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Determinants of AFTA Members' Trade Flows and Potential for Trade Diversion

By

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Executive Summary

One of the most important RTA in Asia and the Pacific is the Association of South-East Asian Nations (ASEAN) Free Trade Area, also referred to as AFTA, which was aimed at eliminating tariff barriers among member countries through the Agreement on the Common Effective Preferential Tariff (CEPT) scheme. It applied to all products from ASEAN member countries defined as those that had at least 40% ASEAN content. More than 99 percent of the products in the CEPT Inclusion List (IL) of ASEAN-6, comprising Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand, have now been brought down to the 0-5 percent tariff range. ASEAN new members including Cambodia, Lao PDR, Myanmar and Vietnam have also implemented their commitment on the CEPT scheme with 80 percent of their products having been moved into their CEPT Inclusion List.

The objective of this paper, therefore, is to investigate the determinants of trade flows of AFTA members, including the impact of creation of AFTA on its intra-regional and extra-regional trade flow by comparing trade patterns of AFTA countries with AFTA members and non-members.

We developed an augmented gravity equation to estimate the impact, including standard gravity variables and two indexes, namely the 'complementarity index' and the 'similarity index' to capture the effect of complementarity and similarity export structure between the exporting countries and the importing countries. We also include dummy variables represent the effects of regional trade arrangement. And to estimate the impact of AFTA whether it causes trade creation or trade diversion, we include trade creation dummy and trade diversion dummy.

We found the standard gravity variables –i.e. both reporting and partner country GDP, distance, common language, common border and whether the partner country is landlocked or not- have significant effects on the bilateral exports of ASEAN members. This result is consistent with many previous studies which estimate the determinants of bilateral trade between countries using gravity equation.

The reduction of tariff was also found to have a significant effect in increasing the bilateral exports of ASEAN members. Therefore, effective implementation of the AFTA CEPT scheme to reduce or eliminate tariff barrier may be expected to boost the trade of ASEAN members. However, a greater number of products may need to be put in the CEPT inclusion list.

The econometric analysis also suggested that AFTA may be causing some trade diversion and shifting trade from countries outside the bloc to possibly less efficient countries inside the bloc. It also confirmed that the more complementary the supply and demand of countries, the more they will trade. Since the export and import profiles of ASEAN members have become more complementary to each other over time, the potential for intra-regional trade is great for ASEAN members. Finally, we also found that the similar structure of export between ASEAN members has a positive effect on its bilateral exports. Thus, intra-industry trade may be expected to increase the intra-regional trade among ASEAN members and to support the further economic integration of the ASEAN region.

The recent emergence of regional trade agreements (RTAs) in Asia and the Pacific¹ has increased the need for a thorough examination of the impact of RTAs on trade, and particularly on intra-regional trade among its members.

One of the most important RTA in Asia and the Pacific is the Association of South-East Asian Nations (ASEAN) Free Trade Area, also referred to as AFTA. AFTA was established in 1992 and currently has a membership of 10 countries. It is expected to become a full free trade area by the year 2008. This should result an increase in intra-regional trade of AFTA members. While Elliot and Ikemoto (2004) found that intra-regional trade in ASEAN had strengthened in the 1990s, they did not attribute this strengthening to the implementation of AFTA.²

The objective of this paper, therefore, is to investigate the determinants of trade flows of AFTA members, including the impact of creation of AFTA on its intra-regional and extra-regional trade flow by comparing trade patterns of AFTA countries with AFTA members and non-members. By doing so, we hope to be able to reveal whether AFTA (i) increases trade among members; (ii) adversely impact non-member countries; and (iii) contributes to or undermines further liberalization of AFTA members. This analysis is limited to ASEAN 5 (Indonesia, Malaysia, Singapore, Philippines and Thailand) and several non-ASEAN member countries to assess the AFTA membership effects. Using several indicators, namely 'complementarity index' and 'similarity index', this study examines whether bilateral trade between economies has been complementary in nature or, on the contrary, similar and thus increased competition so that each countries need to increase their competitiveness.

¹ There are 10 regional agreements in Asia and the Pacific since 1990 according to ESCAP database: <http://www.unescap.org/tid/pta%5Fapp/default.aspx>

² Using gravity equation, Elliot and Ikemoto (2004) estimate whether Asian Economic crisis was a help or hindrance to ASEAN intra-regional trade. One of the finding is that trade flows were not significantly affected in the years immediately following the signing of the AFTA agreement in 1993. Nonetheless, when the gravity equation was re-estimated for intra-ASEAN trade only, there is some evidence of a positive AFTA effect that, although limited at first, gradually increased.

I. An Overview on AFTA

ASEAN was established on August 8th 1967 in Bangkok by its five original member countries, namely, Indonesia, Malaysia, Singapore, Philippines and Thailand³. When ASEAN was established, trade among member countries was insignificant. Estimates between 1967 and the early 1970s showed that the share of intra-ASEAN trade was between 12-15% of total trade of member countries. To support economic cooperation between member countries, the ASEAN Free Trade Area (AFTA) was established in 1992. This agreement was aimed at eliminating tariff barriers among member countries and creating regional market of 500 million people. The Agreement on the Common Effective Preferential Tariff (CEPT) scheme required that tariff levied on a wide range of products traded within the region be reduced to no more than five percent. It applied to all products from ASEAN member countries defined as those that had at least 40% ASEAN content. More than 99 percent of the products in the CEPT Inclusion List (IL) of ASEAN-6, comprising Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand, have now been brought down to the 0-5 percent tariff range. ASEAN new members including Cambodia, Lao PDR, Myanmar and Vietnam have also implemented their commitment on the CEPT scheme with 80 percent of their products having been moved into their CEPT Inclusion List.

Table 1. Average CEPT Rates, By Country, 1993-2003

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Brunei D.	3.78	2.64	2.54	2.02	1.61	1.37	1.55	1.26	1.17	0.96	1.04
Indonesia	17.27	17.27	15.22	10.39	8.53	7.06	5.36	4.76	4.27	3.69	2.17
Malaysia	10.79	10	9.21	4.56	4.12	3.46	3.2	3.32	2.71	2.62	1.95
Philippine	12.45	11.37	10.45	9.55	9.22	7.22	7.34	5.18	4.48	4.13	3.82
Singapore	0.01	0.01	0.01	0.01	0	0	0	0	0	0	0
Thailand	19.85	19.84	18.16	14.21	12.91	10.24	9.58	6.12	5.67	4.97	4.63
ASEAN6	11.44	10.97	10	7.15	6.38	5.22	4.79	3.64	3.22	2.89	2.39
Cambodia								10.39	10.39	8.89	7.94
Lao PDR						5	7.54	7.07	7.08	6.72	5.86
Myanmar						2.39	4.45	4.43	4.57	4.72	4.61
Vietnam				0.92	4.59	3.95	7.11	7.25	6.75	6.92	6.43
ASEAN10				7.03	6.32	4.91	5.01	4.43	4.11	3.84	3.33

Source: ASEAN Secretariat

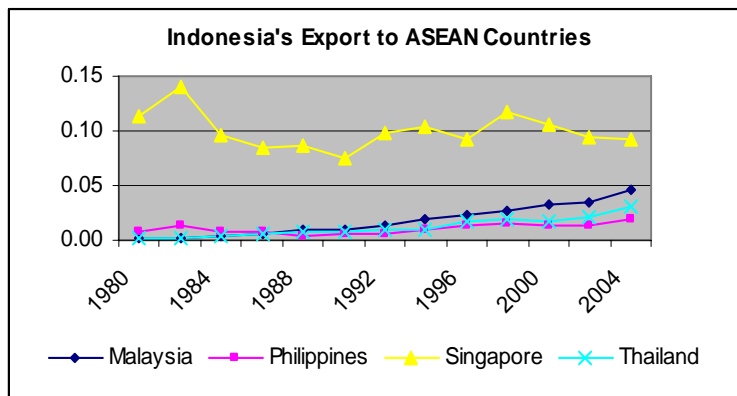
After the AFTA was established, total trade among ASEAN countries has grown from US\$ 44.2 billion in 1993 to US\$ 95.2 billion in 2000, showing an annual increase of 11.6 percent. The intra-ASEAN exports made up about 23.3 percent of total ASEAN exports to the world. Before the financial and economic crisis struck in mid-1997, intra-ASEAN exports had been increasing by 29.6 percent. This is significantly higher than the rate of increase of total ASEAN exports to the world, which grew at 18.8 percent during the same period.

³ Expansions on the membership were Brunei in 1984, Vietnam in 1995, Myanmar and Laos in 1997 and Cambodia in 1999.

The bilateral trade between member countries also shows that there's an increase in the export both in the absolute number and as a share of total trade to the world. Indonesia and Philippines experienced an increase patterns on trade to the other member countries. Prior to the establishment of AFTA, Indonesia's exports to the ASEAN countries amounted only to 10 percent of its total exports while Philippines exports to ASEAN amounted only to 7 percent of its total exports. After AFTA was established, Indonesia increased its export to ASEAN5 countries to 20 percent and Philippines increased its exports to 13 percent, in dollar value almost three times higher compared to pre AFTA period.

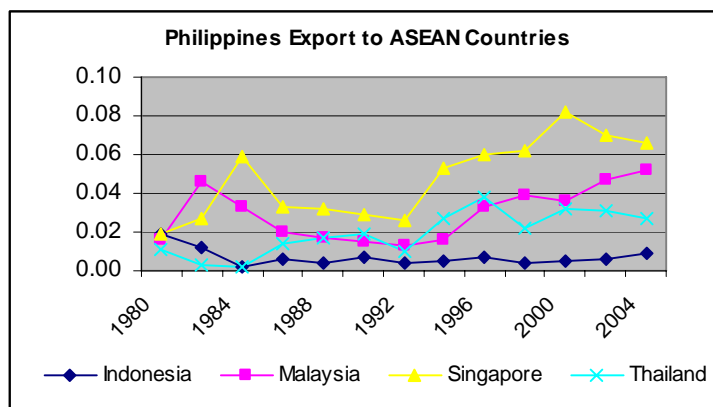
Kien and Hazimoto (2005)⁴ found that even if there's an increase on the bilateral trade between member countries, AFTA has not given rise to export trade diversion. One plausible explanation for this is that export-oriented strategies have been an engine of economic growth for these countries for long time. Moreover, characteristics of production and consumption in all member countries may have led them to persistently aim for non-members as their export destinations.

Figure 1. Trend of Indonesia's Export to ASEAN Countries 1980-2004



Source: UN COMTRADE accessed through WITS

Figure 2. Trend of Philippines Export to ASEAN Countries 1980-2004



Source: UN COMTRADE accessed through WITS

⁴ Using gravity equation, the export and import FTA variables is a unity if only an import or export country belongs to FTA. The result showed a positive sign for both variables.

On the import side, Kien and Hazimoto (2005) found that AFTA members have not transferred their import transaction from non-member trading partners to member ones. It means that there has been no import trade diversion over the period of 10 years since AFTA was established⁵. One possible interpretation is that the dynamic network of domestic production together with foreign investment projects in AFTA countries have caused these countries to prefer importing from non-members outside the region.

However, Damuri, Atje and Gaduh (2006) found that, in 2002, the weighted preferential tariffs (through CEPT scheme) were higher than MFN tariffs. This suggests that the import values of products whose CEPT tariffs are lower than MFN tariffs are not significant relative to total imports, which somewhat substantiate findings that CEPT tariffs have been underutilized. Hence, by way of tariff reduction, AFTA was not particularly successful in lowering tariff rates preferentially.

In this paper, the authors develop and estimate a gravity model to find further evidence of the impact of AFTA and the CEPT scheme on bilateral trade flows within and outside the region.

II. A Literature Review on Gravity Model

Gravity model has been broadly used in explaining the determinants of trade flows of a country and provides accepted framework and a useful multivariate approach for assessing the impact of regional trade. It is a model of trade flows based on the analogy with the law of gravity in physics. Trade between two countries is positively related to their size, and inversely related to the distance between them. Since then, the gravity model has been widely used and increasingly improved in empirical studies of international trade. For example, a population variable was incorporated to show a negative effect of it on trade flows since a larger population means a larger domestic market and a more diversified range of output, and less dependence on international specialization would exist (Oguledo & MacPhee, 1994 and Endoh 1999, 2000). A number of explanatory variables have been added to initial gravity equation to improve explanatory power of the model to analyze various bilateral trade policy issues.

Rose (2002) used gravity model to estimate the effect on international trade of multilateral agreements like World Trade Organization (WTO), Generalized Agreements on Tariffs and Trade (GATT) and the Generalized System of Preferences (GSP). He used a standard gravity model of bilateral trade and panel data set covering over fifty years and 175 countries. He found out that WTO/GATT doesn't have effect on trade of its member, while the GSP does have strong effect and approximately doubling the trade. Another finding based on the result of the gravity model, is that countries that are farther apart will trade less, while economically larger and richer countries will trade more, measured by the GDP variable.

⁵ Kien and Hazimoto used data covering 39 countries of which 26 are members of four FTAs, namely, EU, AFTA, NAFTA and MERCOSUR for the overall 15-years period, 1988-2002. AFTA took place in 1992.

The standard way in assessing the impact of PTAs is to add PTA-specific binary dummy variables in the augmented gravity model to capture effects not captured through normal bilateral trade determinants. Although since Viner (1950) it is known that the impact of any trade agreement is a combination of trade creation and diversion effects, gravity modelers rarely try to decompose these effects (Greenaway and Milner, 2002). Some unsuccessfully tried to use dummy variables for members of trade blocs and for non-members, with the expectation of negative coefficients for the latter. However, this technique has been separately criticized by Polak (1996) and Matyas (1997) because of direct use of bloc dummy variables in the gravity equation, which, they conclude, leads to incorrect inferences. In fact, Matyas (1997) showed that such gravity models used for this purpose were actually misspecified from the econometric point of view due to presence of unnecessary constraints put on the parameters of the model. They suggested a model with country fixed effects, which are to be analyzed to find the impact of liberalization agreements.

Study adding PTA-specific dummy variables to capture trade creation and trade diversion on PTAs was delivered by Haveman and Hummels (1996). They tried to assess the effects of PTAs on the aggregate and bilateral trading patterns of member countries by adding two dummy variables to their gravity model to capture the intra-bloc and extra-bloc effects of PTAs. The first dummy variable takes a value of one when only one member of the country pair is a member of regional trading bloc. The second dummy variable takes the value of one when both members of the country pair belong to the regional trading blocs. Trade creation happens when bilateral trade between countries in the same region exceeds the normal volume of trade, but doesn't change the trade with outside the bloc – first dummy will be zero, and second dummy will be positive. Trade creation causes high intra-bloc trade and lowers the extra-bloc trade of its members –first dummy will be negative and second dummy will be zero.

Another study by Krueger (1999) using the gravity equation to investigate the trade creation and trade diversion under North America Free Trade Agreement (NAFTA) showed that NAFTA was causing trade creation and not trade diversion. It represented by the increase of share on Mexico trade with the U.S but the empirical result seems to indicate that those commodity in which Mexican exports to the U.S grew most rapidly were also those categories in which it grew most rapidly with the rest of the world.

To estimate the effect of AFTA among its member, we build on a standard gravity model, specified as follows:

$$\log X_{ijt} = \beta_0 + \beta_1 \log Y_{it} + \beta_2 \log Y_{jt} + \beta_3 \log D_{ijt} + \beta_4 \log N_{it} + \beta_5 \log N_{jt} + \mu_{ijt} \quad (1)$$

where X_{ij} is the exports from country i to j , Y is income both from country i and j , D_{ij} is the distance between economies i and j , N is the population of both country i and j , and is the log normally distributed error term where $E(\log \mu_{ij}) = 0$. Assuming no PTAs, equation above explains trade between countries i and j and behaves as a counterfactual.

III. Methodology and Data using Augmented Gravity Model

In this paper we modify the basic gravity equation where our estimating equation in natural logs is shown in the equation below:

$$\begin{aligned} \log X_{ij} = & \alpha_0 + \alpha_1 \log GDP_i + \alpha_2 \log GDP_j + \alpha_3 \log PGDP_i + \alpha_4 \log PGDP_j \\ & + \alpha_5 \log D_{ij} + \alpha_6 \log T_j + \alpha_7 LAND_{ij} + \alpha_8 BORDER_{ij} + \alpha_9 COMLANG_{ij} + \alpha_{10} ISLAND_{ij} \\ & + \alpha_{11} COM_{ij} + \alpha_{12} SIM_{ij} + \alpha_{13} ASEAN_{ij} + \alpha_{14} CRE_{ij} + \alpha_{15} DIV_{ij} + \mu_{ij} \end{aligned} \quad (2)$$

where X_{ij} is the exports from country i to j , $GDP_{i(j)}$ is country i (j)'s GDP, $PGDP_{i(j)}$ is country i (j)'s per capita GDP, D_{ij} is the distance between economies i and j , T_j is the tariff rate levied by country j ⁶, $LAND$ is a dummy variable whether the country is landlocked or vice versa, $BORDER$ is a dummy variable whether the country share the same border or vice versa, $COMLANG$ is a dummy variable whether the country used the same common language or vice versa, $ISLAND$ is a dummy variable whether the country is an island or vice versa. All the variables will be represented by the value of unity if the country is landlocked, share the same border, used the common language or an island.

In this model, we also use two indexes, namely the 'complementarity index' and the 'similarity index'. One of the characteristic of the basic gravity equation is that it does not explicitly include a factor endowment variable as, although income level differences reflect factor endowment differences, they may also explain product differentiation or demand dissimilarity (Deardorff, 1984). A complementarity index (COM_{ij}) based on Yeats and Ng (2003) is included to directly capture factor endowment differences and is given by:

$$C_{ij} = 100 - \sum (|m_{ik} - x_{ij}| / 2)$$

where x_{ij} is the share of good i in the exports of country j , and m_{ik} is the share of good i in the imports of country k . The index is zero when no good exported by one country is imported by the other and 100 when the export-import shares exactly match. As such, it is assumed that the higher index values indicate more favorable prospects for a successful trade arrangement between countries. It provides information on how well export profile of one country matches the import profile of another country. COM_{ij} is able to separate the impact of the commodity composition from the other factors that drive trade flows and represents the extent of the fit between the structure of exports and imports of bilateral trade partners based on the assumption that traded commodities reflects factor endowments.

Another index is the 'similarity index'. Based also on Ng and Yeats (2003), the similarity index gives information about the export structure of both countries

⁶ The ASEAN members will use the CEPT rate while the non-ASEAN members will levy the rate based on MFN rate. This will be associated with the dummy variable region 1 while the partner countries include on the non-member countries will use the MFN rate. All the reporting countries are the ASEAN members.

whether they have similar main export products or vice versa. The formula is specified as follows:

$$XS(j,k) = 100 \cdot \sum \min(x_{ij}, x_{ik})$$

where x_{ij} and x_{ik} are industry i 's export shares in country j 's and country k 's exports, which usually include a group of countries or competitors. The index varies between zero and 100, with zero indicating complete dissimilarity and 100 representing identical export composition. This measure is subject to aggregation bias (as the data are more finally disaggregated, the index will tend to fall) and hence embodies certain arbitrariness due to product choice. Both of the indexes are calculated using the two digit level Standard Industrial Trade Classification (SITC)⁷.

All the last three dummy variables represent the effects of regional trade arrangement. The ASEAN dummy is the country group dummy. ASEAN dummy indicates whether the partner country is an ASEAN country regardless of the year in which it joined the agreement. The dummy is included to capture the effect of cultural similarity or common inheritance between countries in each group that may affect how they trade. The CRE variable is the Trade Creation dummy. This dummy indicates whether AFTA brings trade creation or not. Trade creation occurs when trade between members of a preferential trading arrangement replaces what would have been produced in the importing country were it not for the PTA. If AFTA results in trade creation, we may expect the coefficient to be positive and significant. The DIV variable is the Trade Diversion dummy. Trade diversion is a trade that occurs between members of a preferential trading arrangement that replaces what would have been imports from a country outside in the PTA. This dummy indicates whether AFTA results in trade diversion. If there is trade diversion because of AFTA, we may expect the coefficient to be negative and significant. However, if there is only a trade creation as an outcome of AFTA, the coefficient of dummy CRE is expected to be positive and significant while the coefficient of dummy DIV will be insignificant. In the contrary, if there is only a trade diversion as a result of AFTA, the coefficient of dummy DIV is expected to be negative and significant while the coefficient of dummy CRE will be insignificant.

All the data used in the model comprises 19 countries include 5 ASEAN countries, US, Japan, China, India, Australia, Canada, UK, Germany, France, Italy, Belgium, Netherlands, Spain, and Austria. The data set will cover since the year AFTA implemented (1993-2003). The total trade (exports and import between two countries) is taken from UNCTAD COMTRADE, accessed through WITS. GDP will be taken from the World Bank WDI. Some dummy variable and also distance is accessed through the CEPII. Finally, the MFN tariff rate will be obtained from UNCTAD TRAINS (also accessed through WITS), and the CEPT rate will be obtained from ASEAN Secretariat.

The OLS will be used to estimate the data, using STATA program. First, we will estimate the standard gravity model (eq. 1), excluding the effect of RTA and the complementarity effects and the similarity effects. On the second attempt, we will

⁷ The 2 digit SITC is used to avoid too detail products breakdown that can caused both of the index will be undervalued.

include the RTA effects and finally on the third attempt we will include the complementarity and similarity indices, as specified in (2).

IV. Estimation Results

In its standard form, the gravity model explains bilateral trade flows as a function of the trading partners' market size and their bilateral barriers to trade. The empirical results as illustrated in Table 1 (in annex) shows that the standard gravity variables tend to be significant and behave in a manner consistent with the theoretical models⁸.

The standard gravity variables GDP, GDP per capita, and distance have the expected sign and are statistically significant at the 1% level. A 1 percent increase of GDP in the reporting countries⁹, a proxy for market size and ability to supply or demand products, leads to an increase in its bilateral exports by 0.74 percent and a 1 percent increase of GDP in the partner countries leads to a 0.65 percent increase in its bilateral trade. The variable GDP per capita also shows that an increase of GDP per capita by both reporting and partner countries leads to an increase on its bilateral trade. The variable distance shows a negative effect with statistical significance at 1%. The variable distance represents a barrier in trade with implicit assumption that transport costs increase with distance. A 1 percent increase in the distance between two countries will lessen their bilateral export by 1.31 percent.

Other variables also representing barriers are dummy variables such as land and island. It is assumed that transportation costs are higher for island and land countries. On the contrary, countries that share a common border will have less transportation costs. The variable *comlang*, whether bilateral countries share a common language, is included to capture information cost. Information cost caused by inability to communicate and cultural differences. If so, we expected that countries which shares common language will trade more.

Results for *comlang* variable show a positive and significant effect on bilateral exports from ASEAN countries. Border shows a negative and significant effect on bilateral exports from ASEAN countries. The result is inconsistent with the expected results where a shared border will increase bilateral trade between neighboring countries as transportation cost is lower. The reason is probably the different role of trade in the neighboring countries. This is probably caused by a negative effect of bilateral trade between Indonesia and Malaysia that shared common border.. We therefore included a variable reflecting country specific effect between Malaysia and Indonesia. The result is negative and significant at 10 % level significance. Variable *land* shows a negative and significant effect which is consistent with the expected sign

⁸ See for example Deardorff (1995) and Krugman (1991)

⁹ The reporting countries are 5 ASEAN countries (comprises Indonesia, Malaysia, Philippines, Singapore and Thailand), US, Japan, China, India, Australia, Canada, UK, Germany, France, Italy, Belgium, Netherlands, Spain, and Austria

that landlocked partner countries will be more difficult to reach and thus will increase transportation costs. The variable island is significant for ASEAN exports¹⁰.

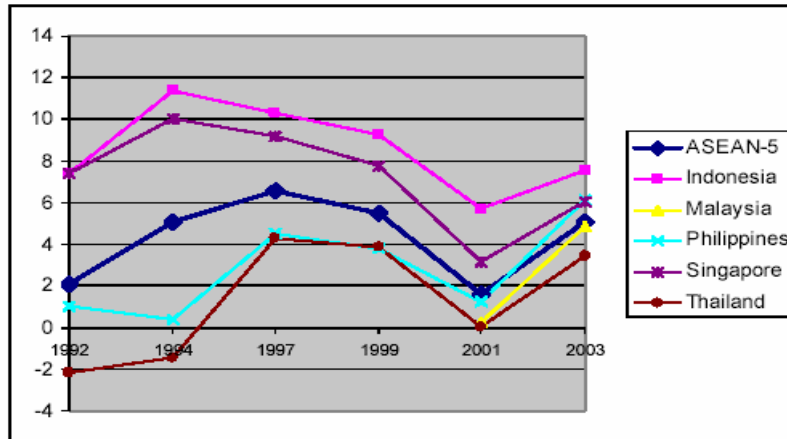
On the second attempt we take an account the effect of RTA on its member's bilateral trade. To capture this effect, the regional dummy ASEAN is included. Moreover, we also estimate whether AFTA results in trade creation or trade diversion to its member. The dummy CRE and DIV characterize the effect of AFTA in creating trade among its member or diverting member's trade from countries outside the agreement to counties inside the agreement. The result, as summarized in Annex, shows that the standard gravity variables are still significant except island with a statistical significance at 1%. Border has negative but insignificant effect on ASEAN exports. We also include the variable tariff as one of the parameter for AFTA through the CEPT scheme.

The variable tariff represents a trade barrier as tariff will increase the transaction cost for the exporting countries. The result indicates a negative and significant effect from tariff to influence the exports value. A reduction in tariff by 1 percent will contribute to an increase in exports by 2.44%. The coefficient above one indicates a multiplying effect of reductions in tariff for ASEAN countries. Hence, a reduction in tariff through the CEPT scheme, as one of the main goal in AFTA to eliminate tariff barriers will boost the regional trade among its member. Following the signing of the Protocol to Amend the CEPT-AFTA Agreement for the Elimination of Import Duties on 30 January 2003, ASEAN-6 (ASEAN-5 plus Brunei Darussalam) has committed to eliminate tariffs on 60 percent of their products in the IL by the year 2003. As of this date, tariffs on 64.12 percent of the products in the IL of ASEAN-6 have been eliminated. The average tariff for ASEAN-6 under the CEPT Scheme is now down to 2.39 percent from 11.44 percent when the tariff cutting exercise started in 1993. However, there are products that remain out of the CEPT-AFTA Scheme which in the Highly Sensitive List (i.e. rice) and the General Exception List. The Coordinating Committee on the Implementation of the CEPT Scheme for AFTA (CCCA) is currently undertaking a review of all the General Exception Lists to ensure that only those consistent with Article 9(b)1 of the CEPT Agreement are included in the lists.

Hence, along with AFTA, individual ASEAN member countries aggressively (and selectively) lowered their tariff barriers unilaterally and non-preferentially. Figure 1 below plots the margin of preference (MOP) – i.e., the difference between the (unweighted) averages of MFN and CEPT tariffs – from 1992 to 2003. The trend between 1994, at the start of APEC, to 2001 was that falling of MoP. The trend start to increase in 2003, at AFTA's agreed deadline of implementation. Falling MOPs was probably caused by the move of trade liberalization in the multilateral-level that is faster than those in regional-level.

¹⁰ This finding is similar with Jansen and Piermartini (2005) as they also used gravity model to estimate the impact of Mode 4 Liberalization on US bilateral trade flows. They found that whether US trade partner country is island or not, doesn't affect both US exports and imports.

Figure 3. The Margin of Preference (MoP) for ASEAN 5 Member, 1992-2003



Source: Damuri, Atje and Gaduh (2006)

The dummy ‘ASEAN’ is also included to capture the effect of the cultural affinities between ASEAN countries. Cultural affinities may affect how the ASEAN countries trade that could lead to an increase their bilateral exports despite common factor endowment that could respectively lead to a decrease in the bilateral trade for some members. The result shows that ASEAN variable is positive and significant affecting the bilateral trade for ASEAN member at 1 % level of significance. Aside the cultural affinities, there is a prospect of intra-regional exports supported by the empirical result as ASEAN variable, which included to capture country group effects, shows a positive and significant effect at 1% level of significance. Elliot and Ikemoto (2004) also find that country-group dummy for ASEAN is positive, implying that countries located within the regions do trade more with each other and even above the levels predicted by basic explanatory variables¹¹. The result of positive and significant effect was different from a number of previous studies such as Sarma and Chua (2000) and Soloaga and Winters (2001), who both observe a negative relationship, albeit for a different estimating equation and country coverage, but similar to Frankel and Endoh (2000) who recorded also positive and significant coefficients. One possible explanation is that it took a regional economic shock of the form of the Asian currency crisis to trigger the latent forces of ASEAN regional integration that could not be stimulated by mere political rhetoric.

Table 2. Export of ASEAN countries to ASEAN 5, 1989-2003

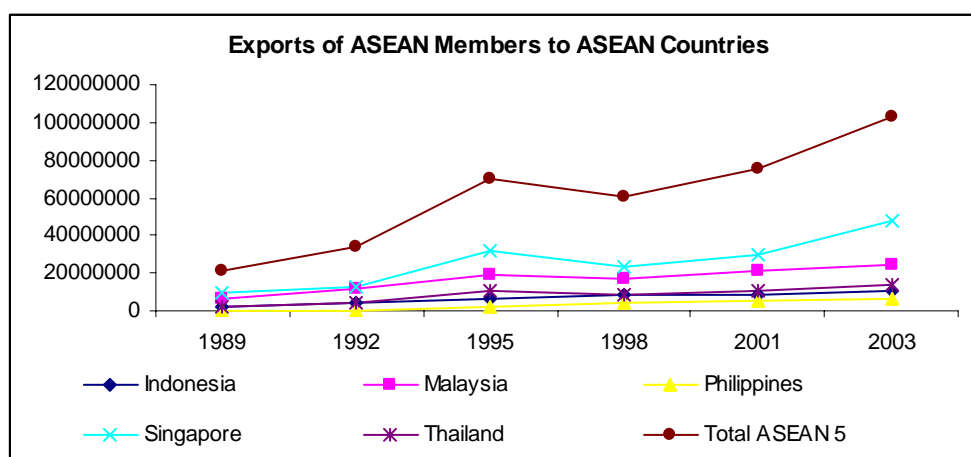
	Exports of ASEAN members to ASEAN countries, 1989-2003				
	1989	1992	1995	1998	2003
Indonesia	2,390,922.9	4,335,113.6	6,046,345.9	8,726,582.8	10,100,717.0
Malaysia	6,300,972.6	11,858,175.3	19,533,263.9	16,918,096.7	24,617,703.0
Philippines	530,970.3	518,827.8	2,239,100.7	3,719,357.7	6,423,036.4
Singapore	9,241,236.1	12,703,439.0	31,437,035.8	23,418,492.9	47,947,567.0
Thailand	2,278,803.9	4,102,380.7	10,698,949.2	8,257,261.8	13,648,218.0
Total ASEAN 5	20,742,905.9	33,517,936.4	69,954,695.4	61,039,792.0	102,737,241.4

Source: UN COMTRADE accessed through WITS

¹¹ Elliot and Ikemoto found that intra-regional dummy for ASEAN contributed to an increase in ASEAN countries by 1.78 percent, using the gravity model with a level significance at 1 %.

From the table above, we can see that ASEAN members have increased their exports over time, to other ASEAN countries. The intra-ASEAN exports start to strengthen after the 1997 crisis, triggered by the fall of the Thai Baht relative to US Dollar. The economy in the region starts to integrate, through the intra-regional trade among members of the region. Intra-ASEAN exports over the period 1989-1992, grew at a rate of 20.5 percent per annum, increasing from US\$20.7 billion in 1989 to US\$33.5 billion in 1992. Total ASEAN exports grew at an average annual rate of 16.9 percent over the same period. After the formation of AFTA, intra-ASEAN exports grew at a rate 36.2 percent per annum over 1992-1995. At the same period, total ASEAN exports to the world grew at an average 24.1 percent per year. However, since 1997 and the Asian financial crisis, ASEAN economic growth and international trade have stalled. The pace of integration through trade has slowed down. The intra-ASEAN exports experienced a negative growth at an average 4.2 percent per annum over 1995-1998. Eventually, in the period of recovery, the economy started to experience an upbeat growth albeit reduced momentum, one of them in the regional trade. The intra-ASEAN exports grew by an average 12.3 percent per annum, increasing from US\$ 75.1 billion in 2001 to US\$ 102.74 billion in 2003. Meanwhile, total ASEAN exports grew at an average annual rate of “only” 7.25 percent over the same period¹².

Figure 4. Trend of export of ASEAN countries to ASEAN 5, 1989-2003



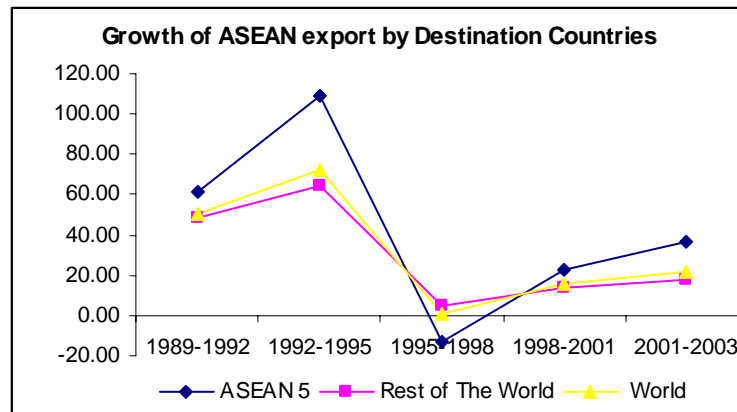
Source: UN COMTRADE database

This finding leads us to enquire whether the AFTA process has been trade-creating or trade-diverting, and whether AFTA is a discriminating bloc or exhibit ‘open regionalism’. In the second regression, we include the dummy CRE for trade creation and DIV for trade diversion. The dummy CRE equals 1 if, for the period after the beginning of AFTA, the partner country is an AFTA member, and zero otherwise. Meanwhile, the dummy DIV equals 1 if, for the period after the beginning of AFTA, the partner country is a non-AFTA member, and zero otherwise. We expect there is only a trade creation as an outcome of AFTA when the coefficient of dummy CRE is positive and significant while the coefficient of dummy DIV will be insignificant. On the contrary, if there is only a trade diversion as a result of AFTA, the coefficient of dummy DIV is expected to be negative and significant while the coefficient of dummy CRE will be insignificant.

¹² Further data about the trend of ASEAN export is presented in Annex in Table 2, 3 and 4.

The result confirms one of the hypotheses. The dummy CRE is negative but insignificant while the dummy DIV shows a negative and significant effect at 10 % level of significance. The change in independent variables can explain 74.2 percent of the changes in ASEAN exports from 1988-2003. The coefficient -0.13 for the dummy DIV implicitly shows that after the establishment of AFTA, bilateral exports from ASEAN countries to those countries outside the region somewhat decreased by 0.13 percent with other variable *ceteris paribus*. This result indicates that the AFTA agreement has been trade-diverting rather than trade creating.

Figure 5. Growth of ASEAN Export by Destination Countries, 1989-2003



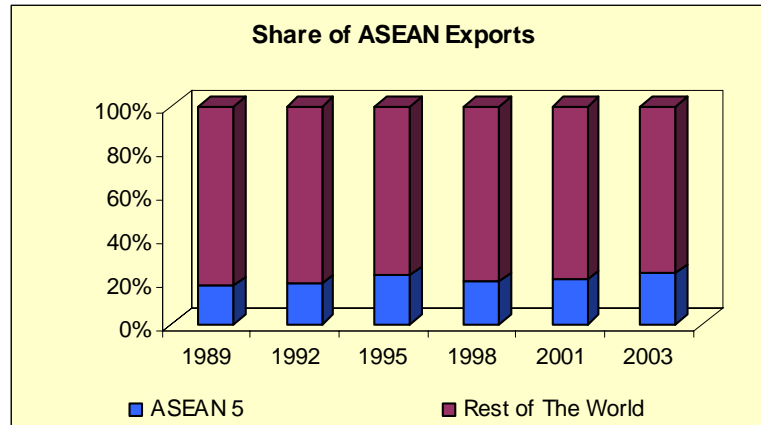
Source: UN COMTRADE Database, accessed through WITS

From Table 2 presented in Annex, the trend in ASEAN members' exports were increasing from 1989-2003 both to other ASEAN members and the world. From 1989-1993 ASEAN exports to ASEAN countries grew from US\$ 20.74 million to US\$ 33.51 million while total ASEAN exports to the world grew from US\$ 119.6 million to US\$ 180.4 million. When the Asian crisis hit in 1997, the ASEAN export to ASEAN members fell from US\$ 69.9 million to US\$ 61.4 million while the total ASEAN exports to the world still increased from US\$ 311.3 million to US\$ 315 million. When the financial crisis hit the region in 1997, ASEAN members exported more of their products to non-member countries. This finding is consistent with the study of Elliot and Ikemoto (2004) who observe a negative trade diversion effect during the period (meaning that the volume of trade between members and non-members had been increasing and not falling, as would be the case with positive trade diversion)¹³. One explanation for this phenomenon is that ASEAN countries may have increased their exports to the rest of the world due to changes in their real

¹³ Elliot and Ikemoto (2004) include dummies for export diversion and import diversion—i.e. imASEAN will be unitary if only the import country *i* belongs to ASEAN and 0 otherwise while exASEAN will be unitary if only the export country *j* belongs to ASEAN and 0 otherwise— and estimated in each several periods between 1983-1999. The dummy exASEAN captures the extra-regional export bias of ASEAN to the rest of the world or the export trade diversion where a negative and significant coefficient means that ASEAN has resulted in a member country preferring to export to members rather than non-members. The dummy imASEAN captures the extra-regional import bias of ASEAN to the rest of the world or the import trade diversion where a negative and significant coefficient means that ASEAN has resulted in a member country preferring to import from members rather than non-members. The result was that both coefficient -imASEAN and exASEAN- all record positive and significant coefficients. The fact that both dummies are positive and significant means that members and non-members have traded with each other more than the hypothetical trade level.

exchange rates. The depreciation of ASEAN currencies during Asian crisis indeed contributed to an increase in the competitiveness of their products with the rest of the world.

Figure 5. Intra-ASEAN Exports (% of Total ASEAN Exports), 1989-2003



Source: UN COMTRADE Database, accessed through WITS

Based on the share of exports, the intra-ASEAN exports have been increasing from 1989 to 2003. The intra-ASEAN exports only fell in 1998 from 22% to 19% when ASEAN members prefer to trade with non-member countries. When they began to recover from the crisis, the intra-ASEAN trade slowly increased from 21% of their total exports to the world in 2001 to 23% in 2003. Moreover, in the early formation of AFTA, the intra-ASEAN export grew by 108 percent, higher than those to the world and rest of the world which only experience a growth at a rate 64.2 percent and 72.4 percent. When the crisis hit, the intra-ASEAN exports fell by 12.74 as the member prefer to trade with non-member countries, resulting an increase in ASEAN exports to the rest of the world by 5.24 percent and a moderate growth of ASEAN export to the world by 1.2 percent. In the period of recovery, the intra-ASEAN exports started to gain its momentum, experiencing a 36.8 percent growth rate. The rate was higher than both to the world and the rest of the world which only grew by 21.7 percent and 17.80 percent. The growth of ASEAN exports to non-member countries is even lower than that to the world, indicating that the growth of ASEAN exports is mainly sourced from the growth of intra-ASEAN exports.

Finally, we include the two indices called ‘complementarity index’ and ‘similarity index’. The result presented in Annex shows that degree of complementarity does have an effect on bilateral trade for ASEAN members while similarity between exported products from each country doesn’t have any effect on how they trade. The coefficient for index of complementarity is positive and significant at 1 percent of significance, showing that an increase in index by 1 percent leads an increase in the bilateral export by 1.4 percent. However, when the two indices are included in the model, the CRE dummy has a negative and significant effect on bilateral export for ASEAN members, which raise issues in terms of model specification and possible multicollinearity problems¹⁴.

¹⁴ See Gujarati, *Basic Econometrics*, 4th edition, McGraw-Hill, New York, 2003 for further explanation of multicollinearity and its degree

To address this issue, the variable ASEAN was dropped from the model to eliminate the multicollinearity problem.¹⁵ After we drop the ASEAN dummy, the result shows a consistent coefficient both for the standard gravity variable and regional trade effect with the previous estimation. The trade creation dummy is negative but insignificant while the trade diversion dummy is negative and significant at 1 percent level of significance. Moreover, both the complementarity index and similarity index give a positive and significant effect. Complementarity index is significant at 1 percent significance level while similarity index is significant only at the 10 percent level. A 1 percent increase in the complementarity index will raise the bilateral export from ASEAN members by 1.4 percent. In the same way, a 1 percent increase in the similarity index leads to a 0.2 percent increase in the bilateral exports from ASEAN members.

In general, the more complementarity there is between the export supply structures in the exporting country and the import demand structures in the destination country, the more they will trade with each other. As already suggested by Ng and Yeats (2003), the export and import profile of ASEAN members have become more complementary over time¹⁶. From Table 5 presented in Annex, exports of ASEAN countries are generally more complementary with each other than with countries outside the association. Except for Indonesia, which shows more complementarity with Japan and USA, the trade complementarity indices among ASEAN countries are relatively higher than those who are non-members.

Taking Malaysia as an example, the complementarity index is highest with the Singapore for each year since 1989. In 2003, Malaysia export structure matches mostly with Philippines and Singapore with index values of 0.69 and 0.75, respectively. Malaysia's export profile with other countries outside the region is rather dissimilar with relatively low index like 0.41 with India or 0.49 with UK. Furthermore, the index is increasing over time with those who are ASEAN members and decreasing with non-members. In 1989, the degree of complementarity with Japan is 0.53 while with Philippines is relatively lower at 0.48. But in 2003, the degree of complementarity with Philippines reached 0.69 while, with Japan it is only 0.56, indicating that the growth of Malaysian export's complementarity is higher with Philippines than with Japan. In conclusion, the increase in ASEAN trade complementarity index no doubt was an important factor fueling the rapid expansion of intra-regional trade. This means that the differences of factor endowments among ASEAN countries complements each others so that the export structure of each ASEAN countries fits in with the imports structure of other ASEAN countries.

On the other side, the similarity index reflects common characteristic of the exporting product between the bilateral countries. From Table 6 presented in Annex, many of the ASEAN countries generally have similar export structure. One of the

¹⁵ The issue of multicollinearity was investigated by looking at the pairwise correlation among the explanatory variables, showing strong correlation (>0.8) between the dummy ASEAN and CRE.

¹⁶ A study by Ng and Yeats accounted for East-Asian trade, including the ASEAN countries for the year 1985, 1995, and 200. Trade complementarity indices for five countries, namely, Hong Kong, Malaysia, Philippines, Thailand and Taiwan rose by more than 50 percent, while Indonesia's indices more than doubled. Overall, the evidence presented in Table 8.1 shows growing similarities between the goods East Asia exports, and the goods other regional countries import, was a potent factor promoting the expansion of intra-trade.

examples is Indonesia who shares common export structure mostly with Malaysia and Thailand in 2003 (with highest index values 0.51 and 0.49, respectively). The similarity index is significant at the 10 percent level and but has the opposite sign to what was expected. A 1 percent increase in the similarity index between the bilateral trading countries is estimated to lead to a 0.2 percent increase in its bilateral exports. This result is not consistent with the initial hypothesis that the more similar the export structure of two countries, the less they will trade. A possible explanation for this result is the large intra-industry trade between countries. The calculation of the index is based on the two-digit level of SITC and the bilateral trade between ASEAN countries is very large in the same sector at this two-digit level. In the case of Indonesia, the highest index with Malaysia is in the sector of petroleum and petroleum products; and telecommunication products. However, there is a great possibility that Indonesia and Malaysia trade in the petroleum and telecommunication sectors although both countries has similar export products, one of them coming from this sector. A study by Austria (2004) also found out that Indonesia has strong intra-industry trade with Malaysia in these sectors. This intra-industry trade with Malaysia was strong in parts of radio radar and apparatus and also electronic integrated circuits and micro assembly. From a broader perspective, the intra-industry trade of Indonesia to other ASEAN countries is also strong in three product categories, i.e., printed circuits, electrical apparatus for switching, and insulated wire/cable, among others¹⁷.

The strong intra-industry trade indicates the good prospect for further ASEAN integration, particularly in the priority sectors that lead to intra-regional trade in ASEAN. Moreover, intra-industry trade is also important for ASEAN to participate in global/regional production networks. However, since this study only looks at the side of the trade flow, then further discussion for the topic is out of the context and could be the basis for further research.

¹⁷ Using the Intra-Industry Trade index (IIT), Austria is aim to estimate how integrate the ASEAN industry since they reflects the increase division of labor and reduce transaction cost (Bora 1996; Austria 2003). The index uses the four-digit level of Harmonized System (HS) code at the year 1997 and 2001. In general, the ASEAN intra-industry trade was relatively high in the ICT and electronic sectors, shown by IIT greater than 50% for most of the ASEAN members.

V. Conclusion

This paper examined the importance of various determinants on intra and extra regional trade flows of ASEAN members. In particular this paper analyzed whether AFTA increased trade among its members and/or negatively affected non-member countries.

A basic and various augmented gravity models were estimated. The standard gravity variables –i.e. both reporting and partner country GDP, distance, common language, common border and whether the partner country is landlocked or not- were found to have significant effects on the bilateral exports of ASEAN members. This result is consistent with many previous studies which estimate the determinants of bilateral trade between countries using gravity equation.

The reduction of tariff was also found to have a significant effect in increasing the bilateral exports of ASEAN members. Therefore, effective implementation of the AFTA CEPT scheme to reduce or eliminate tariff barrier may be expected to boost the trade of ASEAN members. However, a greater number of products may need to be put in the CEPT inclusion list.

The econometric analysis also suggested that AFTA may be causing some trade diversion and shifting trade from countries outside the bloc to possibly less efficient countries inside the bloc. It also confirmed that the more complementary the supply and demand of countries, the more they will trade. Since the export and import profiles of ASEAN members have become more complementary to each other over time, the potential for intra-regional trade is great for ASEAN members.

Correspondingly, the similarity of the export structure of ASEAN members is one of the important factors influencing the growth of intra-industry trade among ASEAN members. Intra-industry trade may be expected to increase the intra-regional trade among ASEAN members and to support the further economic integration of the ASEAN region, as well as to facilitate participation in global/regional production network. Further research in this area may therefore be warranted.

Another issue of importance to the region that arise from this study is that further trade liberalization within ASEAN may also lead to further trade diversion and to possible welfare reduction in non-member countries (resulting from the trade shifting to the members). This study only looked at trade effects and not welfare effects but future research may be needed to investigate this issue which seems increasingly relevant as more and more countries in the region sign preferential trade agreements, all potentially affecting the welfare of excluded members.

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Annex

Table 1. The Impact of AFTA to ASEAN members' export

(OLS estimates, pooled data, 1988-2003)

	I	II	III	IV	V
GDP _{prep}	0.74*** (14.62)	0.74*** (14.68)	0.78*** (11.71)	0.72*** (11.50)	0.72*** (11.42)
GDP _{part}	0.65*** (25.74)	0.65*** (25.86)	0.73*** (23.54)	0.70*** (23.93)	0.65*** (24.59)
PGD _{prep}	0.46*** (22.37)	0.46*** (22.21)	0.42*** (18.76)	0.34*** (15.07)	0.33*** (14.79)
PGD _{part}	0.35*** (18.15)	0.34*** (17.45)	0.21*** (5.49)	0.17*** (4.86)	0.16*** (4.55)
Distance	-1.29*** (-27.04)	-1.31*** (-25.80)	-1.06*** (-16.53)	-0.99*** (-16.50)	-1.06*** (-18.78)
Language	0.27*** (4.27)	0.25*** (4.02)	0.38*** (-5.46)	0.36*** (5.47)	0.35*** (5.34)
Border	-0.34*** (-2.82)	0.19 (-1.29)	-0.21 (-1.30)	-0.21* (-1.73)	-0.21* (-1.73)
Landlock	-2.01*** (-18.79)	-2.01*** (-18.82)	-1.83*** (16.69)	-1.72*** (-15.97)	-1.79*** (-16.80)
Island	0.74 (1.25)	0.09 (1.58)	-0.03 (-0.05)	-0.00 (-0.07)	0.03 (0.65)
IndoMalay		-0.32* (-1.70)	-0.43** (-2.11)		
Tariff			-2.44*** (-4.01)	-1.73*** (-3.03)	-1.86*** (-3.24)
ASEAN			0.70*** (3.76)	0.62*** (3.58)	
Creation			-0.20 (-1.25)	-0.33** (-2.17)	-0.032 (-0.25)
Diversion			-0.13* (-1.73)	-0.26*** (-3.63)	-0.30*** (-4.31)
Complement				1.48*** (10.99)	1.46*** (10.81)
Similar				0.16 (1.43)	0.20* (1.76)
No. of Observations	1335	1140	1140	1131	1131
Adjusted R ²	0.72	0.74	0.74	0.77	0.77

Note: ***, ** and * denote 1%, 5%, and 10% level significance, respectively

Table 2. ASEAN export to ASEAN members, non-members, and the world, 1989-2003

Reporter	Partner	1989	1992	1995	1998	2001	2003
Indonesia	ASEAN 5	2,390,922.9	4,335,113.6	6,046,345.9	8,726,582.8	9,020,760.3	10,100,717.0
	Rest of The World	19,637,186.9	29,631,867.5	39,371,617.6	40,120,936.9	47,296,069.4	50,957,435.2
	World	22,028,109.8	33,966,981.1	45,417,963.5	48,847,519.7	56,316,829.7	61,058,152.1
Malaysia	ASEAN 5	6,300,972.6	11,858,175.3	19,533,263.9	16,918,096.7	21,123,567.4	24,617,703.0
	Rest of The World	18,747,273.7	28,910,320.3	54,244,887.6	56,336,127.2	66,880,917.8	80,089,526.1
	World	25,048,246.3	40,768,495.6	73,778,151.4	73,254,223.9	88,004,485.1	104,707,229.1
Philippines	ASEAN 5	530,970.3	518,827.8	2,239,100.7	3,719,357.7	4,909,916.1	6,423,036.4
	Rest of The World	7,289,738.0	9,305,480.4	15,208,077.6	25,776,982.7	27,239,942.2	29,808,156.1
	World	7,820,708.4	9,824,308.2	17,447,178.2	29,496,340.5	32,149,858.3	36,231,192.6
Singapore	ASEAN 5	9,241,236.1	12,703,439.0	31,437,035.8	23,418,492.9	29,498,825.5	47,947,567.0
	Rest of The World	35,445,394.8	50,759,669.6	86,826,067.7	86,486,444.0	92,254,913.8	112,015,780.8
	World	44,686,630.9	63,463,108.6	118,263,103.5	109,904,937.0	121,753,739.3	159,963,347.8
Thailand	ASEAN 5	2,278,803.9	4,102,380.7	10,698,949.2	8,257,261.8	10,534,617.6	13,648,218.0
	Rest of The World	17,779,455.5	28,372,020.1	45,740,391.9	45,326,233.4	54,578,626.0	66,682,697.9
	World	20,058,259.5	32,474,400.8	56,439,341.1	53,583,495.2	65,113,243.6	80,330,915.8
ASEAN5	ASEAN 5	20,742,905.9	33,517,936.4	69,954,695.4	61,039,792.0	75,087,686.9	102,737,241.4
	Rest of The World	98,899,048.9	146,979,358.0	241,391,042.3	254,046,724.2	288,250,469.2	339,553,596.1
	World	119,641,954.8	180,497,294.3	311,345,737.7	315,086,516.2	363,338,156.0	442,290,837.5

Source: UN COMTRADE Database accessed through WITS

Table 3. Growth of ASEAN Export to ASEAN members, non-members, and to the world, 1989-2003

Reporter	Partner	1989-1992	1992-1995	1995-1998	1998-2001	2001-2003
Indonesia	ASEAN 5	27.11	13.16	14.78	1.12	3.99
	Rest of The World	16.97	10.96	0.63	5.96	2.58
	World	18.07	11.24	2.52	5.10	2.81
Malaysia	ASEAN 5	29.40	21.57	-4.46	8.29	5.51
	Rest of The World	18.07	29.21	1.29	6.24	6.58
	World	20.92	26.99	-0.24	6.71	6.33
Philippines	ASEAN 5	-0.76	110.52	22.04	10.67	10.27
	Rest of The World	9.22	21.14	23.17	1.89	3.14
	World	8.54	25.86	23.02	3.00	4.23
Singapore	ASEAN 5	12.49	49.16	-8.50	8.65	20.85
	Rest of The World	14.40	23.68	-0.13	2.22	7.14
	World	14.01	28.78	-2.36	3.59	10.46
Thailand	ASEAN 5	26.67	53.60	-7.61	9.19	9.85
	Rest of The World	19.86	20.41	-0.30	6.80	7.39
	World	20.63	24.60	-1.69	7.17	7.79
ASEAN5	ASEAN 5	20.53	36.24	-4.25	7.67	12.27
	Rest of The World	16.21	21.41	1.75	4.49	5.93
	World	16.95	24.16	0.40	5.10	7.24

Source: UN COMTRADE database, accessed through WITS

Table 4. Share of ASEAN export to ASEAN members, non-members, and to the world, 1989-2003

Reporter	Partner	1989	1992	1995	1998	2001	2003
Indonesia	ASEAN 5	0.11	0.13	0.13	0.18	0.16	0.17
	Rest of The World	0.89	0.87	0.87	0.82	0.84	0.83
Malaysia	ASEAN 5	0.25	0.29	0.26	0.23	0.24	0.24
	Rest of The World	0.75	0.71	0.74	0.77	0.76	0.76
Philippines	ASEAN 5	0.07	0.05	0.13	0.13	0.15	0.18
	Rest of The World	0.93	0.95	0.87	0.87	0.85	0.82
Singapore	ASEAN 5	0.21	0.20	0.27	0.21	0.24	0.30
	Rest of The World	0.79	0.80	0.73	0.79	0.76	0.70
Thailand	ASEAN 5	0.11	0.13	0.19	0.15	0.16	0.17
	Rest of The World	0.89	0.87	0.81	0.85	0.84	0.83
ASEAN5	ASEAN 5	0.17	0.19	0.22	0.19	0.21	0.23
	Rest of The World	0.83	0.81	0.78	0.81	0.79	0.77

Source: UN COMTRADE Database, accessed through WITS

Table 5. Complementarity Index of ASEAN members with the trading partners, 1989-2003

	Year	Australia	China	India	Indonesia	Japan	Malaysia	Netherlands	Philippines	Singapore	Thailand	United Kingdom	United States
Indonesia	1989	0.287	0.250	0.408		0.547	0.273	0.364	0.411	0.371	0.343	0.320	0.386
	1991	0.306	0.280	0.459		0.530	0.243	0.374	0.398	0.366	0.318	0.343	0.404
	1993	0.365	0.357	0.403		0.567	0.294	0.428	0.443	0.371	0.343	0.393	0.447
	1995	0.387	0.401	0.462		0.579	0.307	0.438	0.480	0.365	0.356	0.400	0.465
	1997	0.451	0.471	0.497		0.644	0.367	0.504	0.434	0.425	0.439	0.447	0.525
	1999	0.458	0.469	0.483		0.622	0.369	0.488	0.430	0.413	0.451	0.452	0.512
	2001	0.520	0.505	0.488		0.664	0.418	0.552	0.517	0.475	0.502	0.512	0.578
	2003	0.505	0.479	0.514		0.659	0.424	0.542	0.439	0.471	0.499	0.511	0.595
Malaysia	1989	0.390	0.344	0.413	0.333	0.534		0.455	0.481	0.602	0.431	0.420	0.525
	1991	0.474	0.368	0.370	0.358	0.550		0.505	0.541	0.659	0.464	0.503	0.581
	1993	0.520	0.417	0.358	0.391	0.537		0.553	0.511	0.685	0.510	0.545	0.599
	1995	0.527	0.454	0.365	0.347	0.525		0.527	0.531	0.710	0.518	0.517	0.583
	1997	0.510	0.482	0.354	0.364	0.550		0.570	0.649	0.711	0.542	0.513	0.571
	1999	0.482	0.528	0.349	0.277	0.527		0.571	0.628	0.712	0.531	0.492	0.548
	2001	0.504	0.565	0.384	0.303	0.569		0.596	0.697	0.714	0.580	0.520	0.552
	2003	0.504	0.600	0.417	0.331	0.568		0.598	0.696	0.752	0.560	0.496	0.551
Philippines	1989	0.460	0.380	0.444	0.375	0.491	0.383	0.479		0.426	0.435	0.505	0.442
	1991	0.347	0.265	0.285	0.251	0.367	0.279	0.379		0.325	0.296	0.384	0.339
	1993	0.492	0.432	0.437	0.411	0.490	0.442	0.520		0.480	0.467	0.549	0.496
	1995	0.505	0.456	0.454	0.416	0.502	0.458	0.529		0.500	0.461	0.531	0.516
	1997	0.416	0.376	0.273	0.268	0.458	0.586	0.510		0.601	0.443	0.463	0.510
	1999	0.340	0.369	0.211	0.168	0.413	0.619	0.447		0.589	0.416	0.401	0.434
	2001	0.366	0.420	0.243	0.195	0.456	0.634	0.459		0.603	0.445	0.437	0.435
	2003	0.360	0.453	0.248	0.227	0.447	0.677	0.471		0.597	0.427	0.409	0.424
Singapore	1989	0.483	0.365	0.484		0.454	0.374	0.503	0.484		0.475	0.462	0.505
	1991	0.465	0.328	0.462		0.456	0.372	0.474	0.417		0.448	0.458	0.488

	1993	0.468	0.377	0.416		0.426	0.380	0.467	0.457		0.438	0.457	0.480
	1995	0.456	0.380	0.385		0.385	0.352	0.451	0.423		0.419	0.416	0.470
	1997	0.567	0.531	0.414		0.537	0.647	0.620	0.693		0.625	0.552	0.614
	1999	0.557	0.568	0.391		0.555	0.649	0.637	0.700		0.640	0.541	0.590
	2001	0.577	0.621	0.425		0.558	0.727	0.644	0.744		0.654	0.564	0.583
	2003	0.565	0.670	0.457	0.453	0.569	0.763	0.655	0.772		0.648	0.534	0.584
Thailand	1989	0.343	0.302	0.262	0.260	0.336	0.299	0.381	0.340	0.320		0.390	0.329
	1991	0.382	0.302	0.271	0.287	0.355	0.334	0.418	0.286	0.353		0.430	0.358
	1993	0.424	0.342	0.308	0.320	0.393	0.372	0.439	0.389	0.394		0.459	0.391
	1995	0.433	0.391	0.333	0.340	0.402	0.367	0.440	0.416	0.398		0.443	0.414
	1997	0.601	0.513	0.377	0.444	0.623	0.564	0.673	0.596	0.649		0.661	0.671
	1999	0.594	0.570	0.339	0.406	0.654	0.565	0.691	0.605	0.643		0.680	0.673
	2001	0.620	0.599	0.372	0.435	0.667	0.597	0.683	0.678	0.646		0.684	0.667
	2003	0.635	0.614	0.402	0.475	0.655	0.621	0.687	0.626	0.659		0.689	0.666

Source: Authors own calculation, database is accessed from WITS

Table 6. Similarity Index of ASEAN Members with trading partners, 1989-2003

	Year	Australia	China	India	Indonesia	Japan	Malaysia	Netherlands	Philippines	Singapore	Thailand	United Kingdom	United States
Indonesia	1989	0.271	0.337	0.336		0.125	0.485	0.332	0.388	0.389	0.313	0.266	0.226
	1991	0.263	0.404	0.383		0.133	0.434	0.345	0.395	0.388	0.368	0.277	0.247
	1993	0.317	0.487	0.439		0.187	0.439	0.377	0.465	0.369	0.431	0.328	0.288
	1995	0.335	0.479	0.424		0.222	0.424	0.393	0.464	0.333	0.463	0.360	0.334
	1997	0.354	0.462	0.394		0.247	0.470	0.433	0.375	0.349	0.465	0.374	0.346
	1999	0.401	0.502	0.432		0.272	0.430	0.438	0.310	0.358	0.467	0.393	0.370
	2001	0.403	0.541	0.475		0.324	0.498	0.461	0.357	0.400	0.502	0.464	0.398
	2003	0.406	0.494	0.470		0.322	0.517	0.454	0.341	0.404	0.499	0.461	0.400
Malaysia	1989	0.379	0.367	0.262	0.485	0.384		0.416	0.506	0.637	0.382	0.382	0.360
	1991	0.411	0.384	0.263	0.434	0.456		0.476	0.561	0.669	0.453	0.470	0.437
	1993	0.415	0.421	0.264	0.439	0.499		0.511	0.579	0.673	0.509	0.512	0.481
	1995	0.388	0.432	0.251	0.424	0.540		0.495	0.620	0.719	0.553	0.521	0.505
	1997	0.404	0.470	0.255	0.470	0.521		0.552	0.658	0.731	0.603	0.506	0.503
	1999	0.384	0.486	0.224	0.430	0.497		0.530	0.620	0.773	0.594	0.491	0.488
	2001	0.401	0.535	0.301	0.498	0.497		0.529	0.643	0.762	0.602	0.524	0.494
	2003	0.397	0.597	0.319	0.517	0.482		0.543	0.639	0.785	0.603	0.478	0.481
Philippines	1989	0.414	0.475	0.423	0.388	0.306	0.506	0.401		0.418	0.592	0.349	0.396
	1991	0.389	0.528	0.451	0.395	0.338	0.561	0.420		0.442	0.627	0.381	0.415
	1993	0.414	0.552	0.442	0.465	0.383	0.579	0.445		0.465	0.668	0.402	0.449
	1995	0.378	0.554	0.426	0.464	0.429	0.620	0.451		0.528	0.605	0.423	0.464
	1997	0.315	0.495	0.329	0.375	0.443	0.658	0.481		0.620	0.607	0.398	0.449
	1999	0.269	0.422	0.239	0.310	0.383	0.620	0.415		0.596	0.542	0.338	0.398
	2001	0.301	0.489	0.287	0.357	0.403	0.643	0.430		0.694	0.557	0.361	0.417
	2003	0.299	0.519	0.279	0.341	0.382	0.639	0.448		0.654	0.540	0.330	0.411
Singapore	1989	0.466	0.416	0.290		0.593	0.637	0.556	0.418		0.405	0.579	0.556
	1991	0.463	0.411	0.294		0.591	0.669	0.547	0.442		0.461	0.578	0.546

	1993	0.444	0.418	0.266		0.596	0.673	0.555	0.465		0.497	0.594	0.556
	1995	0.394	0.431	0.259		0.594	0.719	0.531	0.528		0.525	0.590	0.560
	1997	0.401	0.455	0.266		0.582	0.731	0.579	0.620		0.588	0.570	0.563
	1999	0.388	0.479	0.255		0.574	0.773	0.600	0.596		0.585	0.574	0.560
	2001	0.410	0.503	0.328		0.561	0.762	0.615	0.694		0.587	0.604	0.559
	2003	0.416	0.564	0.347	0.404	0.563	0.785	0.624	0.654		0.609	0.560	0.558
Thailand	1989	0.429	0.537	0.458	0.313	0.320	0.382	0.428	0.592	0.405		0.439	0.439
	1991	0.467	0.592	0.495	0.368	0.398	0.453	0.468	0.627	0.461		0.467	0.476
	1993	0.495	0.646	0.498	0.431	0.458	0.509	0.514	0.668	0.497		0.523	0.540
	1995	0.470	0.652	0.483	0.463	0.487	0.553	0.511	0.605	0.525		0.566	0.570
	1997	0.501	0.635	0.468	0.465	0.534	0.603	0.625	0.607	0.588		0.580	0.614
	1999	0.513	0.643	0.442	0.467	0.556	0.594	0.636	0.542	0.585		0.585	0.636
	2001	0.539	0.674	0.492	0.502	0.570	0.602	0.629	0.557	0.587		0.596	0.649
	2003	0.552	0.673	0.477	0.499	0.588	0.603	0.646	0.540	0.609		0.584	0.668

Source: Authors own calculation, database is accessed from WITS