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The Impacts of East Asia FTA on Foreign Trade in East Asia

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1. Introduction

The world economy has been witnessing the surge in free trade agreement (FTA) since the early 1990s. Up to December 2002, some 250 FTAs have been notified to the GATT/WTO, and of those 130 were notified after the establishment of the WTO in January 1995.¹ More than 170 FTAs are currently in force, and additional 70 FTAs are expected to be operational, although not yet notified. According to the WTO, by the end of 2005, if FTAs reportedly planned or already under negotiation are concluded, the total number of FTAs in force may approach 300. Among the regions of the world East Asia were not active in establishing FTAs until recently. Indeed, until 2002, when Japan-Singapore FTA was enacted, ASEAN Free Trade Area (AFTA) was the only major FTA in the region. Many East Asian economies started showing a strong interest in FTAs toward the end of the 1990s. Although East Asia has so far seen the creation of only few FTAs including AFTA and Japan-Singapore FTA, it is likely to observe the establishment of many FTAs. Indeed, it may not be unrealistic to imagine the formation of the East Asia FTA, covering all East Asian countries and economies.

In light of strong interest in FTAs by East Asian economies, this paper attempts to examine the impact of East Asia FTA on trade patterns in East Asia by using a multi-sector computable general equilibrium (CGE) model. Since FTA removes tariff and non-tariff

¹ At the GATT/WTO the term regional trade agreements (RTAs), which include free trade agreement (FTA) and customs union, are used to describe regionalization. But in this paper we use the term FTAs to mean RTAs, as many RTAs, especially those in East Asia, are FTAs. See WTO website, <http://www.wto.org> for the information on RTAs.

barriers on trade among members, East Asia FTA is expected to have substantial impacts on trade patterns of East Asian economies. Such an analysis is useful not only for researchers interested in trade issues, but also for policy makers responsible trade policies.

The structure of the paper is as follows. Section 2 examines the changing patterns of trade in East Asia in the 1990s, and section 3 reviews recent developments in FTAs in East Asia. These two sections are prepared to set the stage for the simulation analysis of the impact of East Asia FTA on trade in East Asia in sections 4 and 5. Section 4 describes the model and the data to be used in the analysis and section 5 discusses the results of the simulation. Finally in section 6 some concluding comments are presented.

2. The Changing Patterns of Trade in East Asia

2.1. Rapid Expansion of Intra-regional Trade

East Asia saw a rapid increase in its trade in the 1990s. From 1990 to 2001, East Asia's overall exports and imports increased 2.19 and 2.16 times, respectively, significantly faster compared to world trade, which increased 1.83 times. As a result of rapid trade expansion, the share of East Asia in world exports and imports increased from 20.9 and 17.6 percent in 1990 to 25.0 and 20.9 percent in 2001. One of the remarkable developments concerning East Asia's trade is sharp increase in intra-regional trade, that is, trade among the economies in East Asia. Indeed, the value of intra-regional trade in East Asia increased 2.61 times from 1990 to 2001, much faster than its trade with the rest of the world. Below we examine the changes in the patterns of intra-regional trade in East Asia in the 1990s.

Several studies have examined the changes in intra-regional dependence in foreign trade in East Asia. Computing three sets of measures to be discussed below, Petri (1993) found that intra-regional dependence in foreign trade in East Asia increased steadily in the post-World War II period, after declining in the pre-World War II period, and that intra-regional bias declined in the post-World War II period. Urata (2001) also found similar patterns of increasing importance of intra-regional trade and declining intra-regional trade bias for East Asia from 1980 to 1997. Similar to the findings by Petri and Urata, Frankel (1993) also found a decline in intra-regional bias in foreign trade in the 1980s by estimating the magnitude of the bias in the gravity model framework. This subsection investigates the changing patterns of intra-regional trade in East Asia from 1990 to 2001. Following Petri (1993), three measures are computed: absolute measures, relative measures, and double

relative measures.²

The absolute measure compares the scale of a particular intra-regional trade relationship to world trade, while the relative measure compares it to its overall regional trade. The double relative measure, which is commonly called the trade intensity index, shows the intensity or bias of the intra-regional trade relationship by taking into account its importance in world trade. The value of unity for the double relative measure can be interpreted so that the intra-regional trade relationship is neutral, while the relationship is more (or less) biased when the measure is greater (or less) than unity.

Table 1 shows the estimated values of the three measures of foreign trade for three regions in the world — East Asia, the North American Free Trade Agreement (NAFTA), and the European Union (EU). The results indicate that intra-regional trade in East Asia and the NAFTA became more important not only in terms of world trade but also in terms of their regional trade, while the opposite patterns can be found for the EU. Specifically, the share of intra-regional trade in East Asia and the NAFTA in world trade increased from 8.4 and 6.7 percent in 1990 to 11.9 and 10.0 percent in 2001, respectively, while the corresponding share for the EU declined from 29.1 to 22.3 percent.

=== Table 1 ===

The importance of East Asia for East Asia as a destination as well as a source of its imports increased from 1990 to 2001, as the shares of East Asia in East Asia's exports and imports increased from 40.1 and 47.5 percent in 1990 to 47.5 and 56.9 percent in 2001, respectively. It should be noted that East Asia is more important for East Asia as a source of imports than a destination of its exports, indicating strong reliance on the outside regions for its exports. Asymmetric pattern of foreign trade for East Asia observed above reflects the behavior of multinationals and local firms, which import parts and components from East Asian economies to assemble final products, and then export them to the NAFTA and the EU markets. Similar to the pattern of increasing importance of East Asia for its trade, intra-regional trade has become more important for the NAFTA, while the opposite pattern can be found for the EU.

The results of double relative measure for East Asia reveal a new pattern of increase from 1990 to 2001, different from the earlier pattern of decline found by several

² The definitions of these three measures are given in Appendix.

researchers including Urata (2001). Although not shown in the table, double relative measure started to increase slightly toward the end of the 1990s after the financial crisis. The increase in intra-regional trade bias was larger for the NAFTA and the EU, when compared to the case in East Asia. The increase in intra-regional trade in the three regions may be attributable to various factors. One is strategy of multinational companies, which seek to obtain benefits from agglomeration of economic activities, leading to increased intra-regional trade. Such intra-regional activities have been promoted by the presence of institutional regional arrangements in the NAFTA and the EU as they give preferences to their member countries. As to the establishment of regional institutional arrangements, East Asia was lagging behind, but in recent years it has become more active, as will be discussed below.

To summarize the patterns of intra-regional trade in East Asia, we found that the importance of intra-regional trade in East Asia increased not only in world trade but also in regional trade over time. However, extra-regional trade also expanded rapidly, as shown by a small increase in intra-regional trade bias, when compared to the cases for the NAFTA or the EU. Based on these observations, one may characterize the type of regionalization in East Asia as market-led, while the type of regionalization in the NAFTA and the EU as institution-led.³ Having noted the importance of market forces behind regionalization in East Asia, the emergence of regional institutions in East Asia in recent years may change the characteristics of regionalization in East Asia from market-led to institution-led type.

2.2. Factors behind the Rapid Expansion of Foreign Trade

Several factors contributed to rapid trade expansion by East Asian economies. Among them liberalization of trade and FDI regimes was very important. Trade liberalization, which was carried out unilaterally, regionally, and globally, contributed to remarkable expansion in foreign trade. FDI liberalization also contributed to expansion in foreign trade, as it promoted trade-oriented FDI.⁴ It should be noted that remarkable technical progress achieved in information technology, which reduced the cost of communications, contributed to the expansion of trade and FDI. This section examines the experiences of trade liberalization by East Asian economies.

³ Urata (2002) discusses these two types of regionalization.

⁴ Urata (2001) discusses the creation of FDI-trade nexus in East Asia and its contribution to East Asia's economic growth.

Developing East Asian economies embarked on liberalization of trade regime as part of more comprehensive structural reform programs. Such policy changes were due to the realization on the part of developing East Asian economies that liberalization and deregulation would promote economic growth. The liberalization of trade led to the expansion of exports because it shifted the incentives from import-substituting production to export production.

Developing East Asian economies liberalized their import regimes by lowering tariff rates and non-tariff barriers from the early 1980s through the 1990s (Figure 1). The notable exception was Hong Kong and Singapore, which had adopted virtually free trade regimes. Among the East Asian economies the Philippines and Thailand significantly reduced their average tariff rates, as shown in Figure 1. The incidence of non-tariff barriers declined in many East Asian economies, except in China.⁵ The most remarkable is Indonesia, which reduced the incidence of non-tariff barriers from 95 percent in 1984–87 to less than 3 percent in 1991–93.

==== Figure 1 ====

In addition to unilateral efforts, liberalization of trade progressed under regional and global frameworks. The members of the ASEAN formed the ASEAN Free Trade Area (AFTA) in 1992, the only formal regional trade arrangement in East Asia until 2002, when Japan and Singapore enacted FTA. AFTA provided for the liberalization of tariff and non-tariff measures under the Common Effective Preferential Tariffs. The target year for achieving tariff and non-tariff liberalization was originally set for 2008, but was later moved forward to 2002.

Asia Pacific Economic Cooperation (APEC) has also contributed to the liberalization and facilitation of trade and FDI for East Asian economies. This trans-regional forum includes not only East Asian economies but also countries in North and South America and Oceania. One important characteristic of APEC is its inclusion of China and Taiwan as members. Indeed, APEC was the only international economic forum in which both China and Taiwan participated until they became members of the World Trade Organization at the end of 2002.⁶ Following the Bogor declaration in 1994 calling

⁵ See, PECC (1995).

⁶ However, they are members of the Asian Development Bank.

for full liberalization of trade by 2010 for developed-economy members and by 2020 for developing-economy members, APEC members agreed to prepare and implement individual action plans specifying near- and medium-term liberalization measures. Peer pressure is expected to play a crucial role in implementation. All APEC members have made significant progress toward freer trade regime.

The Uruguay Round of multilateral trade negotiations under the GATT started in 1986 and ended in 1994. Although the negotiations lasted eight years, the Uruguay Round made substantial progress toward liberalizing trade. The achievements include: a reduction in tariff rates; framework agreement on trade in services; a timetable for phasing out all quantitative restrictions on trade; first steps toward bringing agriculture more firmly under a multilateral discipline; a stronger dispute settlement mechanism; and the establishment of the World Trade Organization. Though it is difficult to estimate impact of these achievements individually, there is no doubt that the GATT/WTO has promoted trade liberalization in East Asia.

2.3. Changing Composition of Exports and Imports in East Asia

We saw above that East Asian economies expanded their trade significantly since the 1990s. This expansion in foreign trade by East Asian economies was accompanied by a notable change in the commodity composition of trade. Specifically, the share of manufactured products, especially those of machinery products, increased sharply in their exports and imports. We will investigate these changes in trade composition more in detail below.

Table 2 shows export composition of East Asian economies for 1990 and 1999. As to the share of manufactured products in total exports, Japan, Hong Kong, Korea, and Taiwan all recorded the values higher than 90 percent in 1990, and these values have not changed much since then. By contrast, China, Singapore, Indonesia, Malaysia, and Thailand saw sharp increases in the share of manufactured exports in total exports. Among the sub-groups of manufactured products, the share of machinery products increased notably. In 1999 the share of machinery in total exports for Singapore and Malaysia exceeded 50 percent, similar to the cases for Japan, Korea, and Taiwan, while the corresponding shares for China, the Philippines, and Thailand were lower around 30 to 40 percent. Among the East Asian economies that had high share of machinery products in total exports, Indonesia was an exception, as the share of machinery in total Indonesian

exports was as low as 10 percent in 1999. Singapore and Malaysia recorded very high shares of office machines and telecommunication equipment, or electronics products, in their total exports. Not as high as those recorded by Singapore or Malaysia, other East Asian economies except Indonesia also exhibited relatively high share of electronics products in their overall exports.

=== Table 2 ===

Rapid and sharp increase in the exports of electronics products by developing East Asian economies may partly reflect an improvement in technological capability of these economies, but it is largely attributable to active foreign direct investment by Japanese, US, European, Korean and other foreign multinational companies (MNCs). Many MNCs in electronics industry set up labor-intensive assembly operation in East Asian developing economies, where hard-working, low-wage labor is abundantly available. It should also be noted that many East Asian economies had high share of textiles, clothing, and other consumer goods, whose production tends to require labor-intensive technology. These findings appear to reflect the fact that many East Asian economies have a comparative advantage in labor-intensive products and labor-intensive processes.

Contrary to the increase in share of manufactured products in overall exports, the share of agricultural products in overall exports declined in the 1990s for all East Asian economies shown in Table 2. These patterns reflect the declining competitiveness of agricultural production for many East Asian economies, although many East Asian economies such as Japan, Hong Kong, Korea, and Taiwan had already lost their competitiveness long before the 1990s. Among the East Asian economies, Thailand, Indonesia, and Malaysia had still relatively high share of agricultural products in their overall exports in 1999.

Turning to import composition of East Asian economies, one finds that share of manufactured products, especially office machines and telecommunication equipment, or electronics products, increased notably, similar to the pattern found for export composition (Table 3). The rapid increase in the share of electronics was particularly fast in Singapore and Malaysia. In 1999 the shares of machinery and electronics in overall imports for both Singapore and Malaysia were approximately 60 and 40 percent, respectively, which are significantly higher compared with the corresponding values for other countries, at around

40 and 20 percent, respectively. Among East Asian economies, Japan and Korea had a somewhat peculiar pattern in that the share of mining products including fuels was very high. It should also be noted that agricultural products had a substantially high share of overall imports for Japan, accounting for 19 percent of overall imports in 1999. These findings reflect a lack of competitiveness in the production of primary products in Japan and Korea.

=== Table 3 ===

We found that for many East Asian economies both exports and imports of machinery, in particular those of electronics products, increased remarkably in the 1990s. These patterns indicate increase in intra-industry trade in electronics products in East Asia. To investigate the pattern of intra-industry trade more in detail, we computed the Grubel=Lloyd intra-industry trade index for 1990 and 1999. This index takes the value from 0 to 100, and it is constructed in such a way that the index increases with the extent of intra-industry trade. The index was computed at 3-digit SITC level, and the computed values were then aggregated for the categories listed in the table by using simple average.

As expected from the findings on export and import composition earlier, we observe that substantial intra-industry trade for machinery, and especially for electronics products (Table 4). Intra-industry trade in electronics is particularly notable for Singapore and Malaysia. As discussed above, MNCs have been actively undertaken inter-process division of labor by FDI in East Asia. In the inter-process division of labor arrangement, production process is broken up into several sub-processes, which are then located in a country or region, where each sub-process is conducted most efficiently. MNCs adopting this type of production arrangement carry out intra-firm, intra-industry trade in parts and components. In contrast to high intra-industry trade in machinery, clothing exhibits very low intra-industry trade for all the countries except for Singapore. This observation may be explained by the fact that many ASEAN countries except Singapore have a distinctive comparative advantage in the production of clothing.

=== Table 4 ===

3. Emergence of FTAs in East Asia

East Asia was not active in the formation of regional trade agreements such as free trade agreements (FTAs) until recently. Indeed, ASEAN Free Trade Area (AFTA) was the only major FTA until Japan and Singapore enacted Japan-Singapore FTA (formally Japan-Singapore Economic Partnership Agreement) in November 2002. This section provides a brief discussion on the recent developments concerning FTAs in East Asia.

AFTA was established in 1992 with six ASEAN member countries, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Brunei. New ASEAN members, Vietnam, Myanmar, Cambodia, and Laos joined AFTA in the latter half of the 1990s, and currently AFTA has 10 member countries. The main objective of AFTA is to develop competitive industries in ASEAN by promoting intra-ASEAN trade. Several factors contributed to the formation of AFTA. One is the realization of the need to capture export market in the face of increasing FTAs in the world. Another factor is the emergence of China as a competitor for attracting FDI. The end of the cold war also had an impact on ASEAN as it made ASEAN concentrate on economic development. Besides AFTA, ASEAN as a group as well as its members have become active in FTA discussions with other countries. One of the FTAs involving ASEAN that has received most attention recently is that with China, which will be discussed below. ASEAN is also discussing the possibility of FTAs with Japan and Korea.

Compared to ASEAN countries in Southeast Asia, the countries in Northeast Asia including China, Japan, and Korea had not been active in FTAs until recently. Despite increasingly strong interest in FTAs by Northeast Asian countries, there is only one FTA (Japan-Singapore FTA) that has been enacted so far. Japan is currently negotiating an FTA with Mexico, and it has been studying possible FTAs with Korea, ASEAN, Thailand, Malaysia, and the Philippines. The importance of FTAs with East Asian countries for Japan and East Asia is understood by many Japanese, including policy makers and business people. However, the moves toward the formation of FTAs have been rather weak because of strong opposition from various groups such as non-competitive farmers, who would suffer from trade liberalization of agricultural products.

Korea started having an interest in FTAs before Japan. In 1998 Korea disclosed a plan to start FTA negotiations with Chile, and it also set up a joint-study group at private level on FTA with Japan. Korea started negotiations with Chile in 1999, and Korea and Chile signed the agreement in October 2002 after difficult negotiations on liberalization of agricultural imports. Although the agreement was signed, it has not yet ratified by the

Korean Parliament because of strong opposition from the farmers. Korea also started studying the possible FTA with ASEAN.

China's active FTA strategy has received a lot of attention. China joined the WTO in 2001 and established an access to the world market, and it started to pursue regional strategies by using FTAs. China signed a framework agreement on comprehensive economic cooperation with ASEAN in November 2002. The agreement, which was proposed strongly by China, has not only trade liberalization but also cooperation in the areas of FDI and economic development. China and ASEAN started negotiations on FTA this year with a target for its conclusion by June 2004. China has offered various schemes attractive to ASEAN and particularly to its new members such as economic cooperation for the new ASEAN members and advanced trade liberalization (early harvest) in agricultural products. In addition to ASEAN, China has proposed Japan and Korea to establish a trilateral FTA including these three countries.

An idea of FTA covering East Asian countries has emerged. At the Leaders' summit meeting of ASEAN+3 (China, Japan, and Korea) in 1998 the leaders decided to set up East Asia Vision Group to study long term vision for economic cooperation. The group has presented the leaders with recommendations including the establishment of East Asia FTA. Despite the recommendation from the Vision Group, East Asia FTA has not yet become a concrete agenda at the leaders meeting.

One can think of various factors that have led to an emerging interest in FTAs among the countries in East Asia. Many countries consider FTAs as an effective way to penetrate the market of the member countries. Some countries think FTAs would promote deregulation and structural reform to revitalize their economy. The financial crisis in East Asia increased the awareness of the need for regional cooperation such as FTAs to avoid another crisis and to promote regional economic growth. Rivalry in the region has been a factor contributing to an increased interest in FTAs. Specifically, both China and Japan, which are competing to become a 'leader' in the region, are keen on using FTAs to strengthen the relationships with ASEAN and the NIEs. Indeed, in November 2002 Japan proposed an economic partnership framework to ASEAN one day after China agreed to start FTA negotiations with ASEAN. It should also be noted that ASEAN and the NIEs also consider FTAs as a means to maintain and increase their influential position in East Asia.

Currently, the establishment of China-Japan-Korea FTA appears difficult not only because of the opposition groups against trade liberalization but also because of the

differences in their views on past history and other non-economic issues. Rather than China-Japan-Korea FTA, the establishment of three ASEAN+1 FTAs, namely ASEAN-China, ASEAN-Japan, and ASEAN-Korea FTAs, may be more likely. Indeed, ASEAN may be interested in establishing three ASEAN+1 FTAs to keep their negotiating position before moving to the establishment of East Asia FTA.

Considering that FTA would contribute to economic growth of the countries involved and considering that FTAs are likely to increase in other parts of the world, it is hoped that East Asia work hard to establish East Asia FTA by overcoming the obstacles with active cooperation. With these observations in mind, we attempt to investigate the likely impacts of the East Asia FTA on East Asian economies in the following sections.

4. The Impacts of East Asia FTA on East Asian Economies: A Simulation Analysis

4.1. The Model

This section investigates the economic impacts of East Asia FTA on foreign trade in East Asia using a CGE model. The model used in this analysis is the standard Global Trade Analysis Project (GTAP) model. The GTAP project is coordinated by the Center for Global Trade Analysis in the Department of Agricultural Economics, Purdue University. The Center develops multi-regional CGE models and publicly offers the model with data and software. One of the models documented in Hertel (1997) is called the standard GTAP model, which is widely used among the academics, policy makers, and researchers in international organizations such as the World Bank.

The production side of the standard GTAP model assumes constant returns to scale technology and perfect competition. Production by a firm in each sector in each region is represented by a multi-level production function: the Leontief type that involves value-added and intermediate inputs obtained from input-output table. Demands for factors and intermediate inputs are represented by a nested constant elasticity of substitution (CES) function. Each firm uses a CES composite of domestic and imported intermediate inputs in fixed proportions. Imported intermediate inputs are distinguished by import partner country (Armington assumption) so that the model can describe intra-industry trade.⁷

⁷ Note that the definition of IIT index in GTAP model is different from that of Grubel=Lloyd IIT index discussed in 4. The former is differentiated across countries in the same industry while latter is differentiated across commodities (or detailed level of industries) in the same industry.

On the demand side, total income is allocated using fixed value shares among three kinds of final demand: government, private household and savings expenditure, which is derived from an aggregate utility function of Cobb-Douglas type. The single representative private household in each region then maximizes a constant difference of elasticity function, which is calibrated to different income and the price elasticity of demand.

Capital accumulation is endogenously determined in that investment funds are allocated across regions through the hypothetical global sector called global bank, equating the change in the expected rates of return across regions. Transport margins are derived from supply and demand in another hypothetical global sector called global transportation sector. Equilibrium satisfies the conditions in that demand equals supply for all goods and that factors and a firm in each industry earn zero profit. Labor is assumed to be mobile across industries but not across countries. Technical progress is exogenously determined. Imports are distinguished by the country of origin in the traditional Armington structure.

4.2. Data

Source

The data is obtained from the GTAP database (Version 5). The latest GTAP database (Version 5) contains 66 countries/regions and 57 sectors in 1997.⁸ The database provides production and consumption structures described in social accounting matrix for each region. To facilitate computation, we aggregate the database into 20 regions and 21 sectors.

In the GTAP database, tariffs and other taxes are represented as *ad valorem* equivalents of the actual applied rates. The GTAP database incorporates information on distortions in both goods and service sectors, which includes taxes and subsidies on inputs, outputs, trade and consumption by the industry of each region. However, the information on the barriers of trade in services is still under development and does not cover many barriers in service trade.⁹ Hence, this paper focuses on agricultural, mining and manufacturing sectors in analyzing trade flows.

Trade Patterns of the East Asian Countries in the GTAP Database

Table 5 summarizes the export and import compositions of East Asian economies in

⁸ For the GTAP database (Version 5), see Dimaranan and McDougal (2002).

⁹ Because of the limited data availability, the number of sectors significantly decreases when we include the trade barriers in services in the CGE analysis. For more detail, see Brown and Stern (2001).

the GTAP database. Three distinct features, which are consistent with the information given in Tables 2 and 3 as expected, are observed in this table. First, major exports of East Asian economies are textile and machinery, especially electric equipments. The largest export sector is other manufacturing in China (22.7 percent), general machinery in Japan (29.7 percent), electric equipment in Korea (29.1 percent), Singapore (59.1 percent), Taiwan (35.9 percent), Malaysia (52.6 percent), the Philippines (58.0 percent) and Thailand (31.7 percent), and textiles in Hong Kong (29.9 percent) and Vietnam (19.1 percent).

=== Table 5 ===

Second, major imports of East Asian economies are concentrated in electric equipments and general machinery. Electric equipment is the largest import sector in Japan (12.7 percent), Hong Kong (23.2 percent), Singapore (37.0 percent), Taiwan (22.8 percent), Malaysia (36.0 percent) and the Philippines (30.9 percent). Similarly, general machinery is the largest import sector in China (21.8 percent), Korea (19.8 percent), Indonesia (26.9 percent) and Thailand (24.2 percent). Although the largest import sector in Vietnam is chemicals (30.4 percent), general machinery is the second largest sector, accounting for 19.5 percent of its import shares.

Third, the shares of imports in agricultural and food products and beverages are larger than those of exports except for Vietnam. However, we should also note that most East Asian countries show low trade (exports and imports) shares in agriculture and food products and beverages except exports of Thailand (13.7 percent in food products and beverages) and Vietnam (10.9 percent in agriculture and 13.7 percent in food products and beverages) and imports of Japan (10.0 percent in food products and beverages). For other countries, the shares of exports (imports) of agriculture and food products and beverages are less than 10.0 percent of total exports (imports).

Table 6 presents the intra-industry trade (IIT) patterns and revealed comparative advantage (RCA) for East Asian economies. The IIT index presented in Table 6 takes value between zero and 100. The larger the IIT index is, the larger the IIT will be. On the other hand, RCA takes value greater than or equal to zero. If the RCA takes value greater than unity, it means that the industry has a comparative advantage. Similarly, if it takes value less than unity, it means that the industry has a comparative disadvantage. The detailed definitions of IIT index and RCA are summarized in the Appendix.

=== Table 6 ===

There are three notable findings in this table. First, pulp, chemicals, and electronic equipment tend to present large figures in IIT index. The largest IIT index is observed in pulp, paper and paper products in China (65.6), Hong Kong (52.8), Taiwan (60.4), the Philippines (69.1) and Vietnam (49.2), chemicals in Japan (73.0), Indonesia (63.1), Malaysia (78.8) and Thailand (69.5), electronic equipment in Singapore (65.8) and other manufacturing in Korea (78.7). Electronic equipment presents the second largest numbers in Korea (57.8), Indonesia (62.3), Malaysia (66.0), the Philippines (67.8) and Thailand (69.3).

Second, most of agriculture, forestry, fishing, mining and food products and beverages do not register large figures. In these industries, the IIT index with greater than 50.0 only appears in food products and beverages of Singapore (51.0). The IIT indexes of these industries are extremely small in Japan, Korea and Hong Kong.

Third, the largest RCA is likely to be observed in electric equipment. The electric equipment presents largest figures in Japan (1.91), Korea (2.26), Singapore (4.14), Taiwan (2.90), the Philippines (3.33) and Thailand (2.26). The large numbers also appear in textiles and fishing. It is interesting to note that transportation machinery takes values greater than unity only in Japan (1.91) and Korea (1.23) while general machinery takes values greater than unity only in Japan (1.69) and Taiwan (1.09).

Table 7 presents the three types of regionalization indexes, which are examined in section 2, in trade for East Asian economies. The indexes for total trade of East Asia are similar to those of Table 1. But the double relative measure in total for ASEAN is larger than those for East Asia, implying that the intra-regional trade in ASEAN is more biased than in East Asia.

=== Table 7 ===

Sector-level results present similar patterns to those for total trade. The double relative measures for ASEAN are larger than those for East Asia in all industries. In particular, large figures of double relative measure are observed in fishing and electric equipment. For East Asia, chemicals and iron, steel and metal products indicate large

figures in double relative measure.

Nominal and Effective Rate of Protection in the GTAP Database

In the GTAP database, trade barriers, which include tariff- and non-tariff measures, are described as the differences of prices between domestic market prices and world market prices. We define such differences as nominal rate of protection (NRP). We also compute the effective rate of protection (ERP), which accounts for the protection on value added by taking into account of protection given not only to final goods but also to intermediate inputs. Detailed explanations about the calculation method of NRP and ERP are presented in the Appendix.

Table 8 presents the calculated results of NRP and ERP from the GTAP database. There are three notable findings in this table. First, for China, Japan and Korea, the levels of protection on agriculture and food products and beverages are extremely high. The NRP of agriculture in China, Japan and Korea are 41.3 percent, 58.4 percent and 110.9 percent, respectively. NRPs on food products and beverages are also high for these three countries and Taiwan, registering 37.4 percent in China, 50.0 percent in Japan, 37.7 percent in Korea and 26.1 percent in Taiwan.

=== Table 8 ===

Similarly, ERPs tend to high for these industries in these countries. The levels of ERP on agriculture in China, Japan and Korea are estimated to be 51.6 percent, 84.2 percent and 154.2 percent, respectively. ERPs of food products and beverages are 60.5 percent in China, 104.7 percent in Japan, -57.6 percent in Korea and 90.6 percent in Taiwan. Since NRP is very high in agriculture sector in Korea, ERP for food products and beverages turns out to be negative.

Second, high level of protection is given in paper, chemicals and machinery industries in ASEAN countries as well as China, and these industries tend to present larger figures in ERP than NRP. It is to be noted that high protection is observed in transportation machinery industry. NRPs for transportation machinery are 25.4 percent in Indonesia, 18.9 percent in China, 25.4 percent in Indonesia, 19.7 percent in Malaysia, 10.3 percent in the Philippines, 31.5 percent in Thailand and 36.9 percent in Vietnam. ERPs for transportation machinery present 36.0 percent in China, 35.7 percent in Indonesia, 27.8 percent in

Malaysia, 18.5 percent in the Philippines, 37.9 percent in Thailand and 156.8 percent in Vietnam.

Third, there are virtually almost no trade barriers in Hong Kong and Singapore. Only agriculture and food products and beverages receive protection, as NRPs for this sector in Hong Kong and Singapore are 3.5 percent and 4.6 percent, respectively. However, these figures are low compared with other East Asian countries.

4.3. The Simulation Scenarios

Our simulation depicts the world in 2010. The standard scenario (Scenario S) includes growth in factors of production (population, skilled- and unskilled-labor) from 1997 to 2010, abolition of Multi-Fibre Agreements (MFA), incorporation of North American Free Trade Area (NAFTA) and Japan-Singapore Economic Partnership Agreements (JSEPA) and ASEAN Free Trade Area (AFTA). Population growth projection from 1997 to 2010 is obtained from the United Nations (2002). As for Taiwan, we use the projection by the US Bureau of the Economic Analysis (2002). Growth rates in skilled- and unskilled-labor are estimated following Liu et al (1998) using GTAP database (Version 5).

The abolition of MFA means the removal of all the tariff- and non-tariff measures in the textile sector by 2010. NAFTA and AFTA mean the reductions of trade barriers among Canada, Mexico and the United States, and ASEAN countries, respectively. JSEPA means the removal of all trade barriers except agricultural sector between Japan and Singapore.

In addition to the standard scenario (Scenario S), we conduct four different simulations. All four simulations examine the impacts of East Asia FTA, where all trade barriers are removed among FTA member countries. Four scenarios differ in their components, as will be discussed below.

First scenario (Scenario 1) only covers the removal of trade barriers. Second scenario (Scenario 2) captures the effect of trade facilitation such as the improvement of administrative works in imports in addition to trade liberalization. Trade facilitation, which is incorporated by the import augmenting technical progress in our model, is assumed to occur among the FTA member countries.¹⁰

Third scenario (Scenario 3a) examines the impacts of foreign direct investment (FDI) in addition to the removal of trade barriers and the facilitation of imports. In

¹⁰ Specifically, the annual average rate of import augmenting technical progress is assumed to 0.1 percent from 1997 to 2010.

analyzing the impacts of FDI, we also incorporate the productivity growth associated with FDI since FDI can be potential source of technology spillover as was discussed in Coe, Helpman and Hoffmaister (1997).¹¹ FDI is captured by the changes in trade balance (capital accounts) and FDI flows are assumed to take place from Japan to other East Asian countries.¹²

Recent theoretical studies in international trade confirm the importance of adjustment costs in the trade liberalization. For instance, Furusawa and Lai (1999) theoretically reveals that trade liberalization will be gradual under the presence of adjustment cost that is defined as the costs paid by the workers who move across sectors. Although the dynamic path cannot be examined in our framework, the difference in the impacts of FTA with and without adjustment costs is a very important concern. To partially incorporate the adjustment costs, we fix the labor movement across industries as well as across countries in the fourth scenario (Scenario 3b).

5. Simulation results

GDP and Equivalent Variation (EV)

Table 9 presents simulation results for GDP and Equivalent Variation (EV). Shaded areas in this table indicate the member economies of East Asia FTA. GDP growth rates indicate the difference of annual average growth rates in each scenario from that of standard scenario while the changes in EV indicate the difference of annual average changes in each scenario from that of standard scenario.

=== Table 9 ===

The results indicate that almost all member countries obtain benefits from East Asia FTA in terms of growth in GDP and changes in EV. Positive impacts on GDP growth rates are found for all the members, but on EV changes positive impacts are found for all the members except the Philippines in Scenario 1. Large positive impacts on GDP growth are observed for ASEAN countries compared to Japan, while large positive impacts on EV are

¹¹ “DFI (direct foreign investment) that involves technology transfer can be a very potent source of learning” (Coe, Helpman and Hoffmaister (1997, p.136))

¹² The scale of FDI is 0.1 percent of capital account (trade balance) in Japan and FDI is distributed to all member countries weighted by GDP while technical progress associated with FDI occurs in all member countries by 0.1 percent from 1997 to 2010.

found for Japan, reflecting the large initial economic size. These results indicate that the benefits of East Asian countries from East Asia FTA are larger than those of Japan in terms of GDP growth but Japan also would gain large benefits in terms of utility level.

Table 9 also presents large impacts of trade facilitation and FDI. The changes in GDP growth rates and changes in EV in Scenario 2 are larger than those obtained in Scenario 1. Similarly, the growth in GDP and changes in EV in Scenario 3a are larger than those in Scenario 2. These results suggest that the impacts of FTA will be large when the agreements include trade facilitation and FDI promotion. We should also note that the results of Scenario 3b are smaller than Scenario 3a. Since the Scenario 3b include the adjustment costs, the results imply that the presence of adjustment costs slightly reduces the benefits of FTA. Flexible labor adjustment, together with FTA, is important for the members to obtain benefits from FTA. To focus on the likely impacts of FTA, we use the results of Scenario 3a in the following analyses of the impacts on outputs and trade.

Sectoral Outputs and Exports

The impacts of East Asia FTA on growth in real outputs and real exports are presented in Table 10. For China, Indonesia, Malaysia, the Philippines and Thailand, positive impacts on real outputs are observed in all sectors except chemicals in China and transportation machinery in all five countries. Similarly, most sectors are expected to have positive growth in real exports in these countries. On the other hand, for Japan, Korea, Hong Kong, Singapore and Vietnam, the results are mixed in that some sectors grow while others do not. Although the benefits of FTA are expected at the country level, this does not mean that all sectors benefit from FTA.

==== Table 10 ====

Export and Import Composition

Table 11 presents the export and import compositions of East Asian Economies resulting from East Asia FTA. The figures for 1997 indicate the export composition in 1997 (obtained from Table 5) and those under FTA indicate the export composition after the simulation. *Italic figures indicate the changes between compositions in 1997 and those in FTA (percentage points).* Table 11 clearly indicate that the changes in exports with more than 5.0 percent points are confirmed for only some sectors such as textiles in China (5.6

percent points), Hong Kong (-5.4 percent points) and Vietnam (17.1 percent points) and electronic equipment in the Philippines (-5.9 percent points). The changes in import shares with more than 5.0 percent points are only found in pulp, paper and paper products in Vietnam (8.5 percent) and chemicals in Vietnam (-5.7 percent). For other sectors and countries, the magnitudes of the changes are less than 5.0 percent points, most of which are less than 1.0 percentage point. The results shown in Table 10 imply that the impacts of East Asia FTA are not large enough to change the composition of each country's exports and imports.

==== Table 11 ====

Intra-Industry Trade (IIT) and Revealed Comparative Advantage (RCA)

Table 12 presents the IIT indexes resulting from FTA. The figures for 1997 indicate the IIT indexes in 1997 (obtained from Table 5) and those under FTA indicate the IIT indexes resulting from the simulation. *Italic figures indicate the changes from the IIT indexes under FTA to those from the base.* The large changes in IIT indexes are observed in agriculture, food products and beverages and transportation machinery. For instance, the changes in agriculture are -18.4 in China, 18.5 in Singapore, -25.9 in Indonesia and 16.8 in Malaysia. The changes in food products and beverages are 10.2 in Japan, 21.5 in Hong Kong, 17.4 in Taiwan and -18.1 in Vietnam. The changes in transportation machinery are -16.3 in China, -11.6 in Taiwan and -11.7 in Indonesia.

==== Table 12 ====

It is interesting to note that the impacts of East Asia FTA on IIT are ambiguous. In other words, East Asia FTA does not always result in positive impacts on IIT. IIT for some industries increases while for others it declines. Although one may expect an increase in IIT from East Asia FTA, such expectation may not be realized.

Table 13 presents RCAs resulting from East Asia FTA. Similar to Table 12, the figures under 1997 indicate the RCA for 1997 (obtained from Table 5) and those under FTA indicate RCA resulting from the East Asia FTA simulation. *Italic figures indicate the changes from RCA resulting from FTA to those in 1997.* Table 13 indicates some sectors

are expected to improve comparative advantage after East Asia FTA. For instance, RCA in agriculture in China changes from 0.9 to 2.4, implying that agriculture sector in China is expected to have a comparative advantage as a result of East Asia FTA. Similarly, iron, steel and metal products in Japan (from 0.9 in 1997 to 1.0 in FTA), food products and beverages in Korea (0.3 in 1997 to 1.2 in FTA), forestry in Indonesia (0.8 to 1.0) will have comparative advantages after FTA.

=== Table 13 ===

Large changes in comparative advantage are observed in only few sectors. Most sectors and countries do not show significant changes in RCA from 1997 to the post-FTA period. These results clearly indicate that, like the case for IIT, East Asia FTA does not largely alter the structure of comparative advantage of East Asian economies. Rather, East Asia FTA has positive impacts on East Asian economies without inducing large changes in member countries' basic trade structure.

Regionalization

Table 14 presents the regionalization indexes for East Asia and ASEAN countries. Table 14 indicates that for overall trade all three regionalization measures increase for East Asia from East Asia FTA, indicating that the establishment of FTA intensifies regionalization. Contrary to the case for East Asia as a whole, intra-regional trade bias declines for ASEAN, while the absolute and relative measures of regionalization increase. This finding may indicate that for ASEAN extra-ASEAN, intra-East Asia trade expands faster than intra-ASEAN trade.

At the sector-level for almost all sectors absolute and relative measures increase after the FTA. This means that FTA promotes regionalization in East Asia and ASEAN. In particular, agriculture and food products and beverages increase their shares in intra-regional trade.

=== Table 14 ===

Double relative measure presents the different pictures of intra-regional trade in East Asia. While the double relative measure in agriculture increases both in East Asia

(0.44) and ASEAN (1.37), the double relative measure in food products and beverages increases in East Asia (0.25) but decrease in ASEAN (-0.34). Similarly, electronic equipment increases in East Asia (1.09) but decreases significantly in ASEAN (-1.80). These results imply that East Asia FTA promotes the regionalization within East Asia, and ASEAN countries are expected to have closer relationship with other East Asian countries after East Asia FTA.

Protection and the Growth of Outputs and Exports

The relationship between the protection and the growths in real outputs and real exports at the sectoral level is presented in Figures 2 and 3. Figure 2 shows the relationship between NRP in Table 9 and growth rates in outputs and exports in Table 11 while Figure 3 shows the correlation between ERP in Table 8 and growth rates in outputs and exports in Table 11. In addition to the scatter diagram, simple OLS regression results are presented.

=== Figures 2 and 3 ===

From these two figures, we can clearly confirm that the larger the protection, the larger the expected growth in exports will be. On the other hand, for outputs, we could not confirm statistically significant relationship between protection and growth. These results imply following two important points. First, the removal of trade barriers promotes exports, as the incentive shifts from domestic sales to exports as a result of removal of protection. Second, the removal of trade barriers is not always harmful for protected sectors, as is often argued by the opponents of trade liberalization.

6. Conclusions

In light of increasingly strong interest in FTAs and East Asia FTA among many East Asian economies, we investigated the possible economic impacts of East Asia FTA on East Asian economies with a focus on trade patterns. We found that East Asia FTA brings positive impacts to East Asian economies in terms of economic growth and economic welfare. As to its impacts on trade patterns for East Asian economies, the simulation results reveal relatively small impacts, and the patterns of comparative advantage or intra-industry trade in East Asia do not seem affected much by East Asia FTA. It was found that the

sectors that would be affected substantially are protected sectors, although their direction of impacts is not straightforward. One would expect that output will decline for the protected sectors as a result of FTA, but such expectation is not found strongly. Indeed, we found that export from protected sector would increase as a result of FTA by responding to the shift in incentives from domestic sales to export sales. As to the impact on regionalization, we found that East Asia FTA would promote regionalization in East Asia, but it will not necessarily promote regionalization in AFTA

We have examined the impacts of East Asia FTA on trade patterns in East Asia by using a CGE model. Our results present useful information on the likely impacts of such FTA. However, we do realize some shortcomings. First, there are some features of FTAs that could not be incorporated satisfactorily in our model, and we need to devise the ways to incorporate them more satisfactorily. They include foreign direct investment (FDI), technology transfer associated with FDI, international labor mobility and others. Besides the issues related to the simulation model, which is constructed at the sector level, we also realize the need to investigate the likely impacts of FTAs at firm level, to discern the impacts of FTAs. As the availability of firm-level data has become better in recent years, researchers should analyze the impacts of trade liberalization on firms' trading behavior, to draw some implications on the impacts of FTAs. Finally we strongly hope that our results will be used for policy discussions on East Asia FTA.

References

- Brown, Drusilla K. and Robert M. Stern. 2001. "Measurement and Modeling of the Economic Effects of Trade and Investment Barriers in Services," *Review of International Economics*, 9(2): 262-286.
- Coe, David T., Elhanan Helpman and Alexander W. Hoffmaister. 1997 "North-South R&D Spillovers," *Economic Journal*, 107(440): 134-149.
- Dimaranan, Betina V. and Robert A. McDougall. (ed.) 2002. *The GTAP 5 Data Base*, West Lafayette, IN: Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University.
- Frankel, Jefferey. A. 1993. "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" Jefferey A. Frankel and Miles Kahler, eds., *Regionalism and Rivalry: Japan and the United States in Pacific Asia*, Chicago: University of Chicago Press.

- Furusawa, Taiji and Edwin L. –C. Lai. 1999. “Adjustment Costs and Gradual Trade Liberalization,” *Journal of International Economics*, 49: 333-361.
- Hertel, Thomas W. (ed.) 1997. *Global Trade Analysis: Modeling and Applications*, Cambridge, UK: Cambridge University Press.
- Liu, Jing, Nico van Leeuwen, Tri Thanh Vo, Rod Tyers, and Thomas W. Hertel. 1998. “Disaggregating Labor Payments by Skill Level in GTAP,” GTAP Technical Paper, No. 11, West Lafayette: GTAP, Purdue University.
- Pacific Economic Cooperation Council (PECC). 1995. *Survey of Impediments to Trade and Investment in the APEC Region*, Singapore.
- Petri, Peter A. 1993. “The East Asian Trading Bloc: An Analytical History.” Jefferey A. Frankel and Miles Kahler, (ed.) *Regionalism and Rivalry: Japan and the United States in Pacific Asia*, Chicago: University of Chicago Press.
- United Nations. 2002. *World Population Prospects*, New York: United Nations.
- Urata, Shujiro. 2001. “Emergence of an FDI-Trade Nexus and Economic Growth in East Asia.” Joseph Stiglitz and Shahid Yusuf, (ed.) *Rethinking the East Asian Miracle*, New York, Oxford University Press.
- Urata, Shujiro. 2002. “A Shift from Market-led to Institution-led Regional Economic Integration in East Asia,” paper presented at the RIETI international conference, ‘Asian Economic Integration,’ April, Tokyo, Japan.

Appendix Definitions of Variables

Intra-Industry Trade (IIT) index

Intra-industry index is defined as:

$$IIT_{ij} = \left(1 - \frac{\sum_k |x_{ijk} - m_{ijk}|}{\sum_k (x_{ijk} + m_{ijk})} \right) \times 100,$$

where i , j and k indicate industry, home country and partner country, respectively.

x_{ijk} and m_{ijk} represent exports and imports of industry i in country j to country k , respectively. IIT index takes value between 0 and 100. The larger the index is, the larger the intra-industry trade will be. The value of exports is evaluated at the domestic market price while the value of imports is evaluated at the world price.

Note that the definition of IIT index in GTAP model is different from that of Grubel=Lloyd type IIT index. The former is differentiated across countries in the same industry. The latter is differentiated across sub-industries (or detailed level of industries) in the same industry.

Revealed Comparative Advantage (RCA)

RCA is defined as:

$$RCA_{ij} = \frac{x_{ij} / \sum_i x_{ij}}{\sum_j x_{ij} / \sum_j \sum_i x_{ij}},$$

where i and j indicate industry and home country, respectively. x_{ij} represents exports of industry i in country j to world and evaluated at domestic market price. Therefore, $RCA_{ij} > 1$ means that industry i in country j has comparative advantage (compared with world average) while $RCA_{ij} < 1$ means i in country j has comparative disadvantage.

Regionalization index

We use three types of regionalization index. First index is called absolute measure and defined as:

$$A = \frac{x_{jk}}{\sum_k \sum_j x_{jk}},$$

where j and k indicate home and partner countries, respectively. x_{jk} represents exports from country j to country k , respectively. Therefore, absolute measure captures export the share of country j to country k relative to world total exports.

Second index is called relative measure, which is defined as:

$$B = \frac{A}{\sum_k x_{jk} / \sum_k \sum_j x_{jk}} = \frac{x_{jk}}{\sum_k x_{jk}}.$$

The relative measure indicates the export share of country j to country k relative to country j 's total exports.

Third index is called double relative measure. Double relative measure is the divided by home and partner export shares so that we could partly control both home and partner's scale.

$$C = \left(\frac{\sum_k x_{jk} / \sum_k \sum_j x_{jk}}{\sum_j x_{jk} / \sum_k \sum_j x_{jk}} \right) = \frac{x_{jk} \times \sum_k \sum_j x_{jk}}{\sum_j x_{jk} \times \sum_k x_{jk}},$$

The value of exports is evaluated at the domestic market price while value of imports is evaluated at the world price.

Nominal Rate of Protection (NRP)

The rate of protection in imports is defined as:

$$t_{ij} = (m_{ij}^M - m_{ij}^W) / m_{ij}^W,$$

where i and j indicate industry and home country. m_{ij}^M and m_{ij}^W are the values of imports evaluated at the domestic market price and at the world price, respectively. Hence, the rate of protection in imports includes both tariff barriers and non-tariff measures.

Effective Rate of Protection (ERP)

We define Effective Rate of Protection (ERP) as follows.

$$ERP_{ij} = \frac{t_{ij} - \sum_z t_{mj} a_{izj}}{1 - \sum_z a_{izj}},$$

where i , z and j indicate final goods industry, intermediate goods industry and home country, respectively. a_{izj} indicate the input coefficient from industry i to m in country

j obtained from input-output table in GTAP database. t_{ij} is the NRP defined as above.

The rate of protection in this analysis, therefore, includes both tariff and non-tariff barriers.

Table 1 Changing Patterns of Intra-regional Trade

	Absolute measure		Relative measure				Double relative measure	
	1990	2001	Exports		Imports		1990	2001
East Asia	0.08	0.12	0.40	0.48	0.48	0.57	2.26	2.28
NAFTA	0.07	0.10	0.41	0.55	0.35	0.42	2.16	2.29
EU	0.29	0.22	0.66	0.61	0.67	0.62	1.51	1.69

Note: For definition of each measure, see Appendix in the main text.

Source: Authors' estimates using the JETRO database.

Table 2 Changing Composition of Exports of East Asian Economies (%)

	Japan		China		Hong Kong		Korea		Taiwan		Singapore		Indonesia		Malaysia		Philippines		Thailand	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
1. Agricultural products	1.2	1.0	16.2	7.3	2.8	1.9	4.6	2.9	5.5	2.4	7.8	3.4	16.2	15.5	25.3	10.9	20.8	5.1	33.8	20.0
1-1 Food	0.6	0.5	12.7	6.0	2.6	1.7	3.3	2.0	4.0	1.4	5.2	2.8	11.1	11.7	11.7	8.0	18.9	4.5	28.7	17.0
1-2 Raw materials	0.6	0.5	3.5	1.3	0.3	0.2	1.3	1.0	1.5	1.1	2.6	0.6	5.1	3.8	13.7	2.9	1.9	0.5	5.1	3.0
2. Mining products	1.4	1.6	10.6	4.4	1.4	2.2	1.9	5.4	1.8	2.1	19.7	9.2	48.1	27.7	20.4	8.0	10.4	2.1	1.9	2.8
2-1 Ores and other minerals	0.1	0.2	1.2	0.6	0.7	0.6	0.3	0.1	0.2	0.1	0.4	0.2	2.6	3.2	0.5	0.2	4.6	0.6	0.5	0.6
2-2 Fuels	0.5	0.4	8.4	2.4	0.4	0.4	1.1	4.1	0.6	0.9	18.2	8.0	43.8	23.0	18.3	6.8	2.2	0.6	0.8	1.8
2-3 Non-ferrous metals	0.8	1.0	1.0	1.4	0.3	1.2	0.6	1.3	1.0	1.1	1.1	1.0	1.8	1.5	1.5	1.0	3.6	0.9	0.5	0.5
3. Manufactures	95.9	94.1	71.4	88.3	94.5	93.3	93.2	89.6	92.6	95.3	71.2	85.9	35.2	53.9	53.9	80.3	37.9	41.2	63.1	73.9
3-1 Iron and steel	4.4	3.2	2.1	1.6	0.1	0.1	5.7	4.2	1.5	3.1	0.8	0.5	0.9	1.0	0.8	0.6	1.0	0.1	0.6	1.0
3-2 Chemicals	5.4	7.1	6.0	5.3	2.9	3.2	3.8	7.4	4.0	5.6	6.2	7.8	2.4	4.8	1.6	3.2	3.2	0.8	2.0	5.0
3-3 Other semi-manufactures	4.9	4.6	6.0	7.6	3.9	2.3	6.7	6.2	11.4	8.6	3.3	2.2	14.5	14.2	4.5	4.6	3.8	1.4	8.6	7.2
3-4 Machinery and transport equipment	70.6	68.5	17.5	30.1	24.9	22.9	39.3	54.2	39.1	55.8	50.1	66.3	1.4	10.8	35.7	62.3	12.2	31.7	21.9	41.9
(1) Power generating machinery	1.2	1.3	0.3	1.0	0.4	0.4	0.9	0.6	0.6	0.5	0.9	0.8	0.0	0.5	0.2	0.7	0.0	0.1	0.4	1.4
(2) Other non-electrical machinery	12.4	12.0	3.7	2.7	2.1	1.7	2.8	4.6	6.4	6.4	5.2	4.6	0.2	0.8	1.8	2.1	0.3	0.4	2.1	3.5
(3) Office machines and telecommunications equipment	23.4	21.9	5.0	15.5	16.5	16.1	22.1	29.9	21.0	36.4	36.5	52.8	0.5	6.1	27.9	52.4	8.2	25.6	15.3	26.1
(4) Electrical machinery and apparatus	6.4	8.0	1.8	7.6	5.8	4.5	3.5	4.0	6.2	8.1	4.3	6.1	0.3	2.2	3.1	5.3	3.0	3.9	3.1	7.1
(5) Automotive products	21.5	18.4	5.6	0.5	0.0	0.0	3.3	8.9	1.1	1.3	0.6	0.5	0.1	0.5	0.3	0.3	0.3	1.2	0.3	2.8
(6) Other transport equipment	5.7	6.9	1.1	3.0	0.2	0.2	6.7	6.2	3.7	3.0	2.6	1.4	0.4	0.8	2.4	1.5	0.5	0.4	0.8	1.1
3-5 Textiles	2.0	1.6	11.6	6.8	7.5	5.5	9.4	8.1	9.3	9.2	1.7	0.7	4.9	6.2	1.3	1.3	1.2	0.7	4.0	3.1
3-6 Clothing	0.2	0.1	15.6	15.5	32.0	42.8	12.3	3.4	6.0	2.4	3.0	1.4	6.5	8.0	4.5	2.7	8.4	3.4	12.3	6.0
3-7 Other consumer goods	8.4	9.0	12.7	21.5	23.3	16.7	16.0	6.1	21.4	10.7	6.0	7.1	4.6	8.8	5.5	5.5	8.1	3.2	13.8	9.6
4. Others	1.6	3.3	1.9	0.1	1.3	2.6	0.3	2.1	0.1	0.2	1.3	1.5	0.5	3.0	0.4	0.9	30.9	51.7	1.2	3.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' estimates using the World Bank database.

Table 3 Changing Composition of Imports of East Asian Economies (%)

	Japan		China		Hong Kong		Korea		Taiwan		Singapore		Indonesia		Malaysia		Philippines		Thailand	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
1. Agricultural products	21.4	19.2	14.5	8.2	9.8	6.2	13.5	9.2	11.3	7.0	7.7	4.5	9.7	na	8.2	6.9	12.8	9.8	9.7	7.9
1-1 Food	14.4	15.1	8.7	4.0	7.7	4.9	5.6	5.6	6.4	4.5	6.1	4.0	5.1	na	6.9	5.4	10.3	8.2	5.0	5.0
1-2 Raw materials	6.9	4.1	5.8	4.2	2.1	1.3	7.9	3.6	4.9	2.5	1.7	0.5	4.7	na	1.3	1.4	2.4	1.6	4.7	2.9
2. Mining products	33.3	21.6	5.3	10.7	3.9	3.7	22.5	25.5	16.8	12.2	17.9	10.6	14.0	na	8.6	6.4	18.3	10.6	12.9	12.6
2-1 Ores and other minerals	4.7	2.9	1.8	2.5	0.3	0.2	3.9	3.0	2.1	1.3	0.3	0.3	3.1	na	1.5	0.8	2.0	1.5	1.5	0.7
2-2 Fuels	24.5	16.1	2.4	5.4	2.4	2.1	15.9	19.2	11.0	7.5	15.9	9.1	9.0	na	5.1	3.1	14.9	7.9	9.3	9.7
2-3 Non-ferrous metals	4.2	2.6	1.1	2.9	1.3	1.4	2.7	3.2	3.7	3.4	1.7	1.3	1.9	na	2.0	2.5	1.4	1.2	2.1	2.2
3. Manufactures	42.7	57.4	79.7	80.2	83.3	89.1	63.2	62.1	67.2	78.5	73.0	83.2	76.1	na	78.2	83.6	53.1	59.5	74.4	77.2
3-1 Iron and steel	2.0	1.0	5.4	4.6	1.8	1.7	4.7	3.4	5.3	3.9	2.9	1.5	6.1	na	5.0	3.4	4.8	3.2	8.1	5.4
3-2 Chemicals	6.4	7.3	12.5	14.3	7.2	6.3	10.5	9.1	12.5	11.1	7.5	5.8	15.3	na	8.3	7.3	11.3	8.0	10.2	10.8
3-3 Other semi-manufactures	4.8	4.6	5.1	6.8	8.9	8.0	5.1	3.7	4.7	4.1	5.4	4.2	5.2	na	5.6	4.3	4.3	3.6	8.2	9.2
3-4 Machinery and transport equipment	15.3	27.5	40.3	41.9	27.2	38.5	34.3	36.4	37.0	48.9	44.7	60.1	42.6	na	50.2	61.7	25.9	38.1	41.0	43.1
(1) Power generating machinery	0.8	1.2	2.8	2.1	0.8	1.4	1.7	1.3	1.5	0.9	1.9	1.6	1.5	na	0.7	1.3	1.6	1.0	2.6	1.3
(2) Other non-electrical machinery	3.1	3.2	15.9	10.8	3.9	3.5	13.8	7.0	9.6	12.1	8.2	7.6	21.7	na	12.7	7.9	8.1	6.3	13.1	7.3
(3) Office machines and telecommunications equipment	4.8	14.2	7.6	18.4	14.6	24.1	11.1	20.7	13.6	26.3	22.0	38.1	4.1	na	19.6	38.9	6.1	22.4	10.3	19.4
(4) Electrical machinery and apparatus	1.8	3.8	2.4	6.3	5.3	7.5	3.1	4.7	4.8	5.6	5.8	7.5	3.1	na	6.3	8.4	2.8	4.7	4.1	7.6
(5) Automotive products	3.1	2.6	7.9	1.3	1.1	0.9	1.2	0.9	4.4	1.9	2.1	1.3	5.6	na	4.1	1.9	3.8	2.2	6.5	2.5
(6) Other transport equipment	1.8	2.5	3.7	3.0	1.5	1.1	3.4	1.8	3.1	2.2	4.6	4.1	6.8	na	6.7	3.4	3.5	1.6	4.5	5.1
3-5 Textiles	1.9	1.6	10.2	6.8	12.1	7.0	3.0	2.6	1.9	1.4	2.9	1.0	3.6	na	3.3	1.6	4.3	2.7	2.7	2.7
3-6 Clothing	3.7	5.3	0.1	0.7	8.2	8.2	0.2	0.7	0.5	0.8	1.5	1.5	0.1	na	0.3	0.2	0.1	0.2	0.1	0.2
3-7 Other consumer goods	8.5	10.3	6.1	5.2	18.0	19.5	5.5	6.3	5.4	8.4	8.1	9.0	3.2	na	5.5	5.2	2.4	3.6	4.1	5.8
4. Others	2.6	1.9	0.5	0.9	3.1	1.0	0.8	3.3	4.7	2.3	1.3	1.7	0.2	na	5.0	3.2	15.8	20.1	3.1	2.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	na	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' estimates using the World Bank database.

Table 4 Intra-Industry Trade (Grubel=Lloyd Index)

	Japan		China		Hong Kong		Korea		Taiwan		Singapore		Indonesia		Malaysia		Philippines		Thailand	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
1. Agricultural products	13.9	14.2	26.9	33.5	12.7	7.1	24.8	30.9	28.4	33.5	61.3	59.4	25.8	na	36.5	40.0	22.0	22.0	23.9	37.2
1-1 Food	15.8	14.3	25.3	37.8	10.8	6.2	25.5	37.0	26.6	34.8	63.4	56.9	28.3	na	37.7	41.7	20.5	23.4	21.7	37.7
1-2 Raw materials	9.9	14.0	30.3	24.2	17.0	9.0	23.2	17.5	32.2	30.7	56.9	65.0	20.3	na	33.8	36.4	25.8	18.6	28.8	36.3
2. Mining products	19.9	30.2	30.8	31.2	8.9	15.7	21.7	30.2	18.8	24.7	44.2	50.0	26.6	na	25.7	30.1	26.5	22.3	21.6	27.8
2-1 Ores and other minerals	16.0	18.9	27.2	23.7	14.4	25.0	17.1	28.3	11.1	19.6	37.0	46.2	18.3	na	38.7	31.6	33.2	20.8	26.4	27.5
2-2 Fuels	12.8	23.8	24.7	31.7	0.0	4.4	22.1	21.7	13.0	26.7	37.5	41.1	36.0	na	19.2	22.9	28.6	24.0	13.6	33.5
2-3 Non-ferrous metals	29.4	47.1	40.0	40.1	9.4	12.4	26.4	37.9	31.3	29.4	59.2	60.2	28.5	na	14.2	33.1	16.6	22.7	21.6	24.5
3. Manufactures	44.5	48.6	44.7	46.2	29.7	14.1	44.3	53.9	44.1	52.7	64.1	69.2	24.1	na	41.3	55.4	24.4	28.9	32.6	45.7
3-1 Iron and steel	41.2	38.2	56.5	43.1	5.4	2.0	50.7	54.8	43.7	50.5	40.8	44.4	25.4	na	25.7	42.9	18.3	14.5	19.3	47.4
3-2 Chemicals	66.2	63.3	49.6	47.8	12.1	6.9	38.6	53.8	40.0	52.5	72.1	75.3	23.2	na	28.9	50.7	26.2	19.1	19.3	44.4
3-3 Other semi-manufactures	47.0	53.3	51.3	48.8	28.1	5.9	54.2	54.1	53.8	56.6	61.0	63.5	33.8	na	55.6	62.0	29.3	31.9	49.6	52.6
3-4 Machinery and transport equipment	32.6	45.2	39.1	45.3	26.2	9.5	42.6	56.3	49.4	54.4	64.9	70.3	7.8	na	38.8	53.2	20.2	31.8	27.0	45.3
(1) Power generating machinery	29.4	50.7	16.9	38.1	7.2	2.9	48.3	59.2	40.6	46.3	44.8	50.5	3.1	na	55.9	55.3	0.4	14.4	4.9	44.6
(2) Other non-electrical machinery	42.1	41.0	33.5	45.9	22.8	10.8	25.4	66.5	64.1	59.2	66.9	75.0	2.0	na	21.3	49.5	4.1	12.8	15.6	44.2
(3) Office machines and telecommunications equipment	24.0	61.2	53.4	46.1	54.2	11.2	56.9	56.3	46.4	72.1	76.6	84.8	19.0	na	54.0	35.1	49.4	64.4	67.6	46.4
(4) Electrical machinery and apparatus	43.1	65.2	64.1	60.4	45.2	10.6	60.0	71.0	58.5	61.1	75.4	85.2	14.9	na	63.5	80.6	55.1	53.6	44.2	65.5
(5) Automotive products	11.5	11.8	36.1	42.0	0.3	0.0	42.2	23.5	26.2	31.6	35.7	39.1	1.7	na	12.2	50.0	5.7	18.7	8.7	30.4
(6) Other transport equipment	24.7	33.0	30.8	36.0	11.9	14.2	47.5	33.6	27.6	33.2	64.6	61.0	9.6	na	43.9	60.4	15.7	40.2	16.9	37.2
3-5 Textiles	54.3	50.8	52.7	63.3	36.3	15.3	51.6	47.5	35.3	35.7	60.0	68.1	44.4	na	45.7	63.1	25.7	35.7	60.3	63.1
3-6 Clothing	15.3	8.7	1.3	10.1	82.8	70.6	4.0	27.1	14.3	46.1	62.7	84.1	8.1	na	17.5	18.9	17.2	20.8	5.5	7.1
3-7 Other consumer goods	48.0	49.1	48.2	48.4	50.4	27.8	50.1	60.1	39.8	54.4	67.9	71.8	44.4	na	56.1	70.8	29.3	36.1	41.7	44.0
4. Others	30.0	50.0	19.0	28.9	23.6	21.7	28.5	36.3	25.6	46.2	64.3	68.5	7.2	na	37.0	39.6	33.6	32.9	31.6	47.5

Source: Authors' estimates using the World Bank database.

Table 5 Export and Import Compositions of East Asian Economies in 1997 (percentage shares in total)

<i>Exports</i>											
	China	Japan	NIEs			ASEAN					
Sector			Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Agriculture	2.5%	0.1%	0.2%	0.0%	0.5%	0.4%	3.8%	0.8%	2.0%	1.7%	10.9%
Forestry	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	1.1%	0.0%	0.3%	0.3%
Fishing	0.3%	0.0%	0.3%	0.1%	0.1%	0.2%	0.5%	0.1%	0.4%	0.4%	0.5%
Mining	2.2%	0.0%	0.0%	0.0%	0.0%	0.1%	23.4%	5.0%	1.2%	0.3%	17.1%
Food products and beverages	3.6%	0.6%	1.7%	2.9%	1.8%	1.4%	7.4%	6.6%	5.6%	13.0%	13.7%
Textiles	20.4%	2.0%	12.7%	39.9%	1.3%	11.0%	14.0%	3.7%	9.1%	9.2%	19.1%
Pulp, paper and paper product:	2.7%	0.8%	1.7%	4.1%	1.5%	2.9%	15.3%	6.0%	2.5%	2.8%	4.2%
Chemicals	8.2%	9.9%	13.6%	4.9%	15.5%	10.8%	11.2%	9.2%	3.1%	11.2%	3.3%
Iron, steel and metal products	6.3%	6.8%	9.7%	3.3%	3.1%	8.9%	3.1%	2.9%	3.3%	3.6%	1.0%
Transportation machinery	2.2%	21.7%	13.7%	0.1%	1.4%	3.7%	0.8%	1.1%	1.2%	1.8%	0.3%
Electronic equipment	14.6%	25.0%	29.1%	21.4%	59.1%	35.9%	7.3%	52.6%	58.0%	31.7%	3.6%
General machinery	14.4%	29.7%	12.9%	17.2%	13.2%	18.1%	3.9%	8.2%	9.3%	13.3%	4.1%
Other manufacturing	22.7%	3.4%	4.3%	5.9%	2.3%	6.8%	9.3%	2.6%	4.3%	10.7%	22.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<i>Imports</i>											
	China	Japan	NIEs			ASEAN					
Sector			Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Agriculture	2.7%	4.8%	3.5%	3.0%	1.3%	3.3%	6.6%	2.3%	2.8%	2.2%	1.0%
Forestry	0.5%	1.2%	0.6%	0.3%	0.0%	0.2%	0.1%	0.1%	0.3%	0.3%	0.0%
Fishing	0.1%	0.8%	0.1%	0.8%	0.1%	0.2%	0.0%	0.2%	0.0%	0.1%	0.0%
Mining	3.8%	15.9%	16.0%	0.7%	6.2%	6.8%	3.3%	1.0%	7.2%	8.4%	0.2%
Food products and beverages	4.3%	10.0%	3.5%	6.6%	3.2%	3.6%	4.4%	3.8%	5.9%	4.0%	4.3%
Textiles	10.8%	7.1%	4.2%	13.6%	2.7%	3.1%	4.5%	2.2%	4.1%	2.7%	13.5%
Pulp, paper and paper product:	4.3%	6.0%	2.9%	3.0%	1.8%	3.4%	2.6%	2.2%	2.2%	2.3%	2.5%
Chemicals	18.8%	11.0%	12.9%	8.5%	12.5%	13.9%	18.9%	11.0%	9.8%	12.5%	30.4%
Iron, steel and metal products	9.5%	6.6%	13.9%	11.4%	6.7%	9.4%	11.1%	9.5%	6.8%	11.6%	8.5%
Transportation machinery	4.2%	5.6%	4.6%	5.9%	5.9%	6.7%	9.9%	7.8%	8.5%	7.5%	6.4%
Electronic equipment	14.8%	12.7%	13.7%	23.2%	37.0%	22.8%	7.5%	36.0%	30.9%	19.6%	7.0%
General machinery	21.8%	11.8%	19.8%	15.9%	18.8%	22.4%	26.9%	20.7%	18.3%	24.2%	19.5%
Other manufacturing	4.3%	6.6%	4.2%	7.2%	3.9%	4.0%	4.1%	3.2%	3.3%	4.4%	6.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Notes: 1) Values of exports are evaluated at domestic market prices (VXMD). Exports are the sum of all partner countries.

2) Values of imports are evaluated at world prices (VIWS). Imports are the sum of partner countries.

3) Total excludes the services sectors.

Source: GTAP Version 5.

Table 6 Intra-Industry Trade (IIT) Patterns and Revealed Comparative Advantage of East Asian Economies in 1997

<i>Intra-Industry Trade (IIT) Index</i>											
	China	Japan	NIEs				ASEAN				
Sector			Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Agriculture	34.5	4.2	6.3	0.9	32.9	14.1	40.6	21.2	26.9	38.6	17.6
Forestry	9.3	1.4	1.5	0.3	40.2	8.2	36.6	5.5	12.0	15.2	21.0
Fishing	24.5	7.4	23.5	4.9	24.9	13.3	5.7	14.7	11.0	13.6	19.9
Mining	13.5	0.7	0.5	0.2	0.9	1.5	10.8	14.7	2.3	2.8	2.7
Food products and beverages	36.5	14.0	32.8	23.5	51.0	39.6	40.7	43.8	48.0	36.9	43.9
Textiles	38.7	50.8	50.9	43.3	46.0	35.2	27.6	52.5	26.5	32.6	31.9
Pulp, paper and paper product	65.6	26.5	35.8	52.8	60.0	60.4	22.5	42.8	69.1	61.8	49.2
Chemicals	56.9	73.0	54.4	21.1	56.2	46.9	63.1	78.8	28.8	69.5	13.9
Iron, steel and metal products	60.3	56.7	51.7	15.7	42.8	51.9	43.8	48.0	47.8	42.2	14.4
Transportation machinery	42.1	32.6	40.7	1.4	21.9	55.0	13.7	22.0	16.0	21.4	4.9
Electronic equipment	53.2	55.8	57.8	30.8	65.8	52.1	62.3	66.0	67.8	69.3	22.9
General machinery	58.5	46.3	43.9	29.7	49.0	57.7	26.0	55.0	47.6	56.7	17.2
Other manufacturing	22.0	67.1	78.7	36.9	43.5	59.1	36.6	64.6	46.9	53.8	23.1
<i>Reveald Comparative Advantage (RCA)</i>											
	China	Japan	NIEs				ASEAN				
Sector			Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Agriculture	0.88	0.03	0.06	0.01	0.15	0.13	1.28	0.27	0.50	0.51	3.71
Forestry	0.33	0.03	0.03	0.00	0.45	0.09	0.82	5.78	0.13	1.51	1.39
Fishing	1.63	0.13	1.51	0.47	0.48	1.08	2.73	0.61	1.59	2.12	2.95
Mining	0.37	0.01	0.01	0.00	0.01	0.01	3.81	0.81	0.14	0.05	2.84
Food products and beverages	0.68	0.12	0.31	0.30	0.30	0.26	1.36	1.18	0.76	2.19	2.56
Textiles	3.53	0.33	2.13	3.75	0.19	1.92	2.34	0.60	1.13	1.40	3.24
Pulp, paper and paper product	0.64	0.17	0.38	0.52	0.30	0.67	3.45	1.33	0.41	0.58	0.98
Chemicals	0.67	0.77	1.07	0.22	1.10	0.88	0.88	0.71	0.18	0.81	0.26
Iron, steel and metal products	0.86	0.88	1.28	0.24	0.37	1.22	0.41	0.38	0.33	0.43	0.13
Transportation machinery	0.20	1.91	1.23	0.01	0.12	0.35	0.07	0.10	0.08	0.14	0.02
Electronic equipment	1.17	1.91	2.26	0.94	4.14	2.90	0.57	4.00	3.33	2.26	0.28
General machinery	0.86	1.69	0.74	0.56	0.69	1.09	0.23	0.46	0.40	0.70	0.24
Other manufacturing	4.00	0.57	0.73	0.56	0.36	1.20	1.58	0.43	0.54	1.67	3.81

Note: For definition of IIT index and RCA, see Appendix in the main text.

Source: GTAP Version 5.

Table 7 Regionalization in Trade for East Asian Economies in 1997

Sector	East Asia				ASEAN			
	Absolute measure	Relative measure		Double relative measure	Absolute measure	Relative measure		Double relative measure
		Exports	Imports			Exports	Imports	
Total	0.11	0.44	0.50	2.02	0.01	0.21	0.20	3.17
Agriculture	0.04	0.56	0.19	2.53	0.01	0.19	0.13	3.81
Forestry	0.10	0.71	0.20	1.38	0.01	0.07	0.22	1.79
Fishing	0.18	0.84	0.52	2.37	0.02	0.22	0.54	6.52
Mining	0.05	0.81	0.19	2.87	0.01	0.13	0.14	2.67
Food products and beverages	0.07	0.58	0.33	2.72	0.01	0.15	0.24	3.37
Textiles	0.17	0.48	0.77	2.20	0.00	0.08	0.15	2.32
Pulp, paper and paper products	0.07	0.55	0.45	1.72	0.01	0.11	0.26	2.83
Chemicals	0.10	0.56	0.49	3.32	0.02	0.31	0.25	3.78
Iron, steel and metal products	0.12	0.63	0.47	2.68	0.01	0.30	0.10	4.81
Transportation machinery	0.04	0.18	0.32	2.54	0.00	0.24	0.04	4.26
Electronic equipment	0.22	0.42	0.68	1.61	0.05	0.23	0.32	5.73
General machinery	0.11	0.46	0.52	1.31	0.01	0.29	0.13	1.63
Other manufacturing	0.09	0.29	0.52	2.12	0.01	0.11	0.16	3.82

Notes: 1) East Asia is all the countries listed in Table 1 (or Table 2) while ASEAN is Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam.

2) For definition of each measure, see Appendix in the main text.

Source: GTAP Version 5.

Table 8 Nominal and Effective Rate of Protection of East Asian Economies in 1997

<i>Nominal Rate of Protection (NRP) in 1997 (%)</i>											
Sector	NIEs						ASEAN				
	China	Japan	Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Agriculture	41.3%	58.4%	110.9%	0.0%	3.5%	6.0%	5.2%	31.1%	15.0%	20.3%	13.6%
Forestry	2.6%	0.2%	2.0%	0.0%	0.0%	0.4%	1.1%	0.0%	0.5%	1.5%	3.3%
Fishing	14.2%	4.9%	15.8%	0.0%	0.0%	31.1%	7.5%	1.4%	6.6%	44.9%	8.9%
Mining	0.2%	-1.4%	3.9%	0.0%	0.0%	4.9%	2.8%	1.1%	1.0%	0.3%	3.2%
Food products and beverages	37.4%	50.0%	37.7%	0.0%	4.6%	26.1%	14.8%	14.8%	18.7%	37.2%	36.5%
Textiles	25.7%	10.7%	8.0%	0.0%	0.0%	8.1%	15.6%	16.1%	13.6%	26.7%	34.0%
Pulp, paper and paper product	11.7%	2.2%	5.3%	0.0%	0.0%	2.9%	6.2%	9.1%	11.4%	12.6%	19.1%
Chemicals	12.6%	2.3%	7.0%	0.0%	0.0%	3.7%	7.1%	8.6%	6.4%	15.3%	16.1%
Iron, steel and metal products	9.7%	1.0%	4.9%	0.0%	0.0%	4.0%	8.1%	6.1%	8.1%	11.9%	8.1%
Transportation machinery	18.9%	0.0%	4.6%	0.0%	0.0%	13.2%	25.4%	19.7%	10.3%	31.5%	36.9%
Electronic equipment	11.9%	0.0%	8.0%	0.0%	0.0%	2.9%	8.1%	0.8%	3.1%	8.8%	9.7%
General machinery	13.5%	0.3%	7.8%	0.0%	0.0%	4.9%	3.9%	5.1%	5.5%	10.4%	6.7%
Other manufacturing	16.9%	5.5%	7.3%	0.0%	0.0%	5.6%	9.5%	8.2%	12.0%	13.2%	16.9%

<i>Effective Rate of Protection (ERP) in 1997 (%)</i>											
Sector	NIEs						ASEAN				
	China	Japan	Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Agriculture	51.6%	84.2%	154.2%	0.0%	4.3%	-0.5%	5.1%	37.3%	16.2%	20.6%	14.7%
Forestry	0.6%	-1.8%	0.9%	0.0%	-0.1%	0.3%	0.5%	-0.2%	-0.2%	1.3%	3.1%
Fishing	9.5%	2.4%	21.5%	0.0%	0.0%	40.2%	8.2%	1.1%	6.6%	54.3%	10.0%
Mining	-5.4%	-3.3%	4.6%	0.0%	0.0%	5.5%	2.7%	1.1%	0.1%	-0.1%	3.6%
Food products and beverages	60.5%	104.7%	-57.6%	0.0%	8.2%	90.6%	30.1%	-15.4%	29.2%	71.2%	133.9%
Textiles	33.2%	19.3%	12.9%	0.0%	0.0%	16.1%	22.6%	26.7%	18.7%	37.1%	83.6%
Pulp, paper and paper product	10.6%	3.5%	7.7%	0.0%	0.0%	4.5%	12.0%	19.6%	24.1%	15.4%	60.8%
Chemicals	22.2%	3.8%	9.4%	0.0%	0.0%	5.6%	11.6%	-1.0%	4.6%	17.8%	58.1%
Iron, steel and metal products	17.5%	1.5%	7.2%	0.0%	0.0%	7.0%	11.8%	10.2%	16.6%	14.0%	15.1%
Transportation machinery	36.0%	-1.1%	4.8%	0.0%	0.0%	30.9%	35.7%	27.8%	18.5%	37.9%	156.8%
Electronic equipment	14.7%	-0.8%	16.3%	0.0%	0.0%	3.9%	9.1%	-2.4%	1.4%	9.2%	19.8%
General machinery	21.3%	-0.1%	11.7%	0.0%	0.0%	8.7%	1.7%	6.5%	6.2%	11.2%	19.9%
Other manufacturing	24.6%	10.8%	11.2%	0.0%	0.0%	11.5%	10.6%	12.4%	18.8%	15.2%	34.0%

Note: For the definition of NRP and ERP, see Appendix in the main text.

Source: GTAP Version 5.

Table 9 Estimated Effects of East Asia FTA on Growth in Real GDP and Changes in Equivalent Variation, by Country/Region: 1997-2010

	GDP growth (Annual average growth, %)				Equivalent Variation (Annual changes, US\$ million)			
	Scenario 1	Scenario 2	Scenario 3a	Scenario 3b	Scenario 1	Scenario 2	Scenario 3a	Scenario 3b
	Australia/New Zealand	-0.01	-0.02	-0.01	-0.02	-100	-107	-96
China	0.10	0.14	0.19	0.19	504	859	1,260	1,261
Hong Kong	0.10	0.19	0.25	0.23	330	468	546	522
Japan	0.01	0.02	0.05	0.05	936	1,326	2,479	2,406
Korea	0.13	0.17	0.22	0.20	732	948	1,152	1,091
Taiwan	0.12	0.18	0.22	0.21	556	747	870	839
Indonesia	0.37	0.42	0.47	0.43	847	1,000	1,114	1,029
Malaysia	0.15	0.31	0.37	0.36	131	322	387	373
Philippines	0.07	0.17	0.22	0.19	-23	52	86	68
Singapore	0.03	0.22	0.28	0.27	46	205	251	242
Thailand	0.94	1.17	1.26	1.26	1,399	1,766	1,920	1,906
Vietnam	0.49	0.65	0.69	0.65	94	134	145	141
Other Asia	-0.02	-0.02	-0.02	-0.02	-122	-126	-117	-166
Canada	-0.00	-0.00	-0.00	-0.00	-5	-2	-0	-15
United States	-0.00	-0.00	-0.00	-0.01	-561	-607	-534	-660
Mexico	-0.00	-0.00	-0.00	-0.00	2	4	2	-10
Central and Latin America	-0.01	-0.01	-0.01	-0.01	-194	-195	-181	-237
EU	-0.00	0.00	0.00	-0.00	-11	-8	63	-144
Other Europe	-0.00	-0.00	-0.00	-0.01	-61	-70	-68	-79
Rest of the world	0.11	0.13	0.15	0.17	1,389	1,584	1,844	2,060

Notes: 1) GDP growth indicates the deviation of annual average growth rates in each scenario from that of standard scenario (Scenario S).

2) Equivalent variation indicates the deviation of annual average changes in each scenario from that of standard scenario (Scenario S).

3) Scenario 1: Removal of trade barriers + factor growth.

Scenario 2: Scenario 1 + trade facilitation.

Scenario 3a: Scenario 2 + foreign direct investment + technology growth.

Scenario 3b: Scenario 3a + adjustment costs.

4) Shaded cells indicate the countries that establish East Asia FTA.

Source: Model simulation

Table 10 Growth of Real Outputs and Real Exports

Sector	China	Japan	Korea	Hong Kong	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand	Vietnam
<i>Growth of real outputs (%)</i>											
Agriculture	0.3	-0.2	-0.6	0.0	0.0	0.1	0.0	0.1	0.1	0.3	-0.1
Forestry	0.0	-0.2	-0.1	0.2	-0.2	0.2	0.8	0.5	0.3	1.3	0.8
Fishing	0.1	-0.2	0.6	-0.1	0.2	-0.1	0.3	0.2	0.2	1.0	0.1
Mining	0.1	-0.1	-0.2	0.4	-0.0	-0.1	0.3	0.4	0.4	1.4	-0.8
Food products and beverages	0.0	-0.2	2.2	1.9	1.2	0.5	0.3	0.5	0.0	1.3	-0.1
Textiles	-0.0	-0.2	1.5	-0.4	-1.0	1.5	0.2	0.3	1.2	0.7	7.8
Pulp, paper and paper product	-0.0	-0.0	0.2	0.4	0.1	0.1	0.8	0.5	0.2	1.3	1.1
Chemicals	-0.1	0.1	0.4	0.5	0.3	0.6	0.2	0.1	0.1	0.9	-0.0
Iron, steel and metal products	0.0	0.2	-0.1	0.6	-0.0	0.0	0.3	0.1	0.3	1.6	-1.4
Transportation machinery	-1.1	0.5	0.1	-0.7	-1.9	-0.5	-5.5	-2.3	-5.4	-0.9	-2.0
Electronic equipment	0.7	-0.1	-0.1	0.4	0.5	-0.1	1.5	0.6	0.9	2.1	0.0
General machinery	0.0	0.2	-0.4	0.9	0.2	0.2	1.6	0.6	1.0	2.0	-0.6
Other manufacturing	0.2	-0.0	0.1	0.9	-0.0	0.2	0.6	0.2	0.7	1.5	0.7
<i>Growth of real exports (%)</i>											
Agriculture	9.0	3.4	15.5	1.8	0.0	2.4	-1.2	0.2	5.0	-5.4	-0.6
Forestry	0.3	0.2	-0.1	1.5	-0.2	0.8	1.6	0.5	1.2	2.1	-0.2
Fishing	2.1	2.4	1.7	0.5	0.3	0.3	1.2	0.7	2.8	1.3	0.6
Mining	0.6	-0.3	-1.1	-0.7	0.4	-0.2	0.3	0.6	0.7	1.8	-1.9
Food products and beverages	4.5	5.5	15.8	7.9	1.9	7.1	2.8	1.1	1.8	3.4	1.8
Textiles	1.8	3.1	2.6	-0.5	-1.4	2.2	0.8	0.8	2.1	1.5	8.7
Pulp, paper and paper product	0.6	1.4	1.2	1.2	-0.1	0.5	1.1	0.9	0.6	1.5	2.9
Chemicals	1.0	0.7	1.0	1.7	0.3	1.4	0.1	0.3	0.8	1.0	0.9
Iron, steel and metal products	1.2	1.3	0.7	1.7	-0.2	0.5	0.6	0.6	1.4	2.4	-1.1
Transportation machinery	2.6	1.2	0.5	-1.9	-3.3	1.1	-0.9	1.9	-7.0	1.0	1.0
Electronic equipment	1.8	-0.2	0.0	0.5	0.5	-0.0	2.8	0.6	0.9	2.3	0.3
General machinery	0.8	0.7	1.0	2.7	-0.1	0.7	0.7	0.4	1.5	1.9	1.3
Other manufacturing	1.2	0.5	-0.0	1.4	0.3	0.6	2.8	0.8	1.3	2.5	-0.8

Note: The growths of real outputs and exports indicate the deviation of annual average growth rates in scenario 3a from that of standard scenario.

Source: Model simulation

Table 11 Export and Import Compositions of East Asian Economies Resulting from East Asia FTA (percentage shares in total)

<i>Exports</i>																		
Sector	China			Japan			NIEs			Hong Kong			Singapore			Taiwan		
	1997 FTA	Change		1997 FTA	Change		1997 FTA	Change		1997 FTA	Change		1997 FTA	Change		1997 FTA	Change	
Non-manufacturing	5.0	8.9	3.9	0.2	0.3	0.1	0.5	1.0	0.5	0.2	0.2	-0.0	0.7	1.0	0.3	0.6	0.7	0.1
Agriculture	2.5	6.7	4.2	0.1	0.2	0.1	0.2	0.7	0.5	0.0	0.0	-0.0	0.5	0.8	0.3	0.4	0.5	0.1
Forestry	0.1	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	0.1	0.1	-0.0	0.0	0.0	0.0
Fishing	0.3	0.2	-0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.1	0.1	-0.0	0.1	0.1	0.0	0.2	0.2	-0.0
Mining	2.2	1.9	-0.3	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.1	0.1	-0.0
Manufacturing	95.0	91.1	-3.9	99.8	99.7	-0.1	99.5	99.0	-0.5	99.8	99.8	0.0	99.3	99.0	-0.3	99.4	99.3	-0.1
Food products and beverages	3.6	4.3	0.8	0.6	1.4	0.7	1.7	6.1	4.4	2.9	7.7	4.8	1.8	3.8	2.0	1.4	2.7	1.4
Textiles	20.4	26.0	5.6	2.0	2.7	0.7	12.7	14.5	1.7	39.9	34.5	-5.4	1.3	1.3	-0.0	11.0	13.1	2.0
Pulp, paper and paper products	2.7	2.1	-0.6	0.8	0.9	0.1	1.7	1.7	0.0	4.1	4.1	-0.0	1.5	1.5	0.0	2.9	2.8	-0.1
Chemicals	8.2	6.9	-1.3	9.9	10.5	0.6	13.6	12.7	-0.9	4.9	5.2	0.3	15.5	16.0	0.5	10.8	11.6	0.8
Iron, steel and metal products	6.3	5.7	-0.6	6.8	7.6	0.8	9.7	9.4	-0.3	3.3	3.5	0.2	3.1	3.5	0.4	8.9	8.9	0.0
Transportation machinery	2.2	2.3	0.2	21.7	21.5	-0.2	13.7	14.2	0.5	0.1	0.1	-0.0	1.4	1.2	-0.2	3.7	4.2	0.4
Electronic equipment	14.6	13.1	-1.5	25.0	22.3	-2.7	29.1	24.8	-4.4	21.4	19.3	-2.1	59.1	54.9	-4.2	35.9	31.5	-4.4
General machinery	14.4	12.5	-1.9	29.7	29.5	-0.2	12.9	11.4	-1.5	17.2	18.3	1.1	13.2	14.3	1.2	18.1	17.9	-0.1
Other manufacturing	22.7	18.1	-4.6	3.4	3.4	-0.0	4.3	4.2	-0.0	5.9	7.1	1.2	2.3	2.5	0.2	6.8	6.7	-0.1
Total	100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0	
<i>ASEAN</i>																		
Sector	Indonesia		Malaysia		Philippines		Thailand		Vietnam									
	1997 FTA	Change																
Non-manufacturing	27.8	26.7	-1.1	7.1	7.1	0.0	3.6	4.7	1.1	2.7	1.8	-0.9	28.8	17.3	-11.5			
Agriculture	3.8	1.6	-2.2	0.8	0.9	0.1	2.0	2.9	0.9	1.7	0.8	-0.9	10.9	6.8	-4.1			
Forestry	0.2	0.2	0.0	1.1	1.0	-0.1	0.0	0.0	0.0	0.3	0.3	-0.0	0.3	0.2	-0.1			
Fishing	0.5	0.5	0.0	0.1	0.1	0.0	0.4	0.5	0.2	0.4	0.3	-0.1	0.5	0.4	-0.1			
Mining	23.4	24.4	1.1	5.0	5.1	0.0	1.2	1.2	0.0	0.3	0.4	0.0	17.1	9.9	-7.3			
Manufacturing	72.2	73.3	1.1	92.9	92.9	-0.0	96.4	95.3	-1.1	97.3	98.2	0.9	71.2	82.7	11.5			
Food products and beverages	7.4	6.3	-1.1	6.6	7.3	0.7	5.6	4.6	-1.0	13.0	16.4	3.4	13.7	14.8	1.1			
Textiles	14.0	14.9	0.9	3.7	4.4	0.7	9.1	11.4	2.3	9.2	9.4	0.2	19.1	36.2	17.1			
Pulp, paper and paper products	15.3	14.8	-0.5	6.0	6.0	-0.1	2.5	2.5	0.0	2.8	2.4	-0.4	4.2	4.3	0.1			
Chemicals	11.2	9.0	-2.1	9.2	7.9	-1.4	3.1	2.8	-0.2	11.2	9.4	-1.8	3.3	2.5	-0.8			
Iron, steel and metal products	3.1	3.2	0.1	2.9	3.3	0.3	3.3	3.8	0.5	3.6	3.6	0.1	1.0	0.6	-0.4			
Transportation machinery	0.8	2.0	1.2	1.1	2.3	1.2	1.2	3.0	1.8	1.8	3.2	1.4	0.3	0.4	0.1			
Electronic equipment	7.3	8.9	1.6	52.6	50.2	-2.4	58.0	52.1	-5.9	31.7	30.8	-1.0	3.6	2.7	-0.9			
General machinery	3.9	4.5	0.6	8.2	9.0	0.8	9.3	9.8	0.5	13.3	13.5	0.2	4.1	2.9	-1.2			
Other manufacturing	9.3	9.7	0.4	2.6	2.7	0.1	4.3	5.2	0.9	10.7	9.6	-1.1	22.0	18.4	-3.6			
Total	100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0				

Notes: 1) The figures in 1997 indicate the export composition in 1997 (from Table 5).

2) The figures in FTA indicate the export composition resulting from FTA (model simulation 3a in Table 9).

3) The changes indicate the difference between 1997 and FTA (percentage points).

4) Non-manufacturing do not include service sectors.

Source: model simulation and GTAP version 5.

Table 11 (continued) Export and Import Compositions of East Asian Economies Resulting from East Asia FTA (percentage shares in total)

<i>Imports</i>																		
Sector	China			Japan			NIEs Korea			Hong Kong			Singapore			Taiwan		
	1997 FTA		Change	1997 FTA		Change	1997 FTA		Change	1997 FTA		Change	1997 FTA		Change	1997 FTA		Change
Non-manufacturing	7.0	6.7	-0.4	22.6	20.3	-2.3	20.3	23.6	3.3	4.7	5.2	0.5	7.6	8.5	0.9	10.6	11.0	0.4
Agriculture	2.7	3.4	0.7	4.8	4.7	-0.1	3.5	8.2	4.7	3.0	3.5	0.5	1.3	1.8	0.5	3.3	4.0	0.7
Forestry	0.5	0.4	-0.1	1.2	1.1	-0.1	0.6	0.6	-0.1	0.3	0.3	0.0	0.0	0.0	0.0	0.2	0.2	-0.0
Fishing	0.1	0.1	0.0	0.8	0.8	-0.0	0.1	0.1	0.0	0.8	0.7	-0.0	0.1	0.1	-0.0	0.2	0.3	0.0
Mining	3.8	2.8	-1.0	15.9	13.8	-2.0	16.0	14.7	-1.3	0.7	0.8	0.0	6.2	6.6	0.4	6.8	6.5	-0.3
Manufacturing	93.0	93.3	0.4	77.4	79.7	2.3	79.7	76.4	-3.3	95.3	94.8	-0.5	92.4	91.5	-0.9	89.4	89.0	-0.4
Food products and beverages	4.3	5.8	1.4	10.0	12.8	2.8	3.5	3.3	-0.2	6.6	6.4	-0.3	3.2	3.3	0.1	3.6	4.4	0.8
Textiles	10.8	15.1	4.3	7.1	8.2	1.1	4.2	4.5	0.3	13.6	13.5	-0.1	2.7	2.7	-0.0	3.1	3.8	0.7
Pulp, paper and paper products	4.3	3.9	-0.4	6.0	5.7	-0.3	2.9	2.8	-0.1	3.0	3.0	0.0	1.8	1.8	0.0	3.4	3.3	-0.1
Chemicals	18.8	16.4	-2.4	11.0	10.2	-0.8	12.9	12.1	-0.7	8.5	8.5	-0.0	12.5	12.8	0.3	13.9	13.7	-0.2
Iron, steel and metal products	9.5	8.4	-1.1	6.6	6.5	-0.1	13.9	13.2	-0.7	11.4	11.7	0.3	6.7	7.0	0.4	9.4	9.4	-0.0
Transportation machinery	4.2	6.2	1.9	5.6	5.8	0.2	4.6	4.7	0.1	5.9	5.8	-0.1	5.9	5.7	-0.1	6.7	7.8	1.1
Electronic equipment	14.8	13.0	-1.8	12.7	12.3	-0.4	13.7	12.7	-1.0	23.2	22.8	-0.4	37.0	35.6	-1.5	22.8	20.6	-2.2
General machinery	21.8	19.8	-2.0	11.8	11.3	-0.5	19.8	18.9	-0.9	15.9	15.9	0.0	18.8	18.7	-0.1	22.4	21.9	-0.5
Other manufacturing	4.3	4.8	0.4	6.6	6.9	0.3	4.2	4.2	0.0	7.2	7.2	0.0	3.9	3.9	0.0	4.0	4.1	0.1
Total	100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0	
ASEAN																		
Sector	Indonesia		Malaysia		Philippines		Thailand		Vietnam									
	1997 FTA	Change	1997 FTA	Change	1997 FTA	Change	1997 FTA	Change	1997 FTA	Change								
Non-manufacturing	10.0	14.7	4.7	3.7	5.3	1.6	10.2	11.3	1.1	11.0	10.5	-0.5	1.2	1.9	0.7			
Agriculture	6.6	12.2	5.6	2.3	4.1	1.8	2.8	4.5	1.7	2.2	3.3	1.1	1.0	1.6	0.7			
Forestry	0.1	0.1	-0.0	0.1	0.1	-0.0	0.3	0.2	-0.1	0.3	0.2	-0.1	0.0	0.0	0.0			
Fishing	0.0	0.0	-0.0	0.2	0.2	-0.0	0.0	0.0	-0.0	0.1	0.1	0.0	0.0	0.0	0.0			
Mining	3.3	2.4	-0.9	1.0	0.9	-0.2	7.2	6.6	-0.6	8.4	6.8	-1.6	0.2	0.2	-0.0			
Manufacturing	90.0	85.3	-4.7	96.3	94.7	-1.6	89.8	88.7	-1.1	89.0	89.5	0.5	98.8	98.1	-0.7			
Food products and beverages	4.4	5.2	0.9	3.8	4.3	0.6	5.9	7.8	1.9	4.0	5.8	1.8	4.3	7.2	2.9			
Textiles	4.5	5.3	0.8	2.2	2.6	0.4	4.1	4.7	0.7	2.7	3.6	0.9	13.5	22.0	8.5			
Pulp, paper and paper products	2.6	2.3	-0.3	2.2	2.1	-0.0	2.2	2.1	-0.1	2.3	2.2	-0.2	2.5	2.7	0.2			
Chemicals	18.9	17.5	-1.4	11.0	10.9	-0.1	9.8	9.5	-0.3	12.5	11.8	-0.7	30.4	24.7	-5.7			
Iron, steel and metal products	11.1	10.5	-0.6	9.5	9.1	-0.3	6.8	6.9	0.1	11.6	10.6	-1.0	8.5	7.0	-1.5			
Transportation machinery	9.9	9.2	-0.7	7.8	9.2	1.4	8.5	8.4	-0.1	7.5	10.7	3.2	6.4	5.6	-0.8			
Electronic equipment	7.5	6.6	-0.9	36.0	33.4	-2.5	30.9	28.6	-2.2	19.6	18.3	-1.3	7.0	6.0	-1.1			
General machinery	26.9	24.9	-2.0	20.7	19.7	-0.9	18.3	17.3	-0.9	24.2	22.1	-2.1	19.5	15.9	-3.6			
Other manufacturing	4.1	3.8	-0.3	3.2	3.2	-0.0	3.3	3.3	0.1	4.4	4.3	-0.1	6.6	7.0	0.4			
Total	100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0				

Table 12 Changes in Intra-Industry Trade Index

<i>Intra-Industry Trade (IIT) Index</i>																		
Sector	China			Japan			NIEs			Hong Kong			Singapore			Taiwan		
	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change
Agriculture	34.5	16.1	-18.4	4.2	9.2	5.0	6.3	4.4	-1.9	0.9	0.8	-0.1	32.9	51.4	18.5	14.1	15.1	1.1
Forestry	9.3	9.0	-0.4	1.4	1.4	0.0	1.5	1.6	0.1	0.3	0.2	-0.1	40.2	44.0	3.8	8.2	7.2	-1.0
Fishing	24.5	27.7	3.2	7.4	9.3	1.8	23.5	26.1	2.6	4.9	4.9	0.0	24.9	34.1	9.3	13.3	14.7	1.4
Mining	13.5	14.6	1.2	0.7	0.7	0.0	0.5	0.4	-0.1	0.2	0.2	-0.0	0.9	0.9	0.0	1.5	1.4	-0.0
Food products and beverages	36.5	35.4	-1.1	14.0	24.2	10.2	32.8	41.1	8.3	23.5	45.1	21.5	51.0	50.9	-0.0	39.6	57.0	17.4
Textiles	38.7	35.1	-3.5	50.8	57.5	6.7	50.9	47.8	-3.1	43.3	65.8	22.6	46.0	52.4	6.3	35.2	35.2	0.0
Pulp, paper and paper products	65.6	58.7	-6.9	26.5	30.0	3.5	35.8	33.4	-2.5	52.8	49.5	-3.3	60.0	60.5	0.5	60.4	57.4	-2.9
Chemicals	56.9	48.4	-8.5	73.0	68.4	-4.6	54.4	51.8	-2.7	21.1	21.3	0.2	56.2	52.3	-3.9	46.9	43.0	-3.9
Iron, steel and metal products	60.3	57.7	-2.6	56.7	52.6	-4.1	51.7	51.3	-0.4	15.7	17.9	2.2	42.8	45.5	2.6	51.9	48.6	-3.3
Transportation machinery	42.1	25.7	-16.3	32.6	34.1	1.5	40.7	33.9	-6.9	1.4	1.5	0.1	21.9	23.7	1.8	55.0	43.4	-11.6
Electronic equipment	53.2	48.1	-5.1	55.8	59.7	3.9	57.8	57.6	-0.2	30.8	29.1	-1.7	65.8	67.8	2.0	52.1	52.7	0.6
General machinery	58.5	53.7	-4.8	46.3	45.8	-0.5	43.9	41.2	-2.7	29.7	28.4	-1.3	49.0	53.1	4.1	57.7	54.8	-3.0
Other manufacturing	22.0	24.2	2.2	67.1	64.3	-2.9	78.7	80.1	1.4	36.9	33.8	-3.1	43.5	49.3	5.9	59.1	57.8	-1.3
ASEAN																		
	Indonesia			Malaysia			Philippines			Thailand			Vietnam					
	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change
Agriculture	40.6	14.7	-25.9	21.2	38.0	16.8	26.9	18.6	-8.3	38.6	29.5	-9.1	17.6	25.5	7.9			
Forestry	36.6	31.4	-5.1	5.5	5.5	-0.0	12.0	14.0	2.0	15.2	16.7	1.5	21.0	20.9	-0.1			
Fishing	5.7	4.5	-1.2	14.7	31.7	17.0	11.0	7.4	-3.6	13.6	34.6	21.0	19.9	23.9	4.0			
Mining	10.8	9.2	-1.6	14.7	14.6	-0.2	2.3	2.7	0.4	2.8	3.3	0.4	2.7	3.9	1.1			
Food products and beverages	40.7	47.7	7.1	43.8	39.9	-3.9	48.0	42.9	-5.0	36.9	36.3	-0.6	43.9	25.8	-18.1			
Textiles	27.6	23.8	-3.8	52.5	53.9	1.5	26.5	20.1	-6.4	32.6	28.9	-3.7	31.9	30.0	-2.0			
Pulp, paper and paper products	22.5	21.1	-1.4	42.8	41.9	-0.9	69.1	59.6	-9.5	61.8	60.6	-1.2	49.2	43.5	-5.7			
Chemicals	63.1	60.2	-2.9	78.8	72.6	-6.2	28.8	29.0	0.3	69.5	63.9	-5.6	13.9	14.4	0.6			
Iron, steel and metal products	43.8	47.0	3.3	48.0	53.2	5.2	47.8	52.1	4.3	42.2	46.0	3.8	14.4	12.5	-1.9			
Transportation machinery	13.7	2.1	-11.7	22.0	13.2	-8.8	16.0	24.4	8.4	21.4	11.7	-9.7	4.9	4.9	0.0			
Electronic equipment	62.3	59.9	-2.5	66.0	67.0	1.0	67.8	67.6	-0.2	69.3	64.1	-5.2	22.9	24.0	1.1			
General machinery	26.0	31.0	5.0	55.0	60.3	5.3	47.6	52.1	4.5	56.7	63.9	7.2	17.2	21.3	4.1			
Other manufacturing	36.6	34.0	-2.6	64.6	64.4	-0.3	46.9	40.7	-6.2	53.8	53.5	-0.3	23.1	27.3	4.3			

- Notes: 1) The figures in 1997 indicate the IIT index in 1997 (from Table 6).
2) The figures in FTA indicate the export composition resulting from FTA (model simulation 3a in Table 9).
3) The changes indicate the difference between 1997 and FTA.

Source: model simulation and GTAP version 5.

Table 13 Changes in Revealed Comparative Advantage

<i>Reveald Comparative Advantage (RCA)</i>																		
Sector	China			Japan			NIEs			Hong Kong			Singapore		Taiwan			
	1997	FTA	Change	1997	FTA	Change	Korea	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change		
Agriculture	0.9	2.4	1.5	0.0	0.1	0.0	0.1	0.2	0.2	0.0	0.0	-0.0	0.2	0.2	0.1	0.1	0.2	0.0
Forestry	0.3	0.3	-0.1	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.5	0.4	-0.1	0.1	0.1	0.0
Fishing	1.6	1.5	-0.1	0.1	0.2	0.0	1.5	1.6	0.1	0.5	0.4	-0.0	0.5	0.5	0.0	1.1	1.0	-0.1
Mining	0.4	0.3	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0
Food products and beverages	0.7	0.8	0.2	0.1	0.3	0.1	0.3	1.2	0.8	0.3	0.9	0.6	0.3	0.6	0.3	0.3	0.5	0.3
Textiles	3.5	4.6	1.1	0.3	0.5	0.1	2.1	2.5	0.4	3.8	3.6	-0.1	0.2	0.2	0.0	1.9	2.3	0.4
Pulp, paper and paper products	0.6	0.5	-0.1	0.2	0.2	0.0	0.4	0.4	0.0	0.5	0.6	0.1	0.3	0.3	0.0	0.7	0.7	-0.0
Chemicals	0.7	0.6	-0.1	0.8	0.8	0.1	1.1	1.0	-0.0	0.2	0.3	0.0	1.1	1.2	0.1	0.9	1.0	0.1
Iron, steel and metal products	0.9	0.8	-0.1	0.9	1.0	0.1	1.3	1.3	-0.0	0.2	0.3	0.0	0.4	0.4	0.1	1.2	1.2	0.0
Transportation machinery	0.2	0.2	0.0	1.9	1.9	0.0	1.2	1.3	0.1	0.0	0.0	0.0	0.1	0.1	-0.0	0.3	0.4	0.0
Electronic equipment	1.2	1.1	-0.1	1.9	1.7	-0.2	2.3	2.0	-0.3	0.9	0.9	0.0	4.1	4.0	-0.2	2.9	2.6	-0.3
General machinery	0.9	0.8	-0.1	1.7	1.7	0.0	0.7	0.7	-0.1	0.6	0.7	0.1	0.7	0.8	0.1	1.1	1.1	0.0
Other manufacturing	4.0	3.3	-0.7	0.6	0.6	0.0	0.7	0.7	0.0	0.6	0.8	0.2	0.4	0.4	0.0	1.2	1.2	-0.0

<i>ASEAN</i>																
Sector	Indonesia			Malaysia			Philippines			Thailand			Vietnam			
	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	1997	FTA	Change	
Agriculture	1.3	0.6	-0.7	0.3	0.3	0.0	0.5	0.7	0.2	0.5	0.3	-0.3	3.7	2.4	-1.3	
Forestry	0.8	1.0	0.1	5.8	5.3	-0.5	0.1	0.2	0.0	1.5	1.5	-0.1	1.4	1.0	-0.4	
Fishing	2.7	2.8	0.1	0.6	0.7	0.1	1.6	2.3	0.7	2.1	1.8	-0.3	2.9	2.4	-0.5	
Mining	3.8	4.1	0.3	0.8	0.8	0.0	0.1	0.1	0.0	0.0	0.1	0.0	2.8	1.7	-1.1	
Food products and beverages	1.4	1.2	-0.2	1.2	1.3	0.2	0.8	0.6	-0.1	2.2	2.9	0.7	2.6	2.9	0.3	
Textiles	2.3	2.6	0.2	0.6	0.7	0.1	1.1	1.4	0.3	1.4	1.5	0.1	3.2	6.5	3.2	
Pulp, paper and paper products	3.5	3.4	-0.0	1.3	1.3	0.0	0.4	0.4	0.0	0.6	0.5	-0.1	1.0	1.0	0.1	
Chemicals	0.9	0.7	-0.1	0.7	0.6	-0.1	0.2	0.2	-0.0	0.8	0.7	-0.1	0.3	0.2	-0.1	
Iron, steel and metal products	0.4	0.4	0.0	0.4	0.4	0.1	0.3	0.4	0.1	0.4	0.5	0.0	0.1	0.1	-0.0	
Transportation machinery	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.3	0.1	0.0	0.0	0.0	
Electronic equipment	0.6	0.7	0.1	4.0	3.9	-0.1	3.3	3.0	-0.3	2.3	2.3	0.0	0.3	0.2	-0.1	
General machinery	0.2	0.3	0.0	0.5	0.5	0.1	0.4	0.4	0.0	0.7	0.7	0.0	0.2	0.2	-0.1	
Other manufacturing	1.6	1.7	0.1	0.4	0.5	0.0	0.5	0.7	0.1	1.7	1.6	-0.1	3.8	3.4	-0.4	

Notes: 1) The figures in 1997 indicate the RCA in 1997 (from Table 6).

2) The figures in FTA indicate the export composition resulting from FTA (model simulation 3a in Table 9).

3) The changes indicate the difference between 1997 and FTA.

Source: model simulation and GTAP version 5.

Table 14 Regionalization in Trade for East Asian Economies Resulting from East Asia FTA

<i>A) Regionalization in 1997 (from Table 7)</i>									
Sector	East Asia				ASEAN				
	Absolute measure	Relative measure		Double relative measure	Absolute measure	Relative measure		Double relative measure	
		Exports	Imports			Exports	Imports		
Total	0.11	0.44	0.50	2.02	0.01	0.21	0.20	3.17	
Agriculture	0.04	0.56	0.19	2.53	0.01	0.19	0.13	3.81	
Forestry	0.10	0.71	0.20	1.38	0.01	0.07	0.22	1.79	
Fishing	0.18	0.84	0.52	2.37	0.02	0.22	0.54	6.52	
Mining	0.05	0.81	0.19	2.87	0.01	0.13	0.14	2.67	
Food products and beverages	0.07	0.58	0.33	2.72	0.01	0.15	0.24	3.37	
Textiles	0.17	0.48	0.77	2.20	0.00	0.08	0.15	2.32	
Pulp, paper and paper products	0.07	0.55	0.45	1.72	0.01	0.11	0.26	2.83	
Chemicals	0.10	0.56	0.49	3.32	0.02	0.31	0.25	3.78	
Iron, steel and metal products	0.12	0.63	0.47	2.68	0.01	0.30	0.10	4.81	
Transportation machinery	0.04	0.18	0.32	2.54	0.00	0.24	0.04	4.26	
Electronic equipment	0.22	0.42	0.68	1.61	0.05	0.23	0.32	5.73	
General machinery	0.11	0.46	0.52	1.31	0.01	0.29	0.13	1.63	
Other manufacturing	0.09	0.29	0.52	2.12	0.01	0.11	0.16	3.82	

<i>B) Regionalization resulting from East Asia FTA</i>									
Sector	East Asia				ASEAN				
	Absolute measure	Relative measure		Double relative measure	Absolute measure	Relative measure		Double relative measure	
		Exports	Imports			Exports	Imports		
Total	0.16	0.54	0.61	2.11	0.02	0.24	0.24	2.93	
Agriculture	0.13	0.90	0.41	2.97	0.01	0.47	0.15	5.18	
Forestry	0.12	0.75	0.23	1.40	0.01	0.08	0.27	1.82	
Fishing	0.24	0.86	0.62	2.24	0.03	0.23	0.62	5.48	
Mining	0.08	0.82	0.26	2.81	0.01	0.15	0.19	2.60	
Food products and beverages	0.17	0.82	0.62	2.97	0.02	0.19	0.31	3.03	
Textiles	0.26	0.52	0.89	1.82	0.01	0.08	0.16	1.73	
Pulp, paper and paper products	0.10	0.62	0.55	1.89	0.01	0.12	0.31	2.93	
Chemicals	0.13	0.63	0.56	3.30	0.02	0.35	0.27	3.45	
Iron, steel and metal products	0.16	0.70	0.55	2.65	0.01	0.35	0.14	4.51	
Transportation machinery	0.09	0.40	0.61	2.46	0.00	0.23	0.06	4.09	
Electronic equipment	0.26	0.47	0.73	2.70	0.06	0.25	0.37	3.93	
General machinery	0.15	0.55	0.60	1.32	0.02	0.34	0.18	1.59	
Other manufacturing	0.13	0.38	0.64	2.19	0.01	0.14	0.22	3.78	

<i>Changes from 1997 (A) to FTA (B)</i>									
Sector	East Asia				ASEAN				
	Absolute measure	Relative measure		Double relative measure	Absolute measure	Relative measure		Double relative measure	
		Exports	Imports			Exports	Imports		
Total	0.05	0.10	0.11	0.09	0.01	0.03	0.03	-0.25	
Agriculture	0.08	0.34	0.23	0.44	0.01	0.28	0.02	1.37	
Forestry	0.02	0.04	0.03	0.02	0.00	0.01	0.04	0.04	
Fishing	0.05	0.03	0.10	-0.13	0.01	0.00	0.08	-1.05	
Mining	0.02	0.01	0.06	-0.05	0.00	0.02	0.05	-0.08	
Food products and beverages	0.10	0.24	0.29	0.25	0.01	0.04	0.07	-0.34	
Textiles	0.09	0.04	0.12	-0.38	0.00	0.01	0.01	-0.59	
Pulp, paper and paper products	0.03	0.06	0.10	0.17	0.00	0.01	0.05	0.11	
Chemicals	0.03	0.07	0.07	-0.02	0.01	0.05	0.02	-0.33	
Iron, steel and metal products	0.04	0.07	0.08	-0.03	0.00	0.05	0.03	-0.30	
Transportation machinery	0.06	0.22	0.29	-0.07	0.00	-0.01	0.02	-0.17	
Electronic equipment	0.04	0.05	0.05	1.09	0.01	0.03	0.05	-1.80	
General machinery	0.04	0.09	0.08	0.01	0.01	0.06	0.05	-0.04	
Other manufacturing	0.04	0.09	0.12	0.07	0.00	0.03	0.06	-0.04	

Note: For the definition of variables, see Appendix in the main text and notes of Table 7.

Source: Model simulation.

%

Figure 1 Changes in Import Tariff Rates

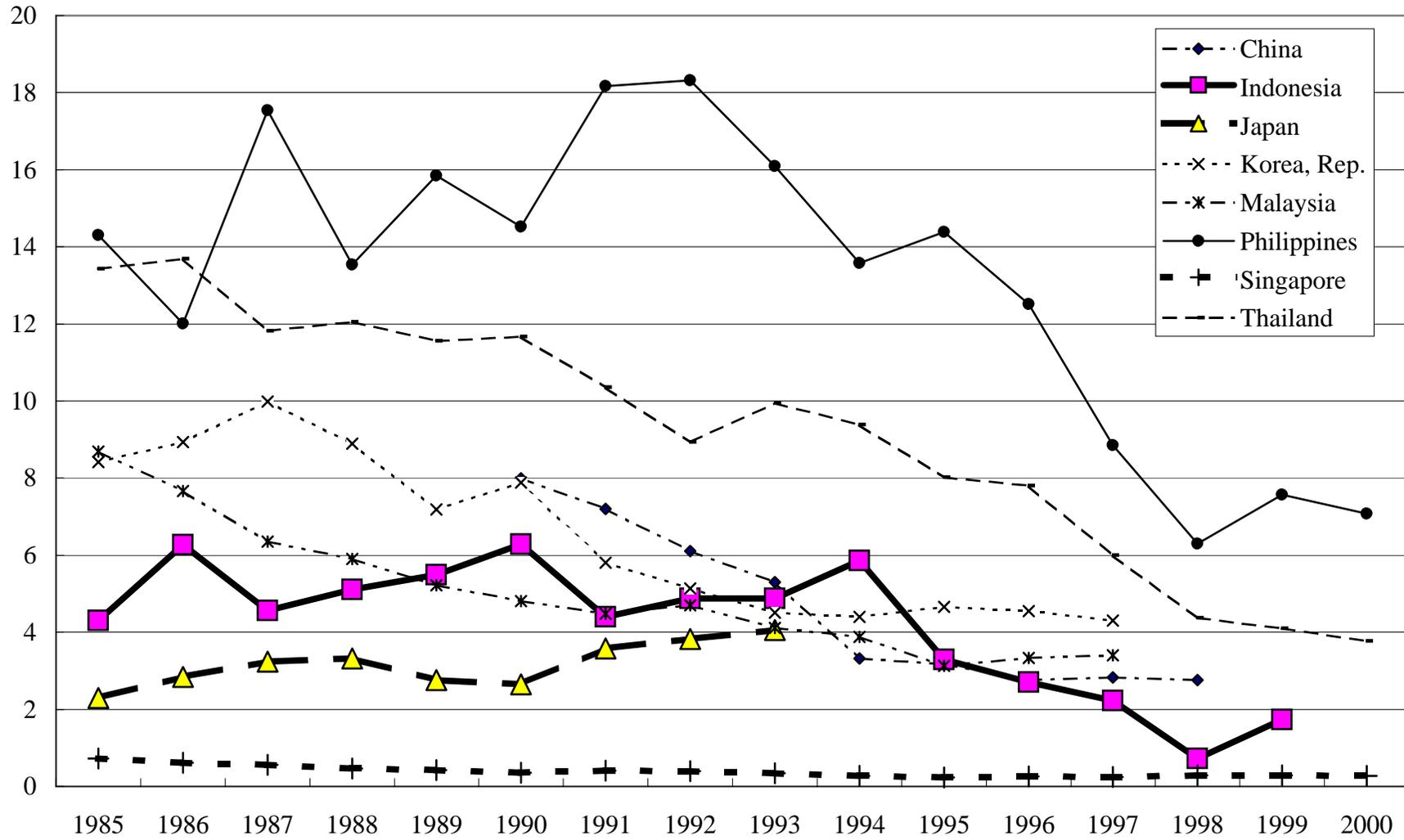
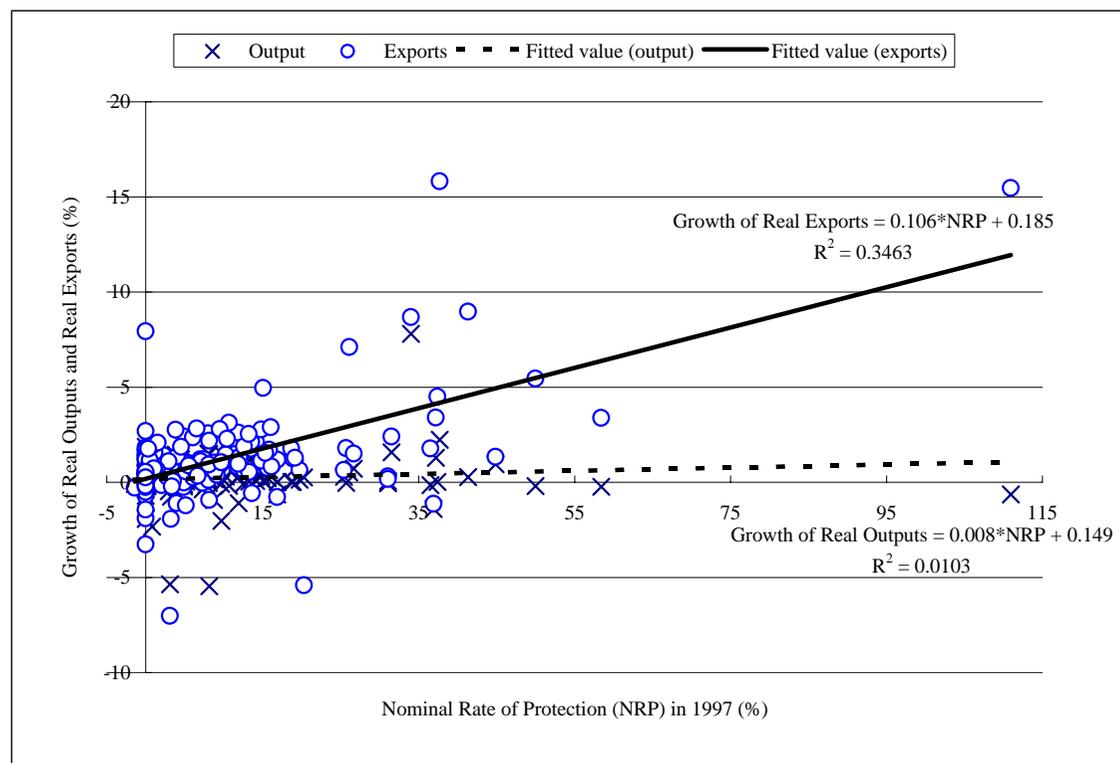


Figure 2 Relationship between Nominal Rate of Protection, Growth of Real Outputs and Real Exports



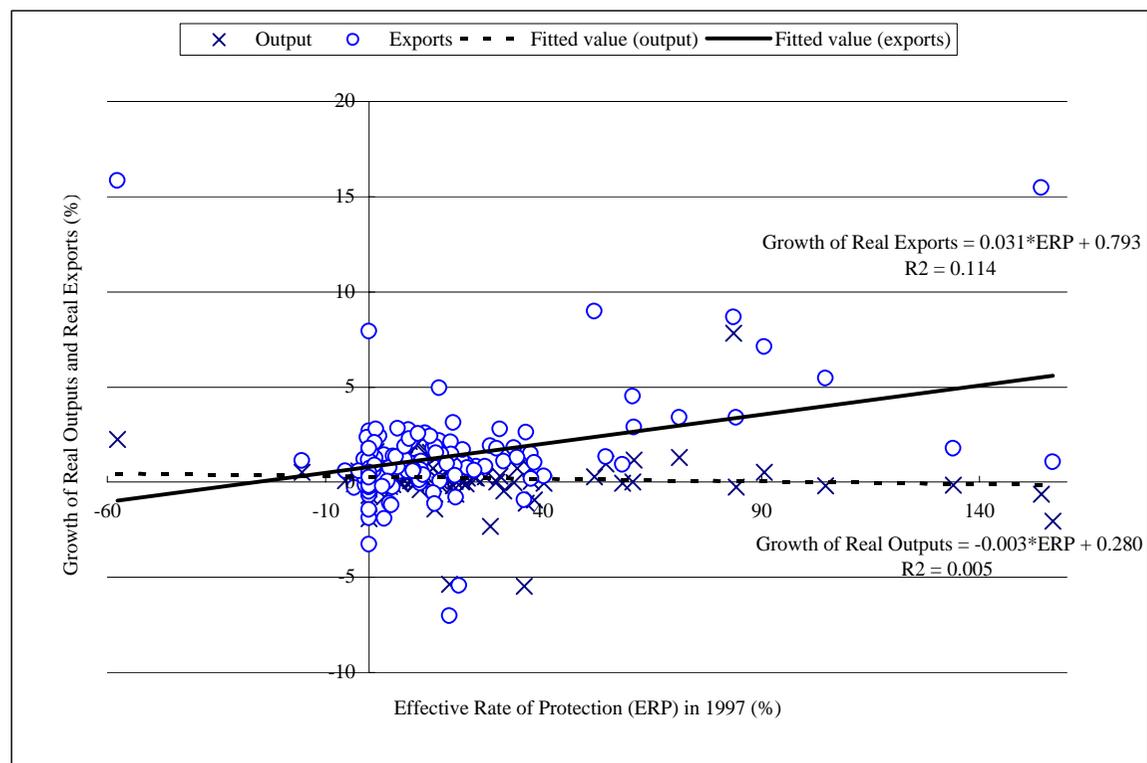
Notes: Regression results is as follows:

	Constant	NRP	R2	Adj. R2	N
Growth of outputs	0.149 (1.238)	0.008 (1.214)	0.010	0.003	142
exports	0.185 (0.852)	0.106*** (8.642)	0.346	0.342	142

t-statistics are in parentheses. *** indicates statistical significance at 1% and 5%, respectively.

Source: NRP is from Table 4. The growth of outputs and exports are from Table 10.

Figure 3 Relationship between Effective Rate of Protection, Growth of Real Outputs and Real Exports



Notes: Regression results is as follows:

	Constant	ERP	R2	Adj. R2	N
Growth of outputs	0.280*** (2.502)	-0.003 (-0.810)	0.005	-0.002	142
exports	0.793*** (3.381)	0.031*** (4.255)	0.114	0.107	142

t-statistics are in parentheses. *** and ** indicate statistical significance at 1% and 5%, respectively.

Source: ERP is from Table 4. The growth of outputs and exports are from Table 10.