

# Investment, Production and Trade Networks as Drivers of East Asian Integration

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## ABSTRACT

*This paper shows that foreign direct investment (FDI), production and trade networks have been a principal driver of East Asian integration. A key element in this has been the role of production sharing, in which different stages of the production process are dispersed across countries in the region. The rise of such patterns of production has been facilitated by the unilateral liberalization of trade and investment by governments in the region to attract FDI. However, liberalization and the resulting pattern of regional integration have been heavily skewed to a select number of industries (led by electrical machinery) and a particular form of supply-side integration (production sharing), meaning that integration is highly unbalanced and the region continues to depend on external demand.*

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## 1. INTRODUCTION

Over the last three or four decades, East Asia has been one of the most vibrant regions of the world economy. Not only have the countries participating in this dynamism each achieved rapid industrial development in their own right; the region as a whole has also become increasingly integrated, giving rise to the notion of a “Factory Asia.” This notion is a reflection of both that Asia has become a key supplier of manufactured goods to consumers around the world and that, in a range of sectors, the production of these manufactured goods is organized in a fashion that spans large parts of the region and closely links economies with each other.

A key element of this Factory Asia is the activities of multinational corporations (MNCs), their foreign direct investment (FDI), and their cross-border networks, in which production processes have become increasingly fragmented and the various elements of the value chain are shared across countries in the region and parts and components actively traded between them. Although the roots of this type of international production in East Asia can be traced back to the 1960s and 1970s, the extent it has reached today is the result of a rapid acceleration during the 1990s and 2000s that has made international production a key driver of regional economic integration. At the same time that such market-driven or “de facto” economic integration has taken place, however, institution-led or “de jure” integration in the form of regional free trade arrangement, etc., as seen in Europe (European Union) or North America (NAFTA), has lagged considerably behind.

Against this background, the purpose of this paper is twofold. First, it seeks to provide an overview of the role of FDI and international production as drivers of de facto East Asian economic integration and the pattern of integration this has given rise to. It will be suggested that, indeed, such activities, largely driven by the fragmentation of production, play a key part in the increase in intra-regional trade and that, moreover, the patterns of fragmentation and resultant trade have become more and more complex. At the same time, though, this regional integration through FDI and production fragmentation is to a large extent the story of a select number of industries, in particular the electrical machinery industry.

The second aim of the paper is to link the patterns of regional integration described in the overview with developments in the policy environment in order to examine how FDI and production strategies in the region have shaped and been shaped by policy trends. It will be argued that in certain respects, developments have reinforced each other in a virtuous cycle, i.e., FDI and production sharing in the region have benefited from competition to attract such FDI through unilateral trade and investment liberalization. However, as will be shown by focusing on the activities of Japanese firms in the region and comparing developments in the electrical machinery and transportation equipment industries, patterns of production sharing differ across industries and clearly reflect different trends in trade liberalization; that is to say, while there are few remaining barriers to trade in electrical machinery, this is not the case in transportation equipment.

A key element highlighted in the analysis of patterns of regional integration in East Asia is its very lopsided nature. Apart from the dominance of the electrical machinery industry, a major aspect of this is the role played by trade in intermediate goods. This point is illustrated by comparing East Asia’s exports and intra-regional trade patterns with those of the EU. The comparison suggests that while regional integration through FDI and production networks has greatly contributed to supply-

side integration (illustrating the aptness of the Factory Asia label), there has been no commensurate demand-side integration, partly reflecting remaining trade barriers.

Finally, based on the analysis of patterns of regional integration through investment and trade, the implications of recent policy initiatives are discussed. Given the lack of progress in efforts to create a region-wide framework for trade liberalization, there has been a proliferation of proposed and concluded bilateral agreements for free trade areas (FTAs). It will be argued that from the viewpoint of multinational firms pursuing production strategies seeking to integrate and streamline activities across the region, such bilateral FTAs are much less useful than a plurilateral arrangement would be. Given that there seems to be little chance of any plurilateral arrangement materializing in the near future, the likely relevance of FTAs being currently implemented is considered. It will be suggested that the FTA with the greatest impact most probably will be the ASEAN-China FTA (ACFTA).

The remainder of this paper is organized as follows. The next section outlines the role of FDI and international production as drivers of de facto East Asian economic integration and the pattern of integration this has given rise to. This is followed, in Section 3, by a discussion of the link between these trends and developments in the policy environment, consisting of a historical overview and a detailed comparison of the electrical machinery and transportation equipment industries. Section 4 then compares the East Asian pattern of regional integration with that of the EU, while Section 5 considers the implications of recent policy initiatives. Section 6 concludes.

## **2. FDI, INTERNATIONAL PRODUCTION, AND DE FACTO ASIAN INTEGRATION**

The role of FDI, international production, and trade in East Asia's de facto economic integration is well documented (see, e.g., Urata, 2002; Hiratsuka, 2006; Haddad, 2007; Hiratsuka and Kimura, 2008) and the purpose of this section is to highlight the main building blocks, mechanisms, trends, and salient features. This will provide the background for the analysis in the following sections.

Essentially, the story goes as follows. Over the past decades, the economies of East Asia, understood here, unless otherwise stated, as comprising North East and South East Asia, have become increasingly integrated as a result of rapidly growing intra-regional trade. Not only has the absolute volume of trade among countries in the region expanded, but the share of such intra-regional trade as a proportion of East Asia's trade overall has also grown. Whereas in 1980, the intra-regional trade ratio for East Asia was only about 35 percent, by the mid-1990s, this had reached around 50 percent, a level at which it has more or less remained since then (Figure 1). Comparing this with the European Union and NAFTA shows that the degree of trade integration in East Asia falls between that of these two formally integrated regions. Moreover, East Asia's intra-regional trade ratio is considerably higher than that of Mercosur. Thus, the region has reached a comparatively high level of de facto economic integration despite the lack of any de jure integration along the lines observed in Europe or North America.

Insert Figure 1

Underlying this high degree of de facto integration are the investment, production and trade activities of MNCs. Foreign direct investment in the region has grown exponentially, with annual inward FDI flows in East Asia rising from ca. US\$700 million in 1970 to roughly US\$240 billion in 2007.<sup>1</sup> What is more, although data on inward FDI flows by investor country for the region as a whole are unavailable, it seems reasonable to assume that, similar to trade, the proportion of intra-regional FDI has also increased over the decades. Since the 1970s, a number of East Asian countries have successively emerged as significant sources of FDI, led by Japan during the 1970s and 1980s and followed by the Asian NIEs (Hong Kong, Taiwan, Singapore and South Korea) during the 1980s and 1990s. Looking, for example, at ASEAN only, for which figures are available, intra-ASEAN inward FDI accounted for 15.2 percent of total inflows in 2006-2008, and combined with inflows from Japan (14.2 percent), South Korea (3.2 percent), Hong Kong (1.9 percent) and China (1.8 percent), East Asian countries were responsible for 36.3 percent of total inflows compared with a combined 29.5 percent from the European Union (22.3 percent; EU25) and the United States (7.2 percent).<sup>2</sup> Moreover, that FDI flows and trade in East Asia are closely connected is illustrated by the fact that foreign-funded enterprises account for roughly 50-60 percent of China's total exports.<sup>3</sup> Conversely, Japanese affiliates in China (including Hong Kong) in fiscal 2002 accounted for roughly 40 percent of Japan's total manufactured imports from that country, and the corresponding figure for the ASEAN-4 was as high as 74 percent.<sup>4</sup>

The increase in FDI within the region has gone hand-in-hand with a trend toward greater fragmentation of production. That is to say, as transportation and communication costs declined and trade barriers in the region were lowered, MNCs from the more advanced countries – both within and outside the region – have sought to lower production costs by relocating different elements of the value chain across different countries within the region. Initially, such production fragmentation took relatively simple forms, consisting, for example, of the relocation of the final assembly of imported parts and components. However, over time, production in certain industries has been divided into an ever greater number of discrete processes. This means that not only parts and components of a particular product may be manufactured in different countries and then potentially assembled in yet another country, but that the various steps in the manufacturing process of a particular part may also be split across countries.<sup>5</sup> This type of production fragmentation (or production sharing) where MNCs split production processes into various stages and relocate these to

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<sup>1</sup> Figures are calculated from UNCTAD online (<http://stats.unctad.org/fdi/>).

<sup>2</sup> Figures are from ASEAN Secretariat, online: <http://www.aseansec.org/Stat/Table25.pdf> (accessed September 16, 2009). Chinese statistics for 2008 indicate that the top ten Asian source countries accounted for 60.0 percent of the realized inward FDI value, compared with 5.4 percent for the European Union and 3.2 for the United States. However, Hong Kong alone accounted for 44.4 percent and it seems likely that this share includes investments from other countries channeled through Hong Kong. Looking, in turn, at Hong Kong's inward FDI statistics shows that the British Virgin Islands accounted for the largest share of inflows in 2007 with 25.8 percent (followed by mainland China with 24.6 percent), considerably more than major economies such as the United States (8.4 percent), the United Kingdom (5.4 percent) and Japan (3.4 percent). Adding up the shares of tax havens (British Virgin Islands, 25.8 percent; Bermuda, 6.5 percent; and the Cayman Islands, 2.6 percent) and including also the Netherlands (9.0 percent), through which much European FDI is channeled, yields a total of 43.9 percent, for which the true nationality of investors cannot be determined. Thus, calculating intra-regional FDI correctly identifying the nationality of investors at present is impossible.

<sup>3</sup> Ministry of Commerce, online: <http://english.mofcom.gov.cn/>.

<sup>4</sup> Figures from Ahn, Fukao and Ito (2008: 19). In addition, they show that the same share for the NIEs-3 (Korea, Singapore and Taiwan) was 28 percent, yielding an average for the nine countries of 45 percent.

<sup>5</sup> Matsuura et al. (2009) provide the example of semiconductor, the manufacturing process for which can be decomposed into capital-intensive processes such as lithography and etching, and labor-intensive processes such as packaging and inspection. A large share of the latter is conducted in China, and the completed semiconductor products are then shipped back to Japan, where they are used in electronics products.

affiliates in different countries according to location-specific advantages represents intra-firm fragmentation. A second type is inter-firm fragmentation, in which parts and components are purchased from, or assembly is outsourced to, non-affiliated suppliers. Examples include Japanese personal computer (PC) manufacturers' procurements of, say, hard disk and CD-ROM drives from Japanese "vendors" located abroad, of keyboards, motherboards, and soundcards from Taiwanese firms, or the outsourcing of production to original equipment manufacturers.<sup>6</sup> Oftentimes, multinationals are engaged in both types of production sharing, giving rise to overlapping and complex production networks.

The increase in such production sharing and the trade in intermediate goods it involves is the main factor underlying the rise in the intra-regional trade ratio. In fact, the share of intra-regional intermediate goods trade in East Asia's trade overall has increased from 15.1 percent in 1980 to 32.1 percent in 2007,<sup>7</sup> and decomposing the intra-regional trade share by type of good shows that intermediate goods trade makes by far the largest contribution to the increase in the intra-regional trade share (Figure 2). In contrast, the share of intra-regional final goods trade in total East Asian trade increased from 8.9 percent in 1980 to a peak of 19.7 percent in 1994 but then declined again to 14.5 percent in 2007, while the share of intra-regional primary goods trade has fallen continuously and now accounts for little more than 2 percent of total East Asian trade.

Insert Figure 2

In addition to increasing in importance overall, intra-regional trade in intermediate products has also grown considerably more complex over the decades, comprising an ever greater number of countries. In this context, two developments stand out: first, the industrial ascendance of the Asian NIEs with their own multinationals that play a lead role in production sharing activities; and second, the rise of China as a major source of and destination for intermediate goods export. The implications of these developments for production sharing and intra-regional trade are shown in Table 1, which provides a matrix of East Asian trade in intermediate goods for 1980, 1990, 2000, and 2007. The matrix shows the share of intermediate goods imports from each row nation in each column nation's total imports.

Insert Table 1

The top panel illustrates that in 1980, the matrix was still very simple. East Asian countries imported their intermediate inputs from Japan and the rest of the world. This pattern reflects the barrier-hopping investment to serve local markets as well as the early stages of the so-called

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<sup>6</sup> "Vendor" is the term Japanese multinationals use for suppliers not affiliated with them and that sell parts and components to customers across the industry. For details on intra- and interfirm procurements by Japanese PC manufacturers, see, e.g., Paprzycki (2005: 126-132).

<sup>7</sup> Authors' calculation based on data retrieved from the RIETI-TID 2008 (<http://rieti.imari.co.jp/>).

“triangle trade,” in which, for example, a Japanese manufacturing affiliate in South East Asia imports parts and components from the parent in Japan for assembly, and exports the finished good to the United States and Europe.<sup>8</sup> By 1990, the pattern had become more complex, with Taiwan and Korea, in addition to Singapore, beginning to provide inputs to the ASEAN-4 (Thailand, Malaysia, Indonesia, and the Philippines). Triangle trade, however, still dominated, with the ASEAN-4 economies providing few inputs in return. By 2000, though, the matrix starts to look truly complex. The ASEAN-4, led by Malaysia and Thailand, had become suppliers not only to each other, but also, though to a lesser extent, to Taiwan, Korea, and Japan. This signals the rise of network production, where production activities are fragmented across countries in the region and intermediate inputs are traded between them, including exports back to the “HQ economies” of Japan, Korea, and Taiwan.<sup>9</sup> Another major development shown in the panel for the year 2000 is the rise of China as a customer for and supplier of intermediate inputs for almost all countries across the region. In fact, the further increase in China’s role is also the most conspicuous trend between 2000 and 2007. The share of intermediate goods imports from China has risen in all countries in the matrix and China is now by far the most important source country for intermediate goods imports for Japan and the second-most important (after Japan) for Korea and Taiwan. In addition, for the “factory economies” of South East Asia, for whom Japan had been the most important source of intermediate goods imports at least since 1980, the Japanese share is rapidly shrinking and that of China is rapidly increasing, so that for Indonesia and Malaysia they are now more or less on par.<sup>10</sup>

Looking at the changes in the pattern in intermediate goods trade between 2000 and 2007 in greater detail shows that these closely mirror two major trends in the strategies of MNCs in the region. The first of these is the increasing focus on China, which accounts for a growing share of regional FDI by the HQ economies of Japan, Korea, and Taiwan, although FDI in the ASEAN countries also remains buoyant.<sup>11</sup> This means that a large proportion of the above-mentioned increase in China’s share in the intermediate goods imports of the HQ economies is the result of re-imports from foreign affiliates located in China.<sup>12</sup> At the same time, the share of the ASEAN-4 in the HQ economies’

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<sup>8</sup> While the focus here is on the role of Asian, and especially Japanese, firms, MNCs from outside the region have, of course, also played a part in the developments described here. U.S. firms from the electronics industry for instance, by this time had also set up production in bases in East Asia to lower costs in response to competition from Japan. See, e.g., Ernst (1997) and Borrus (1997) for details on American electronics firms in East Asia during this period and the regional production networks they subsequently established.

<sup>9</sup> The term “HQ economies” is borrowed from Baldwin (2008) and the analysis and results of the East Asian intermediate goods trade matrix presented so far broadly mirror those of Baldwin who, instead of the RIETI-TID 2008 trade data, used the international input-output tables published by IDE-JETRO to examine these trends. However, the latest version of the international output-tables available is that for 2000, meaning that Baldwin is unable to examine more recent trends.

<sup>10</sup> As can be seen, this is not the case for Thailand, though. The likely reason is that Thailand serves as a major base for Japanese FDI in the automotive industry, where, as will be shown in Section 3.2, trade barriers between China and the ASEAN countries are much higher than in the electrical machinery industry, for which Malaysia, for example, serves as a major Japanese production base.

<sup>11</sup> Reliable, consistent, and comparable outward FDI data by destination within Asia for the three HQ economies unfortunately are unavailable. However, international investment position data show that while Japanese direct investment assets in the ASEAN-4 increased from US\$15.6 billion in 2000 to US\$44.6 billion in 2008, those in China soared from US\$8.7 billion to US\$49.0 billion. Similarly, Korea’s direct investment assets in China rose almost eight-fold from US\$3.6 billion in 2002 to US\$27.4 billion 2008, compared with “only” an almost six-fold increase from US\$3.4 billion to US\$19.6 billion for direct investment assets in South East Asia.

<sup>12</sup> Chinese trade statistics indicate that exports of foreign-funded enterprises account for roughly 50-60 percent of total exports. Conversely, Ahn, Fukao and Ito (2008: 19) highlight that, according to Japanese trade statistics, Japanese affiliates in China (including Hong Kong) accounted for 40.9 percent of total manufactured imports from China. The corresponding figure for the ASEAN-4 was 74.3 percent and that for the NIEs-3 (i.e., Korea, Taiwan, and Singapore) 28.1 percent, for an average of 45.3 percent for these countries together.

intermediate goods imports, which had increased between 1990 and 2000, declined, although again it is important to note that absolute levels generally continued to rise, often substantially.

The second major trend in multinationals' strategies reflected in the trade data is the increasingly pan-East Asian and complementary nature of production fragmentation. That is, the factory economies of South East Asia and China have become less dependent on intermediate goods imports from the HQ economies and instead rely more on imports from each other. This is especially the case for ASEAN intermediate imports from China; but at the same time, the share of the ASEAN countries in China's intermediate goods imports has also increased, as have, in most cases, the shares that the ASEAN countries import from each other.

The matrices for trade in intermediate goods provide clear illustration that de facto regional integration through trade has increased substantially. Yet, it is also important to note that the production fragmentation which accounts for a large share of this intra-regional trade is largely confined to a select number of industries, namely the electrical machinery, general machinery, and chemical industries. A clear indication of this is provided in Figure 3, which presents a breakdown of the intra-East Asian trade ratio by industry. Electrical machinery and household electrical goods together account for far the largest share of intra-East Asian trade and without the substantial increase in such trade between 1980 and 2007, the intra-East Asian trade ratio during this period would have essentially remained unchanged (33.8 percent in 2007 versus 31.0 percent in 1980). As a percentage of intra-East Asian trade in 2007, electrical machinery accounted for 33.4 percent, followed by general machinery with 13.2 percent, and chemicals with 11.4 percent. On the other hand, the share of transportation equipment, another industry that has seen substantial amounts of FDI in the region, in intra-regional trade has actually declined and in 2007 stood at only 2.7 percent.

Insert Figure 3

That the industry trends in intra-regional trade reflect sectoral patterns in the fragmentation of production has been confirmed in a number of empirical studies. Estimating the share of vertical intra-industry trade (VIIT; i.e., intra-industry trade where goods are differentiated by quality) by sector, Fukao, Ishido and Ito (2003) show that in East Asia, this is highest in the electrical machinery and general and precision machinery industries. Moreover, developing and testing a theoretical model on the relationship between VIIT and FDI, they find that FDI plays a significant role in the rapid increase in VIIT in East Asia. Similarly, examining international production/distribution networks in East Asia using Japanese firm level data, Kimura and Ando (2005) conclude that the share of foreign affiliates' transactions with other East Asian countries, both in the case of sales and purchases, is much higher in electrical machinery than in machinery in general, while in transportation machinery, local sales dominate. Other studies coming to similar conclusions with regard to sectoral patterns in the prevalence of fragmentation include Kuroiwa (2006), who shows that forward and backward linkage effects are greatest in electrical machinery, and Kimura, Hayakawa and Ji (2008), who find that although some elements of international fragmentation can be observed in other industries,

such as the chemical industry, fragmentation is most distinctive in the electrical machinery and general machinery industries.

An important conclusion to be drawn from Figure 3 and the studies just mentioned thus is that the story of increasing intra-regional integration through fragmentation trade to a considerable degree is in fact the story of one sector, the electrical machinery industry. To a large extent, this reflects the particular characteristics of the industry. Kimura, Hayakawa and Ji (2008) identify six factors that are potentially important in explaining inter-industry differences in the degree of fragmentation: product portability, time sensitivity, modularization, scale effects, and technological diversity, with the sixth being the policy environment. With the regard the first five, the characteristics of the electrical machinery/electronics industry are particularly conducive to production fragmentation. For example, electrical machinery/electronic parts and components, such as semiconductors, tend to be small and light, yet high in value, so that transportation costs are far outweighed by the cost savings achievable through fragmentation. This contrasts, for example, with many transport equipment parts and components, which are often bulky, such as air conditioner ducts for automobiles. Another important difference between, say, the electrical machinery and the transportation equipment industry is the degree of modularization, that is, the importance of modular products consisting of parts and components with standardized connecting interfaces. Again, the tendency toward modularization and standardization is particularly strong in the electrical machinery/electronics industry. In contrast, “total-integration-type products” like automobiles rely to a much greater extent on customized parts and components, requiring greater interaction in the development and production of parts and components. Similar points can be made with regard to the other industry characteristics that help to explain why fragmentation is particularly prevalent in the electrical machinery industry. However, as will be shown later, the East Asian policy environment also plays an important role in explaining the differing degrees of intra-regional trade.

Summing up the story so far, it was shown that de facto regional integration through FDI and trade has increased considerably over the past three decades or so. Much of that integration owes to the rise of Factory Asia, in which production activities are increasingly fragmented across the region, giving rise to ever-more complex patterns of intra-regional trade in intermediate goods. At the same time, however, much of this growth in intra-regional trade is confined to a select number of industries, especially the electrical machinery industry. To some extent, this owes to the particular characteristics and dynamics of the electrical machinery industry, but, as the next section will show, trade and investment policies are also crucial.

### **3. REGIONAL INTEGRATION AND THE POLICY ENVIRONMENT**

As shown in the preceding section, the investment, production and trade activities of multinationals have been a key driver of de facto integration in East Asia. At the same time, however, it has also become clear that the pattern of integration is a rather peculiar one, dominated, as it is, by production fragmentation and the trade in intermediate goods in a small number of industries. The purpose of this section is to examine how such patterns came about, focusing in particular on their link with trade and investment policies, as well as the current “state of interplay” between multinationals’ production strategies and such policies. Specifically, the discussion will consider the



rise of regional network production in East Asia, concentrating in particular on Japanese firms, and highlight the impact of trade and investment policies on regional production strategies by contrasting the case of the electrical machinery and transportation equipment industries. The reason for focusing on Japanese firms is that they are, and have been for a long time, among the top investors in most East Asian countries, “network production” is something they have been practicing for decades, and their activities are well documented. It is therefore relatively easy to trace the historical connections between production patterns and trade and investment policies.

### *3.1 FDI Patterns and Trade and Investment Policies*

FDI patterns and trade and investment policies in East Asia over the past four or five decades can be divided into four major phases. The first of these is the period up to the mid-1980s, when countries in East Asia tended to follow “dual track” development strategies. These strategies combined import substitution with export promotion, blocking imports of manufactured goods for final consumption, but inviting selective FDI primarily in import-substituting industries (Kimura and Ando, 2005). These policies gave rise to “barrier hopping” investments, of which the so-called “mini-Matsushitas” are the best known example – factories that assembled a wide range of low-end consumer goods, mainly for sale in the local market, using parts and components imported from Japan. However, even at this stage, selective FDI was also already used for export promotion, with the help of institutional innovations such as special export processing zones and bonded industrial warehouses (Asian Development Bank, 2006: 271).

The second phase is the period from the mid-1980s to around 1990. Two closely intertwined developments characterize this phase: (1) the first large wave of Japanese FDI to the rest of East Asia reflecting the rapid appreciation of the yen following the 1985 Plaza Agreement, which eroded Japan’s comparative advantage in manufacturing;<sup>13</sup> and (2) what Baldwin (2008) calls “rampant unilateralism,” that is, unilateral liberalization of trade and investment moving ahead of WTO obligations in order to compete for Factory Asia jobs.

The FDI by Japan’s export firms in search for low-cost export platforms during this period fit in well with the dual track development strategies already in place in much of Asia, and countries in the region sought to attract such FDI by removing restrictions on market access, most-favored nation treatment, and national treatment (Urata, 2002). In addition, tariff and non-tariff barriers to imports declined, partly reflecting the proliferation of export processing zones, bonded warehouses, and duty drawback schemes, all of which provide conditions that mimic free trade for exporters by providing tariff exemptions for imported parts and components used for re-exports. The result was that import duties, as indicated by tariff revenues relative to total imports, declined significantly from ca. 1985 onward (see, e.g., Ando and Kimura, 2005: figure 3). Taken together, these two trends – Japanese FDI in the search of low cost platforms for export production and unilateral liberalization – gave rise to the triangular trade described in the discussion of the Asian manufacturing matrix earlier.

Essentially, however, both for Japanese manufacturers in the region and the countries involved, this was only a transitional phase. During that first wave of FDI in the second half of the 1980s,

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<sup>13</sup> An additional motive was continued trade friction with the major Western trading partners over large deficits with Japan. By shifting production abroad, including third countries in Asia, Japanese manufacturers hoped to mitigate such friction.

Japanese manufacturers ramped up production in East Asia as quickly as possible in response to the rapid appreciation of the yen, and the easiest way to do so was to rely on imported parts and components from Japan. However, during the next phase, from around 1990 until the Asian financial crisis of 1997/98, in order to fully exploit the cost advantage offered by overseas production, Japanese multinationals sought to decrease the reliance of their Asian affiliates on imports from Japan, pursuing a multi-pronged strategy. This included transferring the production of at least some parts and components overseas, urging established suppliers from Japan to follow them abroad, increasing procurements from local indigenous firms, and sourcing parts from non-affiliated and/or non-Japanese suppliers locally and elsewhere in Asia.<sup>14</sup> In other words, manufacturers were beginning to develop production strategies that increasingly focused on intra-regional sourcing, as was seen in Table 1 above in the growing share of intermediate inputs the factory economies sourced from each other.

On the policy front, this phase saw the first attempts at the creation of an institutional framework for regional integration in the form of calls for an East Asian Economic Caucus (EAEC) in 1990 and the first APEC (Asia-Pacific Economic Cooperation) Economic Leaders' Meeting in 1993. However, the most tangible step was the signing of the ASEAN Free Trade Area (AFTA) agreement in 1992 providing Common Effective Preferential Tariffs (CEPT) for member countries. Phased in only gradually, utilization rates of AFTA preferences remained low, though, and the scheme had little practical impact during this decade.<sup>15</sup> Reasons include that unilateral tariff reductions, if anything, accelerated during that period, as indicated by further rapid declines in tariff revenues relative to total imports (Ando and Kimura, 2005: figure 3), and particularly in electrical machinery, the segment dominating trade within ASEAN and the wider region, tariffs were already very low. Against this background, margins of preference were generally too small to compensate for the administrative cost and delay of applying for preferential tariff treatment (Baldwin, 2008). Thus, while multinationals were increasingly moving to production arrangements on a regional level, this was largely aided by unilateral liberalization aimed at attracting FDI, whereas institution-led regionalism continued to flounder.

The fourth major phase, finally, is the period since the Asian financial crisis until today. The key development during this phase of course has been the entry of China into the equation. In fact, the opening up of the Chinese economy had already begun in 1992 and the country attracted growing inflows of FDI throughout the decade. But it was the stability shown during the regional crisis and especially China's accession to the World Trade Organization (WTO) in 2001 that brought about a major shift in multinationals' regional investment and production strategies, both in terms of the regional distribution of activities and the way these are linked with each other. With regard to the former, as mentioned earlier, there emerged a clear shift in emphasis toward China. For example, comparing the number of workers employed by Japanese multinationals in Asia in 1997 (the year of the financial crisis) and in 2005 (the latest year for which figures are available), absolute employment levels increased across the whole of Asia; however, relative employment levels changed substantially, with the share of ASEAN in the total employment of Japanese affiliates in Asia declining from 50.6

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<sup>14</sup> See Paprzycki (2005: chapter 6), Teranishi and Yamasaki (1995), and Guyton (1995) for illustrations from the electrical machinery industry.

<sup>15</sup> On the low utilization of AFTA preferences, see Baldwin (2008). That the scheme had little practical impact overall in terms of fostering regionalism can be seen by referring back to Figure 1, which shows that the introduction of AFTA had no visible effect on the ratio of intra-Asian trade during the 1990s.

percent to 41.8 percent and that of China increasing from 24.5 percent to 37.2 percent.<sup>16</sup> The second shift observed during this period is the further rationalization of production activities on a regional basis. That is to say, not only did the fragmentation of production between the various economies continue to reach new levels; firms, and particularly those from Japan, which had established production bases throughout the region, started pursuing complementary production strategies in which production of similar products is concentrated in a single country to attain economies of scale.<sup>17</sup>

On the policy front, the most important developments during this period include the accelerated trade liberalization undertaken by the ASEAN countries in response to the Asian financial crisis in the form of relaxing the conditions for participation in the ASEAN Industrial Cooperation (AICO) scheme, the full implementation of AFTA in 2003, China's accession to the WTO in 2001, and the proliferation of proposed and concluded FTAs within the region from 2000 onward. Details of some of these steps and their impact will be discussed in Section 5. Suffice it to say here that the period signals the move to greater institution-led regional integration, although this integration so far takes a rather dissonant form.

Summing up the main thrust of the developments described so far, the first major trend that stands out is the transformation of the nature of overseas production activities. Taking Japanese firms as an example, they started with relatively isolated “mini-Matsushitas” that assembled parts and components imported from Japan to produce a wide range of different products for sale mainly in the local market. Over time, however, production activities in the region have come to be increasingly specialized, fragmented, regionally integrated, and not only for the local market, but also for regional markets and the home market (Japan), as well as major Western consumer markets. Thus, the nature of international production has gradually shifted from one end of the spectrum toward the other, in line with economic factors that have resulted in the deepening of the international division of labor worldwide. Regarding the relationship between policy conditions and these trends, this is probably best described as a virtuous cycle in which foreign investment and trade by multinationals provided the incentives for unilateral liberalization, which further facilitated FDI and trade integration through fragmentation.

### *3.2 Regional Integration and Trade Policies: A Comparison of the Electrical Machinery and Transport Equipment Industries*

In Section 2, it was suggested that the growing de facto regional integration as reflected in increased intra-regional trade largely is the result of the rise in production fragmentation and the trade in intermediate products this brings with it. Moreover, it was shown that by far the largest share of the increase in intra-regional trade owes to the significant rise in production sharing in the electrical machinery industry. That the electrical machinery industry plays such a dominant role in this process to a great extent owes to the characteristics of the industry that make it particularly amenable for production sharing, including product portability, time sensitivity, modularization, scale effects, and technological diversity. Yet, in addition to these economic factors, a key determinant is

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<sup>16</sup> Authors' calculations based on data from the *Kaigai Chokusetsu Toshi Database (FDI Database)*, RIETI, online: <http://www.rieti.go.jp/jp/database/FDI2009/index.html>.

<sup>17</sup> On this point, see Kinoshita, Hideki and Aichi (2004).

the policy environment which affects not only the extent of fragmentation trade, but also trade in final products, and the purpose of this section is to examine the role of the policy environment in shaping production and trade network patterns by comparing the electrical machinery and transport equipment industries.

These two industries offer themselves for comparison for a number of reasons. First, both are, if not the most important, then among the most important industries in terms of manufacturing FDI in the region. This is certainly the case for Japanese FDI: measuring industry shares in terms of employment, affiliates in the electrical machinery industry account for around a third and those in the transportation equipment industry for about a fifth of Japanese investment in East Asia.<sup>18</sup> Second, both industries share certain similarities in that they are both assembly industries and, in the case of Japanese firms, which account for a large share of FDI and production in these industries in Asia, share other characteristics such as a heavy reliance on subcontracting and network strategies. Third, both industries feature prominently in the development strategies of countries in the region. Fourth, and crucially, however, policies toward the two industries have differed substantially. Essentially, whereas the electrical machinery industry has been at the heart of the competition to attract Factory Asia investment and jobs through unilateral tariff reductions, the car industry in many countries has tended to be targeted as a “strategic industry” for domestic development, with most countries levying high levels of tariffs and some, such as Malaysia and Indonesia, at one time or another providing additional protection and privileges for favored manufacturers as part of “national car” policies. Thus, overall, despite differences in industry characteristics that are likely to affect the degree of fragmentation, the two industries share a large number of similarities. This means that comparing these two industries should provide a good indication of the impact of trade policies.

The focus of the comparison is the regional distribution of exports of intermediate and final products in the electrical machinery and transportation equipment industries of ASEAN, China, and Japan (Figure 4).<sup>19</sup> Starting with intermediate goods exports in the electrical machinery industry, which have been at the heart of fragmentation trade and the aggregate increase in intra-regional trade highlighted at the outset, the pattern confirms the picture described so far. Beginning with the panel for Japan’s exports, this shows that after the United States, the NIEs-2 (Taiwan and Korea) and the ASEAN countries were the most important destinations during the 1980s. Moreover, as overseas production by Japanese firms in the ASEAN was ramped up, the share of intermediate goods exports to that region rose substantially. However, beginning in the early 1990s and accelerating rapidly after the Asian financial crisis, the share of exports to China increased dramatically, overtaking that of ASEAN in 2003. Next, looking at the panel for ASEAN, the share of intra-ASEAN exports was already relatively high during the early 1980s and increased further during the second half of the decade and the early 1990s. Given that most of that increase occurred before 1992 confirms that the conclusion of AFTA that year appears to have made little difference. The panel also shows that after the crisis,

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<sup>18</sup> Authors’ calculation based on data from the *Kaigai Chokusetsu Toshi Database (FDI Database)*, RIETI, online: <http://www.rieti.go.jp/jp/database/FDI2009/index.html>. To obtain the figure for the electrical machinery sector, the following four industries were aggregated: (1) electronic data processing machines, digital and analogue computer equipment and accessories; (2) communication equipment and related products; (3) electronic parts and devices; and (4) miscellaneous electrical machinery equipment and supplies. The figure for transport equipment is that for motor vehicles, parts and accessories. The shares differ somewhat by subregion (ASEAN, China, NIEs, other Asia), but are broadly similar for ASEAN and China, which are of greatest interest here.

<sup>19</sup> The distribution for the NIEs (NIEs-2, i.e., Taiwan and Korea) is not reported here to conserve space. Overall, the patterns are very similar to those for Japan.

when Japanese (and other) multinationals started production in China in earnest, the share of exports going to that country started to rise significantly. Together with the rise in the share of China's exports going to ASEAN (see China panel), this trend indicates that production sharing in the electrical machinery industry is a truly pan-regional affair. (Note also the rising share of ASEAN and Chinese exports to Japan.)

Insert Figure 4

Staying with the electrical machinery industry, but turning now to final goods exports shown in Figure 4(b), it can be seen that exports to the United States and the European Union still dominate, especially in the case of China. This contrast with intermediate goods highlights a point implied but not explicitly stated earlier, namely that the increase in intra-regional trade in intermediate goods (Figure 1) and that in electrical machinery (Figure 2) essentially are two sides of the same coin in that the increase in the intra-regional trade ratio is the result of increased intra-regional trade in intermediate goods in the electrical machinery industry. Together with the decrease in the share of final goods that Japan exports to the United States and the EU, this suggests that although trade flows have become more complex and no longer conform to simple "triangle trade," the basic pattern with heavy reliance on Western export markets for final consumption remains intact. That being said, however, the figures also clearly show that, generally speaking, East Asian countries are becoming more important as final export destinations for each other: both for Japan and ASEAN, the share of exports to the United States and the European Union has been decreasing, while the share of exports to China has been increasing. In fact, what is particularly interesting is that ASEAN and China both have clearly become more important as export markets for each other. This trend conforms well with the observation that firms are increasingly pursuing complementary production strategies in which production of a particular product is concentrated in one country to exploit economies of scale, and the product is then exported to all other countries in the region (and beyond).

Overall, these patterns illustrate that in addition to the sharing of production for export to markets outside the region, one can also observe a less pronounced but nevertheless clearly visible trend toward regional integration in final goods. The policy background to this trend is that – as a result of unilateral liberalization by governments keen to "get a piece of the action" – tariff rates in the electrical machinery industry are extremely low. This is shown in Table 2, which presents bilateral industry-level tariff rates for the main East Asian economies discussed so far for the year 2001. As can be seen, bilateral tariff rates in the electrical machinery for imports from other East Asian countries in most cases were less than 5 percent. The two exceptions are Thailand and China, the latter of which has continued to lower or remove import tariffs on a wide range of electrical machinery products since its accession to the WTO in that year. Thus, given their extremely low levels, it seems fair to say that import tariffs have played a negligible role in shaping both the extent and the patterns of production fragmentation in the electrical machinery industry. In turn, this suggests that the actual patterns of regional integration observed are a more or less undistorted reflection of the industry characteristics and production and network strategies driving such integration.

Turning now to the transportation equipment industry, the picture is quite different. One aspect that is immediately noticeable when looking at the pattern of export destinations is that it is considerably more difficult to discern any consistent, region-wide trends. In fact, what stands out is the lack of any such trends when focusing on the period from ca. 1990, and the contrast this forms with the electrical machinery industry. Although industry characteristics are also partly responsible, a detailed analysis of the patterns suggests that the policy environment plays a large role. Whereas countries around the region engaged in a "race to the bottom" to lower tariff rates on electrical machinery, this was not the case for transportation equipment, as can be seen in the lower panel of Table 2: bilateral tariff rates for transport equipment are much higher than those for electrical machinery. In fact, with the exception of Japan and Singapore, import tariff rates of less than 5 percent are rare, and rates above 10, 20, and even 30 percent are not uncommon.

Let us examine the trends in the transportation equipment industry in detail. Beginning again with Japan and looking at both intermediate and final goods exports, the United States and, to a lesser extent, the EU are the most important destinations. To some extent, this reflects the different characteristics of, and globalization strategies in, the car industry. Whereas the Japanese and global electronics industry is largely concentrated in East Asia, from where products are then exported to the rest of the world, in the car industry, much more production takes place in the final market. Thus, the high ratio of Japanese intermediate goods exports going to the United States and the EU reflect that fact that Japanese car manufacturers have established major production bases there. In addition, the United States and the EU are also by far the most important destination for Japanese final goods exports in the industry, which is largely a reflection of the much lower degree of production sharing in this industry. That being said, though, as shown in Table 2(b), Japanese exports to the rest of Asia face relatively high tariffs, with the average rates shown in the table masking much higher rates on completely built units than on complete knock down (CKD) units or parts and components. Kajita (2004), for example, reports that, in 2003, Indonesian import tariffs on completed vehicles ranged from 20-80 percent compared with 15 percent for CKDs and 5-15 percent for other parts. This suggests that production by Japanese car manufacturers in the rest of Asia still contains a large element of "barrier hopping."

Next, looking at the export pattern for the ASEAN countries shows that exports to other ASEAN countries account for a large share of total intermediate goods exports. In fact, the largest jump in that share can be observed in 1992-1993, suggesting that at least in this industry, the introduction of AFTA has contributed to greater regional integration. Although no similar clearly discernible change can be observed for final goods exports, intra-ASEAN exports throughout much of the period accounted for the largest share of total final goods exports. The reason for the lack of any discernible trend is that the ASEAN countries serve as a production platform for export not only to the EU, but also a range of other countries not shown here (e.g., Australia, New Zealand, and the Middle East), and the intra-ASEAN export share is greatly included by fluctuations in exports to other regions as well as the impact of the Asian financial crisis in 1997/98. The absolute level of intra-ASEAN exports, however, has grown continuously and rapidly with the exception of 1997-98 (i.e., the period of the Asian financial crisis).

Yet, although the export share does not display any clear trend, it is useful to briefly digress here and look at intra-ASEAN trade in the transportation equipment industry in more detail. Figure 5, in addition to the intra-ASEAN export ratio, also shows the intra-ASEAN import ratio as well as the intra-

ASEAN trade ratio decomposed by production stage. The figure illustrates that apart from the export ratio, all the other ratios display much clearer trends. The intra-ASEAN import ratio registers a small rise around 1993 and, as a result, the intra-ASEAN trade ratio shows a visible increase around 1992-93, i.e., the introduction of AFTA. Moreover, both the intra-ASEAN import and trade ratios show a significant upward trend following the Asian financial crisis. This reflects the accelerated trade liberalization undertaken by ASEAN countries in response to the Asian financial crisis in the form of relaxing the conditions for participation in the ASEAN Industrial Cooperation (AICO) scheme – a scheme that was mainly taken up by the car industry – and the full implementation of AFTA in 2003, when many of the tariff reductions agreed a decade earlier took effect.<sup>20</sup>

Insert Figure 5

Next, breaking down the intra-ASEAN trade ratio into intermediate and final goods shows that both registered increases during this period. These trends appear to neatly confirm and reflect the complementary production strategies of Japanese car manufacturers in the region, in which companies concentrate production of a particular product in a particular country to exploit economies of scale and then export this product – be it a part or a final product – to other countries in the region. An example of such strategies is Toyota's IMV (Innovative International Multi-purpose Vehicle) project, as part of which Toyota concentrates production of diesel engines in Thailand, gasoline engines in Indonesia, and manual transmissions in the Philippines; the same applies to final goods, with pick-up trucks made in Thailand and mini-vans in Indonesia.<sup>21</sup> Thus, de jure integration in ASEAN through AFTA has resulted in de facto integration not only in terms of intra-ASEAN trade in intermediate goods but also in final goods.

In stark contrast with the electrical machinery industry, however, no regional integration between ASEAN and China can be observed. That is, returning to Figure 4, the share of ASEAN exports of both intermediate and final goods to China in the transportation equipment industry is miniscule. Looking at the other direction, the share of ASEAN in China's exports (both in intermediate and final goods), though not negligible, is also small. Instead, the main destinations for Chinese exports are the United States and the EU, especially in intermediate goods, which is likely to reflect the production of parts and components by Japanese and Western multinationals in the country.

Overall, the comparison of the electrical machinery and transportation equipment industries suggests the following: (1) largely uninhibited by trade barriers, production sharing in the electrical machinery industry is truly pan-regional; (2) although the United States and the EU remain the most important final goods export destinations, the countries in the region are becoming more important for each other also as final export destinations; (3) in contrast, reflecting much higher tariff rates across the region, activities in the transportation equipment industry continue to display a large element of "barrier hopping;" (4) only within ASEAN can patterns similar to those in the electrical

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<sup>20</sup> For details, see, e.g., Kinoshita, Hideki and Aichi (2004: 26), who also report that as of January 2004, 92 of the 105 cases approved under the AICO scheme hailed from the car industry.

<sup>21</sup> Toyota corporate website (<http://www.toyota.co.jp/en/strategy/imv/index.html>; accessed 27 August, 2009). Also see Kinoshita, Hideki and Aichi (2004).

machinery industry, with firms organizing regional production activities in a complementary fashion, be observed, suggesting (a) that although industry characteristics mean that production sharing is less prevalent in the car industry, the pattern of intra-regional trade and integration, if unimpeded, would probably not be too dissimilar from that in the electrical machinery industry, and (b) that de jure integration such as AFTA and remaining barriers such as those between ASEAN and China have a large impact on shaping regional production strategies and hence patterns of trade and de facto integration.

#### **4. REGIONAL INTEGRATION: A COMPARISON OF EAST ASIA AND THE EUROPEAN UNION**

The analysis so far has suggested that although FDI has been a key driver of regional de facto integration, the pattern of integration this has given rise to is rather unbalanced, with much of it reflecting the rise of production sharing in the electrical machinery industry. In order to put the East Asian pattern of – market-led – integration into perspective, it is useful to compare it with the institution-led pattern of integration in the EU<sup>22</sup> and discuss the implications of the unbalanced nature of East Asian regional integration.

##### *4.1 A Comparison of intra-regional trade patterns in East Asia and the European Union*

Whereas the ratio of intra-regional trade in East Asia has increased substantially and is not that far behind that in the EU (and, in fact, ahead of that in NAFTA, see Figure 1), the pattern of intra-regional trade, and hence regional integration more generally, is rather unbalanced. However, just how unbalanced the nature of regional integration in East Asia is only becomes clear when comparing it with institutionally integrated areas such as the EU.

A key aspect of this is East Asia's continued reliance on export demand outside the region. Table 3 presents the distribution of exports for East Asia and the EU (as well as NAFTA) by destination for intermediate and final goods. The table shows that whereas the ratio of intra-East Asian exports in intermediate goods lies somewhere between the intra-regional export ratios of the EU and NAFTA, that for final goods is considerably lower. What is more, East Asia's dependence on markets outside the region actually increased following Asian financial crisis, with the intra-East Asian export ratio for final goods declining from around 40 percent to about 30 percent. This contrasts with the stable ratio for the EU, and the increase for NAFTA, which came into force on January 1, 1994. The comparison thus confirms that the trend suggested by Figure 1, namely that East Asia is catching up with, or has overtaken, the EU and NAFTA is somewhat misleading and masks the fact that regional integration in terms of final goods trade is much lower than in the other two regions.

Insert Table 3

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<sup>22</sup> EU here refers to the EU27, i.e., all current member countries. The reason for focusing on the EU rather than, say, NAFTA, is that like East Asia, the EU consists of a relatively large number of countries at different stages of development and, moreover, represents the "extreme case" of institution-led deep integration.



The unbalanced nature of East Asian integration in comparison with the other regions is further illustrated by looking at the composition of intra-regional trade by production stage. Figure 6, which corresponds to Figure 2 for East Asia, depicts the intra-regional trade ratio for the EU broken down into trade in primary, intermediate, and final goods. The figure shows two things. First, in the EU, the relative weights of intermediate and final goods in intra-regional trade remained more or less unchanged between 1980 and 2007, i.e., there is no shift over time; and second, the size of the two, is relatively similar. Of course, there is no a priori reason why this should be the case. For example, it would not be implausible to expect that, as a natural corollary of globalization, fragmentation trade gradually accounts for a growing share of overall trade and that, consequently, trade in intermediate goods increases faster than trade in final goods. However, the fact that the relative shares of the two have remained largely the same in the EU suggests that this is not necessarily the case and that other forms of trade not associated with the fragmentation of production processes – such as inter-industry trade or intra-industry trade (both vertical and horizontal) in final goods – have kept pace.<sup>23</sup> Again, this highlights that regional integration in East Asia – when compared with Europe – has been very one-sided, consisting primarily of what could be labelled as “supply-side integration” through the fragmentation of production in Factory Asia.

Insert Figure 6

Finally, conspicuous differences also emerge when breaking down intra-EU trade by industry (Figure 7) and comparing this with intra-East Asian trade (Figure 3). The industry breakdown for East Asia showed that intra-regional trade has become increasingly dominated by electrical machinery, and other industries accounting for notable shares in intra-regional trade are limited to general machinery, chemicals, and iron and steel. In contrast, in the EU, a much wider range of industries accounts for substantial intra-regional trade, including not only the industries that also play a large role in East Asia but, additionally, transportation equipment and foods. What is more, the share of the different industries has remained comparatively stable in Europe, with only the transportation equipment industry registering a notable increase. A closer analysis of the trend in the European transportation equipment industry similar to that in Figure 5 shows that intra-regional final goods trade accounts for about 50 percent of the total EU trade in this industry. What is more, this percentage has remained virtually unchanged between 1980 and 2007. On the other hand, the share of intra-regional intermediate goods trade in total EU trade in the industry has increased from 19.6 percent in 1980 to 24.3 percent in 2007 following a very smooth trend, suggesting that in this industry, intra-regional production sharing has come to play a growing role in the EU and that this accounts for the increase in intra-regional trade shown in Figure 7.

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<sup>23</sup> The pattern for NAFTA, which is not shown here to conserve space, shows that the increase in intra-regional trade shown in Table 3 also has been relatively balanced and that, in fact, the share of intermediate goods in intra-NAFTA trade has decreased since the inception of NAFTA. (Instead, interestingly, the share of primary goods trade has increased since 1994, while that of final goods trade has remained largely unchanged.)

## Insert Figure 7

At least to some extent, the different industry patterns for the EU and East Asia reflect the fact that the European economies are much more mature and the underlying industrial structures therefore more stable; in contrast, the East Asian economies have grown rapidly, experiencing substantial structural change, a key element of which has been the development of the electrical machinery industry and East Asia's emergence as the global hub for this industry. Nevertheless, structural change is only part of the story and, as shown in Section 3, trade restrictions play an important role.

In sum, the comparison with NAFTA and the EU for exports and with the EU for intra-regional trade suggests that East Asia remains heavily dependent on final demand outside the region and that intra-regional integration is heavily skewed to supply-side integration of a very particular type, namely, integration through production fragmentation. Finally, intra-regional integration is more limited than in the EU in terms of the number of industries involved, and the policy environment is at least partly to blame.

### *4.2 The implications of East Asia's pattern of regional integration*

Although there are clear differences between East Asia's and the EU's patterns of intra-regional trade, it is not straightforward to say which pattern is preferable for economic growth and development. For instance, the high share of intra-regional trade in many industries in the EU may be a reflection of trade diversion effects that lower economic efficiency. Yet, what seems clear is that East Asia's reliance on demand from outside the region has made it highly vulnerable to external shocks, as has been painfully underscored by the severe impact of the downturn of the U.S. and European economies on the East Asian economies. In fact, the economy that has been among the hardest hit is that of Japan, which sits at the core of much of the regional production sharing for export to the United States and Europe.<sup>24</sup> Thus, while it probably could be argued that supply side-led integration through FDI has served East Asia well in terms of spreading and accelerating industrialization, the heavy reliance on the U.S. and European markets for final goods exports, as METI (2008: chapter 2) suggests, means that the scale of production has raced ahead of what can be supported by consumption in the region and that East Asia cannot achieve "self-sufficient, stable growth within its own region."

Thus, for East Asia to reduce its vulnerability to external shocks and to redress the global imbalances that have contributed to the current worldwide economic downturn, what would be needed are policies to stimulate domestic and intra-regional demand, and to facilitate trade in final goods.<sup>25</sup> Further, given that the labor force not only of Japan, where it is already falling, but also of

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<sup>24</sup> According to the IMF's July 2009 "World Economic Outlook Update," Japan's economy is expected to shrink by 6 percent in 2009, compared with a contraction of 2.6 percent for the United States and 4.7 percent for the EU. For an analysis of the link between Western (i.e., United States) demand and Japan's economy through triangle trade using Asian international input-output tables, see Fukao and Yuan (2009).

<sup>25</sup> Of course, the need for East Asia to generate its own demand to achieve sustainable growth has already been pointed out for quite a while, particularly following the Asian financial crisis of 1997/98. See., e.g., Ahn (2001).

other major economies in the region (China, Korea, Hong Kong, and Singapore) is projected to shrink from ca. 2020 onward (Komine and Kabe, 2009), such a shift to demand-led economic growth that results in an integration not only of production but also consumption would seem to represent an important element in maintaining the region's growth dynamics. The creation of a large regional market for consumption goods obviously requires regional per capita income levels to rise, which remain substantially lower than those in the EU, for example (see Figure 8). However, the rapid economic growth the region has experienced over the past couple of decades already has resulted in a substantial expansion of the middle class; METI (2009), for example, suggests that the population of households with disposable incomes of US\$5,001-35,000 increased 6.2-fold during the period from 1990 to 2008. Moreover, during the first half of the 2000s, East Asia contributed almost 50 percent to global economic growth,<sup>26</sup> and by 2007, the region's share in global GDP at ca. 20 percent was rapidly catching up with that of the United States (25 percent) and the EU (28 percent).<sup>27</sup> Consequently, the potential for East Asia to consume more of its own production is certainly there.

Insert Figure 8

Another important aspect in this context is the role of income differentials. As shown in Figure 8, although income differentials among the East Asia countries are still much larger than among the EU countries, they are shrinking rapidly. Income differentials, which closely reflect wage rates, of course provide a major reason for the fragmentation of production, as shown, for example, by Kimura, Takahashi and Hayakawa (2007). Thus, as income differentials shrink, the relative importance of production fragmentation and fragmentation trade should decline and that of other forms of division of labor and specialization, and along with them, other forms of trade, should increase. In other words, one would expect East Asian patterns of regional integration to become more like those of the EU.

## 5. ASSESSING RECENT POLICY INITIATIVES IN THE EAST ASIA REGION

Finally, having examined the nature of East Asian market-led integration through FDI and production networks, it is useful to briefly consider the implications of policy initiatives since the beginning of the decade. In Section 3, it was highlighted that until then, the only attempt at institution-led regional integration of any real significance had been the conclusion of AFTA. Reflecting this lack of progress in efforts to foster wider regional cooperation and integration (such as APEC and ASEAN+3), and triggered by China's proposal of an ASEAN-China Free Trade Agreement (ACFTA) in 2000, countries in the region in recent years have scrambled to forge bilateral FTAs, resulting in what has been labeled the "East Asian 'noodle bowl' syndrome" (Baldwin, 2008) – a confusing array of preferential tariff structures with different rules of origin, product exclusion

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<sup>26</sup> IMF (2006).

<sup>27</sup> Based on current US dollars; calculated from the World Bank's *World Development indicators 2009*.

practices, and phase-in modalities.<sup>28</sup> The purpose here is to use the findings of the analysis so far to examine (1) how the FTAs are likely to affect investment, production, and trade activities and hence regional integration; and (2) which of the FTAs are likely to have the greatest impact.

Regarding the first question, what stands out is the sharp contrast between the increasingly regionally integrated nature of production in Factory Asia on the one hand and the highly "fragmented" nature of preferences afforded under the proliferation of FTAs. Thus, from the viewpoint of multinationals pursuing complementary production strategies in the region, bilateral preferences that differ for each pair of countries and over time (through different phase-in modalities, etc.) are clearly much less useful than any plurilateral preferences. A useful comparison of the likely effect of the proliferation of FTAs therefore is with the first decade of AFTA (i.e., from 1992, when it was agreed, to 2003, when measures were fully implemented). During this period, AFTA proved to be largely irrelevant for sectors such as the electrical machinery industry, where unilateral liberalization had rendered preference margins too small to be worth the trouble. Given the relatively unimpeded trade in both intermediate and final goods in the electrical machinery industry – as illustrated by the extremely low tariff rates and active trade between all the major players in the region – the FTAs are likely to have little impact on trade and investment in this sector. On the other hand, in sectors such as the transport equipment industry, where tariffs continue to be high and production is much less integrated, FTAs are much more likely to have an impact, although the "noodle bowl syndrome" means that especially during the transitional phase, utilization rates are likely to remain low (Hiratsuka, 2007).<sup>29</sup> Yet, if the experience with AFTA is anything to go by, once tariff reductions have been fully implemented, the potential impact is substantial.

This leads to the second question, namely which of the FTAs are likely to have the greatest impact in terms of promoting regional integration? Given the size of the economies involved as well as existing investment and trade patterns, the two likely candidates are the ASEAN-Japan FTA (strictly speaking, the ASEAN-Japan Comprehensive Economic Partnership Agreement) and ACFTA. The former came into force on 1 Dec., 2008, and will eliminate tariffs on 90 percent of imports from Japan, including automobiles and their parts and components, over the coming 10 years. Staying with the transportation equipment industry, the impact of the ASEAN-Japan FTA is likely to differ greatly for intermediate goods and final goods. That is, it is probably going to contribute to greater production fragmentation between the two sides, but will probably have little impact on final goods trade. With regard to intermediate goods, exports in both directions have increased substantially over the past decades. However, what is most notable is the shift in the balance of that trade: whereas exports from ASEAN to Japan until the mid-1990s made up less than 3 percent of the total bilateral trade volume in transportation equipment intermediate goods, by 2007, this share had climbed to 24.6 percent.<sup>30</sup> Although the removal of tariffs will facilitate imports from Japan, it will also strengthen the competitiveness of operations in the ASEAN countries, and thus likely foster tighter integration between the two sides. Bilateral trade in final goods, on the other hand, is very

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<sup>28</sup> As of June 2009, 111 FTAs had been concluded in the region (all of Asia), another 60 were under negotiation, while a further 45 had been proposed (Free Trade Agreement Database for Asia, Asian Development Bank, Asia Regional Integration Center, online: <http://www.aric.adb.org/>).

<sup>29</sup> On the other hand, Kawai and Wignaraja (2009), using evidence from survey of 609 East Asian firms, suggest that FTA utilization rates are higher than previously assumed and only a minority of firms responded that multiple rules of origin significantly added to business costs. However, the authors do point out that as more FTAs take effect and the complexity of the Asian "noodle bowl" increases, the impact on businesses is likely to intensify.

<sup>30</sup> Authors' calculation based on data retrieved from the RIETI-TID 2008 (<http://rieti.imari.co.jp/>).

much a one-way-street, with Japanese exports still accounting for 97.9 percent of the total bilateral trade volume and the removal of tariffs, if anything, is bound to further increase ASEAN imports from Japan. Overall, the impact of the ASEAN-Japan FTA on regional integration is likely to be incremental rather than radical.

In contrast, the impact of ACFTA could be much more profound. Signed in 2002, ACFTA is meant to reduce or eliminate tariffs for trade between China and the ASEAN-6 (Brunei, Indonesia, Malaysia, Philippines, Singapore and Thailand) between 2005 and 2010, with Burma, Cambodia, Laos and Vietnam to follow by 2015. However, most countries, including China, have placed automobiles and auto parts on sensitive lists and have until 2018 to lower tariffs on those items to 0 to 5 percent. Yet, given the efforts by Japanese automotive firms to move toward complementary production in ASEAN following full implementation of AFTA, and looking at patterns in the electrical machinery industry, where trade between ASEAN and China has been largely unimpeded, the scope for integration of the two sides through investment, production and trade once those tariff reductions have been completed seems substantial. What is more, the greater scale of operations in ASEAN and China that would result may then also affect the division of labor and hence trade between these two areas and Japan.

In sum, the FTAs already signed or under negotiation in East Asia are likely to further regional integration. Yet, their impact will probably be limited when compared with what a more region-wide arrangement –for example, ASEAN+3 – would provide, especially since some of the most important trade pairings in the region, such as Japan-Korea, Japan-China, and China-Korea, seem a long way from being covered by FTAs. Thus, the piecemeal approach to regional institution-led integration provided by FTAs is unlikely to redress any time soon the imbalanced nature of the market-led integration. This, in turn, brings with it a number of potential problems. Baldwin (2008), for example, argues that unilateral liberalization in East Asia has resulted in a “tariff bindings overhang” (tariffs actually charged in many countries are below the level they are bound under WTO rules), meaning that to the extent that there is such an overhang, low tariff rates are not subject to WTO discipline and countries could raise tariff rates again if they so choose. Combined with the lack of any regional framework to deal with complex trade disputes involving several nations, this means that any friction could result in an escalation of tariffs that could be disruptive to trade. Although the current global economic downturn, which can be seen as having posed a test of the adherence to free trade principles, has not resulted in any significant friction among countries in the region, the potential for tension in East Asia is substantial. Against this background, efforts at wider regional institution-led integration could help to lock in tariff cuts and other measures already in place and help to bring about a more balanced pattern of regional integration.

## **6. CONCLUDING REMARKS**

Over the past few decades, the economies of East Asia have become increasingly intertwined and foreign investment, production and trade networks have played a key role in this. Reflecting changes in the policy environment, multinationals’ activities in the region have, over time, gone through various phases, starting with relatively isolated barrier-hopping FDI for the assembly of imported parts and components for a wide range of products mainly for sale in local markets to network

production that regionally integrated and complementary, linking not only HQ and factory economies in a hub-spoke pattern, but also factory economies with one another, to serve global markets. In some industries, such as electrical machinery, trade and investment policies – through unilateral liberalization – have actively encouraged and facilitated regional production sharing, enabling firms to build networks spanning the entire region that seek to exploit both location-specific advantages and economies of scale through complementary production strategies. In other industries, or at least in transportation equipment, similar tendencies and strategies can be observed on a sub-regional scale as a result of AFTA, but are hampered on a regional scale through the continued existence of high tariff rates. Bilateral FTAs, and especially the one between ASEAN and China, are likely to improve the situation, but their impact before the second half of the next decade will probably be limited.

A key aspect of the pattern of the integration observed in East Asia today is its highly unbalanced nature, in terms of its heavy concentration on electrical machinery and on intermediate goods trade as a result of production fragmentation. To a considerable extent this reflects the large income differences found in East Asia, which provide the basis for fragmentation trade and are partly responsible for the dependence on export demand from outside the region. However, it certainly also reflects the policy environment, which has concentrated on attracting export-oriented FDI by facilitating trade in intermediate products through lower tariff rates on intermediate than final goods (as seen in the case of the automotive industry), duty drawback schemes, export processing zones, and bonded warehouses. Ignoring such intermediate goods trade to keep Factory Asia running, East Asia's dependence on markets outside the region, if anything, has increased over the past decade-and-a-half or so.

The current global economic crisis has vividly illustrated the vulnerability that this reliance on mainly Western export markets brings with it and suggests that both in order to redress global imbalances and to put growth in East Asia on a more self-sustained footing, it is important that the demand-side aspect of regional integration catches up with the level of supply-side integration already achieved in some industries. As the example of the electrical machinery industry shows, the countries in the region already are becoming increasingly important markets for each other, when trade not only in intermediate but also in final goods is relatively unimpeded. This suggests that, in addition to policies geared toward domestic demand-led economic growth, countries in the region should focus on creating a policy environment that promotes trade in final goods and hence forms of international division of labor other than the fragmentation of production. Whether a "noodle bowl" of bilateral FTAs is the best way to achieve this is questionable, but at present there appear to be few alternatives on the horizon.

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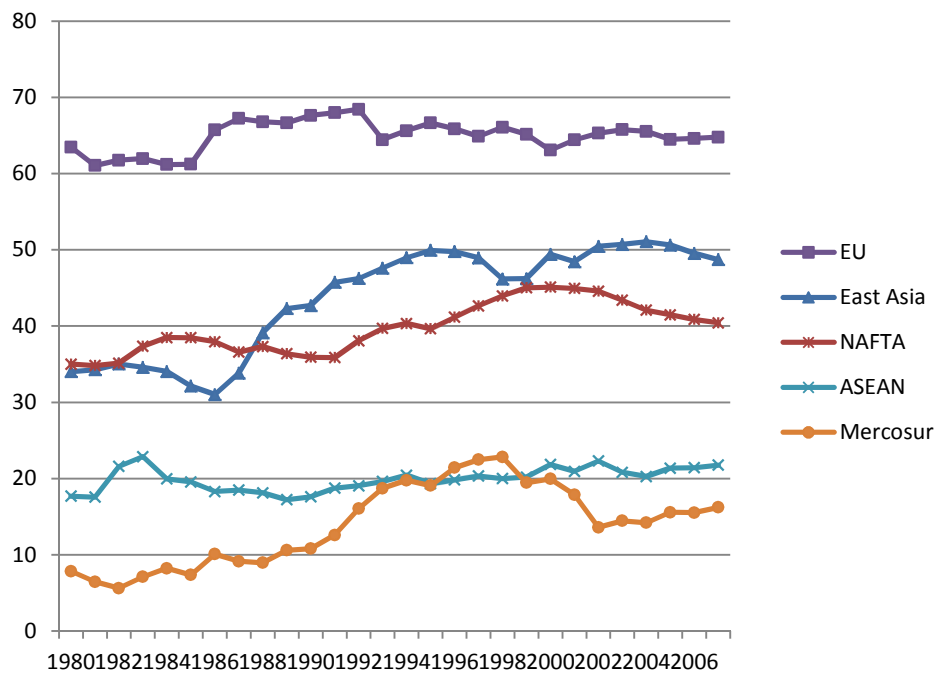


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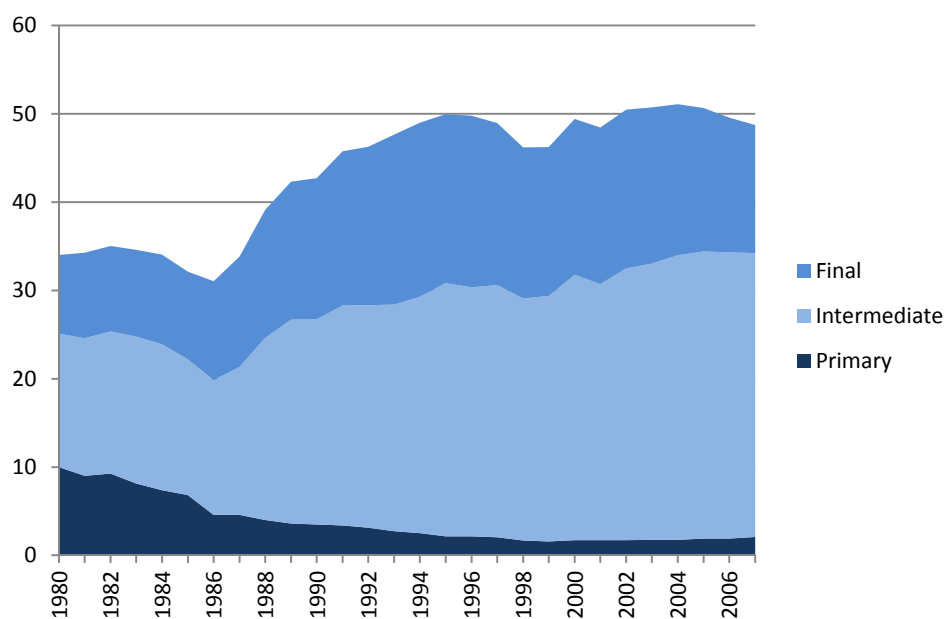
**Figures and Tables**

**Figure 1. Intra-regional trade ratios (%)**



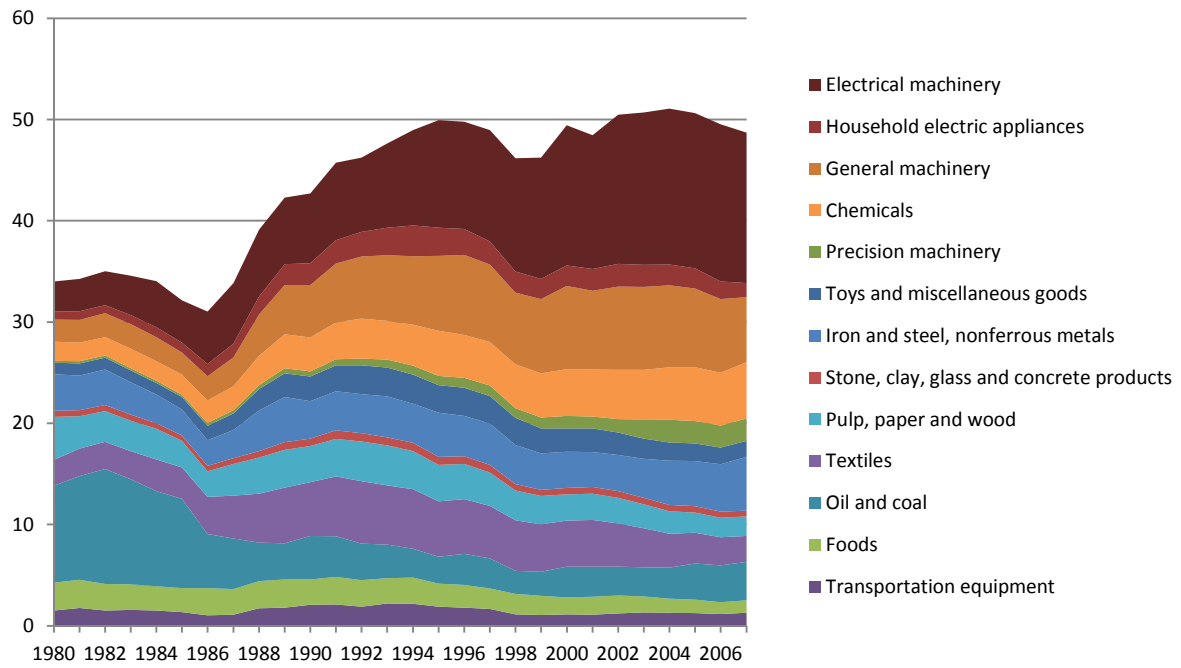
Source: Authors' calculation based on data from the RIETI-TID 2008 (<http://rieti.imari.co.jp>).

**Figure 2. East Asian intra-regional trade by production stage (as a share of total trade, in %)**



Source: Authors' calculation based on data from the RIETI-TID 2008 (<http://rieti.imari.co.jp>).

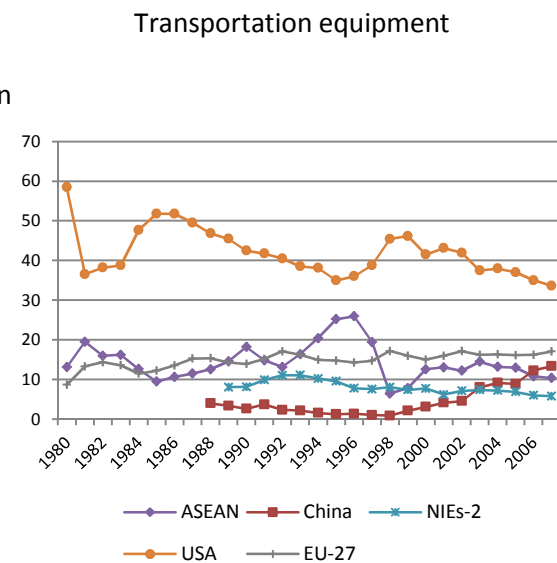
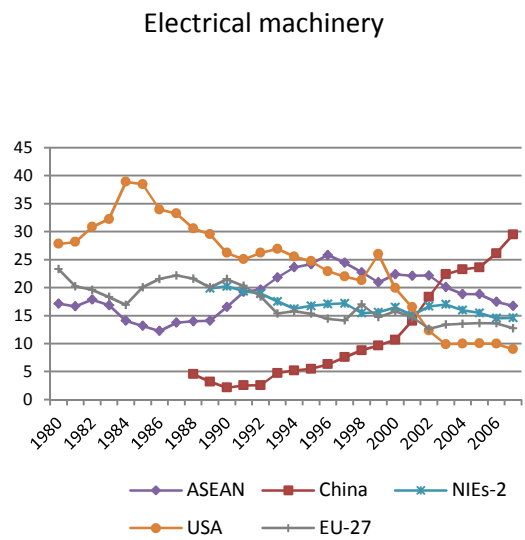
**Figure 3. Industry breakdown of East Asia's intra-regional trade (as a share of total trade, in %)**



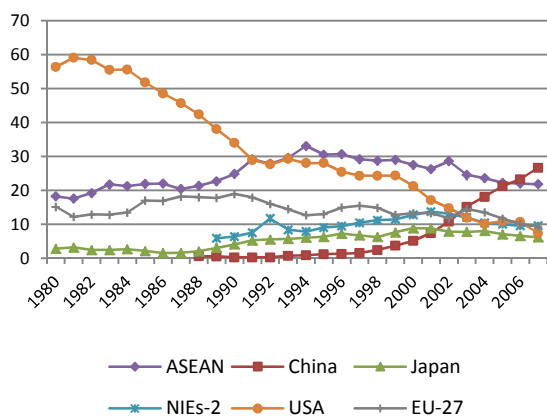
Source: Authors' calculation based on data from the RIETI-TID 2008 (<http://rieti.imari.co.jp>).

**Figure 4. Exports by destination (share in exports to all destinations)**

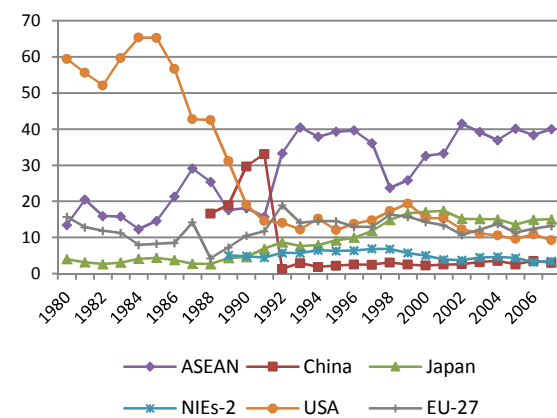
**(a) Intermediate goods**



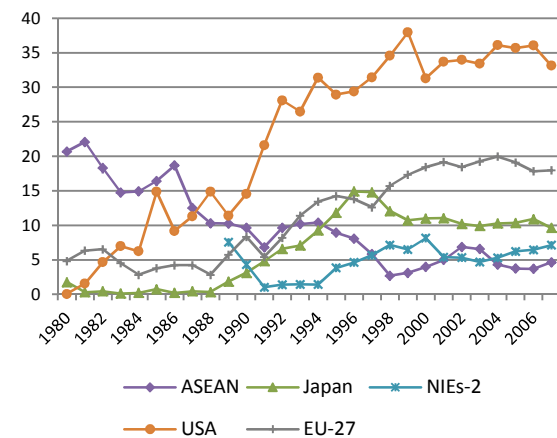
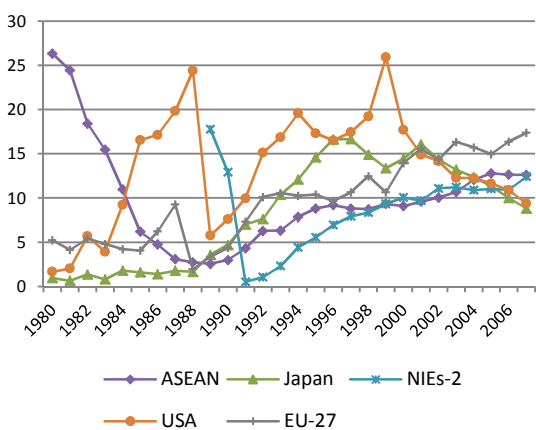
**Japan**



**ASEAN**

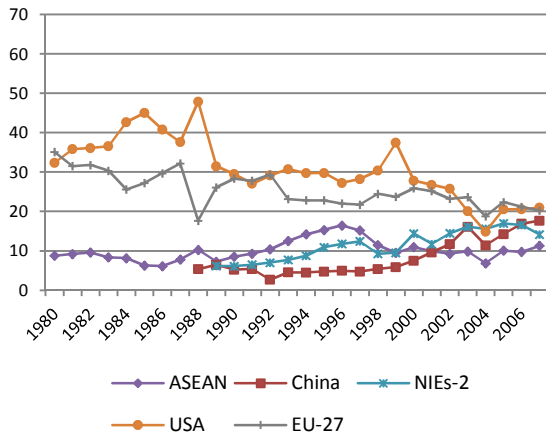


**China**



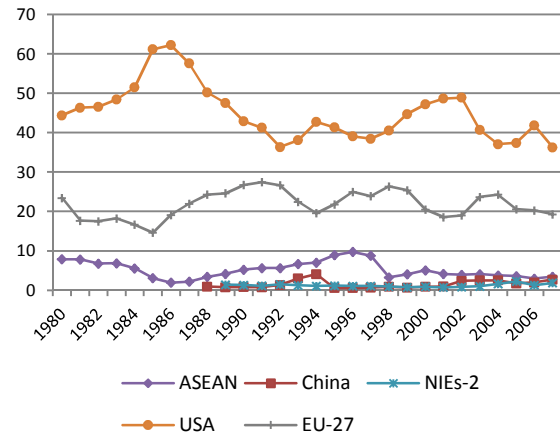
**(b) Final goods**

Electrical machinery

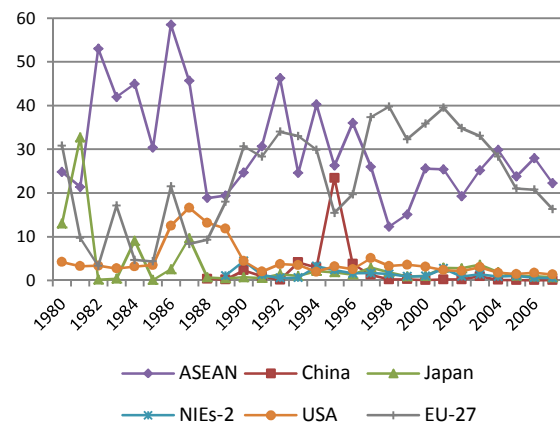
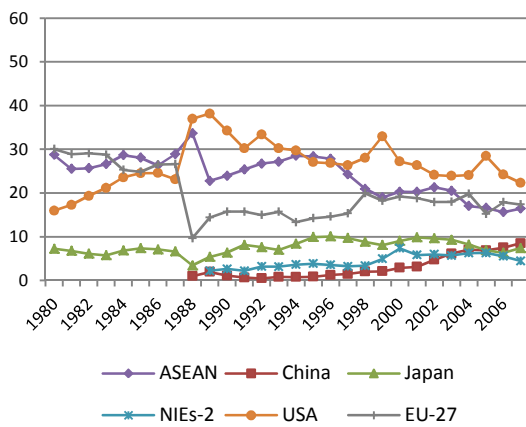


Transportation equipment

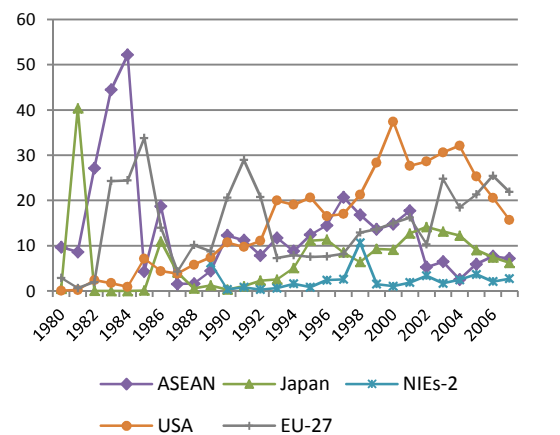
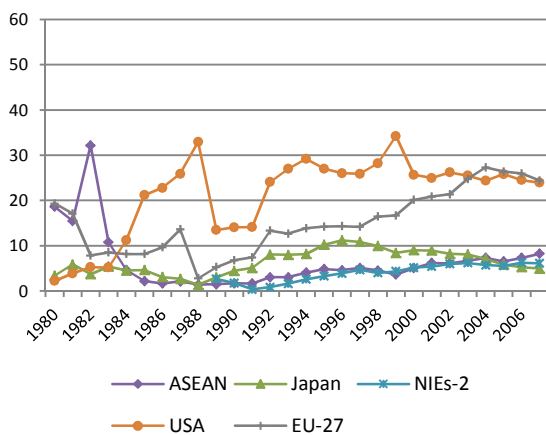
Japan



ASEAN



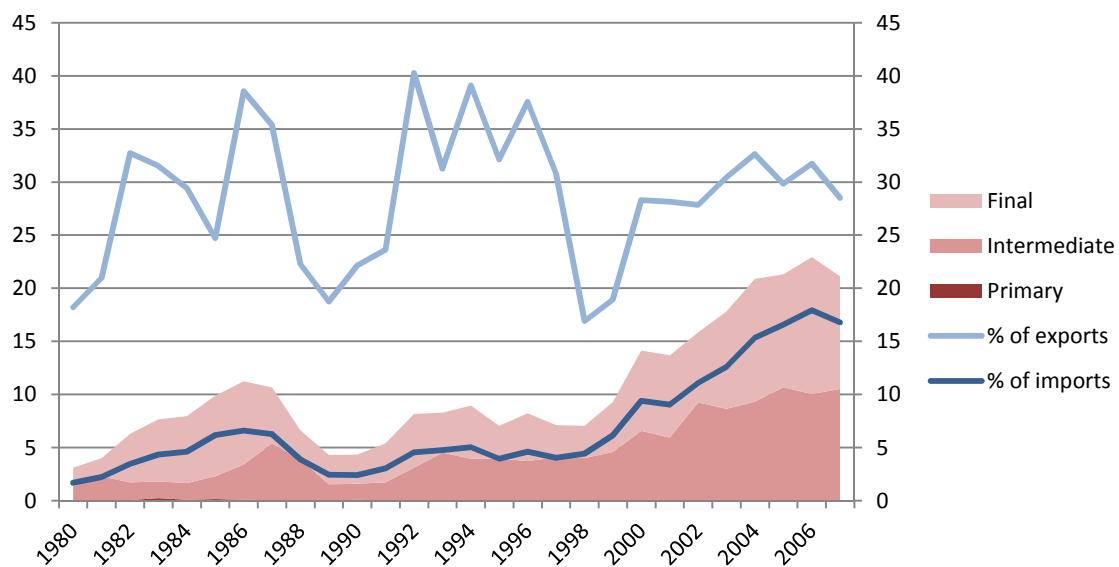
China



Source: Authors' calculation based on data from the RIETI-TID 2008 (rieti.imari.go.jp).  
 Note: The "NIEs-2" comprises Korea and Taiwan.

**Figure 5. Intra-ASEAN trade in the transportation equipment industry**

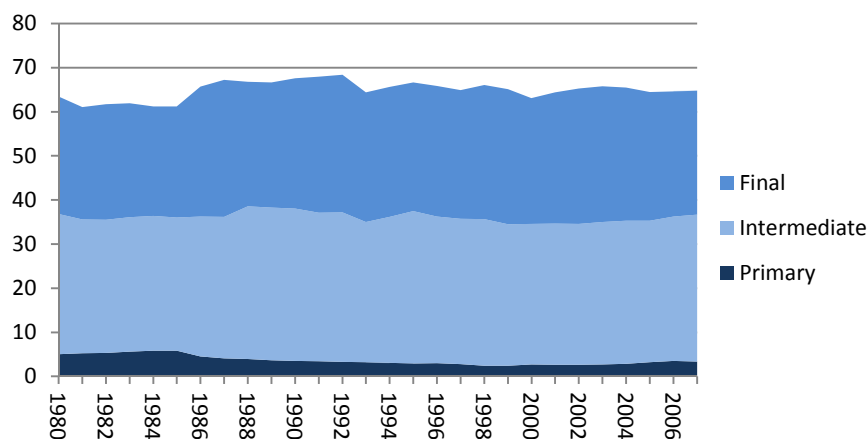
(as a share of total transportation equipment trade, in %)



Source: Authors' calculation based on data from the RIETI-TID 2008 (<http://rieti.imari.co.jp>).

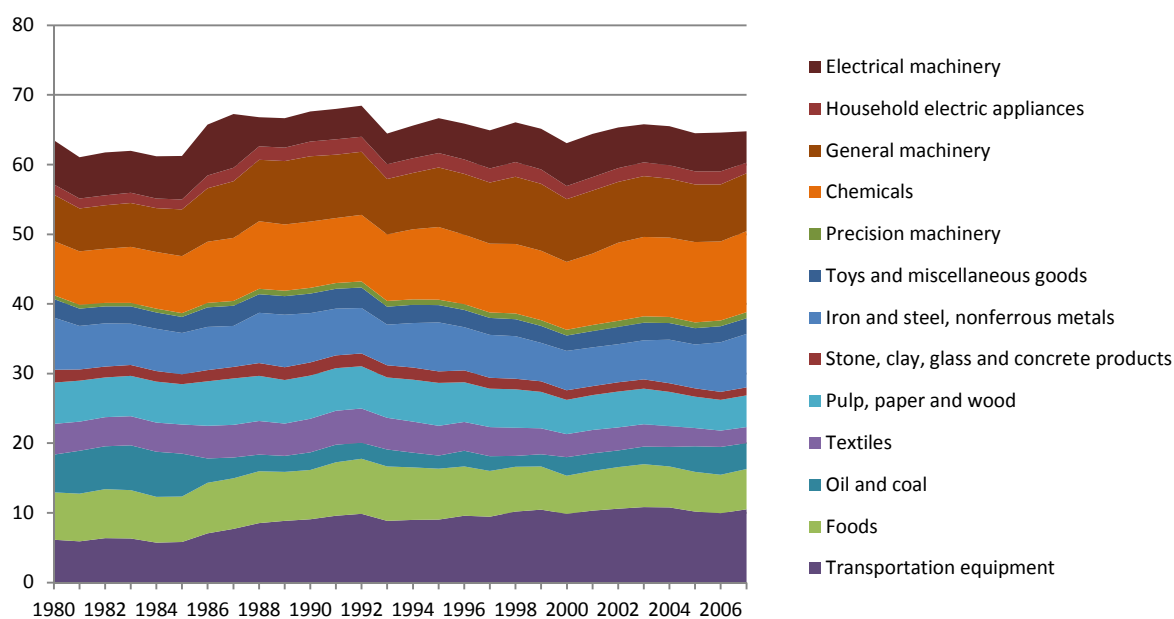
Note: The filled-in areas show the contribution of primary, intermediate, and final goods to the overall intra-ASEAN trade ratio (exports to and imports from ASEAN/exports to and imports from RoW). Trade in primary goods is negligible and therefore not visible here. On the other hand, the lines show the ratios of intra-ASEAN exports (exports to ASEAN/exports to RoW) and intra-ASEAN imports (imports from ASEAN/imports from RoW).

**Figure 6. EU intra-regional trade by production stage (as a share of total trade, in %)**



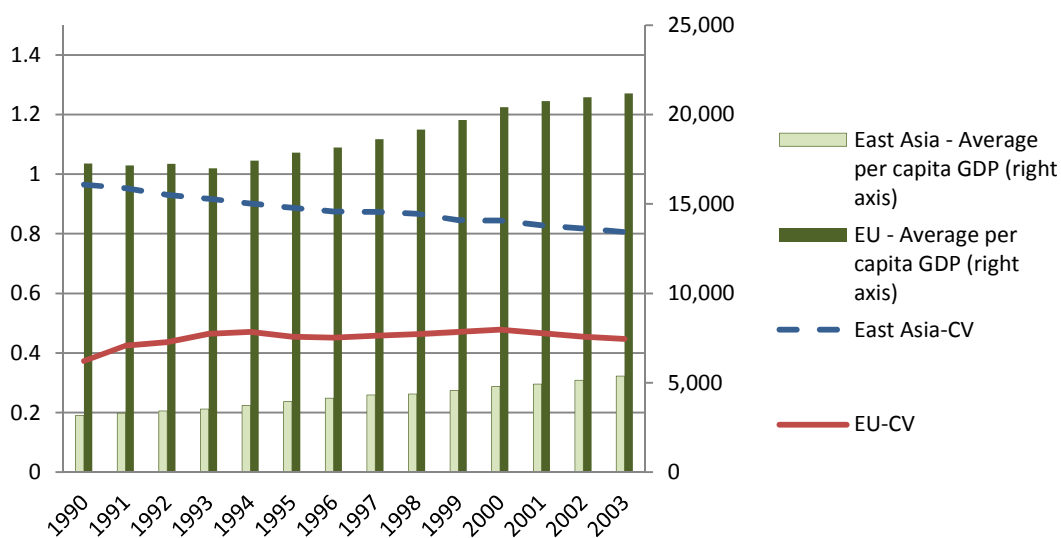
Source: Authors' calculation based on data from the RIETI-TID 2008 (<http://rieti.imari.co.jp>).

**Figure 7. Industry breakdown of the EU's intra-regional trade ratio (as a share of total trade, in %)**



Source: Authors' calculation based on data from the RIETI-TID 2008 (<http://rieti.imari.co.jp>).

**Figure 8. Average real GDP per capita (in US\$) and coefficient of variation for real GDP per capita: East Asia and EU**



Source: Authors' calculation based on the Penn World Table Version 6.2. (<http://pwt.econ.upenn.edu/>).

Notes: "Real GDP per capita" refers to the PPP-converted GDP in international dollars and the reference year is 1996. "Real GDP East Asia" and "Real GDP EU" are the means of real GDP per capita for the countries of each region weighted by country population. The coefficient of variation (CV) is calculated as the standard deviation of real GDP per capita divided by the mean of real GDP per capita for each region.

East Asia includes the 14 East Asian countries making up "East Asia" in the RIETI-TID 2008. EU refers to the EU27. Data for Lithuania and Latvia are missing for the years 1990, 91, and 92. In addition, Bulgaria is not included in the calculation for 1990.

**Table 1. East Asian intermediate goods import matrix**

(percentage share of intermediate goods imports from each row nation in each column nation's total imports)

**1980**

		IMPORTER									
		China	Indonesia	Malaysia	Philippines	Thailand	Hong Kong	Singapore	Taiwan	Korea	Japan
EXPORTER	China		1.2	0.9	0.5	<b>2.4</b>	<b>8.3</b>	1.0	n.a.	n.a.	0.7
	Indonesia	n.a.		0.3	0.3	0.3	0.2	<b>2.4</b>	n.a.	0.3	<b>2.7</b>
	Malaysia	n.a.	0.2		0.2	1.0	0.7	<b>5.3</b>	n.a.	0.3	0.4
	Philippines	n.a.	0.3	0.7		0.7	0.6	0.2	n.a.	0.7	0.4
	Thailand	n.a.	0.4	0.8	0.2		0.6	0.8	n.a.	0.3	0.3
	Hong Kong	n.a.	0.3	0.7	1.2	0.5		0.8		0.3	0.1
	Singapore	n.a.	<b>8.1</b>	<b>9.4</b>	1.2	<b>6.6</b>	<b>4.5</b>		n.a.	0.5	0.9
	Taiwan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.
	Korea	n.a.	1.8	1.3	1.5	1.6	<b>2.5</b>	0.8	n.a.		0.9
	Japan	n.a.	<b>16.9</b>	<b>10.8</b>	<b>13.3</b>	<b>16.2</b>	<b>14.1</b>	<b>8.3</b>	n.a.	<b>17.1</b>	
	RoW	n.a.	<b>20.4</b>	<b>25.4</b>	<b>26.4</b>	<b>22.2</b>	<b>21.2</b>	<b>18.4</b>	n.a.	<b>15.0</b>	<b>20.9</b>

**1990**

		IMPORTER									
		China	Indonesia	Malaysia	Philippines	Thailand	Hong Kong	Singapore	Taiwan	Korea	Japan
EXPORTER	China		1.5	0.8	1.0	<b>2.5</b>	<b>10.8</b>	1.4	n.a.	1.5	1.2
	Indonesia	1.0		0.6	1.2	0.5	0.5	1.7	0.9	1.4	<b>3.1</b>
	Malaysia	1.0	0.5		0.6	1.5	0.9	<b>6.0</b>	0.9	0.7	1.0
	Philippines	0.1	0.2	0.5		0.3	0.3	0.4	0.3	0.2	0.3
	Thailand	0.3	0.5	1.1	0.4		0.6	1.4	0.4	0.4	0.6
	Hong Kong	<b>18.9</b>	0.7	1.2	<b>2.6</b>	0.8		1.8	1.6	0.6	0.2
	Singapore	1.3	<b>4.6</b>	<b>12.3</b>	<b>3.3</b>	<b>6.6</b>	<b>2.6</b>		1.9	0.8	1.1
	Taiwan	0.0	<b>3.6</b>	<b>2.7</b>	<b>6.9</b>	<b>2.9</b>	<b>7.6</b>	<b>2.6</b>		1.4	1.4
	Korea	1.1	<b>3.1</b>	<b>2.0</b>	<b>2.8</b>	<b>2.4</b>	<b>3.1</b>	1.9	1.8		<b>2.2</b>
	Japan	<b>9.8</b>	<b>15.1</b>	<b>14.0</b>	<b>14.2</b>	<b>21.2</b>	<b>9.2</b>	<b>10.8</b>	<b>19.3</b>	<b>17.5</b>	
	RoW	<b>20.2</b>	<b>25.1</b>	<b>27.8</b>	<b>26.6</b>	<b>24.4</b>	<b>12.0</b>	<b>23.9</b>	<b>28.0</b>	<b>27.7</b>	<b>28.9</b>

Cont'd



## 2000

		IMPORTER									
		China	Indonesia	Malaysia	Philippines	Thailand	Hong Kong	Singapore	Taiwan	Korea	Japan
EXPORTER	China		<b>2.8</b>	<b>2.1</b>	1.4	<b>3.5</b>	<b>12.0</b>	<b>2.8</b>	<b>2.7</b>	<b>4.0</b>	<b>3.7</b>
	Indonesia	1.5		<b>2.0</b>	1.1	1.4	0.4	<b>2.7</b>	1.4	<b>2.2</b>	<b>2.6</b>
	Malaysia	<b>2.2</b>	1.7		<b>2.5</b>	<b>4.0</b>	1.5	<b>10.5</b>	<b>3.0</b>	<b>2.3</b>	<b>2.2</b>
	Philippines	0.7	0.2	<b>2.4</b>		1.7	0.7	<b>2.0</b>	1.9	0.9	1.0
	Thailand	1.7	<b>2.1</b>	<b>2.6</b>	<b>2.0</b>		1.0	<b>2.6</b>	1.1	0.6	1.0
	Hong Kong	<b>3.1</b>	0.7	<b>2.0</b>	<b>2.4</b>	1.0		1.4	0.8	0.6	0.2
	Singapore	1.9	<b>9.0</b>	<b>11.9</b>	<b>5.0</b>	<b>4.1</b>	<b>3.2</b>		<b>2.5</b>	1.4	0.9
	Taiwan	<b>2.0</b>	<b>4.3</b>	<b>3.9</b>	<b>8.0</b>	<b>3.3</b>	<b>11.9</b>	<b>3.4</b>		<b>2.0</b>	<b>2.5</b>
	Korea	<b>10.4</b>	<b>5.2</b>	<b>3.9</b>	<b>5.4</b>	<b>2.6</b>	<b>3.7</b>	<b>2.4</b>	<b>4.1</b>		<b>3.3</b>
	Japan	<b>15.5</b>	<b>12.1</b>	<b>15.6</b>	<b>14.5</b>	<b>18.5</b>	<b>7.7</b>	<b>10.6</b>	<b>15.4</b>	<b>13.9</b>	
	RoW	<b>23.2</b>	<b>25.3</b>	<b>26.9</b>	<b>25.4</b>	<b>23.6</b>	<b>12.2</b>	<b>23.7</b>	<b>21.2</b>	<b>26.5</b>	<b>22.5</b>

## 2007

		IMPORTER									
		China	Indonesia	Malaysia	Philippines	Thailand	Hong Kong	Singapore	Taiwan	Korea	Japan
EXPORTER	China		<b>6.4</b>	<b>8.8</b>	<b>5.2</b>	<b>7.4</b>	<b>20.0</b>	<b>6.2</b>	<b>7.7</b>	<b>10.5</b>	<b>7.2</b>
	Indonesia	0.7		<b>2.5</b>	1.2	1.7	0.2	<b>2.9</b>	1.8	1.5	<b>2.5</b>
	Malaysia	<b>2.8</b>	<b>5.8</b>		<b>2.4</b>	<b>4.0</b>	1.6	<b>9.2</b>	<b>2.4</b>	1.8	<b>2.0</b>
	Philippines	<b>2.2</b>	0.2	1.6		1.0	1.4	<b>2.1</b>	0.9	0.4	0.8
	Thailand	1.5	<b>3.2</b>	<b>3.5</b>	1.5		1.2	<b>2.2</b>	1.1	0.6	1.3
	Hong Kong	0.8	0.3	<b>2.1</b>	<b>3.3</b>	0.8		0.7	0.4	0.4	0.1
	Singapore	1.5	<b>11.2</b>	<b>10.0</b>	<b>7.1</b>	<b>3.1</b>	<b>6.0</b>		1.8	1.6	0.7
	Taiwan	<b>6.2</b>	<b>3.4</b>	<b>3.4</b>	<b>10.6</b>	<b>2.9</b>	<b>8.6</b>	<b>4.2</b>		1.9	<b>2.0</b>
	Korea	<b>9.3</b>	<b>3.7</b>	<b>4.0</b>	<b>4.9</b>	<b>3.2</b>	<b>3.7</b>	<b>4.1</b>	<b>6.0</b>		<b>3.1</b>
	Japan	<b>11.1</b>	<b>5.8</b>	<b>9.3</b>	<b>10.1</b>	<b>16.2</b>	<b>6.7</b>	<b>5.7</b>	<b>14.5</b>	<b>11.1</b>	
	RoW	<b>19.3</b>	<b>19.0</b>	<b>23.4</b>	<b>17.0</b>	<b>19.4</b>	<b>10.9</b>	<b>27.2</b>	<b>22.2</b>	<b>22.3</b>	<b>21.1</b>

Source: Authors' calculation based on data from the RIETI-TID 2008 (rieti.imari.go.jp).

Note: RoW (Rest of World) is "not East Asia." Values of 2.0 percent or greater are highlighted in bold.

**Table 2. Bilateral industry-level tariff rates in East Asia, 2001**

**(a) Electrical machinery**

		IMPORTER								
		China	Indonesia	Malaysia	Philippines	Thailand	Singapore	Taiwan	Korea	Japan
EXPORTER	China		7.06	6.63	5.19	13.75	0	5.38	5.17	0
	Indonesia	18.21		3.46	2.44	12.98	0	6.78	5.70	0
	Malaysia	11.19	1.22		0.81	6.05	0	2.84	2.36	0
	Philippines	8.36	1.02	0.39		2.50	0	0.78	0.93	0
	Thailand	12.53	1.97	2.74	1.34		0	3.69	3.70	0
	Singapore	11.30	1.55	1.44	0.89	5.87		1.39	1.33	0.02
	Taiwan	9.18	1.77	1.77	0.94	4.21	0		1.81	0.05
	Korea	12.66	2.72	4.38	2.05	7.99	0	2.52		0.03
	Japan	10.96	2.54	2.28	1.30	6.15	0	3.24	3.09	

>=5%, <10%
>=10%, <20%

**(b) Transportation equipment**

		IMPORTER								
		China	Indonesia	Malaysia	Philippines	Thailand	Singapore	Taiwan	Korea	Japan
EXPORTER	China		11.84	16.35	10.29	22.96	0	7.68	5.34	0
	Indonesia	34.34		20.21	8.26	37.12	0	11.70	6.32	0
	Malaysia	18.39	4.76		5.38	22.63	0	8.88	4.74	0
	Philippines	25.06	9.25	16.98		34.07	0	11.61	5.97	0
	Thailand	39.76	9.60	26.83	9.30		0	39.31	8.76	0
	Singapore	11.44	1.99	16.99	3.71	10.00		5.48	3.55	0
	Taiwan	28.91	16.09	20.01	8.00	28.17	0		7.26	0
	Korea	30.85	15.41	60.07	11.89	25.72	0	35.50		0
	Japan	28.81	14.71	56.10	10.35	25.77	0	43.24	7.59	

>=5%, <10%
>=10%, <20%
>=20%, <30%
>=30%

Source: CEPII (2008), "TradeProd: The CEPII Trade, Production and Bilateral Protection Database," online: <http://www.cepii.fr/anglaisgraph/bdd/TradeProd.htm> (accessed September 16, 2009).

**Table 3. Export Matrix for East Asia, the EU, and NAFTA**

(percentage share in exporting region's total exports)

**(a) Intermediate Goods**

EXPORTER		IMPORTER						Exports (US\$ mil.)	
		East Asia		EU		NAFTA		World	
		1995	2007	1995	2007	1995	2007	1995	2007
EXPORTER	East Asia	57.9	58.0	13.0	14.1	21.5	14.7	613,478	1,775,840
	EU	8.4	7.3	69.7	68.8	8.3	9.4	948,680	2,314,123
	NAFTA	25.3	21.0	19.5	17.9	43.2	47.7	439,639	831,962

**(b) Final Goods**

EXPORTER		IMPORTER						Exports (US\$ mil.)	
		East Asia		EU		NAFTA		World	
		1995	2007	1995	2007	1995	2007	1995	2007
EXPORTER	East Asia	39.7	29.7	19.4	23.4	32.1	31.0	596,944	1,565,174
	EU	10.5	7.0	66.7	66.5	8.6	9.7	836,334	2,015,248
	NAFTA	25.0	15.1	17.6	18.3	43.5	50.8	332,856	647,018

Source: Authors' calculation based on data from the RIETI-TID 2008 (rieti.imari.go.jp).