JSPS (Kyoto University)-NRCT (Thamassat University)
Core University Program Conference 2006
"Emerging Developments in East Asia FTA/EPAs"
October 27-28, 2006
Kanbaikan Hall
Doshisha University

The Impacts of East Asia FTA:

A CGE Model Simulation Study

By

Mitsuyo Ando and Shujiro Urata
Waseda University

The Impacts of East Asia FTA: A CGE Model Simulation Study

Mitsuyo Ando and Shujiro Urata

I. Introduction

Free trade agreements (FTAs), which remove tariff and non-tariff barriers on trade among FTA members, have been actively established, negotiated and studied in East Asia in recent years. FTAs are likely to have significant economic impacts on FTA members as well as non-members. The impacts would be greater if the contents of FTAs are extended to include not only trade liberalization but also foreign direct investment (FDI) liberalization, trade and FDI facilitation, and economic cooperation as are the cases for FTAs in East Asia. Recognizing the increasing number of FTAs in East Asia, it is important to examine their impacts on economies.

In light of the on-going discussions on the possibility of East Asia FTA involving ASEAN members, China, Japan and Korea, this paper attempts to assess the likely impacts of East Asia FTA on the members and non-members of such an FTA. For the analysis, we use a computable general equilibrium (CGE) model, which has been the most popular tool for the analysis of trade policies such as FTAs.

The remainder of the paper is organized as follows. Section II discusses the properties and characteristics of CGE models, while section III reviews previous studies on the impacts of FTAs in East Asia using CGE models. The discussions in these sections set the stage for the main analysis of the paper, the impacts of ASEAN+3 FTAs, which is presented in section IV. Section V concludes the paper.

II. CGE Models: General Properties and Limitations

A number of simulation studies using CGE models have been undertaken to analyze the impacts of FTAs involving East Asian countries. Many studies use variations of the GTAP (Global Trade Analysis Project) model, while some apply other models such as the Michigan model (Brown, Deardorff, and Stern, 2003) (Table 1).

== Table 1 ==

CGE models are constructed to mimic the functioning of the economy so that they are suitable for simulation analysis of the impacts of economic policy such as trade policies. In constructing a simulation model, various assumptions about the workings of economic systems are made. Some of the fundamental assumptions are discussed below.

In CGE models, assumptions are made on how producers, consumers and governments behave. Producers and consumers are assumed to behave optimally to achieve their objectives. Specifically, producers are assumed to maximize profits while consumers to maximize utility. The government collects revenue from various types of taxes including direct and indirect taxes and import tariffs. As for government spending, various schemes have been adopted in the CGE models. Many models assume that government allocates its expenditure among different products according to pre-fixed sectoral shares,

Most CGE models assume perfect competition in product/service markets as well as in markets for the factors of production including labor and capital. One exception is the Michigan model, which assumes imperfect competition for non-agricultural sectors and perfect competition for agricultural sectors. In non-agricultural sectors the model assumes the presence of increasing returns to scale in production rather than constant returns to scale, which is generally assumed in other CGE models. The incorporation of scale economies (increasing returns to scale) is likely to result in larger economic impacts from policy changes such as tariff elimination under FTAs. This is because producers tend to expand their production by a larger scale than if they would under the constant return to scale case, as they benefit from lower average costs by increasing production.

In virtually all the CGE models, factors of production, labor and capital, are assumed to be mobile among sectors within a country but not mobile across borders. In an age of globalization, this assumption of international immobility of such factors of production is unrealistic. However, the incorporation of foreign direct investment and foreign workers in CGE models has not been satisfactorily dealt with yet. Some models assume that capital moves freely among the sectors and among the countries so as to equalize the rate of return on capital globally. Such treatment of capital may be justified in the very long run but it does not apply to actual FDI, which is subject to sectoral specificity in that a firm in the automobile sector in one country tend to undertake FDI in the automobile sector in another country. International labor movement has been attempted in some models in a very ad hoc way, in which the number of workers moving

internationally is assumed exogenously.

Most models are static in the sense that no time dimension is explicitly considered. As such the results of the simulation conducted using the static model or comparative static simulation can be interpreted as the “long-run” or “potential” impacts of FTAs. Only a few studies incorporate dynamic elements by introducing investment, which provides inter-temporal linkages. In many models inter-temporal linkages are incorporated in a rather crude and recursive fashion, in that investment for one period is added to capital stock for the next period. In these models, investment is determined not on the basis of inter-temporal optimization on the part of investors. Rather investment is determined in a static fashion from the optimizing behavior of the investor in the current period without considering the future. One notable exception is the APG-Cubed model developed by McKibbin and his colleagues, in which investment is determined endogenously to maximize the welfare of the consumers over time. Now that we discussed the main properties of the CGE models, let us turn next to the scenarios and methods used for the simulation analysis of FTAs.

FTAs in recent years, particularly those in East Asia, have not only liberalized trade policies by eliminating import tariffs and quotas, but they have also liberalized services trade and investment policies. Furthermore, many FTAs have trade and investment facilitation programs such as the mutual recognition of technical standards. Some FTAs even include economic cooperation projects such as the development of human resources and support for small and medium enterprises. In fact, such comprehensive FTAs including trade and investment liberalization and facilitation and economic cooperation have been named comprehensive economic partnership agreements (CEPA) or economic partnership agreements (EPA).

Although FTAs in recent years have comprehensive contents, most simulation studies of FTAs only analyzed the impacts of trade liberalization in product markets, mainly because of the difficulty associated with the incorporation of other features such as investment liberalization. Trade liberalization in models deals with tariff elimination explicitly but not the elimination of import quotas. As will be discussed below in the discussions on the data, import quotas are dealt with by expressing the impact of import quotas by “tariff equivalent.”

Liberalization in trade in services is not analyzed in CGE model simulations mainly because of the lack of information on barriers to services trade. One exception is

the Michigan model, which is used to analyze the impact of the liberalization of service trade by adopting information on barriers to service trade obtained from earlier studies.

As discussed above, trade facilitation has not been incorporated in many CGE models. One interesting attempt has been made by Hertel, Walmsley, and Itakura (2001), incorporating a mechanism under which trade facilitation is captured by a reduction in transportation costs.

Recognizing a variety of components of FTAs, the analysts have faced an enormous challenge for the incorporation of these components in the CGE models so that the impacts of FTAs may be analyzed with greater confidence.

Before closing this section on the discussions on the properties of the CGE models, let us briefly examine the data used for the analysis. Most CGE model simulation studies of FTAs use the GTAP database, which has information basically on production, consumption and foreign trade for the countries involved. The most up-to-date database is for 2001 but many studies conducted so far used the database for 1997. One should interpret the results of simulation using the 1997 database with caution, however, because 1997 was the year of financial crisis in East Asia and thus the information contained in the database is likely to be subject to abnormality. Currently, the GTAP database has 87 regions (countries) and 57 sectors. Many simulation studies modified the basic database in their analysis to fit their need by aggregating the sectors and countries.

III. The Results of Previous Simulation Studies

Despite some limitations, CGE models are considered the best tool for analyzing the impacts of FTAs. Because of this, many simulation exercises have been conducted to analyze FTAs. This section reviews the CGE based simulation studies, which have been conducted to study the impacts of FTAs involving East Asian countries.

As shown in Table 2, a variety of groupings under different FTAs has been studied to examine the impacts of FTAs. Some groupings represent actual and existing FTAs, while some represent hypothetical FTAs. Among the different groupings, those that are frequently chosen groupings include AFTA (ASEAN Free Trade Area, in action), three ASEAN+1s (ASEAN+China in action, ASEAN+Japan and ASEAN+Korea, in negotiation), China+Japan+Korea (hypothetical), East Asia (ASEAN+3, China, Japan, and Korea, hypothetical), and APEC.

== Table 2 ==

The economic impacts of FTAs are analyzed by setting domestic prices equal to international prices, which are interpreted as removing tariff and non-tariff barriers such as import quotas. As indicated earlier, the treatment of import quotas this way is not satisfactory, because the mechanism of quantity restriction under the import quota system is not explicitly incorporated. However, despite this drawback, the treatment of import quotas this way may be justified as a rough approximation.

CGE model studies analyze the impacts of FTAs on overall economies at a macroeconomic level as well as on industries at a microeconomic level. For impacts on overall economies, people's welfare level and GDP are generally chosen as the indicators, while for sectoral impacts, production and foreign trade are generally chosen for the analysis. In this survey, we consider the overall impacts on economies because of the limited space.

We observe some general trends. First, FTA members gain in terms of welfare and GDP, while non-FTA members lose. These observations can be seen in China-ASEAN5 FTA (Tsutsumi and Kiyota, 2000), Korea-ASEAN FTA (Lee et.al. 2003), and Japan-ASEAN6 FTA (Kawasaki, 2003). China-ASEAN5 FTA would increase welfare and GDP of China and ASEAN5 members, while Japan and Korea would suffer from a decline in welfare and GDP. Analogous patterns can be found for Korea-ASEAN FTA and Japan-ASEAN6 FTA. These findings are consistent with expectations that FTA members would gain by benefiting from expanded trade or trade creation, while non-FTA members would lose by a decline in trade or trade diversion. It should be noted, however, that this general trend cannot be observed in all studies. For example, Feridhanusetyawan, et.al. (2003) find that non-members of AFTA such as Japan and China would gain from AFTA. This somewhat unexpected result may be attributable to a very large gain on the part of AFTA members in terms of GDP growth, so that even for non-members the loss incurred from trade diversion is completely offset by the gain accrued from the trade expansion with AFTA members.

Another general trend observed from the results of CGE simulation studies has to do with the number of FTA members or FTA coverage. Generally, we observe that the larger the number of FTA members, the larger the gain from a FTA. This can be seen by comparing the results of different FTAs using the same model. For example,

Feridhanusetyawan et.al (2003) report that the APEC FTA results in larger welfare gain for the world compared to AFTA, although the larger welfare gain is not observed for all the countries. A similar pattern can be found in studies by Scollay and Gilbert (2001), Tsutsumi and Kiyota (2000), Kawasaki (2003), and Lee et.al. (2003). These findings are expected, because the benefits from improvements in resource allocation tend to increase with the country coverage, as the area without distortional measures such as tariffs broadens. This observation reminds us of the important policy implication that the best trade policy for the world is global free trade.

Focusing on the results obtained for an East Asia (ASEAN+3) FTA, the main issue of this paper, we find substantial variations among the studies shown in Table 2, that is, Lee et.al. (2003), Brown, et.al. (2003), and Tsutsumi and Kiyota (2000). Since these three studies report different economic indicators to assess the impacts of an East Asia FTA, we make comparisons between the studies using common indicators. In terms of changes in GDP, Lee et.al report that among China, Japan, and Korea, Korea benefits the most with China being the second to benefit and Japan being the last. The ordering is different in Tsutsumi and Kiyota, which puts China, Korea and Japan in descending order. As for the impacts on welfare per capita, Brown et.al list Japan, Korea, and China in descending order, while Tsutsumi and Kiyota's ordering is very different, placing Korea first, followed by Japan and then China. The two studies also measure the impacts of welfare per capita among ASEAN5 differently, although both report that Singapore and Malaysia are the largest and next largest gainers from an East Asia FTA.

The impacts of an East Asia FTA on non-FTA members are different among the three studies. As somewhat expected from the model incorporating economies of scale, Brown et.al. obtain positive impacts on the US, the EU and other non-members in terms of welfare. In contrast, Lee et.al. report negative impacts on both the US and the EU. Tsutsumi and Kiyota report a different result from the previous two studies. In their study, an East Asia FTA brings benefits to the US but loss to the EU.

A comparison of three studies, which examined the impacts of East Asia FTA, revealed remarkably different results. The differences are mainly due to the specification of the CGE model, because the data used in the analysis are more or less the same. Identification of the causes for these differences is beyond the scope of this paper. However, we can draw an important implication from this comparison in that CGE model simulations can produce different results depending on the specifications and

assumptions made for the model, and therefore, we must be careful to understand the results of CGE simulation exercises by paying special attention to the specifications and assumptions made for the model.

IV. An Analysis of FTAs in East Asia

This section attempts to estimate the effects of various FTAs in East Asia by undertaking simulation analysis based on the CGE model. As mentioned above, we employ the most pervasively used CGE model, i.e., the GTAP model. The database used in the paper is a recently updated version of the GTAP 6 database that corresponds to the global economy in the year 2001. Therefore, compared to those in the previous studies using version 5 (data as of 1997) or earlier versions of the GTAP database, our estimates would reflect a more updated picture of the global economy as a benchmark.

IV. I The Data and Experimental Design

The GTAP ver.6 database is composed of 87 regions and 57sectors.[1] In our analysis, 87 regions are aggregated into 15 regions (Table A.1 in the Appendix), and 57 sectors are aggregated into 15 sectors (Table A.2). This paper, in particular, focuses on 9 regions out of 15 regions as potential East Asia FTA members: Japan, China, Korea, and ASEAN members (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam).[2]

With the above aggregation of regions and sectors, the paper examines the effects of the following (hypothetical) FTAs:

(i) FTA among ASEAN (A)

(ii) FTA among ASEAN and China (A + C)

(iii) FTA among ASEAN and Japan (A + J)

(iv) FTA among ASEAN and Korea (A + K)

(v) FTA among ASEAN, China, and Japan (A + C+ J)

---

[1] The GTAP ver.5 database, for instance, is with 66 regions and 57 sectors.

[2] Note that “Vietnam” in our aggregation includes Brunei, Cambodia, Laos, Myanmar, and Timor, which are called “the rest of Southeast countries” in the GTAP ver.6 database. In the earlier versions of GTAP database, these countries are treated as a member of the rest of the world (ROW), and thus previous studies did not include these countries in ASEAN.

(vi) FTA among ASEAN, China, and Korea (A + C+ K)

(vii) FTA among ASEAN. Japan, and, Korea (A + J + K)

(viii) FTA among ASEAN+3 (incl. Hong Kong) (A + 3)

Considering the existence of ASEAN-China FTA that has been in force since July 2005, a comparison of the results of (ii: A + C), (v: A + C+ J), (vi: A + C +K), and (viii: A + 3) would be particularly of interest among the eight scenarios.

The elimination of trade barriers is, of course, an important element of FTAs, but FTAs are expected to have various effects other than the simple effects of trade liberalization as discussed in previous sections. In order to capture some of the dynamic effects besides static effects through the removal of trade barriers, we attempt to examine the impact of (a) trade liberalization, (b) capital accumulation, and (c) various facilitation and coordination programs. “Trade liberalization” in our simulations assumes the complete elimination of import tariffs and export subsidies (taxes) for the countries involved in a FTA.[3]

“Capital accumulation” is incorporated into the model, in which a change in investment levels is linked to a change in the levels of capital stock. In the basic version of the standard GTAP model, a change in investment levels has no influence on the levels of capital stock that is one of factors of production. In other words, the levels of capital stock do not change when the investment levels increase or decrease. By allowing for capital accumulation in the model, however, capital stock increases when investment increases, and, as a result, output would increase since the rental price of capital declines, resulting in the increase in capital stock used for production. Although the effects of FDI, one form of international capital movements, are not directly considered in our simulations, one would get a sense of its impacts by observing the impacts of capital accumulation.

“Various facilitation and coordination” programs are formulated in our simulation as an “import-augmenting technical change". In the model, a positive “import-augmenting technical change” or technical improvement in importing products lowers the market price (domestic price) of imported products. To estimate the effects of various facilitation and coordination programs, we investigate the effects of one percent change in this technical improvement as an exogenous change.

[3] Import tariff rates, for instance, are calculated as price differentials between domestic and c.i.f. import price. Unfortunately, the effects of the removal of service trade barriers are not considered in the paper since they are not reflected in the GTAP database.

The technical improvement in importing products can be regarded as improved efficiency in importing products. If a FTA covers trade facilitation and institutional convergence besides trade liberalization, for instance, such facilitation and coordination would contribute to improve efficiency in importing products and lower the market price of imported products. The technical improvement can also be interpreted as a reflection of reduced service link costs across borders. In East Asia, the international production/distribution networks, particularly in machinery industries, have been rapidly developed since the 1990s. Vertical international division of labor within the region has been well developed in production and distribution. When production processes are fragmented into several production blocks (PBs) and remotely located, the geographical distance requires service link costs connecting PBs such as transport cost, telecommunication cost, and various coordination costs. If a FTA helps to lower these service link costs across borders among the member countries, there would be a room for international production/distribution networks in the region to be more actively utilized.

In the paper, the above-mentioned effects are examined with the following simulations for each FTA:

(i) (a) Trade liberalization

(ii) (a) Trade liberalization + (b) capital accumulation

(iii) (a) Trade liberalization + (b) capital accumulation + (c) various facilitations and coordination

IV.II Economic Structure of ASEAN+3 in 2001

Before analyzing the simulation results, this subsection briefly discusses the features of the economic structure of potential members of East Asia FTA, based on the GTAP database with the aggregation noted above. Table 3 shows values and sectoral compositions of output, value added, exports, and imports for each county in the base year, 2001. Table 4 in turn presents the relative importance of East Asian countries in merchandise trade for each country/group by sector.[4]

== Table 3 ==

[4] See Table A.3 in the Appendix for the corresponding figures of individual ASEAN countries.

== Table 4 ==

Manufacturing sectors as a whole, which includes the sectors from textile and apparel to other manufacturing in the table, account for a significant component of production activities in East Asia: their sectoral shares of output (value added) are 29 percent (18 percent) for Japan, 51 percent (37 percent) for China, 43 percent (26 percent) for Korea, and 41 percent (24 percent) for ASEAN. Some ASEAN countries present even higher shares such as Malaysia with 57 percent (44 percent) and Thailand with 44 percent (27 percent). In manufacturing sectors, relatively large sectors with a share of more than five percent in total output for each country/group are textile and apparel for China (seven percent) and ASEAN (five percent), chemical products for Japan (six percent), China (14 percent), Korea (11 percent), and ASEAN (eight percent), machinery for China (nine percent) and Korea (eight percent), electronic machinery for Japan (five percent), Korea (15 percent), and ASEAN (13 percent), and transport equipment for Japan (five percent) and Korea (six percent).

These manufacturing sectors play an outstandingly important role in international trade in East Asia: manufacturing accounts for 90 percent of total exports and 56 percent of total imports for Japan, 89 percent and 76 percent for China, 88 percent and 62 percent for Korea, and 73 percent and 74 percent for ASEAN.[5] The high portion of manufacturing trade can be explained by machinery, electronic machinery, and transport equipment sectors. These machinery sectors (the sum of “machinery”, “electronic machinery”, and “transport equipment”) account for 68 percent of total exports and 28 percent of total imports for Japan, 35 percent and 40 percent for China, 54 percent and 34 percent for Korea, and 18 percent and 53 percent for Indonesia, 57 percent and 54 percent for Malaysia, 69 percent and 59 percent for the Philippines, 58 percent and 43 percent for Singapore, 39 percent and 22 percent for Thailand, and six percent and 48 percent for Vietnam. Moreover, a large portion of trade in these sectors is intra-East Asian trade (Tables 4 and A.3). These facts suggest the existence of a significant amount of

[5] The figures of individual ASEAN countries are 67 percent and 76 percent for Indonesia, 74 percent and 77 percent for Malaysia, 87 percent and 79 percent for the Philippines, 78 percent and 72 percent for Singapore, 72 percent and 60 percent for Thailand, and 50 percent and 74 percent for Vietnam.

back-and-forth transactions of machinery parts and components beyond national borders within the region, particularly in machinery and electronic machinery sectors.

Other manufacturing sectors, in particular textile and apparel and chemical sectors, also witness active international transactions in the region. In the textile and apparel sector, for instance, intra-regional trade accounts for over 80 percent of imports in Japan and over 60 percent of imports in Korea and ASEAN. China accounts for almost 70 percent and 50 percent of textile and apparel imports for Japan and Korea, respectively (Table 4).

Regarding non-manufacturing sectors, agriculture and food is relatively large in production for China (15 percent of total production and 20 percent of value added) and ASEAN (13 percent and 14 percent). Although the relative significance of individual services sector varies among countries, trade, transport and communication, and public services sectors tend to be commonly large.

Table 5 presents sectoral average import tariffs rates in ASEAN+3 in 2001. Clearly, the agriculture and food sector is protected by high tariffs for many countries. On the other hand, tariffs in manufacturing sectors on average are already less than five percent except China (13 percent), Thailand (10 percent), and Vietnam (13 percent). Looking at individual manufacturing sectors, however, one finds some sectors with relatively high tariffs. The typical sector with high tariff is the textile and apparel: tariffs are close to or over 10 percent in all ASEAN+3 countries except Singapore.[6] One would expect that the tariff elimination in this sector would have a significant effect on location of production and international trade. There is also relatively large room to liberalize trade in the transport equipment sector in China with 21 percent tariff rate and all ASEAN countries other than Singapore with 15 percent tariff rate on average. In addition to these sectors, relatively high protection is given for wood and paper, chemical, and metal products sectors in China and some ASEAN countries, and for the machinery and electronic machinery sectors in China.[7]

---

[6] The tariffs in the textile and apparel are nine percent for Japan, 21 percent for China, 10 percent for Korea, nine percent for Indonesia, 12 percent for Malaysia, seven percent for the Philippines, 19 percent for Thailand, and 21 percent for Vietnam.

[7] The tariffs in the transport equipment sector in ASEAN countries other than Singapore are 10 percent for Indonesia, 32 percent for Malaysia, 12 percent for the Philippines, 24 percent for Thailand, and 42 percent for Vietnam.

== Table 5 ==

Table 6 in turn presents bilateral trade-weighted average import tariff rates in ASEAN+3. Chinese tariffs imposed on imports from Japan, Korea, and all ASEAN countries exceed 10 percent. Thailand and Vietnam also impose high tariffs on imports from Japan, China, and Korea, and other ASEAN countries. Furthermore, Korean tariffs imposed on imports from China are also high.

== Table 6 ==

IV.III Some Implications of Our Simulation Results

Tables 7-9 display our estimates of the effects of eight scenarios of FTAs among Japan (J), China (C), Korea (K), and ASEAN (A) on real GDP and welfare.[8] Apparently, regardless of the case with simple static effects through trade liberalization or the case with static plus some dynamic effects, ASEAN+3 FTA brings about the largest impact on welfare as well as GDP for ASEAN+3 as a whole: 0.14 percent (percent changes in real GDP of the base year), US$20 billions (changes in welfare), and US$10 (changes in per capita welfare) in the case with trade liberalization, 1.17 percent, US$65 billions, and US$33 in the case with trade liberalization and capital accumulation, and 1.48 percent, US$83 billions, and US$42 in the case with trade liberalization, capital accumulation, and various facilitations and coordination.[9] It implies that the larger the number of FTA members, the larger the gains from FTA.

= Table 7 ==

= Table 8 ==

= Table 9 ==

[8] Per capita welfare effects in Table 9 are obtained by dividing welfare effects in Table 8 by population available from the GTAP database.

[9] The welfare loss in China due to the simple trade liberalization in FTA with ASEAN, FTA with ASEAN and Japan, and FTA with ASEAN and Korea is due to the deterioration of the terms of trade effect.

Moreover, ASEAN+3 FTA is the most beneficial among the eight FTAs to all individual member countries except Hong Kong in terms of GDP when we consider the effects through trade liberalization, capital accumulation, and various facilitations and coordination. The percentage changes in real GDP are 15.37 percent for Thailand, 6.33 for Vietnam, 5.64 percent for Malaysia, 5.17 percent for Singapore, 5.06 percent for the Philippines, 4.91 percent for Korea, 3.22 percent for Indonesia, 1.73 percent for China, and 0.31 percent for Japan in the descending order. It confirms that ASEAN+3 FTA creates the largest gains for the member economies.

The tables also demonstrate huge impacts of capital accumulation. A large difference in the effects on GDP and welfare between the case with only trade liberalization and the case with trade liberalization and capital accumulation indicates that an increase in investment, followed by an increase in capital stock, has a large impact on the economy. It implies that, roughly speaking, the effects of FDI as an international capital movement would be large particularly for developing countries such as China and ASEAN countries, though the effects of FDI are not directly considered in our simulations.[10]

Furthermore, our results clearly present how various facilitation and coordination are important. Our simulations formulated them as a positive “import-augmenting technical change" (technical improvement) and assumed only one percent change in this technical improvement as an exogenous change. Even one-percent improved efficiency in importing products has indeed a significant impact on GDP and welfare as a comparison of the cases with and without various facilitations and coordination suggests. Thus, if a FTA covers trade facilitation and institutional convergence besides trade liberalization, such facilitations and coordination no doubt are beneficial to member economies. In addition, if a FTA helps to lower service link costs across borders among the member countries, there is room for international production/distribution networks in the region to be more actively utilized.

A comparison of our results with those from the previous studies shown in Table 2, one observes somewhat smaller impacts from our simulation. One important

[10] An important motivation for developing countries to conclude FTAs with developed countries is to stimulate inward FDI since FDI brings in a bundle of capital, technology, and managerial ability as well as providing a channel to access to international markets.

reason is the reduction in tariff rates from 1997 to 2001, as previous studies use 1997 data while we use 2001 data. Besides the differences in the data, different models and simulation scenarios are accounted for the differences in the results.

In the following, let us focus on the effects of ASEAN+3 FTA on output, exports, imports, and trade balance (net exports) for different sectors. Real changes in output and percentage changes are expressed in Table 10, and real changes in exports and imports and percentage changes are shown in Table 11. Table 11 also shows the changes in trade balance (nominal). Moreover, in order to understand more precisely changes in trade, contribution ratios of each East Asian country to the changes in exports and imports are obtained (Table 12). Note that contribution ratios in Table 12 are calculated, based on the changes in values of exports and imports, which are nominal changes. These ratios here are expressed as a relative portion of increases in trade with each member country to total increases in trade in one country by sector, indicating how significantly each member country contributes to expansions in exports/imports of one country.[11]

== Table 10 ==

== Table 11 ==

== Table 12 ==

In Japan, output in most manufacturing sectors increases, while output in the agriculture and food sector declines by two percent. In the agriculture and food sector, changes in trade balance are significantly negative. Combined with the fact that both exports and imports increase by almost the same percentage, this indicates that increases in imports are larger than increases in exports. Major importers contributing to the negative changes in net exports are China and Thailand. Although Japanese exports to

[11] For instance, increases in Japanese exports to China correspond to 68 percent of increases in total Japanese exports in the agriculture and food sector. Similarly, increases in Japanese imports from China correspond to 61 percent of increases in total Japanese imports in the same sector. In some cases, you would get the value greater than 100 percent if you add the values for all member countries. This is because there is a large decline in the value for non-East Asian countries. See Table A.4 for corresponding figures for individual ASEAN countries.

China and Thailand increase, the increases in imports from these countries greatly exceed that amount. Regarding manufacturing sectors, all sectors other than wood and paper products, electronic machinery, and "other" manufacturing sectors expand production. Exports and imports also increase in sectors such as textile and apparel, chemical products, metal products, and machinery, and China and ASEAN greatly contribute to such trade changes for both Japanese exports and imports. Note that electronic machinery exports decrease largely due to decline in exports to China, while electronic machinery imports increase due to grow in imports from China and ASEAN.

Regarding China, output in the agriculture and food sector increases by 5.5 percent, while exports in the sector significantly grow, resulting in a large degree of increase in net exports (US$17 billions). Such a drastic increase in exports is attributed to an increase in its exports to Korea (corresponding to 77 percent of the increase in exports) and Japan (24 percent). The electronic machinery sector also shows gains in terms of its output and trade balance. In this sector, exports and imports increase by 12 percent and 25 percent. Major destinations of growing exports of Chinese electronic machinery are Japan (corresponding to 16 percent of the export increase) and ASEAN (23 percent). Major origins of growing imports are again Japan (65 percent) and ASEAN (70 percent). On the other hand, output in some manufacturing sectors such as transport equipment declines, and the value of net exports is also negative. Although exports increase by 24 percent, imports increases at a faster pace by 38 percent; a large portion of this increase in imports derives from Japan (corresponding to 148 percent of the increase) and Korea (33 percent). Interestingly, Vietnam significantly contributes to the increases in Chinese exports in the transport equipment sector.

In Korea, output in all sectors except agriculture and food and natural resources sectors expand. A significant drop in the production of agriculture and food, which corresponds to a 13 percent-decline, seems to be replaced by the increases in imports mainly from China (174 percent of the increase), while both exports and imports even become three times and two times the base year as a result of ASEAN+3 FTA. On the other hand, the production in the textile and apparel sector expands by 34 percent. Although exports and imports are also almost 1.5 times of the base year, increases in exports are larger than increases in imports as a large positive changes in net exports suggests (US$6 billions); the main contributors to this growth in trade are China (71 percent of the increases in exports and 94 percent of the increases in imports) and

ASEAN countries (21 percent and 13 percent). The expansion in the production of chemical products, which is equivalent to eight percent of output in the base year, is also notably large; the largest contributor of increased exports is China (74 percent), and the largest origin of increased imports is Japan (73 percent). In machinery sectors, Korean imports from Japan increase and Korean exports to China greatly increase.

In ASEAN countries, remarkable changes are observed in chemical products, machinery, and electronic machinery sectors. Output expands by 12 percent on average in the chemical products sector, six percent on average in the machinery sector, and 10 percent in the electronic machinery sector. The expanding machinery exports by ASEAN countries tend to go to China and other ASEAN countries, while a large portion of the increase in machinery imports tends to come from Japan, China, and other ASEAN countries. The expanding electronic machinery exports by ASEAN countries also tend to go to China and other ASEAN countries, while a large portion of the increase in electronic machinery imports tends to come from China and other ASEAN countries. Although expansion of production in the transport equipment in ASEAN is small on average, trade become active even in this sector, with increases in exports by 33 percent and those in imports by 26 percent as a result of increases in intra-regional trade. These indicate that back-and-forth transactions are likely to be more active with ASEAN+3 FTA in machinery sectors.

V. Conclusions

This paper examined the possible impacts of eight hypothetical FTAs by using a simulation analysis based on a GTAP CGE model. We found that ASEAN+3 FTA is the most desirable FTA among eight hypothetical FTAs to all member countries at the macro level. At the same time, our results demonstrate significant impacts of capital accumulation and various facilitation and coordination programs on the member economies. At the sectoral level, many sectors gain in terms of output and trade. Some sectors in certain countries indeed lose in terms of output as a result of ASEAN+3, but most of them experience increases in both exports and imports even if output declines.

These results indicate that the larger the coverage in terms of membership as well as contents such as trade and FDI liberalization and facilitation, and economic cooperation will be, the greater benefits can be accrued to the members. Despite the overall benefits or benefits at macroeconomic level obtained from FTAs, some sectors

tend to suffer from a decline in output and employment, which would result from greater competition caused by FTAs. Indeed, these potentially and negatively impacted sectors oppose to FTAs and become an obstacle to the formation of FTAs. In order to overcome such opposition and to successfully establish FTAs, governments should provide temporary safety net such as provision of financial and technical assistance under a strong political leadership.

References:

ACEGEC (2001) “Forging Closer ASEAN- China Economic Relations in the Twenty-first Century” A Report submitted by the ASEAN- China Expert Group on Economic Cooperation.

Adams, F. Gerard and Innwon Park (1995) “Measuring the Impact of AFTA: An Application of a Linked CGE System” Journal of Policy Modeling 17:4, 325- 365.

APEC (1997),"The Impact of Trade Liberalization in APEC", APEC Economic Committee

APEC (2002),"The Benefits of TILF in APEC", APEC Economic Committee

Brown, Drusilla K., Alan V. Deardorff and Robert M. Stern (2003) “Multilateral, Regional and Bilateral Trade Options for the United States and Japan” World Economy 26:6, 803- 828.

Chirathivat, Suthipand (2002) “ASEAN- China Free Trade Area: Background, Implications and Future Development” Journal of Asian Economics 13, 671- 686.

Davis, Lee, Warwick McKibbin and Andrew Stoeckel (2000) “Economic Benefits of an AFTA- CER Free Trade Area: Year 2000 Study” Centre for International Economics, Canberra.

Feridhanusetyawan, Tubagus and Mari Pangestu (2003) “Indonesian Trade Liberalization: Estimating the Gains” Bulletin of Indonesian Economic Studies 39:1, 51- 74.

Hertel, Walmsley and Itakura (2001),"The Dynamic Impact of Japan's "New Age" Free Trade Agreements"

Kawasaki (2003),"The Impact of Free Trade Agreements in Asia", RIETI Discussion Paper Series 03- E- 018.

Lee, Chang- Soo, Nakgyoon Choi and Park Soon- Chan (2003) “Analysis of the Trade Negotiation Options in the East Asian Context” KIEP Policy Analyses 03- 02.

Scollay, Robert and John Gilbert (2001) “New Trading Arrangements in the Asia-Pacific?” Institute for International Economics. Washington DC.

Tsutsumi, Masahiko and Kozo Kiyota (2000), "The Impact of Free Trade Agreements among Japan: analysis by CGE model" or Nihon wo meguru Jiyu Boeki Kyotei no Koka: CGE model ni yoru Bunseki, JCER DISCUSSION PAPER No.74.

Urata, Shujiro and Kozo Kiyota (2003) “The Impact of an East Asia FTA on Foreign Trade in East Asia” Paper prepared for Fourteenth Annual NBER- East Asian

Seminar on Economics in Taipei, 5- 7 Sep 2003.

Table 1 Survery of previous studies: the model structures and simulation methods

papers	FTAs in analysis	model/database used for analysis	aggregation of regions and sectors	structure of model	method and characteristic of simulation
Adams and Park (1995)	ASEAN Free Trade Area (AFTA)	- Linked CGE System: i) no inter- sectoral capital transference, ii) existence of misemployment, iii) connection btw. education/health- related consumption and human resource, iv) impact of government investment on long- term economic growth, v) governmental fiscal deficit is financed by household savings, vi) imbalance of current-account is financed by external investment and exchange reserve, vii) money supply is decided by governmental fiscal deficit and external imbalance	- countries/regions: 6 (ASEAN5+others) - sectors: na	- static model - accumulation process of physical and human capital is subject to dynamics	- estimating impact of tariff reduction by ASEAN countries i) tariff reduction on imports from other ASEAN countries ii) tariff reduction on imports from other countries/regions iii) tariff reduction of both i) and ii)
APEC (1997)	APEC trade liberalization	- GTAP model - GTAP Version2 database (data as of 1992)	- countries/regions: 19 - sectors: 16	- static model with capital accumulation	simulating by giving impact on tariff as exogenous variable
Tsutsumi and Kiyota(2000)	1. Japan, Singapore 2. Japan, Korea and Singapore 3. Japan, Mexico and Singapore 4. Japan, Korea, Mexico and Singapore 5. ASEAN4, China, Japan, Korea and Singapore 6. ASEAN4, China and Singapore 7. Japan - US 8. China - Japan	- GTAP model - GTAP Version4 database (data as of 1995)	- countries/regions: 19 - sectors: 16	- static model - comparative analysis between benchmark case (growth of factors incorporated into base year of 1995 data) and FTA case	i) trade liberalization case (with and without the agriculture sector) - impact on tariffs ii) capital movement/technology transfer case - sectoral TFPs are calculated from GTAP database; estimating under assumption that signatory of lower TFP would experience 1% increase of TFP iii) labor movement case - estimating under assumption that scale of Japanese labor market would experience increase by 1% of labor of partner-signatory of FTA model formula considers impact of overseas remittance (by Francois)
Lee, McKibbin and Stoeckel(2000)	1. ASEAN- CER trade liberalization 2. ASEAN- CER trade liberalization and APEC trade liberalization 3.APEC trade liberalization	- APG- Cubed model - existing applied general equilibrium model with characteristics of: i) modeling of financial sector. ii) linkage with macro economic variable (especially fiscal sector), iii) time series estimation of policy impact	- countries/regions: 18 - sectors: 14	- dynamic model - 1999 data as base year: simulated till 2020	i) ASEAN- CER liberalization - estimating impact of tariff reduction imposed on trade between Australia/New Zealand and ASEAN ii) APEC liberalization - tariff reduction of APEC economies based upon Bogor Declaration
ACEGEC (2001)	ASEAN - China FTA	- GTAP model - GTAP Version4 database (data as of 1995)	- countries/regions: 10 - sectors: 10	- static model	- estimating impact of tariff reduction of China and ASEAN countries
Hertel, Walmsley and Itakura(2001)	APEC Region FTA	- Dynamic- GTAP model - GTAP Version4 database (data as of 1995), estimation based on a data to which foreign income data (based on IMF Balance of Payment) is added	- countries/regions: 19 - sectors: 17	- dynamic model - estimation by distinct impact of FTA from dynamic and statistic models	i) Japan - Singapore, Japan - Korea FTAs - tariff decreasing effect (impose on tariff as shock), cost decreasing effect from trade procedure (as elimination of transportation cost), propulsive effect of e-Commerce (margin decreasing effect as shock to production tax), decreasing effect of service trade barrier calculating service barrier based on gravity model and impose as shock ii) APEC- FTA - considering impact of decreasing service trade barrier
Scollay, Robert and John Gilbert (2001)	1. APEC trade liberalization 2. ASEAN - China - Japan - Korea - CER FTA 3. Global trade liberalization	- standard applied general equilibrium model - GTAP Version4 database (data as of 1995)	- countries/regions: 22 - sectors: 21	- static model - tariff reduction by Uruguay Round and elimination of textile export restriction, impact from AFTA of ASEAN members are incorporated into trade barrier data in GTAP Version4 database	- estimating impact of tariff elimination by trading partners

(Continue)

	FTAs subject to analysis	model/database used for analysis	aggregation of regions and sectors	structure of model	method and characteristic of simulation
APEC (2002)	1. APEC trade liberalization (50% tariff reduction) 2. APEC trade facilitation (elimination of trade cost) 3. APEC investment liberalization (elimination of investment cost)	- GTAP model - GTAP Version5 database (data as of 1997)	- countries/regions: 22 - sectors: 20 investment facilitation - countries/regions: 23 - sectors: 17	- static model - enables estimation of impact of trade facilitation by incorporating tariff, transportation cost and inefficiency of trade into formula of imported goods price	i) APEC trade liberalization - estimating impact of tariff elimination within the area ii) APEC trade facilitation - estimating impact of reduction of trade cost iii) APEC investment liberalization - estimating impact of decrease of capital price at rate of tariff- equivalent investment barrier
Chirathivat (2002)	ASEAN - China trade liberalization	- CAMGEM (Chulalongkorn and Monash General Equilibrium Model: GTAP- based applied general equilibrium model)	- courtiers/regions: na - sectors: 50	- static model	- estimating impact of tariff reduction between analyzed countries
Brown, Deardorff and Stern (2003)	1.APEC FTA 2.ASEAN＋3 FTA	- Michigan Model - GTAP Version4 database (data as of 1995) and necessary data, e.g. numbers of corporations, is added - In addition to the above, base data as of 2005 is composed by several data	- countries/regions: 21 - sectors: 18	- static model - modeled under assumption of perfect competition in agriculture sector and monopolistic competition in other sector - merit of scale is considered	i) APEC trade liberalization - estimating impact of reduction of agriculture and manufacturing, service trade barriers among APEC economies: barriers are calculated as tariff- equivalent ii) ASEAN+3 FTA - estimating under assumption that barriers be eliminated in agriculture, manufacture and service sectors among ASEAN countries (Indonesia, Malaysia, Philippines, Singapore and Thailand) and China/Hong Kong, Japan, Korea: barriers are calculated as tariff-equivalent
Feridhanusetyawan and Pangestu(2003)	1.ASEAN Free Trade Area (AFTA) 2.APEC trade liberalization	- GTAP model - GTAP Version3 database (data as of 1994)	- countries/regions: 19 - sectors: 12	- static model	- estimating trade liberalizing effect based on the assumption of tariff elimination by liberalization of Uruguay Round, ASEAN Free trade Area and APEC
Kawasaki(2003)	1. ASEAN - Japan 2. ASEAN - China 3. ASEAN - China -Japan	- GTAP model - GTAP Version5 database (data as of 1997)	- countries/regions: 23 - sectors: 16	- static model with effect of productivity by trade liberalization	- estimating effect of tariff reduction of each FTA combination, based upon calculation of tariffs of countries/regions, industrial sectors, respectively, by GTAP database
Lee, Choi and Park (2003)	1. China - Japan - Korea - FTA 2. ASEAN - Korea FTA 3. ASEAN+3 FTA	- GTAP model - GTAP Version5 database (data as of 1997) incorporated impact of accession of China to WTO as the result of post- Uruguay Round negotiations	- countries/regions: 8 - sectors: 17	- static model with capital accumulation impact by trade liberalization	- estimating impact of tariff reduction of agriculture, manufacture and service sectors
Urata and Kiyota (2003)	East Asian Region FTA (China, Japan, Korea, Hong Kong, Singapore, Taiwan, Indonesia, Malaysia, Philippines, Thailand, Vietnam)	- GTAP model - GTAP Version5 database (data as of 1997)	- countries/regions: 20 - sectors: 21	- static model	- estimating effect of tariff reduction of agriculture and manufacture calculated from GTAP database

Table 2 Survey of previous studies: simulation results

FTAs in analysis	ASEAN			ASEAN-CER	ASEAN6-China		ASEAN5-China			ASEAN6-Japan	ASEAN-Korea
Papers	Adams and Park (1995)	Feridhanusetyawan and Pangestu (2003)		Lee, McKibbin and Stoeckel (2000)	Kawasaki (2003)	ACEGEC (2001)	Tsutsumi and Kiyota (2000)			Kawasaki (2003)	Lee, Choi and Park (2003)
Effects of FTAs on	Welfare (percentage change)	Welfare (billion dollar)*1	Welfare per capita (dollar)*10	GDP (cumulative percent change)*2	GDP (percentage change)	GDP (percentage change)	GDP (percentage change)*3	Welfare (billion dollar)*3	Welfare per capita (dollar)*10	GDP (percentage change)	GDP (percentage change)
Japan	—	96.57	773	—	-0.07	-0.09	-0.05	-4.90	-39	0.38	-0.27
Korea	—	6.93	156	—	—	—	-0.16	-1.74	-39	—	4.83
China	—	3.52	3	—	0.97	0.27	9.17	40.88	34	-0.27	-0.08
Hong Kong	—	0.74	121	—	—	—	-6.68	4.76	768	—	—
Taiwan	—	4.01	191	—	—	—	-0.92	-3.82	-180	—	—
Indonesia	0.60	1.60	8	0.34	1.92	1.12	3.16	6.82	35	3.66	0.46
Thailand	1.34	1.73	30	0.27	10.13	0.41	6.03	7.07	121	25.75	
Malaysia	1.60	1.35	69	0.15	6.78	1.17	7.24	6.25	311	9.27	
Philippines	0.67	0.46	7	0.26	2.79	0.32	2.69	1.64	24	3.96	
Singapore	—	4.08	1,407	0.17	5.64	1.05	10.40	9.97	3,323	4.53	
U.S.	—	3.13	12	—	—	-0.04	0.00	0.85	3	—	-0.06
EU	—	18.13	54	—	—	—	0.02	1.73	5	—	-0.08
Australia	—	2.30	129	0.25	—	—	0.14	1.15	53	—	—
New Zealand	—	1.87	534	0.27	—	—				—	—
The World	—	116.46	21	—	0.10	—	—	—	—	0.22	—

FTAs in analysis	ASEAN-Korea	ASEAN6-China-Japan	China-Japan-Korea		ASEAN+3						
Papers	Lee, Choi and Park (2003)	Kawasaki (2003)	Lee, Choi and Park (2003)		Lee, Choi and Park (2003)*4		Brown, Deardorff and Stern (2003)		Tsutsumi and Kiyota (2000)	Tsutsumi and Kiyota (2000)	
Effects of FTAs on	Welfare (percentage change)	GDP (percentage change)	GDP (percentage change)	Welfare (percentage change)	GDP (percentage change)	Welfare (percentage change)	Welfare (billion dollar)	Welfare per capita (dollar)*10	GDP (percentage change)*3	Welfare (billion dollar)*3	Welfare per capita (dollar)*10
Japan	-0.09	0.79	0.93	0.48	1.17	0.75	170.39	1,361	1.02	79.80	637
Korea	3.17	—	2.25	3.55	5.18	5.45	23.94	533	9.05	43.89	978
China	-0.07	3.68	2.31	0.97	2.37	1.17	17.66	15	27.69	122.69	102
Hong Kong	—	—	—	—	—	—	0.21	34	-0.20	6.42	1,035
Taiwan	—	—	—	—	—	—	10.80	509	-2.56	-9.99	-471
Indonesia	0.53	4.08	-0.93	-0.48	3.25	2.86	5.80	30	13.46	17.81	92
Thailand		27.16					5.36	92	18.44	17.49	301
Malaysia		10.79					7.70	383	18.52	10.96	545
Philippines		4.67					6.42	94	8.43	3.05	44
Singapore		5.66					7.93	2,643	16.85	12.03	4,010
U.S.	-0.01	—	-0.60	-0.08	-0.90	-0.15	12.98	49	0.07	7.51	29
EU	-0.03	—	-0.53	-0.08	-0.82	-0.16	4.29*6	12	-0.01	-2.25	-6
Australia	—	—	—	—	—	—	1.77	98	0.35	2.71	125
New Zealand	—	—	—	—	—	—	0.31	86			
The World	—	0.34	—	—	—	—	282.61	50	—	—	—

(Contitue)

FTAs in analysis	East Asian Region FTA[*11]			ASEAN-China-Japan-Korea-CER	APEC						
Papers	Urata and Kiyota (2003)			Scollay, Robert and John Gilbert (2001)	Lee, McKibbin and Stoeckel (2001)	Feridhanusetyawan and Pangestu (2003)		Scollay, Robert and John Gilbert (2001)	APEC (2002)[*5]	Brown, Deardorff and Stern (2003)	
Effects of FTAs on	GDP (percentage change)	Welfare (billion dollar)	Welfare per capita (dollar)[*10]	Welfare (percentage of base year's GDP)	GDP (cumulative percent change)[*2]	Welfare (billion dollar)[*1]	Welfare per capita (dollar)[*10]	Welfare (percentage of base year's GDP)	GDP (percentage change)	Welfare (billion dollar)	Welfare per capita (dollar)[*10]
Japan	0.05	8.20	65	0.57	—	100.57	805	0.68	0.41	318.09	2,541
Korea	1.71	7.81	170	1.20	—	8.10	182	1.08	2.73	42.38	944
China	1.27	5.49	4	1.94	—	0.67	1	3.35	2.69	49.63	41
Hong Kong	1.41	3.39	484	—	—	3.02	495	—	2.22	17.54	2,829
Taiwan	1.51	5.60	259	-1.18	—	7.76	369	3.82	2.31	32.98	1,554
Indonesia	5.61	10.21	51	0.71	6.85	2.10	11	0.55	2.74	10.49	54
Thailand	15.90	19.79	324	1.19	4.46	1.12	19	1.63	1.87	11.71	201
Malaysia	2.83	2.28	109	1.74	2.11	1.74	88	1.35	2.18	12.17	605
Philippines	2.02	0.60	8	1.01	3.93	0.85	13	3.94	2.19	12.72	185
Singapore	2.26	2.94	980	0.92	1.05	4.13	1,424	0.37	2.60	12.15	4,050
U.S.	-0.06	-7.06	-26	-0.06	—	2.31	9	0.01	0.06	244.25	928
EU	-0.01	-1.81	-5	-0.02	—	21.69	65	0.05	-0.79	4.11[*6]	12
Australia	-0.23	-1.34	-58	1.05	2.84	5.51	310	0.81	2.36	16.33	902
New Zealand				4.32	2.03	1.90	543	2.53	4.66	5.4	1,500
The World	—	—	—	0.16	—	135.53	24	0.34	—	824.15	145

FTAs in analysis	APEC		APEC trade facilitation	APEC investment liberalization			ASEAN-CER trade liberalization + APEC trade liberalization	Global liberalization
Papers	Hertel, Walmsley and Itakura (2001)		APEC (2002)[*9]	APEC (2002)			Lee, McKibbin and Stoeckel (2002)	Scollay, Robert and John Gilbert (2001)
Effects of FTAs on	Welfare (billion dollar)[*7]	Welfare per capita (dollar)[*10]	GDP (percentage change)	GDP (percentage change)	Welfare (billion dollar)	Welfare per capita (dollar)[*10]	GDP (cumulative percentage change)[*2]	Welfare (percentage of base year's
Japan	23.37	187	0.47	0.00	0.50	4	—	0.98
Korea	6.58	147	2.18	0.10	0.30	7	—	1.83
China	6.94	6	2.00	1.00	5.60	5	—	4.51
Hong Kong	7.91	1,276	2.56	0.10	0.10	14	—	—
Taiwan	8.33	393	3.93	0.10	0.40	19	—	4.95
Indonesia	2.15[*8]	8	1.88	3.10	4.30	22	6.89	1.31
Thailand	1.95	34	1.94	2.40	2.60	43	4.53	2.57
Malaysia	1.41	70	6.15	1.70	1.10	52	2.28	6.05
Philippines	2.15[*8]	8	4.40	0.90	0.40	5	3.93	3.42
Singapore	4.76	1,587	7.85	0.50	0.30	100	1.07	6.94
U.S.	8.93	34	0.40	0.10	6.00	22	—	-0.05
EU	-8.25	-23	0.14	0.00	-1.20	-3	—	0.22
Australia	8.99	414	0.86	0.50	1.40	74	2.83	0.98
New Zealand			1.41	0.40	0.20	50	2.02	4.90
The World	59.32	10		0.10	30.80	5	—	0.56

Note

1: Including agriculture sector's liberalization: figures from Feridhanusetyawan and Pangestu (2003).

2: Cumulative rate of change till 2020.

3: Not including agriculture sector's liberalization: figures from Tsutsumi and Kiyota (2000).

4: Categorized as ASEAN+3 since countries subject to analysis are identical to those of ASEAN+3, despite description in the article as "East Asian FTA".

5: Impact of 50% tariff reduction.

6: Figure of EU plus EFTA.

7: Figure as of year 2005.

8: Total figure of Indonesia, Philippines and Vietnam.

9: Assuming 5% trade cost reduction in APEC region.

10: Estimation by the author.

11: ASEAN+3+Taiwan.

Definition

ASEAN5: Indonesia, Thailand, Malaysia, Philippines and Singapore.

ASEAN6: ASEAN5 and Vietnam

ASEAN: Referred as "ASEAN" in article but unable to identify exact countries/regions.

Table 3 Sectoral structure in ASEAN+3

i) Output	Japan	China	Korea	ASEAN						
Sector					Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Values (billions US$)										
Agriculture and food	390	454	70	178	56	13	38	5	36	29
Natural resources	37	122	5	62	29	12	4	0	6	11
Textile and apparel	95	218	31	61	18	4	5	2	18	14
Wood and paper products	188	95	20	40	16	7	2	4	6	5
Chemical products	449	426	102	113	27	21	9	20	25	11
Metal products	319	217	56	32	7	6	5	5	6	4
Machinery	296	276	75	53	6	12	4	14	13	4
Electoronic machinery	368	125	69	179	12	64	23	52	24	4
Transport equipment	349	83	55	35	7	4	1	4	11	8
Other manufacturing	82	146	10	36	6	8	2	2	10	8
Trade	944	198	70	112	17	15	12	24	22	20
Construction	640	280	58	73	17	8	7	10	10	21
Transport and communication	522	109	63	81	15	11	6	20	17	12
Public services	954	171	82	71	12	5	12	20	11	12
Other services	1,700	219	203	225	45	31	21	45	41	42
Manufacturing total	2,145	1,584	418	549	99	126	52	104	112	57
Total	7,332	3,136	969	1,350	290	220	152	228	255	205
Shares in total (%)										
Agriculture and food	5.3	14.5	7.3	13.2	19.2	6.0	25.0	2.1	14.3	14.4
Natural resources	0.5	3.9	0.5	4.6	10.0	5.4	2.9	0.1	2.2	5.4
Textile and apparel	1.3	6.9	3.2	4.5	6.2	1.7	3.3	0.8	7.0	7.1
Wood and paper products	2.6	3.0	2.1	2.9	5.4	3.2	1.4	1.7	2.4	2.4
Chemical products	6.1	13.6	10.5	8.4	9.3	9.5	5.7	9.0	9.7	5.6
Metal products	4.4	6.9	5.8	2.4	2.4	2.9	3.4	2.1	2.2	1.7
Machinery	4.0	8.8	7.7	3.9	2.2	5.3	2.9	6.3	5.1	1.7
Electoronic machinery	5.0	4.0	7.1	13.3	4.1	29.3	15.2	22.8	9.2	1.9
Transport equipment	4.8	2.6	5.7	2.6	2.4	1.8	0.9	1.7	4.3	3.7
Other manufacturing	1.1	4.6	1.0	2.6	2.0	3.6	1.1	1.0	4.1	3.7
Trade	12.9	6.3	7.2	8.3	6.0	7.0	7.9	10.7	8.7	9.9
Construction	8.7	8.9	6.0	5.4	6.0	3.6	4.7	4.2	3.9	10.3
Transport and communication	7.1	3.5	6.5	6.0	5.2	4.8	4.1	9.0	6.7	5.8
Public services	13.0	5.5	8.4	5.2	4.1	2.1	7.6	8.6	4.3	5.8
Other services	23.2	7.0	20.9	16.7	15.6	13.9	13.8	19.9	15.9	20.7
Manufacturing total	29.3	50.5	43.1	40.6	34.0	57.2	33.9	45.4	44.0	27.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(Continue)

ii) Value added	Japan	China	Korea	ASEAN						
Sector					Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Values (billions US$)										
Agriculture and food	125	188	22	75	27	5	17	1	14	12
Natural resources	18	59	3	45	23	10	3	0	3	6
Textile and apparel	32	52	8	17	5	1	1	0	5	4
Wood and paper products	69	24	6	13	5	2	0	2	2	1
Chemical products	126	91	21	26	6	6	2	5	5	3
Metal products	98	36	14	8	2	1	1	1	1	1
Machinery	105	67	24	12	1	3	1	3	3	1
Electoronic machinery	114	23	13	38	3	21	2	5	5	1
Transport equipment	82	17	12	11	3	1	0	1	3	3
Other manufacturing	27	42	3	11	2	2	1	1	3	2
Trade	572	74	35	69	13	10	8	10	15	14
Construction	278	74	24	26	6	2	3	4	4	8
Transport and communication	259	54	29	38	8	5	3	9	8	6
Public services	637	76	56	43	8	3	7	10	7	8
Other services	1,077	88	112	123	24	14	13	21	22	29
Manufacturing total	654	351	100	136	28	37	7	19	26	18
Total	3,619	963	382	555	137	84	60	75	99	101
Shares in total (%)										
Agriculture and food	3.4	19.5	5.8	13.5	20.0	5.5	27.7	1.7	13.9	11.5
Natural resources	0.5	6.1	0.8	8.1	17.0	11.5	4.7	0.1	3.5	5.9
Textile and apparel	0.9	5.4	2.2	3.1	3.8	1.0	1.7	0.6	5.2	4.4
Wood and paper products	1.9	2.5	1.4	2.3	3.9	2.2	0.8	2.1	2.1	1.4
Chemical products	3.5	9.4	5.4	4.7	4.1	7.1	2.6	6.7	4.7	3.2
Metal products	2.7	3.7	3.6	1.5	1.5	1.6	1.7	1.4	1.4	1.5
Machinery	2.9	6.9	6.4	2.1	1.0	3.1	1.1	4.5	2.7	1.0
Electoronic machinery	3.1	2.4	3.4	6.9	2.5	25.2	3.3	7.1	4.8	1.4
Transport equipment	2.3	1.7	3.1	1.9	1.9	1.6	0.2	1.6	2.7	2.8
Other manufacturing	0.8	4.4	0.7	2.0	1.7	2.2	0.9	0.8	3.3	2.4
Trade	15.8	7.7	9.3	12.5	9.2	11.5	12.5	14.0	15.4	13.6
Construction	7.7	7.7	6.2	4.7	4.0	2.2	4.9	5.8	3.6	7.8
Transport and communication	7.2	5.6	7.7	6.9	5.7	5.7	4.4	12.3	7.7	6.1
Public services	17.6	7.8	14.6	7.7	5.8	3.1	12.3	12.9	7.3	8.0
Other services	29.8	9.1	29.4	22.1	17.8	16.2	21.1	28.5	21.8	29.0
Manufacturing total	18.1	36.5	26.2	24.4	20.4	44.2	12.2	24.8	26.8	18.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(Continue)

iii) Exports Sector	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Values (billions US$)										
Agriculture and food	4	16	3	34	7	7	2	3	12	4
Natural resources	0	5	0	22	12	5	0	0	0	5
Textile and apparel	10	61	17	28	9	3	3	1	6	5
Wood and paper products	3	16	3	20	9	5	1	2	3	1
Chemical products	50	36	24	43	7	9	1	15	10	1
Metal products	27	19	12	12	3	3	1	2	2	0
Machinery	118	58	21	38	4	8	4	12	10	1
Electoronic machinery	95	68	50	163	9	62	22	50	19	0
Transport equipment	98	9	25	7	1	1	1	2	2	0
Other manufacturing	9	75	5	18	4	2	1	1	5	3
Trade	7	8	2	11	0	4	0	5	1	0
Construction	4	1	0	1	0	0	0	0	0	0
Transport and communication	12	7	6	16	1	3	1	3	6	1
Public services	2	2	2	2	0	0	0	1	0	0
Other services	15	4	8	33	2	13	1	13	3	1
Manufacturing total	409	341	157	328	46	93	33	86	58	12
Total	453	384	177	448	69	126	38	111	80	24
Shares in total (%)										
Agriculture and food	0.8	4.1	1.4	7.6	9.9	5.3	6.0	2.5	14.6	15.5
Natural resources	0.1	1.4	0.1	5.0	16.8	3.9	0.9	0.2	0.3	21.8
Textile and apparel	2.1	15.9	9.6	6.3	13.3	2.3	8.0	1.3	8.1	21.0
Wood and paper products	0.7	4.1	1.4	4.4	13.5	3.8	2.0	1.4	3.1	3.9
Chemical products	11.0	9.4	13.7	9.6	10.4	7.3	3.0	13.6	12.2	3.5
Metal products	6.0	4.8	6.8	2.7	4.9	2.1	2.4	2.2	2.9	1.0
Machinery	26.1	15.1	11.6	8.5	5.5	6.1	9.6	11.2	12.3	3.5
Electoronic machinery	20.9	17.6	28.3	36.3	12.4	49.6	57.6	44.9	24.1	2.0
Transport equipment	21.6	2.2	14.3	1.6	1.0	1.0	1.5	1.8	2.8	0.8
Other manufacturing	2.0	19.4	2.8	3.9	6.1	1.8	2.6	1.3	6.6	14.1
Trade	1.6	2.2	0.9	2.5	0.6	3.5	0.7	4.1	1.6	1.3
Construction	0.9	0.2	0.1	0.2	0.2	0.2	0.2	0.0	0.3	0.4
Transport and communication	2.6	1.7	3.5	3.5	1.9	2.5	3.4	3.1	6.9	4.1
Public services	0.4	0.6	1.3	0.5	0.3	0.2	0.3	0.8	0.3	1.7
Other services	3.2	1.1	4.3	7.4	3.0	10.5	1.9	11.6	3.8	5.6
Manufacturing total	90.4	88.6	88.4	73.3	67.2	73.9	86.8	77.6	72.1	49.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(Continue)

iv) Imports	Japan	China	Korea	ASEAN						
Sector					Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Values (billions US$)										
Agriculture and food	43	14	10	23	4	5	4	5	4	2
Natural resources	52	15	25	18	2	1	3	6	6	0
Textile and apparel	25	20	6	12	2	1	2	3	2	3
Wood and paper products	17	9	4	7	1	2	1	2	1	1
Chemical products	42	45	21	48	9	8	5	12	8	6
Metal products	18	21	12	25	3	6	2	6	6	2
Machinery	43	48	22	60	6	13	6	20	11	4
Electoronic machinery	56	52	27	104	3	25	16	46	13	1
Transport equipment	15	12	7	20	3	3	1	7	4	2
Other manufacturing	17	5	3	7	1	1	0	2	2	1
Trade	14	24	3	10	2	1	1	4	2	1
Construction	4	1	0	2	0	1	0	0	0	1
Transport and communication	26	6	11	13	2	2	1	4	2	3
Public services	5	2	2	4	1	0	0	1	1	1
Other services	35	6	12	33	6	9	1	8	4	5
Manufacturing total	233	213	101	284	28	58	34	98	46	19
Total	413	281	163	386	45	77	44	124	64	32
Shares in total (%)										
Agriculture and food	10.5	5.0	6.1	6.0	9.1	5.9	8.0	3.7	6.2	7.3
Natural resources	12.7	5.2	15.2	4.6	3.6	1.7	6.7	4.9	9.0	0.3
Textile and apparel	6.0	7.1	3.5	3.2	4.9	1.8	3.8	2.1	2.7	8.5
Wood and paper products	4.2	3.3	2.2	1.9	2.4	2.1	2.0	1.5	2.0	2.1
Chemical products	10.2	15.9	12.7	12.3	19.1	11.0	11.1	9.3	12.6	18.6
Metal products	4.3	7.6	7.5	6.5	6.6	7.6	4.8	5.0	9.2	6.2
Machinery	10.4	17.2	13.8	15.5	14.3	16.7	13.3	16.2	16.8	12.2
Electoronic machinery	13.7	18.6	16.5	27.0	6.4	32.3	37.6	37.0	20.1	4.1
Transport equipment	3.6	4.4	4.0	5.2	7.4	3.5	3.2	5.8	5.7	5.3
Other manufacturing	4.0	1.8	1.7	1.9	1.7	1.3	1.1	1.8	3.1	2.7
Trade	3.5	8.5	1.7	2.6	5.2	1.0	1.7	2.8	2.6	3.7
Construction	1.1	0.5	0.0	0.4	0.0	0.8	0.8	0.0	0.2	1.7
Transport and communication	6.3	2.0	6.6	3.4	4.1	2.5	2.8	2.9	3.0	8.6
Public services	1.3	0.7	0.9	0.9	1.4	0.6	0.4	0.6	0.9	3.2
Other services	8.4	2.3	7.5	8.5	13.9	11.3	2.8	6.2	5.9	15.5
Manufacturing total	56.3	75.8	61.9	73.5	62.7	76.2	76.8	78.8	72.2	59.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Data source: GTAP ver.6 database.

Table 4 Relative significance of East Asian countries in merchandise trade, 2001

[Exports] Unit: percent

Destination / Origin	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	ASEAN+3
Japan											
Agriculture and food	-	8.9	7.0	11.4	0.6	0.7	0.6	5.9	3.1	0.6	27.2
Natural resources	-	22.8	28.6	16.1	4.8	1.4	7.8	1.1	0.9	0.2	67.6
Textile and apparel	-	57.4	5.2	9.8	1.9	0.8	1.7	0.8	2.3	2.5	72.4
Wood and paper products	-	16.9	6.6	16.7	2.3	3.6	1.7	3.4	4.8	0.9	40.2
Chemical products	-	14.6	11.4	12.8	1.9	2.4	1.8	2.8	3.4	0.5	38.9
Metal products	-	17.7	13.2	21.6	2.7	5.9	2.0	3.8	6.1	1.1	52.5
Machinery	-	11.5	7.0	13.7	1.8	2.6	1.9	3.4	3.5	0.6	32.2
Electronic machinery	-	13.5	6.8	20.1	0.9	4.5	4.7	7.0	2.8	0.3	40.4
Transport equipment	-	2.0	1.0	5.6	1.2	1.1	0.6	1.1	1.3	0.2	8.6
Other manufacturing	-	5.1	3.7	6.8	0.9	1.7	0.6	1.8	1.5	0.3	15.5
Manufacturing total	-	11.5	6.3	13.5	1.5	2.8	2.2	3.5	2.9	0.5	31.3
Total	-	10.7	6.0	12.8	1.5	2.7	2.0	3.4	2.7	0.6	29.5
China											
Agriculture and food	30.7	-	9.2	9.5	1.8	3.0	0.9	1.6	0.9	1.2	49.4
Natural resources	29.0	-	22.1	5.6	1.2	0.8	2.3	0.4	0.7	0.1	56.6
Textile and apparel	26.9	-	4.2	3.6	0.5	0.4	0.4	1.1	0.6	0.7	34.7
Wood and paper products	14.7	-	1.7	1.6	0.1	0.3	0.1	0.6	0.2	0.2	18.0
Chemical products	11.5	-	4.9	9.8	1.4	0.8	0.9	1.9	1.2	3.6	26.2
Metal products	11.1	-	5.8	8.3	1.1	0.9	0.6	3.2	1.1	1.5	25.2
Machinery	13.7	-	2.7	6.0	0.9	1.0	0.4	2.0	1.0	0.7	22.4
Electronic machinery	13.2	-	3.9	9.9	0.5	2.4	0.4	4.8	1.6	0.1	27.0
Transport equipment	11.0	-	5.0	12.5	2.2	0.6	0.7	1.4	0.5	7.0	28.4
Other manufacturing	8.3	-	1.0	1.1	0.2	0.2	0.1	0.4	0.2	0.1	10.4
Manufacturing total	14.4	-	3.3	5.7	0.7	0.9	0.4	2.0	0.8	0.9	23.4
Total	14.9	-	3.7	5.9	0.7	1.0	0.4	1.9	0.8	0.9	24.4
Korea											
Agriculture and food	50.1	6.9	-	6.0	1.2	0.4	1.0	0.8	2.0	0.5	62.9
Natural resources	69.5	6.5	-	12.3	6.0	3.4	0.2	2.3	0.1	0.3	88.3
Textile and apparel	6.0	25.3	-	9.4	3.3	0.3	1.4	0.5	1.0	2.8	40.6
Wood and paper products	10.0	28.7	-	9.7	1.0	2.5	1.6	2.1	0.6	1.9	48.4
Chemical products	13.2	34.2	-	11.2	4.0	1.4	1.6	0.7	1.5	1.9	58.5
Metal products	13.8	20.2	-	13.0	2.1	2.9	1.9	2.2	2.2	1.5	46.9
Machinery	9.6	17.0	-	9.8	1.7	1.8	0.9	2.0	1.6	1.8	36.4
Electronic machinery	10.1	12.2	-	13.6	1.0	3.0	2.6	4.9	1.9	0.2	35.8
Transport equipment	1.0	1.2	-	4.0	1.0	0.4	0.3	1.3	0.3	0.7	6.2
Other manufacturing	11.9	25.4	-	10.9	4.0	0.6	0.8	1.2	0.9	3.5	48.2
Manufacturing total	8.9	17.2	-	10.5	2.0	1.8	1.6	2.4	1.4	1.3	36.6
Total	9.3	15.5	-	9.9	1.9	1.7	1.4	2.3	1.3	1.2	34.7
ASEAN											
Agriculture and food	15.7	6.6	2.6	17.1	1.7	3.2	2.2	5.3	1.4	3.2	42.0
Natural resources	34.1	5.9	10.7	14.0	0.6	1.3	1.3	4.5	6.1	0.2	64.8
Textile and apparel	6.8	2.9	1.5	8.4	0.6	1.5	0.7	3.1	0.6	1.9	19.7
Wood and paper products	20.3	11.1	4.8	11.6	0.5	3.1	1.1	3.7	1.7	1.4	47.7
Chemical products	9.2	11.4	3.5	28.0	5.1	6.9	2.5	5.5	3.5	4.5	52.1
Metal products	17.5	5.2	3.4	31.1	2.6	7.1	1.8	11.5	4.5	3.6	57.2
Machinery	13.7	6.6	2.0	27.9	2.2	8.3	2.1	9.3	3.6	2.3	50.2
Electronic machinery	11.2	7.7	3.7	22.0	0.3	5.4	1.4	11.8	2.9	0.3	44.7
Transport equipment	10.2	2.1	1.9	25.5	8.6	3.4	2.1	3.4	3.7	4.3	39.7
Other manufacturing	7.7	1.0	0.9	7.1	0.3	1.3	0.3	3.6	0.8	0.8	16.7
Manufacturing total	11.4	7.3	3.2	21.3	1.4	5.2	1.5	8.8	2.7	1.5	43.2
Total	12.2	6.5	3.4	18.3	1.4	4.3	1.4	7.2	2.5	1.5	40.4

(Continue)

[Imports] Unit: percent

Origin / Destination	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	ASEAN+3
Japan											
Agriculture and food	-	12.3	3.3	13.3	2.5	0.9	1.1	0.8	6.5	1.4	28.8
Natural resources	-	3.6	0.3	16.4	9.5	3.4	0.5	0.1	0.0	2.8	20.3
Textile and apparel	-	69.3	4.3	8.1	2.4	0.6	0.6	0.1	1.6	2.8	81.7
Wood and paper products	-	15.0	1.6	26.4	12.1	7.9	1.2	0.6	3.2	1.4	43.0
Chemical products	-	10.9	8.2	10.2	2.2	2.3	0.5	1.8	3.2	0.3	29.3
Metal products	-	12.3	10.0	12.3	6.2	1.4	0.8	0.8	2.7	0.3	34.6
Machinery	-	19.1	4.7	12.6	1.8	2.4	1.8	1.6	4.1	0.9	36.4
Electronic machinery	-	16.4	9.1	32.8	1.9	12.2	6.5	6.4	5.7	0.1	58.3
Transport equipment	-	6.8	1.8	5.0	0.7	0.5	0.7	0.6	2.3	0.1	13.6
Other manufacturing	-	39.9	3.8	8.6	2.0	0.9	0.6	0.2	3.1	1.7	52.2
Manufacturing total	-	22.2	6.3	16.8	3.0	4.7	2.3	2.3	3.7	0.8	45.3
Total	-	14.7	4.2	14.0	3.2	3.5	1.5	1.8	3.0	1.0	32.9
China											
Agriculture and food	2.4	-	1.3	17.4	3.0	5.0	0.9	0.8	5.6	2.0	21.0
Natural resources	0.6	-	0.1	9.9	2.8	1.8	0.1	0.0	0.1	5.0	10.6
Textile and apparel	28.4	-	22.2	4.2	1.6	0.8	0.1	0.3	1.3	0.2	54.8
Wood and paper products	6.3	-	8.4	25.8	18.2	2.4	0.2	1.0	2.9	1.0	40.4
Chemical products	17.3	-	19.8	12.0	2.1	2.1	0.2	4.5	2.8	0.3	49.1
Metal products	24.1	-	12.1	3.0	0.3	0.8	0.6	0.7	0.6	0.0	39.2
Machinery	28.7	-	7.4	5.4	0.1	1.0	0.5	2.9	0.9	0.0	41.5
Electronic machinery	24.8	-	11.9	24.2	1.2	10.6	1.5	7.6	3.3	0.0	60.9
Transport equipment	16.5	-	2.5	1.2	0.0	0.3	0.0	0.6	0.2	0.0	20.2
Other manufacturing	9.3	-	26.0	3.5	0.5	0.8	0.1	0.9	0.8	0.4	38.8
Manufacturing total	22.7	-	13.2	11.6	1.7	3.6	0.6	3.7	1.9	0.2	47.5
Total	17.8	-	10.1	10.8	1.7	3.2	0.5	3.0	1.8	0.5	38.7
Korea											
Agriculture and food	2.6	15.6	-	10.0	1.5	1.7	1.1	0.4	3.9	1.5	28.3
Natural resources	0.4	6.0	-	10.7	7.3	2.2	0.0	0.0	0.0	1.3	17.1
Textile and apparel	9.3	47.8	-	7.9	3.7	0.7	0.1	0.4	1.5	1.5	65.0
Wood and paper products	6.4	8.7	-	29.9	17.9	7.6	0.1	1.1	2.2	1.0	45.0
Chemical products	29.3	9.3	-	7.9	2.3	1.4	0.3	2.1	1.7	0.2	46.5
Metal products	31.9	9.4	-	3.6	0.7	0.8	1.3	0.5	0.2	0.1	44.9
Machinery	37.8	7.1	-	3.6	0.2	0.8	0.2	1.7	0.6	0.1	48.4
Electronic machinery	24.3	10.1	-	22.9	0.5	7.9	3.4	9.0	1.9	0.2	57.3
Transport equipment	15.0	7.0	-	2.0	0.2	0.3	0.2	0.5	0.1	0.7	24.0
Other manufacturing	12.4	29.4	-	6.2	1.7	0.9	0.1	0.4	1.2	1.8	48.0
Manufacturing total	26.8	11.6	-	10.7	1.6	3.0	1.2	3.4	1.2	0.3	49.2
Total	17.5	9.2	-	9.8	2.2	2.6	0.8	2.5	1.1	0.5	36.5
ASEAN											
Agriculture and food	1.9	7.1	0.7	27.6	5.0	7.0	1.1	5.3	6.8	2.5	37.3
Natural resources	0.3	2.0	0.1	19.3	6.4	2.2	0.0	0.4	0.6	9.6	21.8
Textile and apparel	8.1	18.5	13.7	20.1	5.3	4.6	0.4	2.8	4.3	2.6	60.4
Wood and paper products	7.8	3.7	3.6	34.3	10.4	10.6	0.6	6.9	4.1	1.8	49.4
Chemical products	14.3	8.0	6.1	27.3	3.0	5.6	0.5	11.7	6.3	0.3	55.8
Metal products	25.3	6.6	6.6	15.6	4.4	4.0	0.7	4.2	2.1	0.3	54.2
Machinery	28.0	6.0	3.5	18.4	2.4	4.1	0.7	7.7	3.0	0.4	55.9
Electronic machinery	18.6	6.6	6.6	35.0	2.3	14.5	4.2	9.7	4.1	0.3	66.8
Transport equipment	28.4	5.6	5.2	9.4	1.3	1.1	0.9	3.2	2.8	0.0	48.7
Other manufacturing	8.6	11.8	7.8	17.7	2.6	7.7	0.3	3.7	2.7	0.8	45.9
Manufacturing total	20.1	7.2	6.0	25.6	2.9	8.2	1.9	8.1	3.9	0.4	59.0
Total	15.5	6.1	4.7	22.1	2.8	6.9	1.5	6.6	3.4	0.9	48.5

Data source: GTAP ver.6 database.

Note: exports and imports are at world prices.

Table 5 Average tariff rates in ASEAN+3, 2001

(%)

	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Agriculture and food	30.2	37.6	81.7	13.9	5.0	17.1	9.5	0.4	29.4	30.7
Natural resources	0.1	0.3	3.8	0.8	0.3	1.4	3.1	0.0	0.4	3.2
Textile and apparel	9.0	20.5	10.0	11.1	8.6	12.3	6.5	0.0	18.5	21.4
Wood and paper products	1.1	9.0	4.0	5.4	3.4	6.6	4.7	0.0	11.0	12.0
Chemical products	1.1	13.0	6.7	5.2	4.4	5.9	4.5	0.0	11.7	7.3
Metal products	0.5	7.5	3.8	5.6	5.9	8.5	3.9	0.0	9.3	4.7
Machinery	0.1	13.1	6.1	3.3	3.0	3.9	2.3	0.0	8.2	7.5
Electronic machinery	0.0	10.1	1.1	0.8	2.1	0.4	0.1	0.0	4.7	8.8
Transport equipment	0.0	20.5	3.9	14.6	9.6	31.7	11.5	0.0	24.0	42.1
Other manufacturing	5.3	13.9	8.5	6.1	6.5	6.8	6.1	0.0	7.1	18.4
Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport and communication	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manufacturing	1.7	12.7	4.7	4.2	5.0	4.8	2.4	0.0	9.6	13.0
Total	4.1	11.6	8.5	4.0	3.6	4.7	2.8	0.0	8.8	10.0

Data source: authors' calculation, based on GTAP ver.6 database.

Note: see Table A.1 for the definition (aggregation) of Vietnam.

Table 6 Bilateral trade-weighted average tariff rates in ASEAN+3, 2001

(%)

Exporter / Importer	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Japan	-	5.2	2.6	2.8	1.2	0.5	1.0	1.5	8.8	3.5
China	13.6	-	13.4	11.6	11.4	10.3	10.1	10.6	16.7	11.2
Korea	5.1	21.6	-	3.8	4.1	2.7	3.3	1.9	8.7	6.8
ASEAN	5.5	6.7	6.1	3.8	4.6	1.9	3.2	4.6	5.4	4.4
Indonesia	5.3	6.6	5.8	3.5	-	2.7	4.3	2.7	6.3	4.4
Malaysia	7.8	6.7	5.3	4.1	7.1	-	3.8	2.2	9.5	3.7
Philippines	2.3	5.9	3.0	3.4	3.9	2.0	-	2.0	4.4	14.5
Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Thailand	11.2	11.1	10.4	8.7	15.9	9.0	7.9	7.4	-	5.7
Vietnam	11.1	17.0	17.6	13.8	12.4	12.1	12.8	16.9	11.6	2.3

Data source: authors' calculation, based on GTAP ver.6 database.

Note: see Table A.1 for the definition (aggregation) of Vietnam.

Table 7 Effects of various FTAs in East Asia on real GDP

Unit: percent

	FTA among							
	A	A+C	A+J	A+K	A+C+J	A+C+K	A+J+K	A+3
i) Trade liberalization								
Japan	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.01
China	0.00	0.02	-0.01	-0.01	0.09	0.01	-0.02	0.13
Korea	0.00	-0.03	-0.01	-0.02	-0.09	1.12	0.03	1.11
Indonesia	0.02	0.05	0.02	0.03	0.05	0.06	0.03	0.07
Malaysia	0.05	0.15	0.23	0.03	0.31	0.13	0.31	0.38
Philippines	0.16	0.24	0.13	0.14	0.19	0.26	0.11	0.22
Singapore	0.06	0.08	0.06	0.05	0.05	0.07	0.05	0.05
Thailand	0.09	0.45	0.31	0.08	0.66	0.44	0.35	0.68
Vietnam	0.09	0.35	0.23	0.26	0.53	0.53	0.45	0.72
ASEAN total	0.07	0.22	0.16	0.10	0.30	0.25	0.22	0.36
ASEAN+3 total	0.01	0.02	0.01	0.01	0.05	0.09	0.02	0.14
ii) Trade liberalization + capital accumulation								
Japan	0.00	-0.02	0.07	0.00	0.18	-0.03	0.10	0.19
China	-0.01	0.49	-0.03	-0.04	1.23	0.65	-0.06	1.41
Korea	-0.03	-0.21	-0.07	0.55	-0.62	4.15	1.13	4.19
Indonesia	0.73	1.78	1.72	1.08	2.32	1.93	2.04	2.52
Malaysia	1.26	2.49	3.10	1.75	3.86	2.78	3.45	4.08
Philippines	1.79	3.08	2.59	2.21	3.00	3.17	2.94	3.13
Singapore	2.01	3.44	2.15	2.06	3.01	3.32	2.18	2.92
Thailand	4.61	8.07	10.36	5.25	12.71	8.42	10.93	13.13
Vietnam	1.54	3.68	2.84	2.62	4.50	4.46	3.88	5.29
ASEAN total	1.93	3.64	3.74	2.44	4.80	3.90	4.17	5.07
ASEAN+3 total	0.19	0.42	0.41	0.27	0.78	0.76	0.55	1.17
iii) Trade liberalization + capital accumulation + various facilitations and coordination								
Japan	0.00	-0.02	0.13	0.00	0.27	-0.03	0.17	0.31
China	-0.01	0.59	-0.03	-0.03	1.49	0.83	-0.07	1.73
Korea	-0.02	-0.22	-0.07	0.75	-0.66	4.64	1.61	4.91
Indonesia	1.00	2.20	2.26	1.44	2.95	2.42	2.65	3.22
Malaysia	2.07	3.52	4.42	2.70	5.33	3.92	4.87	5.64
Philippines	2.54	4.06	4.24	3.19	4.74	4.35	4.79	5.06
Singapore	3.30	5.11	3.96	3.51	5.13	5.12	4.13	5.17
Thailand	5.57	9.43	12.26	6.37	14.86	9.88	12.95	15.37
Vietnam	1.88	4.21	3.39	3.09	5.18	5.08	4.54	6.05
ASEAN total	2.59	4.50	4.85	3.22	6.03	4.85	5.37	6.39
ASEAN+3 total	0.26	0.53	0.56	0.37	1.02	0.93	0.75	1.48

Data source: authors' simulation.

Note: A, C, J, K, and A+3 stand for ASEAN, China, Japan, Korea, and ASEAN+3.

Table 8 Welfare effects of various FTAs in East Asia

Unit: millions US$

	FTA among							
	A	A+C	A+J	A+K	A+C+J	A+C+K	A+J+K	A+3
i) Trade liberalization								
Japan	-497	-1,569	933	-776	6,555	-2,123	1,783	6,584
China	-241	-211	-731	-524	-623	189	-1,131	800
Korea	-135	-630	-378	912	-1,761	7,625	640	5,973
Indonesia	343	734	442	402	680	698	502	668
Malaysia	372	1,315	859	527	1,428	1,279	1,025	1,448
Philippines	268	477	136	273	205	413	147	156
Singapore	1,367	2,256	1,230	1,343	1,830	2,140	1,212	1,729
Thailand	563	1,744	2,260	602	2,985	1,530	2,331	2,828
Vietnam	-249	119	-151	-244	226	137	-31	279
ASEAN total	2,665	6,646	4,777	2,903	7,355	6,197	5,186	7,107
ASEAN+3 total	1,791	4,235	4,601	2,515	11,526	11,888	6,478	20,463
ii) Trade liberalization + capital accumulation								
Japan	-265	-1,632	3,038	-516	10,544	-2,208	4,457	11,054
China	-308	3,575	-872	-690	8,487	5,580	-1,384	11,306
Korea	-184	-1,130	-507	2,514	-3,213	16,046	3,754	14,508
Indonesia	1,195	2,791	2,468	1,662	3,373	2,957	2,888	3,614
Malaysia	1,038	2,584	2,338	1,439	3,282	2,708	2,641	3,395
Philippines	1,082	1,891	1,368	1,304	1,602	1,864	1,562	1,611
Singapore	2,265	3,838	2,336	2,306	3,357	3,701	2,365	3,250
Thailand	4,019	7,607	9,943	4,556	12,227	7,652	10,417	12,354
Vietnam	1,004	2,959	2,105	1,766	3,627	3,492	2,906	4,199
ASEAN total	10,603	21,670	20,558	13,033	27,468	22,374	22,779	28,423
ASEAN+3 total	9,847	22,483	22,217	14,340	43,286	41,792	29,605	65,291
iii) Trade liberalization + capital accumulation + various facilitations and coordination								
Japan	-270	-1,735	4,835	-545	13,988	-2,337	6,870	15,013
China	-326	4,586	-996	-739	11,041	7,264	-1,586	14,483
Korea	-205	-1,232	-603	3,281	-3,511	18,019	5,462	17,122
Indonesia	1,588	3,408	3,284	2,194	4,326	3,671	3,817	4,663
Malaysia	1,831	3,616	3,617	2,367	4,712	3,834	4,017	4,900
Philippines	1,528	2,476	2,326	1,882	2,606	2,552	2,622	2,707
Singapore	3,194	5,067	3,586	3,340	4,835	5,007	3,707	4,805
Thailnad	4,910	8,876	11,717	5,579	14,218	9,001	12,286	14,420
Vietnam	1,334	3,488	2,673	2,223	4,321	4,106	3,581	4,976
ASEAN total	14,385	26,932	27,202	17,586	35,017	28,170	30,030	36,471
ASEAN+3 total	13,585	28,551	30,438	19,583	56,535	51,116	40,775	83,090

Data source: authors' simulation.

Note: A, C, J, K, and A+3 stand for ASEAN, China, Japan, Korea, and ASEAN+3.

Table 9 Per capita welfare effects of various FTAs in East Asia

Unit: US$

	FTA among							
	A	A+C	A+J	A+K	A+C+J	A+C+K	A+J+K	A+3
i) Trade liberalization								
Japan	-4	-12	7	-6	52	-17	14	52
China	0	0	-1	0	0	0	-1	1
Korea	-3	-13	-8	19	-37	160	13	126
Indonesia	2	3	2	2	3	3	2	3
Malaysia	16	56	36	22	60	54	43	61
Philippines	3	6	2	3	3	5	2	2
Singapore	411	678	369	403	550	643	364	519
Thailand	9	28	36	10	48	24	37	45
Vietnam	-2	1	-1	-2	2	1	0	2
ASEAN total	5	13	9	5	14	12	10	13
ASEAN+3 total	1	2	2	1	6	6	3	10
ii) Trade liberalization + capital accumulation								
Japan	-2	-13	24	-4	83	-17	35	87
China	0	3	-1	-1	7	4	-1	9
Korea	-4	-24	-11	53	-68	337	79	305
Indonesia	6	13	12	8	16	14	14	17
Malaysia	44	109	99	61	139	114	112	143
Philippines	14	24	17	16	20	23	20	20
Singapore	680	1,152	702	693	1,008	1,111	710	976
Thailand	64	121	158	73	195	122	166	197
Vietnam	7	20	14	12	25	24	20	29
ASEAN total	20	41	39	25	52	42	43	54
ASEAN+3 total	5	11	11	7	22	21	15	33
iii) Trade liberalization + capital accumulation + various facilitations and coordination								
Japan	-2	-14	38	-4	110	-18	54	118
China	0	4	-1	-1	9	6	-1	11
Korea	-4	-26	-13	69	-74	379	115	360
Indonesia	7	16	15	10	20	17	18	22
Malaysia	77	153	153	100	199	162	170	207
Philippines	19	31	29	24	33	32	33	34
Singapore	959	1,522	1,077	1,003	1,452	1,504	1,113	1,443
Thailand	78	141	187	89	227	143	196	230
Vietnam	9	24	18	15	29	28	24	34
ASEAN total	27	51	51	33	66	53	57	69
ASEAN+3 total	7	14	15	10	29	26	21	42

Data source: authors' simulation.

Note: A, C, J, K, and A+3 stand for ASEAN, China, Japan, Korea, and ASEAN+3.

Table 10 Effects of ASEAN+3 FTA on output in ASEAN+3

(Changes in volume in millions US$, %)

	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
(i) Changes										
Agriculture and food	-7,828	24,748	-9,127	10,066	1,485	914	710	2,504	4,148	306
Natural resources	-42	168	-32	1,148	316	177	64	4	256	331
Textile and apparel	2,685	319	10,354	4,536	591	699	459	-60	1,337	1,508
Wood and paper products	-684	-1,469	1,158	3,303	1,192	433	111	167	680	721
Chemical products	5,689	-5,626	8,120	13,556	1,470	1,850	557	1,985	5,837	1,857
Metal products	7,104	-2,828	1,883	2,716	185	527	389	333	1,179	103
Machinery	7,660	-4,531	1,128	10,646	802	1,972	870	2,090	4,394	518
Electronic machinery	-7,641	14,309	2,791	17,959	877	3,340	1,781	3,939	7,999	23
Transport equipment	5,201	-3,085	556	40	-45	184	470	-458	1,624	-1,733
Other manufacturing	-1,337	-481	3,504	3,135	-114	669	82	-2	1,165	1,335
Trade	2,180	1,144	3,551	7,349	653	353	691	806	3,601	1,245
Construction	3,750	10,217	4,140	6,776	846	530	506	779	2,200	1,916
Transport and communication	467	707	936	3,792	493	324	296	163	1,678	838
Public services	955	1,345	1,400	1,939	141	116	224	785	524	149
Other services	4,105	1,477	7,987	10,830	1,240	629	1,016	206	5,402	2,338
(ii) Percent changes										
Agriculture and food	-2.0	5.5	-13.0	5.7	2.7	6.9	1.9	51.1	11.4	1.0
Natural resources	-0.1	0.1	-0.7	1.8	1.1	1.5	1.5	1.2	4.6	3.0
Textile and apparel	2.8	0.2	33.6	7.4	3.3	18.9	9.1	-3.2	7.5	10.4
Wood and paper products	-0.4	-1.6	5.7	8.3	7.7	6.1	5.1	4.4	11.2	14.9
Chemical products	1.3	-1.3	8.0	12.0	5.5	8.9	6.4	9.7	23.7	16.4
Metal products	2.2	-1.3	3.4	8.4	2.6	8.3	7.6	6.8	21.3	2.9
Machinery	2.6	-1.6	1.5	20.0	12.8	17.0	19.9	14.6	33.8	14.6
Electronic machinery	-2.1	11.5	4.0	10.0	7.4	5.2	7.7	7.6	34.0	0.6
Transport equipment	1.5	-3.7	1.0	0.1	-0.6	4.6	32.5	-11.6	14.7	-23.1
Other manufacturing	-1.6	-0.3	35.9	8.8	-2.0	8.4	4.7	-0.1	11.3	17.6
Trade	0.2	0.6	5.1	6.6	3.8	2.3	5.7	3.3	16.2	6.1
Construction	0.6	3.7	7.2	9.3	4.9	6.7	7.1	8.2	22.4	9.1
Transport and communication	0.1	0.7	1.5	4.7	3.3	3.1	4.8	0.8	9.9	7.1
Public services	0.1	0.8	1.7	2.7	1.2	2.5	1.9	4.0	4.8	1.2
Other services	0.2	0.7	3.9	4.8	2.7	2.1	4.9	0.5	13.3	5.5

Data source: authors' simulation.

Table 11 Effects of ASEAN+3 FTA on trade in ASEAN+3

[Exports] (Changes in volume in millions US$, %)

	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
(i) Changes										
Agriculture and food	717	19,471	4,760	9,346	787	1,201	298	2,294	3,575	1,191
Natural resources	445	677	121	-857	-363	-253	-40	10	-104	-107
Textile and apparel	8,555	11,930	9,110	4,813	755	721	427	-35	931	2,014
Wood and paper products	583	-57	674	2,444	954	437	61	67	352	573
Chemical products	5,595	2,285	5,147	11,180	1,252	1,730	303	1,764	4,548	1,583
Metal products	4,614	593	1,437	2,055	296	628	116	209	765	42
Machinery	8,528	3,926	2,228	10,145	738	1,764	819	2,067	4,018	739
Electronic machinery	-1,923	16,986	2,767	17,035	840	3,309	1,695	3,834	7,176	181
Transport equipment	3,468	2,027	266	2,339	159	781	481	-366	1,240	44
Other manufacturing	430	1,434	3,233	2,466	-25	422	84	16	684	1,286
Trade	-339	-249	24	-687	-8	-336	1	-412	50	18
Construction	-195	-8	-8	15	-3	6	1	-1	7	6
Transport and communication	-161	47	-375	157	-6	103	50	-174	71	114
Public services	-107	-91	-346	-274	-20	-19	-15	-122	-68	-30
Other services	-801	-49	-663	-1,487	-92	-191	0	-1,072	-180	48
Total	29,375	59,137	27,886	58,538	5,255	10,253	4,272	8,075	23,033	7,651
(ii) Percent changes										
Agriculture and food	20.3	123.2	186.9	27.6	11.6	18.2	13.1	83.1	30.4	32.0
Natural resources	159.8	12.5	76.8	-3.8	-3.2	-5.2	-12.0	4.2	-48.9	-2.1
Textile and apparel	88.9	19.5	53.4	17.2	8.3	25.4	13.9	-2.4	14.4	39.9
Wood and paper products	18.5	-0.4	26.8	12.4	10.3	9.2	7.9	4.4	14.0	61.5
Chemical products	11.2	6.3	21.3	25.9	17.6	18.8	26.2	11.7	46.6	188.9
Metal products	16.8	3.2	12.0	17.3	8.8	23.9	12.5	8.6	33.2	18.1
Machinery	7.2	6.8	10.9	26.5	19.5	23.1	22.4	16.6	40.7	87.5
Electronic machinery	-2.0	25.1	5.5	10.5	9.9	5.3	7.7	7.7	37.1	38.2
Transport equipment	3.6	23.6	1.1	33.2	22.6	63.0	81.8	-17.8	54.3	23.9
Other manufacturing	4.8	1.9	64.6	14.0	-0.6	18.8	8.5	1.1	12.9	37.9
Trade	-4.5	-3.0	1.5	-6.1	-2.1	-7.7	0.5	-9.0	3.8	5.6
Construction	-4.7	-1.0	-8.7	1.6	-1.7	1.9	1.1	-7.9	2.6	5.6
Transport and communication	-0.4	0.5	-1.8	0.6	-0.3	1.8	2.7	-1.9	1.1	8.1
Public services	-6.6	-3.8	-15.0	-13.1	-11.1	-8.9	-12.3	-13.4	-27.2	-7.4
Other services	-5.5	-1.1	-8.6	-4.5	-4.4	-1.5	-0.1	-8.3	-5.9	3.6
Total	6.1	15.2	14.5	12.8	7.6	8.0	11.0	6.9	28.4	31.3

(Continue)

[Imports] (Changes in volume in millions US$)

	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
(i) Changes										
Agriculture and food	8,686	3,807	9,448	7,454	602	954	757	891	2,635	1,615
Natural resources	811	539	1,820	3,004	221	185	249	556	1,759	34
Textile and apparel	7,937	11,288	2,550	3,696	528	329	234	170	993	1,441
Wood and paper products	1,177	1,515	619	1,121	132	224	64	162	332	208
Chemical products	2,312	11,153	3,264	6,863	887	1,104	443	947	2,530	952
Metal products	1,289	2,800	1,605	3,794	358	796	265	587	1,569	219
Machinery	3,225	11,774	3,948	7,813	557	1,351	509	1,773	3,075	548
Electronic machinery	4,923	9,309	2,099	10,505	288	1,504	1,190	3,131	4,050	342
Transport equipment	970	4,748	867	5,278	464	737	264	512	1,522	1,779
Other manufacturing	2,478	2,049	542	1,419	145	205	73	185	460	351
Trade	488	673	137	1,105	155	90	60	375	364	60
Construction	183	65	7	151	1	61	26	1	22	39
Transport and communication	872	105	597	918	90	127	66	178	316	141
Public services	197	61	191	378	52	32	20	70	136	67
Other services	1,250	124	1,027	2,211	348	316	70	573	685	219
Total	36,797	60,010	28,723	55,709	4,829	8,016	4,289	10,112	20,450	8,014
(ii) Percent changes										
Agriculture and food	20.1	27.0	94.7	32.2	14.6	21.0	21.6	19.2	66.3	69.4
Natural resources	1.6	3.7	7.4	16.8	13.6	14.0	8.6	9.1	30.5	36.8
Textile and apparel	31.9	56.3	44.4	29.9	23.9	23.3	14.2	6.5	56.6	53.3
Wood and paper products	6.8	16.5	17.6	15.3	11.9	14.2	7.4	8.6	26.6	30.8
Chemical products	5.5	25.0	15.8	14.4	10.2	13.1	9.1	8.2	31.5	16.1
Metal products	7.3	13.2	13.3	15.2	12.0	13.7	12.6	9.4	26.6	11.2
Machinery	7.5	24.4	17.6	13.1	8.6	10.6	8.7	8.8	28.7	14.1
Electronic machinery	8.7	17.8	7.8	10.1	10.0	6.1	7.2	6.8	31.6	26.0
Transport equipment	6.6	38.3	13.2	26.4	13.8	27.3	19.1	7.1	41.7	104.9
Other manufacturing	14.9	40.2	19.6	19.3	19.3	21.1	14.8	8.2	23.1	40.1
Trade	3.4	2.8	5.0	10.8	6.6	12.1	7.9	10.7	22.2	5.1
Construction	4.1	5.1	11.9	9.0	7.6	10.3	7.7	5.5	15.6	7.0
Transport and communication	3.4	1.9	5.6	7.0	4.9	6.8	5.3	4.9	16.7	5.2
Public services	3.8	3.3	12.6	10.3	8.1	7.0	11.0	8.7	24.7	6.6
Other services	3.6	1.9	8.4	6.8	5.5	3.6	5.7	7.5	18.1	4.4
Total	8.9	21.3	17.7	14.4	10.6	10.5	9.8	8.1	32.0	25.2

(Continue)

[Trade balance (net exports)] (Changes in millions US$)

	Japan	China	Korea	ASEAN						
					Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Agriculture and food	-8,211	16,868	-6,049	3,439	404	205	-417	1,521	2,215	-489
Natural resources	-595	165	-1,810	-3,511	-363	-363	-295	-572	-1,898	-20
Textile and apparel	1,017	124	6,238	620	182	304	141	-151	-163	307
Wood and paper products	-479	-1,546	107	1,325	905	235	-10	-64	6	253
Chemical products	3,961	-8,989	1,919	4,426	398	617	-163	982	1,995	597
Metal products	3,777	-2,228	-19	-1,887	-72	-237	-158	-342	-900	-178
Machinery	7,117	-8,312	-1,506	1,838	127	330	244	493	483	162
Electronic machinery	-5,247	5,477	912	5,602	547	1,877	346	657	2,343	-168
Transport equipment	3,905	-2,863	-205	-3,275	-326	-106	182	-828	-480	-1,716
Other manufacturing	-1,838	-528	2,476	825	-134	181	4	-130	133	771
Trade	-701	-770	-110	-1,580	-162	-326	-56	-667	-323	-46
Construction	-306	-67	-12	-136	-3	-56	-25	-2	-16	-34
Transport and communication	-422	-20	-475	-616	-84	-28	-24	-168	-258	-54
Public services	-262	-124	-449	-574	-65	-46	-31	-159	-187	-86
Other services	-1,750	-142	-1,495	-3,245	-403	-439	-67	-1,356	-810	-169
Total	-35	-2956	-479	3,252	951	2147	-330	-786	2139	-869

Data source: authors' simulation.

Note: changes in volumes of exports and imports are evaluated at FOB and CIF prices.

Table 12 Contribution ratios of each member country to increases in trade in ASEAN+3

	Contribution to increases in exports (%)										Contribution to increases in imports (%)									
	J	C	K	A	I	M	P	S	T	V	J	C	K	A	I	M	P	S	T	V
Japan																				
Agriculture and food	-	67.9	-21.9	66.9	2.2	0.7	0.9	8.7	54.0	0.4	-	60.9	24.2	72.0	-1.3	0.3	1.1	5.0	64.0	2.8
Natural resources	-	8.9	86.9	5.7	1.9	0.2	1.9	0.1	1.5	0.1	-	22.7	13.7	-30.5	-18.7	-4.4	-2.7	2.2	-0.6	-6.3
Textile and apparel	-	88.1	2.8	11.6	0.3	0.3	0.5	0.0	2.1	8.4	-	102.1	7.1	10.0	1.0	0.4	0.8	0.0	1.4	6.4
Wood and paper	-	72.8	9.2	41.4	4.9	8.8	2.6	0.8	18.6	5.8	-	14.6	0.1	86.9	31.6	24.9	1.8	-0.4	3.3	25.7
Chemical products	-	57.3	37.2	38.4	3.9	8.0	3.0	1.3	21.6	0.6	-	15.1	38.0	16.0	2.3	2.7	1.5	4.2	4.1	1.2
Metal products	-	46.0	19.0	58.4	5.7	20.0	2.5	0.7	29.2	0.3	-	17.2	10.6	24.8	8.6	3.5	1.4	0.5	9.8	0.9
Machinery	-	120.7	35.1	26.1	2.7	5.0	2.2	0.7	14.9	0.6	-	30.6	0.5	34.9	3.5	4.5	4.2	0.4	19.4	2.9
Electronic machinery	-	-652.5	-37.9	32.8	7.6	24.6	-6.7	26.5	-26.7	7.4	-	55.2	1.4	45.0	1.2	6.0	7.9	6.1	23.5	0.3
Transport equipment	-	143.2	10.3	88.8	9.5	27.2	5.0	0.6	41.5	4.9	-	14.9	-0.2	26.7	1.9	4.7	3.5	-0.3	16.4	0.6
Other manufacturing	-	144.0	23.1	65.6	3.4	25.1	2.8	-0.5	24.2	10.5	-	96.4	18.3	30.2	6.4	0.1	1.2	1.3	3.9	17.2
Total	-	116.5	24.1	40.9	3.8	9.6	2.7	0.2	21.5	3.2	-	56.3	12.2	35.3	1.7	2.4	2.1	2.4	22.4	4.3
China																				
Agriculture and food	24.3	-	77.0	3.5	0.3	1.3	0.4	0.2	1.1	0.2	14.1	-	17.6	63.7	8.9	18.2	5.5	8.8	10.3	12.0
Natural resources	26.6	-	77.8	24.9	2.3	1.4	14.6	0.3	5.0	1.3	9.4	-	3.5	-3.1	4.1	-0.1	0.1	1.0	-1.2	-6.9
Textile and apparel	66.0	-	19.8	12.9	1.9	2.3	1.2	0.2	5.5	1.9	70.5	-	57.4	9.1	3.1	2.1	0.4	0.5	2.5	0.6
Wood and paper	-706.1	-	-576.8	-609.7	-40.3	-127.1	-51.4	-46.7	-224.8	-119.2	32.4	-	51.3	70.8	45.2	7.6	0.5	3.3	9.9	4.4
Chemical products	13.7	-	37.6	63.4	7.7	7.1	4.5	3.5	13.3	27.4	33.3	-	36.7	82.6	8.5	11.0	0.9	9.2	38.8	14.1
Metal products	31.9	-	70.4	72.9	15.5	11.0	7.1	9.5	23.2	6.6	85.1	-	56.0	13.1	1.2	4.8	0.6	2.3	4.0	0.1
Machinery	24.2	-	25.9	43.2	6.8	9.5	3.0	4.5	16.4	3.0	104.2	-	26.9	29.7	0.6	5.5	2.8	14.1	6.4	0.3
Electronic machinery	15.6	-	9.1	22.5	2.2	4.4	1.0	6.2	8.0	0.8	65.5	-	44.5	69.7	5.6	24.4	3.0	19.9	16.3	0.5
Transport equipment	6.3	-	14.8	66.6	11.8	-1.2	1.7	1.0	-0.5	53.9	147.9	-	33.3	5.8	0.3	1.0	0.1	0.0	4.2	0.1
Other manufacturing	148.5	-	30.7	38.9	5.6	6.7	3.2	1.0	17.3	5.1	40.6	-	93.1	13.4	1.8	5.2	0.8	2.0	1.2	2.4
Total	33.0	-	40.7	19.7	2.6	3.3	1.5	2.4	6.0	4.0	69.2	-	40.6	41.2	5.0	9.1	1.7	8.5	13.0	3.8
Korea																				
Agriculture and food	50.5	16.5	-	15.2	1.6	0.4	1.9	0.7	10.2	0.5	-1.8	173.5	-	-7.4	-1.3	-1.3	-0.7	-0.3	-2.7	-1.1
Natural resources	83.3	12.7	-	5.3	3.2	1.0	0.2	0.4	0.1	0.3	26.7	37.0	-	39.6	24.7	7.1	0.2	0.2	0.0	7.5
Textile and apparel	5.9	70.7	-	19.0	4.7	0.4	1.3	0.1	2.6	9.8	10.4	94.4	-	13.1	4.5	1.2	0.2	0.4	2.3	4.6
Wood and paper	0.2	101.1	-	14.7	1.0	2.9	1.1	0.2	2.5	7.0	10.2	21.9	-	68.6	33.1	19.5	0.4	0.6	6.2	8.9
Chemical products	15.1	74.1	-	16.6	4.6	2.4	2.2	0.3	5.5	1.5	73.4	27.8	-	16.7	4.8	2.4	0.9	5.0	3.3	0.3
Metal products	7.8	94.0	-	34.9	7.6	8.1	3.0	0.6	11.7	3.9	62.1	29.0	-	10.4	1.5	3.1	3.6	1.2	0.9	0.1
Machinery	0.6	125.2	-	27.9	2.7	5.4	1.1	0.3	8.8	9.6	90.5	24.4	-	12.1	0.6	3.1	0.9	3.1	3.9	0.4
Electronic machinery	2.1	140.5	-	29.3	0.7	2.8	4.1	2.4	16.9	2.4	17.9	70.0	-	37.4	3.7	11.2	3.2	8.2	10.0	1.1
Transport equipment	-0.2	239.2	-	177.3	22.1	58.1	9.3	0.8	8.5	78.4	60.1	35.7	-	6.8	0.4	2.6	0.5	1.0	1.1	1.3
Other manufacturing	13.5	58.3	-	14.5	2.4	0.1	0.7	0.5	2.3	8.6	24.0	88.2	-	34.1	5.9	3.5	0.5	0.6	5.5	18.1
Total	13.9	83.4	-	24.7	4.1	3.3	2.1	0.6	7.0	7.6	30.2	85.4	-	10.5	3.4	2.5	0.5	1.7	1.2	1.3

(Continue)

	Contribution to increases in exports (%)										Contribution to increases in imports (%)									
	J	C	K	A	I	M	P	S	T	V	J	C	K	A	I	M	P	S	T	V
ASEAN																				
Agriculture and food	53.8	19.9	-5.8	56.5	3.0	11.4	5.8	2.4	16.5	17.4	6.8	10.2	8.1	88.9	19.8	12.6	3.7	25.6	16.2	11.0
Natural resources	69.1	3.9	-179.0	-162.7	-1.6	-5.9	-33.2	-0.6	-117.7	-3.7	1.1	7.1	0.2	22.0	8.2	3.6	0.1	0.6	-1.3	10.7
Textile and apparel	17.4	23.5	7.4	14.5	0.7	4.3	0.9	3.4	4.2	1.0	29.8	43.0	49.8	18.0	6.5	2.7	1.2	0.8	3.3	3.5
Wood and paper	34.1	40.8	15.4	27.2	1.4	7.4	1.7	3.1	8.4	5.3	25.4	12.3	10.3	65.4	17.2	10.8	2.1	13.7	11.9	9.6
Chemical products	2.9	74.9	4.5	24.3	3.3	4.8	1.4	2.1	8.8	3.9	36.2	22.2	13.3	42.6	5.8	9.0	1.9	17.3	8.1	0.5
Metal products	14.8	18.2	8.2	53.2	3.4	12.6	3.1	12.0	13.8	8.4	81.7	12.8	15.5	28.7	4.3	8.2	0.7	6.5	8.5	0.6
Machinery	10.3	35.5	4.8	39.8	1.6	8.5	1.9	7.7	15.0	5.2	34.5	20.8	9.2	50.7	6.0	9.7	2.2	12.5	13.0	7.3
Electronic machinery	12.2	41.0	4.7	39.1	0.4	6.3	2.9	12.5	15.0	2.1	-3.1	34.1	8.6	62.2	3.4	19.2	7.2	16.2	15.6	0.8
Transport equipment	11.2	13.5	2.8	35.1	-2.8	-2.5	3.8	4.4	24.1	8.0	83.5	25.5	22.5	13.9	1.9	3.4	7.1	-4.2	5.7	0.0
Other manufacturing	30.4	11.6	7.8	22.1	0.7	2.1	1.1	5.2	9.2	3.8	26.7	43.4	33.9	37.2	3.1	12.9	0.7	6.8	5.6	8.2
Total	20.2	40.2	5.0	40.0	1.8	7.3	3.1	6.7	14.6	6.5	26.8	21.3	13.2	44.4	6.8	9.7	3.2	11.0	9.6	4.1

Data source; authors' simulation.

Note; contribution ratio of each country is calculated, based on the changes in values of exports and imports at world prices in each sector. J, C, K, A, I, M, P, S, T, V stand for Japan, China, Korea, ASEAN, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam.

Table A.1 Aggregation of GTAP ver. 6 database: region

15 aggregated regions	87 GTAP regions					
Australia and NZ	1 aus	Australia				
Australia and NZ	2 nzl	New Zealand				
China	4 chn	China				
Hong Kong	5 hkg	Hong Kong				
Japan	6 jpn	Japan				
Korea	7 kor	Korea				
Taiwan	8 twn	Taiwan				
Indonesia (ASEAN)	10 idn	Indonesia				
Malaysia (ASEAN)	11 mys	Malaysia				
Philippines (ASEAN)	12 phl	Philippines				
Singapore (ASEAN)	13 sgp	Singapore				
Thailand (ASEAN)	14 tha	Thailand				
Vietnam (ASEAN)	15 vnm	Vietnam				
Vietnam (ASEAN)	16 xse	Rest of Southeast Asia (Brunei, Cambodia, Laos, Burma, (East)Timor Leste)				
NAFTA	21 can	Canada	22 usa	USA	23 mex	Mexico
EU	37 aut	Austria	42 deu	Germany	47 lux	Luxemburg
	38 bel	Belgium	43 gbr	U.K.	48 nld	Netherland
	39 dnk	Denmark	44 grc	Greece	49 prt	Portugal
	40 fin	Finland	45 irl	Ireland	50 esp	Spain
	41 fra	France	46 ita	Italy	51 swe	Sweden
ROW	9 xea	Rest of East Asia (Macau, Mongolia, Democratic Korea)				
	3 xoc	Rest of Oceania	52 che	Switzerland	71 tur	Turkey
	17 bgd	Bangladesh	53 xef	Rest of EFTA	72 xme	Rest of Middle East
	18 ind	India	54 xer	Rest of Europe	73 mar	Morocco
	19 lka	Ski Lanka	55 alb	Albania	74 tun	Tunisia
	20 xsa	Rest of South Asia	56 bgr	Bulgaria	75 xnf	Rest of North Africa
	24 xna	Rest of North America	57 hrv	Croatia	76 bwa	Botwana
	25 col	Colombia	58 cyp	Cyprus	77 zaf	South Africa
	26 per	Peru	59 cze	Czech	78 xsc	Rest of SACU
	27 ven	Venezuela	60 hun	Hungary	79 mwi	Malawi
	28 xap	Rest of Andean Pact	62 pol	Poland	80 moz	Mozambique
	29 arg	Argentina	63 rom	Romania	81 tza	Tanzania
	30 bra	Brazil	64 svk	Slovakia	82 zmb	Zambia
	31 chl	Chile	65 svn	Slovenia	83 zwe	Zimbabwe
	32 ury	Uruguay	66 est	Estonia	84 xsd	Rest of SADC
	33 xsm	Rest of South America	67 lva	Latovia	85 mdg	Madagascor
	34 xca	Central America	68 ltu	Lithuania	86 uga	Uganda
	35 xfa	Rest of FTAA	69 rus	Russia	87 xss	Rest of Sub-Saharan Africa
	36 xcb	Rest of the Caribbean	70 xsu	Rest of FSU		

Table A.2 Aggregation of GTAP version 6 database sectors

14 aggregated sectors	57 GTAP sectors			
Agriculture and food	1 pdr	Paddy Rice	11 rmk	Raw milk
	2 wht	Wheat	12 wol	Wool
	3 gro	Other grains	19 cmt	Meat: cattle, sheep, goats, horse
	4 v_f	Vegetables, fruits, nuts	20 omt	Other meat
	5 osd	Oil seeds	21 vol	Vegetable oils
	6 c_b	Sugar cane and sugar beet	22 mil	Milk: dairy products
	7 pfb	Plant fibres	23 pcr	Processed rice
	8 ocr	Other crops	24 sgr	Sugar
	9 ctl	Cattle, sheep, goats, horses	25 ofd	Other food
	10 oap	Other animal products	26 b_t	Beverages and tobacco
Natural resources	13 frs	Forestry	16 oil	Oil
	14 fsh	Fishing	17 gas	Gas
	15 coa	Coal	18 omn	Other mining
Textile and apparel	27 tex	Textiles	28 wap	Wearing apparel
Wood and paper products	30 lum	Wood products	31 ppp	Paper products
Chemical products	32 p_c	Petroleum and coke	34 nmm	Non-metallic minerals
	33 crp	Chemical rubber products		
Metal products	35 i_s	Iron and steel	37 fmp	Metal products
	36 nfm	Non-ferrous metals		
Machinery	41 ome	Other machinery and equipment		
Electronic machinery	40 ele	Electronic equipment		
Transport equipment	38 mvh	Motor vehicles	39 otn	Other transport equipment
Other manufacturing	29 lea	Leather	42 omf	Other manufacturing
Construction	46 cns	Construction		
Trade	47 trd	Trade		
Transport and communicati	48 otp	Other transport	50 atp	Air transport
	49 wtp	Water transport	51 cmn	Communications
Public services	56 osg	Public administration, defense, education, health		
Other services	43 ely	Electricity	53 isr	Insurance
	44 gdt	Gas distribution	54 obs	Other business services
	45 wtr	Water	55 ros	Recreation and other services
	52 ofi	Other financial intermediatic	57 dwe	Dwellings

Table A.3 Relative significance of East Asian countries in ASEAN's merchandise trade, 2001

[Exports] Unit: percent

Destination / Origin	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	ASEAN+3
Indonesia											
Agriculture and food	15.3	5.7	1.9	15.4	-	4.1	0.8	6.3	3.0	1.3	38.2
Natural resources	38.5	3.3	14.1	8.8	-	1.2	2.2	3.8	1.7	0.0	64.7
Textile and apparel	6.1	3.4	2.2	6.8	-	1.9	1.0	1.9	1.1	0.9	18.5
Wood and paper products	19.8	16.7	6.1	7.5	-	3.3	0.6	2.3	0.6	0.7	50.0
Chemical products	11.8	12.3	6.1	18.7	-	4.5	2.6	6.0	3.2	2.3	48.9
Metal products	31.4	1.8	2.4	31.1	-	5.1	1.6	16.9	6.1	1.3	66.6
Machinery	19.4	1.4	1.1	37.2	-	9.0	1.6	22.2	3.9	0.5	59.1
Electronic machinery	12.6	7.4	1.6	27.2	-	3.6	0.3	21.9	1.4	0.1	48.8
Transport equipment	15.0	0.7	1.5	36.3	-	9.0	4.7	15.2	5.0	2.4	53.6
Other manufacturing	7.5	0.6	1.1	4.3	-	0.8	0.2	2.6	0.4	0.3	13.5
Manufacturing total	14.1	7.6	3.3	17.1	-	3.7	1.1	9.3	2.0	0.9	42.1
Total	17.9	6.4	4.9	14.7	-	3.2	1.2	7.6	2.0	0.8	43.8
Malaysia											
Agriculture and food	5.2	9.7	2.2	22.0	2.7	-	1.0	13.0	1.7	3.5	39.1
Natural resources	32.7	4.8	9.9	7.5	0.9	-	0.6	1.3	4.1	0.6	54.8
Textile and apparel	5.3	5.3	1.3	19.1	0.8	-	0.6	11.8	0.9	5.0	31.0
Wood and paper products	24.9	4.3	5.0	14.8	0.4	-	1.8	9.1	2.4	1.0	48.9
Chemical products	9.8	9.4	2.9	26.9	3.8	-	1.8	14.1	4.3	2.9	48.9
Metal products	8.8	6.5	3.4	35.6	3.4	-	1.8	23.2	4.8	2.4	54.5
Machinery	13.3	6.2	2.2	31.5	2.7	-	1.4	22.3	4.2	0.9	53.2
Electronic machinery	10.8	8.8	3.4	23.9	0.4	-	1.0	19.8	2.6	0.1	46.8
Transport equipment	6.0	3.2	1.5	17.0	4.0	-	0.9	7.2	3.5	1.4	27.8
Other manufacturing	6.7	1.8	1.1	24.4	1.2	-	1.1	19.1	2.3	0.7	34.1
Manufacturing total	11.2	8.0	3.2	24.4	1.1	-	1.2	18.5	2.9	0.7	46.8
Total	11.1	7.0	3.3	20.4	1.2	-	1.0	14.8	2.5	0.9	41.7
Philippines											
Agriculture and food	19.4	5.4	4.5	10.0	2.3	4.4	-	1.5	1.0	0.7	39.3
Natural resources	67.2	4.8	1.0	1.1	0.0	0.3	-	0.4	0.2	0.2	74.1
Textile and apparel	4.4	0.7	0.2	1.7	0.4	0.5	-	0.4	0.2	0.2	7.0
Wood and paper products	24.1	2.3	0.6	5.1	0.4	2.9	-	0.9	0.6	0.2	32.0
Chemical products	17.9	6.6	4.7	19.5	1.9	5.8	-	3.8	5.3	2.7	48.8
Metal products	14.8	14.0	16.4	17.0	0.5	2.4	-	5.2	8.0	0.9	62.2
Machinery	20.4	5.8	1.3	10.9	0.5	2.3	-	6.5	1.2	0.3	38.4
Electronic machinery	16.3	3.7	4.1	19.6	0.1	4.1	-	10.4	5.1	0.0	43.7
Transport equipment	17.9	0.7	2.5	29.2	4.7	2.3	-	0.6	21.3	0.4	50.4
Other manufacturing	9.8	0.5	0.4	1.8	0.2	0.4	-	0.9	0.2	0.1	12.5
Manufacturing total	15.7	3.8	3.5	16.2	0.3	3.4	-	8.0	4.3	0.2	39.3
Total	15.8	3.8	3.5	14.9	0.5	3.3	-	7.1	3.9	0.3	38.0
Singapore											
Agriculture and food	11.4	4.0	1.3	42.3	1.9	6.5	13.9	-	2.1	17.9	59.0
Natural resources	22.5	1.6	1.1	30.0	5.4	12.7	0.3	-	9.7	1.9	55.2
Textile and apparel	0.9	3.7	1.7	22.8	2.2	9.7	1.0	-	1.3	8.7	29.0
Wood and paper products	6.0	5.6	2.3	30.2	3.5	11.2	1.9	-	6.3	7.5	44.1
Chemical products	4.7	12.4	2.8	34.5	9.8	13.0	3.2	-	5.2	3.3	54.3
Metal products	5.9	5.7	2.3	40.9	6.5	20.9	3.5	-	4.0	6.1	54.8
Machinery	5.4	10.8	2.9	35.9	3.9	18.6	3.8	-	5.4	4.3	55.0
Electronic machinery	7.1	7.9	4.8	19.8	0.2	13.0	2.2	-	3.7	0.8	39.6
Transport equipment	4.2	3.4	1.6	29.7	19.9	3.0	0.8	-	2.8	3.2	38.9
Other manufacturing	2.3	3.3	0.8	18.4	0.5	10.1	0.9	-	3.7	3.2	24.8
Manufacturing total	6.1	8.8	3.8	25.7	3.1	13.6	2.5	-	4.2	2.2	44.5
Total	6.4	7.5	3.5	22.1	2.8	11.1	2.4	-	3.5	2.3	39.5
Thailand											
Agriculture and food	22.1	6.0	3.0	11.9	2.0	3.6	1.1	2.9	-	2.2	43.0
Natural resources	9.0	8.2	1.4	38.6	2.3	27.7	0.5	6.7	-	1.4	57.1
Textile and apparel	5.9	3.7	1.2	7.8	1.4	1.0	1.2	1.5	-	2.6	18.6
Wood and paper products	19.8	9.9	2.8	10.9	1.1	3.5	1.9	2.3	-	2.1	43.3
Chemical products	12.4	11.5	3.3	27.9	3.7	6.0	2.5	5.7	-	9.9	55.1
Metal products	19.7	4.9	1.0	20.9	2.3	5.4	1.2	4.7	-	7.2	46.6
Machinery	17.3	4.1	1.4	17.5	1.3	4.1	1.8	7.7	-	2.6	40.4
Electronic machinery	16.3	8.7	2.6	21.6	0.6	5.1	1.8	13.9	-	0.2	49.2
Transport equipment	14.3	1.3	0.3	23.9	5.1	4.4	3.7	1.8	-	8.9	39.8
Other manufacturing	9.2	0.7	0.6	3.5	0.4	0.6	0.2	1.1	-	1.1	14.0
Manufacturing total	14.2	6.7	2.0	18.4	1.6	4.1	1.8	7.6	-	3.3	41.3
Total	14.4	6.1	2.1	15.6	1.5	3.7	1.5	6.1	-	2.8	38.2
Vietnam											
Agriculture and food	15.7	6.9	3.6	13.6	1.5	3.2	2.7	3.8	2.4	0.0	39.9
Natural resources	25.1	13.0	5.6	30.5	1.5	1.5	0.2	9.4	18.0	0.0	74.2
Textile and apparel	13.4	0.7	1.6	6.1	0.0	0.5	0.1	5.3	0.2	0.0	21.9
Wood and paper products	22.7	9.4	3.2	12.8	0.1	2.0	0.1	2.3	8.2	0.0	48.1
Chemical products	15.1	13.9	3.7	12.9	0.4	5.6	2.1	3.1	1.6	0.0	45.7
Metal products	22.5	1.1	2.6	34.9	3.0	7.1	1.1	10.4	13.3	0.0	61.2
Machinery	45.4	2.2	2.3	28.5	0.4	2.5	0.4	3.6	21.6	0.0	78.3
Electronic machinery	12.8	4.4	8.4	55.5	0.3	11.0	38.4	4.9	0.8	0.0	81.0
Transport equipment	9.8	0.5	25.3	3.6	0.3	1.6	0.2	0.9	0.5	0.1	39.3
Other manufacturing	7.7	0.5	1.4	1.6	0.1	0.2	0.1	1.0	0.3	0.0	11.2
Manufacturing total	15.0	2.5	2.5	9.9	0.2	1.6	1.8	3.6	2.7	0.0	29.9
Total	16.3	5.4	3.3	14.2	0.7	1.7	1.4	4.5	5.7	0.0	39.1

(Continue)

[Imports] Unit: percent

Origin / Destination	Japan	China	Korea	ASEAN	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	ASEAN+3
Indonesia											
Agriculture and food	0.6	7.7	0.8	15.6	-	4.7	1.4	1.4	6.5	1.6	24.7
Natural resources	1.2	4.5	0.6	9.4	-	2.9	0.0	1.0	0.3	5.1	15.7
Textile and apparel	8.5	13.9	27.0	7.5	-	1.1	0.5	1.5	4.3	0.1	56.9
Wood and paper products	7.0	2.0	2.4	10.5	-	2.0	0.3	5.5	2.6	0.1	22.0
Chemical products	11.9	6.4	12.0	27.3	-	4.3	0.3	18.1	4.5	0.0	57.5
Metal products	26.7	7.1	9.1	11.1	-	3.2	0.2	5.6	1.9	0.2	54.0
Machinery	33.7	8.5	5.6	13.5	-	3.3	0.3	7.8	2.1	0.1	61.3
Electronic machinery	28.9	13.1	17.4	15.7	-	8.3	0.5	3.0	3.8	0.1	75.1
Transport equipment	36.4	6.2	7.9	19.1	-	1.6	0.9	13.1	3.6	0.0	69.6
Other manufacturing	11.5	17.5	27.6	8.3	-	3.8	0.2	1.0	2.9	0.4	64.9
Manufacturing total	22.6	8.3	11.5	17.6	-	3.7	0.4	10.1	3.4	0.1	60.0
Total	15.3	6.7	7.7	14.6	-	3.6	0.4	7.3	2.9	0.4	44.2
Malaysia											
Agriculture and food	0.6	11.5	0.2	26.8	6.6	-	2.5	4.3	10.5	3.0	39.2
Natural resources	0.3	3.8	0.5	26.1	11.8	-	0.1	2.4	5.6	6.2	30.8
Textile and apparel	5.6	16.9	4.1	32.0	13.2	-	1.2	10.7	5.0	1.8	58.5
Wood and paper products	7.9	3.6	4.4	42.2	21.5	-	1.5	11.7	6.1	1.3	58.1
Chemical products	15.3	3.8	4.4	38.4	4.1	-	0.8	25.1	7.7	0.6	61.9
Metal products	30.3	3.0	6.4	15.3	3.1	-	0.4	9.2	2.3	0.3	55.0
Machinery	24.7	4.5	3.0	25.5	2.7	-	0.7	18.6	3.3	0.2	57.6
Electronic machinery	17.4	6.8	6.3	35.9	1.3	-	3.7	26.6	4.1	0.2	66.4
Transport equipment	42.0	1.9	3.5	9.3	2.5	-	0.5	2.3	3.9	0.1	56.7
Other manufacturing	16.4	14.6	3.3	23.9	3.7	-	0.5	15.3	3.6	0.8	58.1
Manufacturing total	20.6	5.6	5.0	30.6	3.1	-	2.0	20.8	4.3	0.3	61.7
Total	16.3	5.1	4.1	26.0	3.0	-	1.7	16.6	4.1	0.6	51.5
Philippines											
Agriculture and food	0.6	4.7	0.8	22.8	1.6	2.1	-	11.5	4.2	3.4	28.9
Natural resources	1.0	5.1	0.0	11.3	9.7	1.1	-	0.0	0.1	0.4	17.4
Textile and apparel	10.4	13.9	15.8	13.3	5.7	1.1	-	0.9	5.1	0.4	53.4
Wood and paper products	6.8	2.7	5.1	27.9	6.7	11.4	-	3.6	6.1	0.2	42.5
Chemical products	19.4	7.5	8.5	24.0	4.2	3.7	-	10.4	5.3	0.4	59.4
Metal products	27.4	5.5	11.7	10.9	2.8	2.4	-	4.2	1.4	0.1	55.5
Machinery	39.8	4.1	3.2	14.6	1.1	1.9	-	8.3	3.2	0.1	61.8
Electronic machinery	27.4	1.6	8.0	14.1	0.2	3.9	-	6.7	2.2	1.1	51.0
Transport equipment	43.8	4.5	5.4	11.0	2.5	0.8	-	1.3	6.3	0.0	64.8
Other manufacturing	11.6	19.8	8.0	12.2	1.4	5.4	-	2.7	2.3	0.4	51.5
Manufacturing total	27.5	4.1	7.7	15.6	1.6	3.4	-	6.7	3.2	0.7	54.9
Total	21.5	4.0	6.1	14.9	2.1	2.9	-	6.2	2.9	0.8	46.5
Singapore											
Agriculture and food	4.7	6.0	0.5	43.4	10.2	20.8	0.8	-	8.3	3.4	54.6
Natural resources	0.1	0.4	0.1	18.1	7.9	1.3	0.0	-	0.3	8.6	18.6
Textile and apparel	2.9	26.3	3.2	35.1	6.7	13.4	0.5	-	3.9	10.6	67.5
Wood and paper products	6.1	5.9	3.0	43.4	12.7	25.5	0.4	-	3.4	1.3	58.4
Chemical products	12.8	6.3	1.6	21.8	4.0	12.0	0.4	-	5.2	0.3	42.5
Metal products	17.4	10.1	4.6	23.1	9.6	10.4	0.8	-	1.9	0.4	55.1
Machinery	20.4	6.0	2.1	18.3	4.3	8.7	1.2	-	3.9	0.2	46.8
Electronic machinery	14.7	7.3	5.4	42.3	4.2	27.1	5.0	-	6.0	0.1	69.6
Transport equipment	15.5	1.8	4.7	3.5	1.6	1.3	0.0	-	0.6	0.0	25.6
Other manufacturing	7.3	12.8	2.8	29.3	5.0	19.5	0.4	-	2.8	1.5	52.2
Manufacturing total	15.2	7.3	4.0	30.4	4.6	18.0	2.7	-	4.6	0.5	56.9
Total	12.6	6.2	3.4	27.0	4.4	15.4	2.2	-	4.1	0.9	49.2
Thailand											
Agriculture and food	2.9	4.0	1.3	13.2	5.4	3.0	0.6	1.5	-	2.5	21.4
Natural resources	0.1	0.8	0.0	25.5	3.9	3.7	0.0	0.4	-	17.5	26.4
Textile and apparel	13.1	22.3	10.7	9.8	6.2	1.5	0.4	1.1	-	0.5	55.9
Wood and paper products	13.3	2.6	1.3	30.3	4.7	10.2	0.4	8.2	-	6.8	47.5
Chemical products	22.1	5.6	4.9	19.7	3.0	5.3	0.8	10.3	-	0.2	52.3
Metal products	30.3	3.8	4.8	9.5	3.6	2.2	1.3	1.7	-	0.6	48.4
Machinery	39.2	5.8	3.1	13.1	1.4	3.1	0.4	6.4	-	1.7	61.2
Electronic machinery	20.9	8.7	7.5	37.4	0.9	12.8	8.9	14.7	-	0.0	74.6
Transport equipment	37.4	1.2	2.2	7.5	1.0	1.2	3.6	1.6	-	0.0	48.4
Other manufacturing	6.8	7.0	2.5	7.0	0.9	2.7	0.1	2.8	-	0.5	23.3
Manufacturing total	26.8	6.5	5.0	20.2	2.1	6.0	3.2	8.1	-	0.7	58.5
Total	19.9	5.3	3.9	18.3	2.2	5.1	2.4	6.3	-	2.3	47.4
Vietnam											
Agriculture and food	0.9	8.4	0.6	50.9	4.2	11.1	0.8	22.4	12.5	0.0	60.8
Natural resources	0.8	9.3	0.7	50.6	4.1	35.3	1.1	6.0	4.1	0.0	61.4
Textile and apparel	9.3	16.0	18.8	20.5	3.3	5.5	0.2	4.9	6.7	0.0	64.6
Wood and paper products	4.7	3.9	7.5	45.5	10.4	7.7	0.3	18.6	8.6	0.0	61.6
Chemical products	4.7	23.6	8.3	35.6	2.9	4.8	0.6	9.3	18.1	0.0	72.3
Metal products	16.0	15.1	10.1	23.5	2.5	3.6	0.4	7.9	9.1	0.0	64.7
Machinery	20.0	11.0	10.1	24.1	0.5	1.9	0.3	14.4	7.0	0.0	65.1
Electronic machinery	22.5	6.8	7.1	38.5	0.4	5.6	0.3	29.5	2.7	0.0	74.9
Transport equipment	13.2	37.0	11.4	18.8	1.0	1.1	0.2	4.0	12.5	0.0	80.5
Other manufacturing	3.3	7.5	21.1	16.1	1.5	1.8	0.1	5.4	7.3	0.0	48.0
Manufacturing total	11.6	17.6	11.1	28.0	2.3	3.9	0.4	10.6	10.9	0.0	68.3
Total	8.3	11.7	7.1	22.0	1.8	3.7	0.3	8.5	7.7	0.0	49.1

Data source: GTAP ver.6 database.

Note: exports and imports are at world prices.

Table A.4 Contribution ratios of each member country to increases in ASEAN's trade

	Contribution to increases in exports (%)										Contribution to increases in imports (%)									
	J	C	K	A	I	M	P	S	T	V	J	C	K	A	I	M	P	S	T	V
Indonesia																				
Agriculture and food	-10.4	30.2	-10.5	139.1	-	19.3	0.9	5.4	110.0	3.4	2.8	10.2	10.5	60.0	-	14.9	1.9	1.4	33.2	8.6
Natural resources	123.4	-17.4	-325.9	-171.4	-	-18.2	-86.1	-3.2	-62.0	-1.9	5.2	8.4	1.9	2.9	-	1.6	0.0	1.4	-1.0	0.9
Textile and apparel	10.6	48.3	15.3	31.8	-	10.9	2.1	0.5	13.6	4.9	5.8	44.9	86.5	6.3	-	1.6	0.6	0.3	3.6	0.2
Wood and paper	29.8	61.7	17.7	17.0	-	6.5	0.6	1.4	5.5	2.9	25.3	7.0	6.0	28.2	-	6.5	1.2	12.3	7.6	0.6
Chemical products	3.7	68.5	11.1	29.0	-	9.4	2.1	2.6	12.1	2.7	28.2	20.8	28.3	44.6	-	7.0	0.8	28.6	8.0	0.2
Metal products	34.6	11.5	7.8	53.7	-	11.6	4.8	22.7	11.0	3.6	83.7	28.6	35.6	19.0	-	6.8	0.1	6.3	5.9	0.0
Machinery	14.5	10.1	3.4	65.4	-	15.3	3.6	20.4	23.9	2.2	49.3	44.9	12.4	27.6	-	7.0	1.1	6.2	13.1	0.2
Electronic machinery	5.9	62.5	8.7	40.1	-	4.1	0.7	14.0	20.8	0.5	-26.1	123.0	7.5	21.6	-	1.6	0.2	2.4	17.3	0.1
Transport equipment	10.5	10.1	2.2	65.4	-	-11.0	10.3	12.4	43.7	10.0	99.8	51.6	31.0	-13.1	-	3.6	2.8	-30.5	10.9	0.1
Other manufacturing	5151.6	1194.6	1058.4	1433.7	-	163.4	32.3	36.2	663.4	538.4	13.6	63.0	55.8	12.4	-	6.0	0.6	0.5	1.3	3.9
Total	10.0	49.6	15.9	61.0	-	11.3	4.1	8.0	34.2	3.4	28.4	32.1	25.1	23.1	-	5.9	1.0	4.4	10.5	1.4
Malaysia																				
Agriculture and food	2.1	49.5	-9.0	70.3	6.8	-	2.3	15.5	27.4	18.3	0.5	27.4	1.6	133.6	20.2	-	14.6	5.0	94.2	-0.4
Natural resources	22.4	0.2	-75.1	-64.0	-2.2	-	-3.9	-2.0	-49.8	-6.2	0.5	5.9	0.8	10.6	13.7	-	0.2	-0.2	-15.0	11.8
Textile and apparel	4.4	35.6	4.6	14.7	1.2	-	1.0	8.7	5.7	-1.9	9.5	84.0	12.6	59.1	24.9	-	6.0	12.9	7.4	8.0
Wood and paper	52.6	23.0	23.1	23.9	1.7	-	4.0	8.1	7.9	2.2	26.5	12.8	10.1	87.8	32.9	-	7.4	11.0	23.7	12.8
Chemical products	3.2	66.1	4.3	33.3	3.4	-	1.5	7.5	17.8	3.0	46.4	15.4	12.1	51.6	11.7	-	3.7	20.5	15.0	0.7
Metal products	7.1	22.5	8.1	50.8	4.0	-	2.8	21.7	19.3	3.1	132.5	9.1	17.1	31.9	4.4	-	0.0	12.3	15.1	0.1
Machinery	7.6	37.8	7.1	43.2	2.3	-	1.5	15.9	18.3	5.3	38.0	26.1	10.2	61.8	8.1	-	2.7	28.5	21.7	0.9
Electronic machinery	7.8	69.2	6.7	58.1	0.1	-	2.4	20.5	33.5	1.5	-16.9	49.3	6.1	73.0	2.6	-	5.4	38.0	26.1	0.9
Transport equipment	6.2	7.3	3.3	26.3	2.4	-	0.9	7.8	11.2	3.9	178.1	-3.2	51.0	-6.7	-2.2	-	-0.3	-5.0	1.1	-0.2
Other manufacturing	0.7	26.2	4.7	44.0	2.0	-	3.8	17.0	19.2	2.0	68.0	50.8	2.3	24.2	2.4	-	0.7	6.5	5.0	9.6
Total	8.1	52.2	6.8	50.7	2.7	-	2.3	16.1	24.7	4.8	43.5	24.4	12.1	56.1	8.7	-	4.3	16.6	25.0	1.6
Philippines																				
Agriculture and food	25.1	56.0	-18.5	72.6	3.1	38.8	-	1.6	19.9	9.2	0.9	13.1	10.0	95.2	1.3	3.9	-	6.3	10.6	73.1
Natural resources	76.4	-1.5	-9.5	-8.8	0.0	-0.8	-	-0.1	-6.8	-1.1	4.7	50.1	0.1	55.7	49.3	2.6	-	0.1	-0.1	3.8
Textile and apparel	16.7	12.8	1.3	11.6	0.8	5.1	-	0.3	3.3	2.1	19.4	65.1	57.5	19.2	6.9	2.9	-	0.7	7.2	1.5
Wood and paper	32.9	12.3	3.5	40.2	2.6	28.1	-	1.9	7.1	0.6	27.8	18.3	13.6	72.1	9.7	31.9	-	5.0	22.7	2.8
Chemical products	10.9	33.5	9.4	42.0	2.3	13.7	-	2.3	21.4	2.3	43.9	23.8	27.3	36.5	6.8	6.6	-	9.2	12.8	1.2
Metal products	14.9	13.5	49.4	23.2	0.2	0.0	-	5.7	17.1	0.2	48.4	17.7	19.0	23.4	5.5	6.3	-	6.0	5.3	0.3
Machinery	15.8	42.7	4.5	21.7	0.8	4.6	-	6.1	8.8	1.3	43.3	22.1	5.2	35.6	5.0	4.9	-	7.9	17.5	0.3
Electronic machinery	22.2	18.4	4.2	46.8	0.0	4.9	-	16.8	25.0	0.0	5.3	12.4	10.3	39.1	0.5	6.9	-	14.7	12.3	4.7
Transport equipment	6.5	1.4	0.8	80.1	2.8	-0.6	-	0.2	77.5	0.1	93.2	12.7	23.7	30.3	6.0	2.3	-	-1.1	23.0	0.1
Other manufacturing	36.7	19.0	3.7	11.6	1.1	1.7	-	1.3	5.5	2.0	22.5	68.4	30.9	35.4	1.3	22.4	-	1.6	5.4	4.8
Total	18.0	25.1	3.4	43.6	1.1	8.1	-	8.3	24.6	1.6	22.5	20.7	14.4	45.5	6.0	5.6	-	7.5	11.3	15.1

(Continue)

	Contribution to increases in exports (%)										Contribution to increases in imports (%)									
	J	C	K	A	I	M	P	S	T	V	J	C	K	A	I	M	P	S	T	V
Singapore																				
Agriculture and food	17.3	13.1	-1.0	76.2	0.3	2.0	1.9	-	5.2	66.7	7.4	4.1	3.1	32.0	6.4	23.3	0.6	-	-2.3	4.0
Natural resources	102.8	29.3	20.6	91.1	14.4	-1.4	0.9	-	73.5	3.7	0.1	0.5	0.1	-0.1	0.6	0.6	0.0	-	-1.3	0.1
Textile and apparel	-15.8	-228.3	-43.5	-123.3	-5.9	-179.1	-6.9	-	-101.3	169.9	-2.8	18.4	4.3	114.2	2.6	44.1	1.0	-	6.2	60.4
Wood and paper	-4.3	48.5	3.6	146.1	14.6	23.8	3.0	-	57.4	47.3	3.2	6.7	1.1	51.9	10.0	25.5	0.7	-	5.6	10.1
Chemical products	4.6	50.0	8.2	58.6	12.7	11.2	2.1	-	23.6	9.1	8.9	9.0	1.9	27.3	3.9	15.0	0.8	-	7.0	0.5
Metal products	2.7	27.1	8.1	100.0	9.3	40.8	6.6	-	38.7	4.6	6.5	11.0	1.7	43.2	12.1	23.3	1.2	-	5.7	0.9
Machinery	0.5	73.4	5.5	43.3	1.6	17.2	1.8	-	17.0	5.6	3.9	10.0	0.5	44.8	8.6	16.2	2.8	-	16.7	0.5
Electronic machinery	7.3	51.5	4.5	44.8	0.2	14.4	4.7	-	20.0	5.5	-8.6	32.4	2.4	68.8	4.1	23.4	8.9	-	32.2	0.2
Transport equipment	0.7	-0.1	-2.5	62.1	40.2	11.0	0.8	-	0.7	9.5	6.0	4.1	1.1	18.8	4.0	10.6	0.2	-	3.9	0.1
Other manufacturing	78.4	105.5	9.0	243.6	2.0	35.3	3.0	-	172.6	30.8	-1.6	9.3	9.5	71.6	0.6	40.8	0.6	-	6.6	23.0
Total	9.2	56.0	5.4	66.9	2.3	14.7	3.6	-	22.0	24.3	0.7	14.3	1.7	41.6	4.9	17.4	3.4	-	13.8	2.0
Thailand																				
Agriculture and food	110.1	7.4	-4.9	23.3	3.8	18.4	1.6	-0.4	-	-0.1	16.2	9.1	15.9	75.9	45.9	14.4	2.9	5.2	-	7.6
Natural resources	5.4	7.0	0.2	33.0	2.1	24.7	0.3	6.7	-	-0.7	0.5	2.5	0.0	27.5	5.2	4.9	0.1	0.8	-	16.6
Textile and apparel	12.2	33.1	6.7	13.7	2.1	2.7	1.8	0.9	-	6.1	19.8	66.5	25.1	18.9	10.0	3.9	1.3	2.3	-	1.5
Wood and paper	9.6	41.6	10.1	36.5	2.7	14.6	4.0	2.4	-	12.7	39.1	15.5	6.0	68.9	19.2	12.2	1.3	18.1	-	18.2
Chemical products	1.8	86.5	2.2	11.3	1.5	3.4	1.2	1.3	-	3.9	55.3	12.5	12.0	41.5	6.6	13.1	2.6	18.7	-	0.6
Metal products	16.4	15.9	1.9	43.9	2.9	16.6	2.0	4.4	-	18.0	98.0	9.8	12.5	17.7	2.1	7.4	1.2	6.0	-	0.9
Machinery	15.4	20.8	4.2	27.3	2.0	8.0	2.5	7.7	-	7.2	49.7	19.8	7.3	48.1	5.6	10.3	2.2	12.4	-	17.6
Electronic machinery	15.7	23.5	3.1	24.1	0.7	5.5	2.2	14.3	-	1.3	6.2	30.1	12.4	60.1	4.4	27.8	9.7	18.1	-	0.1
Transport equipment	13.0	18.7	0.9	27.0	4.7	0.7	5.5	1.8	-	14.4	134.7	-0.7	3.7	32.8	4.4	4.9	23.6	-0.2	-	0.1
Other manufacturing	15.1	3.8	4.8	12.4	0.3	1.7	0.6	1.8	-	8.0	29.9	58.3	15.8	46.6	4.3	17.0	1.0	14.5	-	9.9
Total	33.0	32.2	1.6	22.3	2.1	8.2	2.1	5.8	-	4.1	38.0	17.4	10.0	43.6	10.2	12.7	4.9	9.8	-	5.9
Vietnam																				
Agriculture and food	19.5	34.2	-8.4	60.5	3.7	-0.3	40.0	2.8	14.3	0.0	0.2	3.1	1.2	120.2	2.2	14.9	2.1	101.4	-0.4	0.0
Natural resources	-355.7	-232.0	839.3	1964.1	12.6	137.4	51.4	6.6	1756.2	0.0	1.4	33.8	1.8	44.0	7.6	30.8	1.2	2.1	2.2	0.0
Textile and apparel	26.9	3.7	6.3	6.8	0.1	1.4	0.2	4.4	0.8	0.0	54.6	15.7	65.2	3.2	2.5	-0.9	0.6	-2.7	3.7	0.0
Wood and paper	51.1	13.0	10.1	20.5	0.2	5.5	0.3	3.1	11.4	0.0	19.0	12.8	25.6	67.5	15.9	5.4	0.2	23.8	22.3	0.0
Chemical products	1.5	94.6	0.7	2.1	0.1	0.5	0.3	0.3	0.9	0.0	4.2	69.7	8.9	50.9	3.9	5.9	0.7	19.7	20.5	0.0
Metal products	27.9	6.7	5.4	52.0	-0.1	2.7	2.1	12.5	34.8	0.1	7.7	20.9	30.9	82.0	5.3	9.3	0.1	5.2	61.9	0.0
Machinery	12.0	4.5	2.4	78.3	0.2	1.7	0.2	1.1	75.2	0.0	11.0	20.5	45.7	95.2	2.9	17.2	1.9	23.6	49.6	0.0
Electronic machinery	8.0	26.8	12.5	45.6	0.2	7.1	31.9	3.4	2.9	0.1	-20.5	35.9	21.5	101.3	1.3	15.0	0.2	59.4	25.3	0.0
Transport equipment	12.7	11.0	29.4	0.9	1.0	-3.9	0.4	1.3	2.2	0.0	13.8	61.6	30.3	9.6	0.9	1.5	0.0	-1.9	9.1	0.0
Other manufacturing	33.9	4.1	8.0	9.4	0.5	1.7	0.3	3.2	3.8	0.0	17.7	22.8	81.0	25.8	4.7	2.4	0.5	3.5	14.7	0.0
Total	19.8	29.6	4.9	29.1	0.8	1.7	7.9	2.6	16.0	0.0	14.7	30.3	28.4	50.5	2.6	6.6	0.8	28.1	12.4	0.0

Data source; authors' simulation.
Note; see note for Table12.