesia, Malaysia, the Philippines and Vietnam in 2008 as 18.3%, 27.4%, 16.7% and 26.1%, respectively. Also, according to Sukegawa (2009), who calculates the utilization rate of AFTA by Thailand by using statistics of export value through AFTA issued by the government, the utilization rate in Thailand was 26.8% in 2008.¹³ The low level of AFTA utilization is likely to be a cause for the limited impacts of AFTA on intra-AFTA trade observed in our study. A study on Japanese firms by Takahashi and Urata (2010) finds that a lack of knowledge about the FTAs and the difficulty in obtaining the certificates of origin are the two most serious obstacles for increasing the use of FTAs. They also find that these obstacles are more serious for small and medium-sized firms compared to large firms. A detailed

analysis by product of the use of FTAs is warranted to help understand the results of our estimation on the impacts of AFTA on intra-AFTA trade. A low level of utilization rate of AFTA appears to indicate a huge potential for the expansion of intra-AFTA trade in the future.

Second, the elimination of non-tariff measures (NTMs) is also an important element for trade liberalization under AFTA, as is the case with tariff elimination. ATIGA prescribes the detailed targets and schedule of elimination of NTMs. The effects of NTMs on trade could be larger than tariff measures since NTMs include a much broader range of policy measures such as technical standards and customs procedures.¹⁴ Table 9 is a comparison of the results of estimated tariff elimination effects and frequency ratios of NTMs. Roughly speaking, unprocessed and processed agricultural products, mineral resources and chemicals, general and electrical machinery, and vehicles other than railway vehicles, are subject to many NTMs. High NTM frequency ratios in agricultural products, mineral fuels, and medical and pharmaceutical products, may have been obstacles to trade creation by tariff elimination for these products, as was found in the previous section. The correlation coefficient between the frequency ratios of NTMs and the estimated coefficients on *Tariff reduction* calculated by pooled data of all products and countries is -0.1918 and it was significant at the 1% level.¹⁵ The negative coefficient denotes that the trade creation effect by AFTA is inversely correlated with the frequency of NTMs, in other words, the more NTMs are imposed the less trade creation effects are generated by AFTA. Based on this observation, the elimination of NTMs is indispensable for realizing substantial trade liberalization after the completion of tariff elimination for regional trade in ASEAN.

Table 9: Comparison of Tariff Elimination Effect and Frequency Ratio of NTMs

SIT C	HS	Description	Brunei		Cambodia		Indonesia		Malaysia		Myanmar		Philippines		Singapore		Thailand		Vietnam		
			Tariff effect	NTM																	
00	01	Live animals		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%	0.1502	100.0%		100.0%	
01	02	Meat and meat preparations		100.0%		100.0%		100.0%		100.0%	0.7720	100.0%		100.0%		100.0%		100.0%		100.0%	
02	04	Dairy products and eggs		30.0%	0.1391		0.4211	100.0%		100.0%		30.0%				100.0%		20.0%		10.0%	
03	03	Fish and fish preparations		57.1%		100.0%	0.3287	100.0%		100.0%			0.1208			100.0%		14.3%	0.0625		
04	10	Cereals and cereal preparations		100.0%				50.0%		100.0%			0.1476	12.5%		12.5%	0.0990	25.0%	0.0757		
05	07	Fruit and vegetables		100.0%				100.0%		100.0%		100.0%	0.1361	7.1%		100.0%	0.0462	28.6%	0.0596	100.0%	
06	17	Sugar, sugar preparations and honey		50.0%				100.0%	0.2669	100.0%			0.4193	100.0%		25.0%	0.0321	25.0%	0.1413	25.0%	
07	09	Coffee, tea, cocoa, spices & manufacs. thereof		100.0%	0.0651		0.1306	10.0%	0.2322	100.0%		90.0%	0.3709	10.0%				0.0937	30.0%	0.0575	100.0%
08	23	Feeding stuff for animals excl. unmilled cereals				0.6554		100.0%		33.3%			0.3269					22.2%	0.1945	100.0%	
09	15	Miscellaneous food preparations		95.5%				86.4%	0.1142	90.9%	3.4057	13.6%	0.2373				0.0254	13.6%			
11	22	Beverages		100.0%				100.0%	0.3903	100.0%		88.9%	0.2224			11.1%	0.0580	100.0%	0.0150	44.4%	
12	24	Tobacco and tobacco manufactures		100.0%				100.0%	0.9500	66.7%		66.7%	0.1499	100.0%		100.0%	0.0546	33.3%		100.0%	
21	41	Hides, skins and fur skins, undressed			0.2016																
22	12	Oil seeds, oil nuts and oil kernels		100.0%				100.0%		92.9%		100.0%		100.0%		7.1%		21.4%		7.1%	
23	40	Crude rubber including synthetic and reclaimed					0.4439		0.0869	11.8%				17.6%		11.8%		5.9%	0.6155	11.8%	
24	44	Wood, lumber and cork		100.0%			1.2437	4.8%		81.0%				4.8%					0.6056	19.0%	
25	47	Pulp and paper								14.3%										14.3%	
26	51	Textile fibres, not manufactured, and waste		23.1%	0.5310				8.8269				0.3080				0.0498		0.1606	23.1%	
27	25	Crude fertilizers and crude minerals, nes		10.0%			0.3177	3.3%	0.4408	63.3%		3.3%	0.2842	3.3%		96.7%		3.3%		3.3%	
28	26	Metalliferous ores and metal scrap		4.8%			0.5999			19.0%									1.4435	19.0%	
29	12	Crude animal and vegetable materials		100.0%			0.1837	100.0%		92.9%		100.0%	0.2388	100.0%		7.1%		21.4%	0.1211	7.1%	

Table 9: Comparison of Tariff Elimination Effect and Frequency Ratio of NTMs (Continued)

SIT C	HS	Description	Brunei		Cambodia		Indonesia		Malaysia		Myanmar		Philippines		Singapore		Thailand		Vietnam	
			Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM								
32	27	Coal, coke and briquettes		12.5%				100.0%		18.8%						6.3%	0.0466	12.5%		18.8%
33	27	Petroleum and petroleum products		12.5%			0.6672	100.0%	0.2167	18.8%						6.3%		12.5%		18.8%
34	27	Gas, natural and manufactured		12.5%			0.4761	100.0%		18.8%			0.5695			6.3%		12.5%		18.8%
41	15	Animal oils and fats		95.5%				86.4%		90.9%		13.6%						13.6%		
42	15	Fixed vegetable oils and fats		95.5%			0.2892	86.4%	0.9597	90.9%		13.6%						13.6%		
43	15	Animal and vegetable oils and fats, processed		95.5%				86.4%	1.2284	90.9%		13.6%	0.4469					13.6%		
51	28	Chemical elements and compounds		100.0%			0.2809	100.0%	0.7682	100.0%		2.0%	0.2198	2.0%		100.0%				
52	27	Crude chemicals from coal, petroleum and gas		12.5%				100.0%	3.2460	18.8%						6.3%		12.5%		18.8%
53	32	Dyeing, tanning and colouring materials			0.0983			100.0%	0.1529	66.7%			0.5428			13.3%				6.7%
54	30	Medicinal and pharmaceutical products		100.0%		100.0%	0.4502	100.0%		33.3%		16.7%	0.3680			100.0%		33.3%		66.7%
55	33	Perfume materials, toilet & cleansing preparations	0.5998	100.0%	0.0627		0.3192	100.0%	0.2929	28.6%	4.6118		0.5515			100.0%			0.0569	85.7%
56	31	Fertilizers, manufactured				100.0%		100.0%		20.0%		100.0%				40.0%				100.0%
57	36	Explosives and pyrotechnic products		100.0%	0.8934		0.8016	100.0%		66.7%		100.0%		16.7%		33.3%				66.7%
58	39	Plastic materials, etc.	10.0930				0.1106	100.0%	0.1706	100.0%			0.5900	3.8%		3.8%	0.0349	3.8%	0.2876	26.9%
59	38	Chemical materials and products, nes					0.2990	100.0%	0.1790	100.0%	17.3141	4.3%	0.3502	4.3%		4.3%				8.7%
61	41	Leather, leather manufactures nes & dressed fur skins	4.7542				0.1487		0.2191		4.5942									
62	40	Rubber manufactures, nes	0.3515				0.1555		0.1093	11.8%			0.2186	17.6%		11.8%	0.0552	5.9%	0.0915	11.8%
63	44	Wood and cork manufactures excluding furniture		100.0%			0.1085	4.8%	0.0547	81.0%			0.4067	4.8%			0.0250			19.0%
64	48	Paper, paperboard and manufactures thereof			0.5394			100.0%	0.0622	100.0%	31.3293		0.6520				0.0516		0.1031	13.0%
65	52	Textile yarn, fabrics, made up articles, etc.					0.0607	33.3%	0.1458		4.3786		0.1455						0.0353	41.7%

Table 9: Comparison of Tariff Elimination Effect and Frequency Ratio of NTMs (Continued)

SITC	HS	Description	Brunei		Cambodia		Indonesia		Malaysia		Myanmar		Philippines		Singapore		Thailand		Vietnam	
			Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM	Tariff effect	NTM
66	70	Non-metallic mineral manufactures							0.0690	5.0%	4.8083		0.3511			5.0%	0.0494			5.0%
67	72	Iron and steel			0.4279		0.3332		0.1182	100.0%			0.5485	100.0%				3.4%	0.5063	13.8%
68	81	Non-ferrous metals									3.2557			100.0%					1.6503	100.0%
69	73	Manufactures of metal						3.8%	0.1226	30.8%	3.0010		0.1621	100.0%			0.1236		0.0552	15.4%
71	84	Machinery, other than electric	0.1798		0.1005		0.3838	100.0%	0.5199	20.0%	77.4194	1.2%	0.7658	8.2%		4.7%	0.0799	5.9%		23.5%
72	85	Electrical machinery, apparatus and appliances		16.7%			0.1536	100.0%	0.1586	50.0%		2.1%	0.3346	97.9%		97.9%	0.1274	2.1%	0.0932	37.5%
73	87	Transport equipment		68.8%			0.2319	68.8%	0.1674	62.5%		12.5%	0.3383	100.0%		100.0%	0.0968	18.8%		62.5%
81	94	Sanitary, plumbing, heating and lighting fixt.					0.1926		0.0472	60.0%			0.3200				0.0440	20.0%	0.0419	80.0%
82	94	Furniture							0.0509	60.0%			0.1905				0.0333	20.0%	0.0299	80.0%
83	42	Travel goods, handbags and similar articles							0.0938				0.2076		0.5292					50.0%
84	40/42	Clothing					0.0653	100.0%	0.0331	35.3%			0.0660					70.6%		100.0%
85	64	Footwear			0.0943		0.1215	83.3%	0.0854		0.8550		0.1782				0.0155			100.0%
86	90	Scientific and control instrument, photographic supplies, clocks	0.2145				0.2810	3.0%	0.7121	6.1%			0.2903				0.0857	9.1%		100.0%

Notes: The frequency ratio of NTMs is a ratio of the number of NTMs to the number of product lines at HS 6-digit level. The ratios are calculated at HS 4-digit level by using the ASEAN database on NTMs. Cells of NTMs frequency ratio over 80% are coloured in grey in order to discern a high ratio. Figures in columns of ‘tariff effect’ are significant positive estimated coefficients of tariff elimination multiplied by country. ‘nes’ in SITC 61-62 and HS 40-41 means “not elsewhere specified”.

5. Conclusions

To sum up the major findings from the descriptive statistics, the patterns of intra-ASEAN import and export shares appear to reflect two prominent features in production patterns taking place in ASEAN and its trading partners. First, an increasing trend in the intra-ASEAN import shares in intermediate and capital goods indicate the formation of regional production networks in ASEAN. Second, a declining trend in intra-ASEAN export shares in these intermediate goods indicates the presence of a production network involving ASEAN and China, which has become an increasingly important destination of ASEAN exports of intermediate and capital goods. In addition, a noteworthy characteristic of intra-ASEAN trade is that bilateral trade between Singapore and Malaysia accounts for a large portion of ASEAN's intra-regional trade. However, between 1990 and 2010, the shares of Singapore and Malaysia declined, and other countries such as Indonesia, Thailand and Vietnam increased their shares. The decline in the concentration of bilateral trade shares in ASEAN appears to reflect rapid economic growth and catching up of relatively underdeveloped ASEAN member countries and their involvement in regional production networks.

From the econometric analysis, we found positive and significant trade creation effects of AFTA in a wide range of products for both imports and exports. We also found that the elasticity of tariff reduction on imports tends to be larger than that of exports. Our analysis of the impacts of AFTA for individual AFTA members showed that the trade creation effects of tariff elimination under the CEPT Scheme are relatively small and limited to a small number of products for the new AFTA members such as Cambodia, Myanmar and Vietnam compared to the old members. One reason for this result may be low utilization of the AFTA preferential treatment by the new members, as it takes time to spread the information on the presence and the benefit of AFTA.

Some policy implications can be derived from our empirical analysis. First, AFTA has been effective in promoting intra-AFTA trade. This finding confirms the appropriateness of the policy decision by the ASEAN members on the formation of AFTA. Second, although the trade creation effect of AFTA was found in many

products, there is still vast potential for further expansion in intra-AFTA trade by increasing AFTA utilization and removing remaining trade barriers in the forms of non-tariff measures by improving the efficiency of customs procedures, harmonizing product standards and others. The utilization of AFTA may be improved by spreading the information of the presence and the benefits of AFTA and by reducing the cost of obtaining the certificates of origin by simplifying the application form, for example. Third, the finding that exports do not respond to the tariff reduction as much as imports may reflect the limited capacity of exporters or producers of exports to exploit the business opportunity arising from the tariff reduction in the export destination countries. To remedy the situation, it is important to improve infrastructure and to develop competitive industries.

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ENDNOTES

- ¹ The AFTA was signed in 1992 and was enacted in 1993.
- ² The tariff reduction and elimination schedule was categorized into eight groups from Schedule A to H. The tariffs on the products in Schedule A were to be eliminated by 2010 for the six members and by 2015 for Cambodia, Lao PDR, Myanmar and Vietnam (hereafter CLMV); Schedule B indicates tariff reduction on information and communication technology (ICT) equipment for CLMV; Schedule C is for priority integrated sectors (PIS) products for CLMV, whose tariffs were to be eliminated by 2012; Schedules D and E include unprocessed agricultural products; Schedule F defines the out-quota tariff rate for Thailand and Vietnam; Schedule G is for petroleum products (PP) for Cambodia and Vietnam; and Schedule H is for General Exceptions (GE).
- ³ In this section we utilize the RIETI-TID database constructed by the Research Institute of Economy, Trade and Industry (RIETI) in Japan to calculate import and export share by product. The import and export share of ASEAN excludes the data of Lao PDR and Myanmar due to data limitation. The RIETI-TID database is published at the website (<http://www.rieti.go.jp/en/projects/rieti-tid/index.html>).
- ⁴ The shares of China for ASEAN's exports of parts and components and capital goods were 21.5% and 17.4% in 2010, respectively.
- ⁵ For a detailed review on the gravity model in terms of its theoretical background, Anderson (2010) provides the development of theoretical background of the gravity model, and Fratianni (2010) introduces the progress of theoretical background briefly and several examples of application of estimation of the gravity model.
- ⁶ Gilbert, *et al.* (2004) analyzed the effects of major FTAs by sector and found that there was a positive and strongly significant effect from AFTA particularly in the manufacturing sector. By using product level data, Urata and Okabe (2010) found that AFTA has had a trade creation effect in many products while a trade diversion effect was found in half of the sample products.
- ⁷ For more accurate estimation, tariff levels in countries other than the ASEAN members should be included in the estimation equation if country j (importer) is not a member of ASEAN in the case of exports. However, it is difficult to collect data for annual tariff rates of all sample countries other than ASEAN members, and thus tariff levels in the other countries are dropped from the estimation equation.
- ⁸ These FTAs are: Global System of Trade Preferences among Developing Countries (GSTP), Asia-Pacific Trade Agreement (APTA), New Zealand-Singapore FTA, Japan-Singapore FTA, the European Free Trade Association (EFTA), Australia-Singapore FTA, USA-Singapore FTA, Australia-Thailand FTA, New Zealand-Thailand FTA, India-Singapore FTA, Jordan-Singapore FTA, Korea-Singapore FTA, Trans-Pacific Strategic Economic Partnership (TPSEP), Japan-Malaysia FTA, Panama-Singapore FTA, Japan-Thailand FTA, Pakistan-Malaysia FTA, Japan-Indonesia FTA, Japan-Brunei FTA, Japan-Philippines FTA, China-Singapore FTA, Peru-Singapore FTA, Japan-Vietnam FTA, ASEAN-Japan FTA, ASEAN-Australia-New Zealand FTA, ASEAN-India FTA, ASEAN-China FTA and ASEAN-Korea FTA.
- ⁹ The calculator is published on the website. (http://www.worldatlas.com/travelaids/flight_distance.htm)
- ¹⁰ See Table 9.

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- ¹¹ The elasticity of tariff reduction here is the value of the estimated coefficient of tariff reduction. The coefficient of tariff reduction, ϕ^k is defined as the derivative of the function with respect to the tariff reduction rate, that is $\phi^k = \frac{\Delta Trade/Trade}{\Delta Tariffreduction}$. The unit of variable *Tariff reduction* is the percentage; hence the coefficient denotes a percentage change of trade volume by 1% change of difference of tariff rate from the MFN rate.
- ¹² Singapore had already reduced or eliminated its tariff from the beginning of the sample periods, therefore the difference between MFN tariff rate and the CEPT rate has been small or constantly zero during the sample periods. Hence significant coefficients are relatively few compared to the other four countries.
- ¹³ Pomfret, *et al.* (2010) calculated the utilization rate of Australian RTAs by using disaggregated customs data, which enables one to measure the imports under the preferential rate directly. After adjustment of the share of imports paying zero MFN tariffs, the utilization rate of Australian imports under the Singapore–Australia FTA and the Thailand–Australia FTA are over 90% and 75% respectively.
- ¹⁴ François, *et al.* (2011) conducted a simulation analysis of the preferential trade agreement in the EU using the GTAP model and found that the impact of the reduction of NTMs on GDP growth is higher than the tariff reduction.
- ¹⁵ Sample size is 486. The significance level is 0.0013.

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