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International Production Networks in Machinery Industries: Structure and Its Evolution*

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***Abstract*:** This paper intensively employs annual international trade statistics obtained from the UN Comtrade and examines to what degree East Asian countries have participated in global production networks in comparison with countries in other regions and whether East Asia's intra-regional trade in machinery is different from extra-regional trade and transactions by other regions. It provides strong evidence of the formation of East Asian production networks, particularly in the form of expansion of exports and imports of parts & components, often ICT-related. It also traces the development of intra-regional markets of both parts & components and finished products since 2000.

***Keywords*:** Fragmentation; Regional integration, East Asia

***JEL Classification*:** F14; F15,;F23

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1. Introduction

The East Asian region has recently been attracting much attention for the unprecedented development of international production networks since the beginning of the 1990s, particularly in the machinery industries (See Fukao *et al*., 2003; Athukorala and Yamashita, 2006; Kimura, 2006). However, we have not yet reached solid consensus on the geographical extent of production networks as well as the distinctive nature of East Asian development of production networks. One source of confusion resides in the handling of international trade data. Although international trade data are often regarded as a clean, common pool of information, the handling of data downloading system and the treatment of tricky transactions such as trade between Mainland China and Hong Kong actually generate vast differences in basic figures among researchers. Production networks are often in the form of production-process-wise division of labor, which can be statistically captured by parts & components trade. However, the definition of parts & components varies among researchers, and we tend to end up with quite different conclusions.

This paper revisits international trade data obtained from UN Comtrade, carefully deals with subtle nature of the data set, and investigates the evolutionary process of production networks. Namely, it examines to what degree East Asian countries have participated in global production networks when compared to countries in other regions, and whether East Asia's intra-regional trade in machinery is distinct in some way from its extra-regional trade and transactions by other regions.

We begin with an overview of East Asia's trade structure by using international bilateral trade data at the most disaggregated product-line level. The examination of East Asia's trade structure highlights the fact that East Asian countries have expanded and strengthened both intra-regional exports and imports of machinery parts & components to a significant degree compared to extra-regional trade and transactions outside the region. This fact suggests the formation of international production networks in East Asia. In addition, we point out the fact that since 2000, not only East Asia's intra-regional exports of machinery parts & components but also those of finished products have begun to increase at a rapid pace, which can be interpreted as

indicating a potential importance of intra-regional partners as an ultimate source of demand for their exports. We then further examine the presence of East Asian countries in the process of the formation and development of international production networks in the wider global context, with a specific focus on trade in machinery parts & components.

The rest of this paper proceeds as follows: the next section provides a detailed description of the dataset used throughout the paper. Section 3 overviews characteristic features of East Asian's trade structure by comparing it with those of Europe and America. Section 4 examines the degree of participation of East Asian countries in global production networks, as well as providing some evidence for the development of international production networks within East Asia. The final section concludes the paper.

2. The Data Sets

Bilateral export and import data used in this paper are obtained from the United Nations Commodity Trade Statistics Database (UN Comtrade). We have cleaned up raw data obtained from the UN Comtrade as described in Appendix A. The following two subsections provide information on sample countries and the definitions of product groups.

2.1. Regional Classification and Sample Countries

Trade patterns in East Asia are to be compared with Europe as well as North and South America. Each of these three regions includes the countries listed in Table 1. East Asia consists of the so-called ASEAN+6, namely, ASEAN member countries, China, Japan, Rep. of Korea, India, Australia, and New Zealand. Europe is defined as the 27 European Union (EU) member countries, i.e., EU27. America is composed of the North American Free Trade Agreement (NAFTA) member countries and the Union of South American Nations (UNASUR) member countries.

Table 1. Sample Countries by Region.

East Asia (ASEAN+6) (15 countries)	Europe (EU27) (27 countries)	America (NAFTA & UNASUR) (15 countries)
Japan	*EU15*	*NAFTA*
NIEs	Belgium[*iii]	Canada
Korea	Luxembourg[*iii]	Mexico
Singapore	Denmark	USA
ASEAN4	France	*UNASUR*
Indonesia	Germany	Argentina
Malaysia	Greece	Bolivia
Philippines	Ireland	Brazil
Thailand	Italy	Chile
China incl. Hong Kong[*i]	Netherlands	Colombia
Others in East Asia	Portugal	Ecuador
Brunei	Spain	Guyana
Cambodia	UK	Paraguay
(Laos[*ii])	Austria	Peru
Myanmar	Finland	Suriname
Viet Nam	Sweden	Uruguay
India	*New members*	Venezuela
Australia	Bulgaria	
NZ	Cyprus	
	Czech Rep.	
	Estonia	
	Hungary	
	Latvia	
	Lithuania	
	Malta	
	Poland	
	Romania	
	Slovakia	
	Slovenia	

Notes: (i) Data for China includes those for Hong Kong unless we mention the change of the definition, (ii) Laos is excluded from our sample since trade statistics based on the HS classification are not reported by Laos throughout the sample period 1994-2007, and (iii) Belgium and Luxembourg had been treated as a single region, Belgium-Luxembourg, until 1998 in the UN Comtrade.

In this paper, export or import data for China includes figures for Hong Kong. Reflecting active entrepôt trade between mainland China and Hong Kong, mainland China's exports and imports via Hong Kong and a third country's exports to and imports from mainland China via Hong Kong are likely to be simultaneously counted in trade statistics reported by different countries.[1] In order to deal with such possibility of multiple counting, it would be best to treat mainland China and Hong Kong as a single

[1] See Appendix B for cases in which entrepôt trade between mainland China and Hong Kong are possibly counted in trade statistics multiple times.

large economy. We therefore exclude transactions between mainland China and Hong Kong from our sample, so as not to overestimate the importance of intra-regional trade in East Asia.[2]

We focus on three points in time, the years 1994, 2000, and 2007. Basically, where available, we use reported data based on the latest version of the HS product classification for respective years, i.e., data based on the HS 1992, 1996, and 2007 classifications for the years 1994, 2000, and 2007, respectively. For some of the sample countries, however, we use data based on the older version of the HS classification or those for the nearest year instead. A small number of countries have never reported trade statistics based on the HS classifications throughout the sample period, and are entirely excluded from the sample.[3]

2.2. Definitions of Product Groups

Based on the HS product classification, manufactured goods range from HS28 to HS92. Among them, machinery include all the goods classified as part of general machinery (HS84), electric machinery (HS85), transport equipment (HS86-89), and precision machinery sectors (HS90-92). For this product group, Ando and Kimura (2005) grouped the HS product codes into parts & components and finished products.[4] And we have recently revised the list of parts & components so as to meet more stringent criteria. The distinction between intermediate goods and finished products is not always obvious, not simply because the HS 6-digit product category is too broad in scope though internationally comparable, but because the HS classification is not designed on the basis of the functionality of goods. We therefore need to apply a strict classification criterion in the sense that we identify a product code as parts & components only if all the commodities subsumed within the code can be unambiguously considered as intermediate goods rather than finished products. The revised list of parts & components at the HS 4-digit and 6-digit levels is provided in Table 2. The lists vary slightly among different versions of the HS classification, reflecting mergers and branching of product codes due to classification updates.

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[2] One exception is Appendix Table A2, which reports figures for the case in which mainland China and Hong Kong are treated separately, as a reference.

[3] The details of these exceptional cases are summarized in Appendix Table A1.

[4] Capital goods are classified under finished products.

Table 2. Lists of Machinery Parts & Components: by the Version the HS Classification.

HS 1992 classification

840140, 840290, 840390, 840490, 840590, 8406, 8407, 8408, 8409, 8410, 8411, 8412, 8413, 8414, 841590, 8416, 8417, 841891, 841899, 841990, 842091, 842099, 842123, 842129, 842131, 842191, 842199, 842290, 842390, 842490, 8431, 843290, 843390, 843490, 843590, 843691, 843699, 843790, 843890, 843991, 843999, 844090, 844190, 844240, 844250, 844390, 8448, 845090, 845190, 845240, 845290, 845390, 845490, 845590, 8466, 846791, 846792, 846799, 846890, 8473, 847490, 847590, 847690, 847790, 847890, 847990, 8480, 8481, 8482, 8483, 8484, 8485, 8503, 850490, 8505, 850690, 8507, 850890, 850990, 851090, 8511, 8512, 851390, 851490, 851590, 851690, 851790, 851840, 851850, 851890, 8522, 8529, 853090, 8531, 8532, 8533, 8534, 8535, 8536, 8537, 8538, 8539, 8540, 8541, 8542, 854390, 8544, 8545, 8546, 8547, 8548, 8607, 8706, 8707, 8708, 870990, 8714, 871690, 8803, 8805, 9001, 9002, 9003, 900590, 900691, 900699, 900791, 900792, 900890, 900990, 901090, 901190, 901290, 9013, 9014, 901590, 901790, 902490, 902590, 902690, 902790, 902890, 902990, 903090, 903190, 903290, 9033, 9104, 9110, 9111, 9112, 9113, 9114, 9209

(433 parts & components and 691 finished products; 1,124 product codes in total)

HS 1996 classification

840140, 840290, 840390, 840490, 840590, 8406, 8407, 8408, 8409, 8410, 8411, 8412, 8413, 8414, 841520, 841590, 8416, 8417, 841891, 841899, 841990, 842091, 842099, 842123, 842129, 842131, 842191, 842199, 842290, 842390, 842490, 8431, 843290, 843390, 843490, 843590, 843691, 843699, 843790, 843890, 843991, 843999, 844090, 844190, 844240, 844250, 844390, 8448, 845090, 845190, 845240, 845290, 845390, 845490, 845590, 8466, 846791, 846792, 846799, 846890, 8473, 847490, 847590, 847690, 847790, 847890, 847990, 8480, 8481, 8482, 8483, 8484, 8485, 8503, 850490, 8505, 850690, 8507, 850890, 850990, 851090, 8511, 8512, 851390, 851490, 851590, 851690, 851790, 851840, 851850, 851890, 8522, 8529, 853090, 8531, 8532, 8533, 8534, 8535, 8536, 8537, 8538, 8539, 8540, 8541, 8542, 854390, 8544, 8545, 8546, 8547, 8548, 8607, 8706, 8707, 8708, 870990, 8714, 871690, 8803, 8805, 9001, 9002, 9003, 900590, 900691, 900699, 900791, 900792, 900890, 900990, 901090, 901190, 901290, 9013, 9014, 901590, 901790, 902490, 902590, 902690, 902790, 902890, 902990, 903090, 903190, 903290, 9033, 9104, 9110, 9111, 9112, 9113, 9114, 9209

(445 parts & components and 729 finished products; 1,174 product codes in total)

HS 2002 classification

840140, 840290, 840390, 840490, 840590, 8406, 8407, 8408, 8409, 8410, 8411, 8412, 8413, 8414, 841520, 841590, 8416, 8417, 841891, 841899, 841990, 842091, 842099, 842123, 842129, 842131, 842191, 842199, 842290, 842390, 842490, 8431, 843290, 843390, 843490, 843590, 843691, 843699, 843790, 843890, 843991, 843999, 844090, 844190, 844240, 844250, 844390, 8448, 845090, 845190, 845240, 845290, 845390, 845490, 845590, 8466, 846791, 846792, 846799, 846890, 8473, 847490, 847590, 847690, 847790, 847890, 847990, 8480, 8481, 8482, 8483, 8484, 8485, 8503, 850490, 8505, 850690, 8507, 850990, 851090, 8511, 8512, 851390, 851490, 851590, 851690, 851790, 851840, 851850, 851890, 8522, 8529, 853090, 8531, 8532, 8533, 8534, 8535, 8536, 8537, 8538, 8539, 8540, 8541, 8542, 854390, 8544, 8545, 8546, 8547, 8548, 8607, 8706, 8707, 8708, 870990, 8714, 871690, 8803, 8805, 9001, 9002, 9003, 900590, 900691, 900699, 900791, 900792, 900890, 900991, 900992, 900993, 900999, 901090, 901190, 901290, 9013, 9014, 901590, 901790, 902490, 902590, 902690, 902790, 902890, 902990, 903090, 903190, 903290, 9033, 9104, 9110, 9111, 9112, 9113, 9114, 9209

(445 parts & components and 727 finished products; 1,172 product codes in total)

HS 2007 classification
840140, 840290, 840390, 840490, 8406, 8407, 8408, 8409, 8410, 8411, 8412, 8413, 8414, 841520, 841590, 8416, 8417, 841891, 841899, 841990, 842091, 842099, 842123, 842129, 842131, 842191, 842199, 842290, 842390, 842490, 8431, 843290, 843390, 843490, 843590, 843691, 843699, 843790, 843890, 843991, 843999, 844090, 844190, 844240, 844250, 844391, 844399, 8448, 845090, 845190, 845240, 845290, 845390, 845490, 845590, 8466, 846791, 846792, 846799, 846890, 8473, 847490, 847590, 847690, 847790, 847890, 847990, 8480, 8481, 8482, 8483, 8484, 8486, 8487, 8503, 850490, 8505, 850690, 8507, 850870, 850990, 851090, 8511, 8512, 851390, 851490, 851590, 851690, 851770, 851840, 851850, 851890, 8522, 852352, 8529, 853090, 8531, 8532, 8533, 8534, 8535, 8536, 8537, 8538, 8539, 8540, 8541, 8542, 854390, 8544, 8545, 8546, 8547, 8548, 8607, 8706, 8707, 8708, 870990, 8714, 871690, 8803, 8805, 9001, 9002, 9003, 900590, 900691, 900699, 900791, 900792, 900890, 901090, 901190, 901290, 9013, 9014, 901590, 901790, 902490, 902590, 902690, 902790, 902890, 902990, 903090, 903190, 903290, 9033, 9104, 9110, 9111, 9112, 9113, 9114, 9209
(440 parts & components and 677 finished products; 1,117 product codes in total)

Note: The numbers of product codes classified under machinery parts & components and finished products at the 6-digit level are shown in parentheses for different versions of the HS classification

Among machinery sectors, the electronics industry such as information and communication technology (ICT) equipment and semiconductors has performed the most crucial role in developing and extending production networks across East Asia and other regions over the last couple of decades. In order to deepen our understanding of the nature of international production networks it would be instructive to more closely examine trade patterns in the electronics industry. OECD (2003) gives a definition of ICT goods as follows: "ICT goods must either be intended to fulfill the function of information processing and communication by electronic means, including transmission and display, OR use electronic processing to detect, measure and/or record physical phenomena, or to control a physical process." Applying this definition to the selected HS 6-digit product codes, OECD (2003) proposed a list of ICT goods based on the HS 1996 and 2002 classifications.[5] This list of ICT goods that we have modified to fit the HS 1992 classification is provided in Table 3. As with the original OECD list, ICT goods are grouped into five broad categories: telecommunications equipment, computer and related equipment, electronic components, audio and video equipment, and other ICT goods.[6]

[5] The WTO also provided a list of information technology (IT) products in the context of the Information Technology Agreement (ITA), which was concluded in 1996 and is a tariff-cutting mechanism designed to eliminate duties on those IT products. Differences between the OECD list and the ITA list, which reflect the different purposes of the two lists, are discussed in OECD (2003).

[6] The last category covers office machinery and equipment, medical equipment, industrial process

Table 3. Lists of ICT Goods: by the Version the HS Classification.

HS 1992 classification

Telecommunications equipment (17 product codes)

851710, 851720, 851730, 851740, 851781, 851782, **851790**, 852020, 852510, 852520, 852530, 852610, 852790, **852910**, **853110**, **854420**, **854470**

Computer and related equipment (7 product codes)

847110, 847120, 847191, 847192, 847193, 847199, **847330**

Electronic components (39 product codes)

850431, 850450, **850490**, **852990**, **853221**, **853224**, **853230**, **853310**, **853321**, **853329**, **853331**, **853339**, **853340**, **853390**, **853400**, **854011**, **854012**, **854020**, **854030**, **854041**, **854042**, **854049**, **854081**, **854089**, **854091**, **854099**, **854110**, **854121**, **854129**, **854130**, **854140**, **854150**, **854160**, **854190**, **854211**, **854219**, **854220**, **854280**, **854290**

Audio and video equipment (38 product codes)

851810, 851821, 851822, 851829, 851830, **851840**, **851850**, **851890**, 851910, 851921, 851929, 851931, 851939, 851940, 851991, 851999, 852010, 852031, 852039, 852090, 852110, 852190, **852210**, **852290**, 852311, 852312, 852313, 852320, 852390, 852711, 852719, 852721, 852729, 852731, 852732, 852739, 852810, 852820

Other ICT goods (51 product codes)

846910, 847010, 847021, 847029, 847040, 847050, **847310**, **847321**, 852691, 852692, **901410**, **901420**, **901480**, **901490**, 901540, 901580, 901811, 901819, 902211, 902219, 902410, 902480, **902490**, 902620, 902710, 902730, 902740, 902750, 902780, 902810, 902820, 902830, **902890**, 902910, 902920, **902990**, 903010, 903020, 903031, 903039, 903040, 903081, 903110, 903120, 903130, 903180, **903190**, 903210, 903220, 903289, **903290**

(152 product codes in total)

HS 2007 classification

Computers and peripheral equipment (18 product codes)

844331, 844332, 847050, 847130, 847141, 847149, 847150, 847160, 847170, 847180, 847190, 847290, **847330**, **847350**, 852351, 852841, 852851, 852861

Communication equipment (10 product codes)

851711, 851712, 851718, 851761, 851762, 851769, **851770**, 852550, 852560, **853110**

Consumer electronic equipment (32 product codes)

851810, 851821, 851822, 851829, 851830, **851840**, **851850**, **851890**, 851920, 851930, 851950, 851981, 851989, 852110, 852190, **852210**, **852290**, 852580, 852712, 852713, 852719, 852721, 852729, 852791, 852792, 852799, 852849, 852859, 852869, 852871, 852872, 852873

Miscellaneous ICT components and goods (39 product codes)

852321, 852329, 852340, **852352**, 852359, 852380, **852910**, **852990**, **853400**, **854011**, **854012**, **854020**, **854040**, **854050**, **854060**, **854071**, **854072**, **854079**, **854081**, **854089**, **854091**, **854099**, **854110**, **854121**, **854129**, **854130**, **854140**, **854150**, **854160**, **854190**, **854231**, **854232**, **854233**, **854239**, **854290**, **901310**, **901320**, **901380**, **901390**

(99 product codes in total)

Notes: The number of product codes classified under each of five/four broad categories is in parentheses. Product codes highlighted in boldface type are classified under parts & components based on our list (See Table 3).

Although the OECD list of ICT goods based on the HS 2007 classification is yet to be made available, OECD (2008) provided the updated list based on the Central Product

control equipment, and instruments and appliances for measuring, checking, testing and navigating.

Classification (CPC) Ver. 2. By using a correspondence table between the CPC Ver.2 and HS 2007 classification,[7] we have revised the list of ICT goods to fit the HS 2007 classification (see the lower part of Table 3). Following the list of OECD (2008), ICT goods here are grouped into four categories: computers and peripheral equipment, communication equipment, consumer electronic equipment, and miscellaneous ICT components and goods.

3. East Asia's Trade Structure: Comparison with Europe and America

This section overviews characteristic features of East Asian's trade structure by comparing it with two other major world regions, i.e., Europe and America. Sections 3.1 and 3.2 present the overall patterns of intra-regional and extra-regional trade conducted by East Asia viewed from various perspectives. In Section 3.3, the specific characteristics of East Asia's trade are further examined by comparing trade patterns between subgroups in the region.

3.1. Overview of Intra-regional and Extra-regional Trade

Table 4 provides an overview of intra-regional and extra-regional exports by East Asian countries, which are compared with European and American countries. The values of intra-regional exports in 1994, 2000, and 2007, annual average growth rates of export values during the periods 1994-2000 and 2000-2007, and the product composition of exports in 1994 and 2007 are reported in the left part of the table. The corresponding figures for extra-regional exports are in the right part of the table. The proportions of intra-regional exports to the total exports to the world in 1994 and 2007 are reported in the rightmost column. We can draw the following conclusions about the overall pattern of East Asia's intra-regional and extra-regional exports by comparing these patterns with those of Europe and America.

[7] Available at the UN Statistics Division's webpage: http://unstats.un.org/unsd/cr/registry/regdnld.asp?Lg=1

Table 4. Intra-regional and Extra-regional Exports by East Asia: Comparison with Europe and America.

	Intra-regional exports						Extra-regional exports						Intra-regional share		
	Value (millions US$)			Product composition			Value (millions US$)			Product composition			in exports to world		
	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
East Asia (ASEAN+6)															
All manufactured goods	4,468	5,678	11,035	80%	80%	78%	6,415	8,141	14,897	89%	88%	87%	41%	41%	43%
Machineries	2,579	3,513	6,607	46%	49%	47%	4,278	5,494	9,266	59%	60%	54%	38%	39%	42%
Parts & components	1,405	2,301	4,292	25%	32%	30%	1,669	2,307	3,314	23%	25%	19%	46%	50%	56%
(ICT-related goods)	816	1,585	2,433	15%	22%	17%	844	1,308	1,310	12%	14%	8%	49%	55%	65%
Finished products	1,174	1,212	2,315	21%	17%	16%	2,610	3,187	5,951	36%	35%	35%	31%	28%	28%
(ICT-related goods)	428	530	1,035	8%	7%	7%	1,086	1,316	2,456	15%	14%	14%	28%	29%	30%
Other manufactured goods	1,889	2,165	4,428	34%	31%	31%	2,136	2,646	5,631	30%	29%	33%	47%	45%	44%
Merchandise trade, total	5,585	7,099	14,106	100%	100%	100%	7,233	9,227	17,166	100%	100%	100%	44%	43%	45%
Europe (EU27)															
All manufactured goods	11,846	14,213	25,837	80%	80%	79%	5,820	6,979	12,953	84%	84%	85%	67%	67%	67%
Machineries	5,707	7,770	13,074	38%	44%	40%	3,206	4,072	7,423	46%	49%	49%	64%	66%	64%
Parts & components	2,364	3,204	5,554	16%	18%	17%	1,350	1,806	3,179	20%	22%	21%	64%	64%	64%
(ICT-related goods)	506	867	771	3%	5%	2%	293	521	501	4%	6%	3%	63%	62%	61%
Finished products	3,343	4,566	7,520	23%	26%	23%	1,856	2,266	4,244	27%	27%	28%	64%	67%	64%
(ICT-related goods)	752	1,378	1,636	5%	8%	5%	285	525	583	4%	6%	4%	73%	72%	74%
Other manufactured goods	6,139	6,444	12,763	41%	36%	39%	2,613	2,908	5,530	38%	35%	36%	70%	69%	70%
Merchandise trade, total	14,846	17,692	32,748	100%	100%	100%	6,905	8,271	15,272	100%	100%	100%	68%	68%	68%
America (NAFTA & UNASUR)															
All manufactured goods	4,505	7,122	8,033	77%	77%	69%	3,702	4,715	6,727	73%	77%	71%	55%	60%	54%
Machineries	2,829	4,637	4,883	49%	50%	42%	2,255	3,095	3,765	45%	51%	40%	56%	60%	56%
Parts & components	1,389	2,271	2,130	24%	25%	18%	1,116	1,717	1,817	22%	28%	19%	55%	57%	54%
(ICT-related goods)	317	636	319	5%	7%	3%	470	836	556	9%	14%	6%	40%	43%	36%
Finished products	1,440	2,366	2,752	25%	26%	24%	1,139	1,379	1,948	23%	23%	21%	56%	63%	59%
(ICT-related goods)	327	720	733	6%	8%	6%	372	499	325	7%	8%	3%	47%	59%	69%
Other manufactured goods	1,676	2,485	3,150	29%	27%	27%	1,446	1,619	2,962	29%	26%	31%	54%	61%	52%
Merchandise trade, total	5,819	9,237	11,584	100%	100%	100%	5,038	6,120	9,439	100%	100%	100%	54%	60%	55%

Notes: All figures are calculated using export statistics for bilateral merchandise trade. Trade values are deflated by the consumer price index (CPI) in the US.

First, the increasing importance of machinery parts & components in intra-regional exports is a prominent feature of East Asia, though the proportion of machinery in the total intra-regional merchandise exports does not differ substantially among regions. In each region, 69-80% of total intra-regional merchandise exports are accounted for by manufactured goods, and 38-50% of those are by machinery over the period 1994-2007. The composition of the intra-regional exports of machinery, however, has, over the years, been markedly different across regions. In East Asia, the proportion of machinery parts & components in the total intra-regional merchandise exports has increased from 25% in 1994 to 30% in 2007, whereas the proportion of machinery finished products has decreased from 21% to 16% over the same period. By contrast, in America, the proportion of parts & components has declined from 24% in 1994 to 18% in 2007 while the proportion of finished products stands at around 25% over the period. As for Europe, the composition of intra-regional exports of machinery remains relatively unchanged; as of 2007, the proportions of parts & components and finished products are 17% and 23%, respectively.

Second, intra-regional exports of ICT-related parts & components are strikingly large in terms of values, a fact which is reflected in an extremely high percentage figure in the product composition, in East Asia, as compared with Europe and America. As of 2007, the value of East Asia's intra-regional exports of ICT-related parts & components stands at 2.4 billion US$, a three-fold increase from 1994, and a much larger figure than that for Europe, at 0.8 billion US$, and America, at 0.3 billion US$. 17% of total intra-regional merchandise exports are accounted for by ICT-related parts & components in East Asia while the corresponding figures are only 2-3% in the other two regions. From a different standpoint, over 60% of the intra-regional exports of machinery by East Asian countries are of parts & components, i.e., 30% points out of 47% points, more than half of which are of ICT goods, i.e., 17% points out of 30% points. Such relative importance of ICT-related parts & components in the intra-regional exports of machinery is not observed for the other regions, where non-ICT-related finished products are relatively more important. In addition, the difference in the proportion of machinery parts & components in total intra-regional merchandise exports among regions, ranging from 17% in Europe to 30% in East Asia, can be explained by the difference in the proportion of ICT-related parts & components,

ranging from 2% in Europe to 17% in East Asia. In other words, the proportion of non-ICT-related parts & components differs only slightly among regions.

Third, the increasing importance of machinery parts & components with a high proportion of ICT-related parts & components is a feature specific to East Asia's intra-regional exports and does not hold true for its extra-regional exports. In the cases of Europe and America, the product composition differs only slightly between intra-regional and extra-regional exports, except the proportion of machinery which is 10% points higher for Europe's extra-regional exports than for its intra-regional exports, and the percentage of ICT-related parts & components which is notably higher for America's extra-regional exports than for its intra-regional exports. In the case of East Asia, on the other hand, the composition of the extra-regional exports of machinery is distinctly different from that of intra-regional exports. As of 2007, in stark contrast to intra-regional exports, over 60% of the extra-regional exports of machinery are of finished products, i.e., 35% points out of 54% points. In addition, the relative importance of ICT-related parts & components in the exports of machinery is no longer observed for extra-regional exports although the value of extra-regional exports of ICT-related parts & components is more than twice that of the other two regions.

Fourth, reflecting the above-mentioned three features, the significance of intra-regional transactions of East Asian exports of machinery parts & components, particularly those related to the ICT sector, has, unlike Europe and America, increased sharply. To be more precise, in East Asia, the proportion of intra-regional exports to total exports of machinery parts & components to the world has increased from 46% in 1994 to 56% in 2007 for parts & components; in particular, the intra-regional share has increased greatly from 49% to 65% for ICT-related parts & components. In fact, if we look at the intra-regional share of exports of parts & components in isolation, even in 2007, it can been seen that the rate for East Asia, at 56%, is lower than that for Europe, at 64%, and not significantly different from that for America, at 54%. More interestingly, although the intra-regional share tends to remain unchanged at the aggregate level in each region, the rise in the intra-regional share of East Asia's exports of parts & components is highly noticeable. In addition, the intra-regional shares are almost the same for the total merchandise exports, the exports of manufactured goods, and those of machinery, in each region; however, the intra-regional share of East Asia's

exports of parts & components has increased to far exceed the corresponding rate for total merchandise exports, at 45%. As for East Asia's exports of finished products, on the other hand, the intra-regional share has hovered around 30%, which is low compared to the aggregate level.

The last, but not the least, East Asia's intra-regional exports of machinery finished products have begun to increase significantly since 2000, though the continuing high growth of those of parts & components overshadows it. The value of East Asia's intra-regional exports of finished products has almost doubled from 1.2 billion US$ in 2000 to 2.3 billion US$ in 2007, at an annual average growth rate of 10%, which is notably high compared to the corresponding rate of 1% for the earlier period 1994-2000. Meanwhile, the value of East Asia's intra-regional exports of parts & components has continued to increase at an annual rate of 9% since 1994. We would emphasize that when we look only at the period 2000-2007, not only East Asia's intra-regional exports of parts & components but also those of finished products have grown at a rapid pace. In addition, East Asia's intra-regional exports of finished products have grown at a slightly higher rate than its extra-regional exports of finished products since 2000.

Table 5 corresponds to Table 4 and provides an overview of intra-regional and extra-regional imports by East Asia, Europe, and America. While all the figures in Table 4 are calculated using export statistics, those in Table 5 are based on import statistics. Intra-regional exports in Table 4 are conceptually equivalent to intra-regional imports in Table 5, but in fact the figures differ somewhat from one another, due in part to the difference in valuation between export and import statistics. In the UN Comtrade database, imports are generally reported on the basis of Cost, Insurance and Freight (CIF), while exports are reported on a Free on Board (FOB) basis. This tends to make import values higher than export values. Indeed, apart from 1994, the values of intra-regional imports that are reported by East Asian countries are higher than the corresponding figures for intra-regional exports. As for Europe and America, however, the values of intra-regional imports are uniformly lower than those of intra-regional exports, and the differences between export and import values increase from 1994 to 2007. The fact that the values reported in export statistics are higher than import statistics cannot, it seems, be explained only by the differences in the time of recording and may be largely due to multiple counting of trade flows, as discussed in

Table 5. Intra-regional and Extra-regional Imports by East Asia: Comparison with Europe and America.

	Intra-regional imports						Extra-regional imports						Intra-regional share		
	Value (millions US$)			Product composition			Value (millions US$)			Product composition			in imports from world		
	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
East Asia (ASEAN+6)															
All manufactured goods	4,451	5,839	11,509	79%	80%	78%	4,433	4,801	7,689	73%	67%	58%	50%	55%	60%
Machineries	2,546	3,518	6,991	45%	48%	47%	2,386	2,746	4,104	39%	39%	31%	52%	56%	63%
Parts & components	1,399	2,281	4,668	25%	31%	32%	1,014	1,539	2,286	17%	22%	17%	58%	60%	67%
(ICT-related goods)	825	1,560	2,929	15%	21%	20%	446	888	835	7%	12%	6%	65%	64%	78%
Finished products	1,147	1,237	2,323	20%	17%	16%	1,373	1,207	1,818	22%	17%	14%	46%	51%	56%
(ICT-related goods)	425	586	1,070	8%	8%	7%	312	416	275	5%	6%	2%	58%	58%	80%
Other manufactured goods	1,905	2,321	4,518	34%	32%	31%	2,047	2,054	3,584	34%	29%	27%	48%	53%	56%
Merchandise trade, total	5,665	7,330	14,785	100%	100%	100%	6,106	7,126	13,232	100%	100%	100%	48%	51%	53%
Europe (EU27)															
All manufactured goods	11,242	13,219	24,265	79%	79%	78%	5,097	6,907	12,055	69%	71%	66%	69%	66%	67%
Machineries	5,235	6,999	12,166	37%	42%	39%	2,669	3,964	6,158	36%	41%	34%	66%	64%	66%
Parts & components	2,234	3,006	5,350	16%	18%	17%	1,206	1,916	2,652	16%	20%	15%	65%	61%	67%
(ICT-related goods)	446	752	661	3%	5%	2%	491	897	940	7%	9%	5%	48%	46%	41%
Finished products	3,002	3,992	6,816	21%	24%	22%	1,463	2,049	3,505	20%	21%	19%	67%	66%	66%
(ICT-related goods)	629	1,118	1,459	4%	7%	5%	628	874	1,372	9%	9%	8%	50%	56%	52%
Other manufactured goods	6,007	6,221	12,099	42%	37%	39%	2,428	2,943	5,897	33%	30%	32%	71%	68%	67%
Merchandise trade, total	14,236	16,635	30,998	100%	100%	100%	7,368	9,733	18,243	100%	100%	100%	66%	63%	63%
America (NAFTA & UNASUR)															
All manufactured goods	4,329	6,985	7,610	76%	77%	68%	5,891	8,567	12,070	81%	79%	73%	42%	45%	39%
Machineries	2,632	4,423	4,430	46%	49%	40%	3,690	5,297	6,988	51%	49%	42%	42%	46%	39%
Parts & components	1,211	2,103	1,849	21%	23%	17%	1,541	2,294	2,731	21%	21%	17%	44%	48%	40%
(ICT-related goods)	244	537	172	4%	6%	2%	618	1,046	747	8%	10%	5%	28%	34%	19%
Finished products	1,421	2,320	2,581	25%	25%	23%	2,150	3,004	4,258	30%	28%	26%	40%	44%	38%
(ICT-related goods)	314	680	585	6%	7%	5%	811	1,174	1,675	11%	11%	10%	28%	37%	26%
Other manufactured goods	1,697	2,562	3,180	30%	28%	29%	2,201	3,269	5,081	30%	30%	31%	44%	44%	38%
Merchandise trade, total	5,680	9,117	11,143	100%	100%	100%	7,268	10,847	16,488	100%	100%	100%	44%	46%	40%

Notes: All figures are calculated using import statistics for bilateral merchandise trade. Trade values are deflated by the consumer price index (CPI) in the US.

the case of entrepôt trade between mainland China and Hong Kong in Section 2.1. In fact, including transactions between mainland China and Hong Kong as parts of East Asia's intra-regional trade causes more noticeable increases in the values of intra-regional exports than in those of intra-regional imports (see Appendix Table A2).[1] It would appear that trade flows are more likely to be counted multiple times in export statistics reported by different countries than in import statistics, mainly because the final destination market may not be known at the time of export while the country of origin may need to be verified under tariff regulations. The possible overlaps due to multiple counting will push up the values of exports.

Despite non-negligible differences between the values of intra-regional exports and intra-regional imports, the overall pattern does not differ qualitatively. As for extra-regional imports, the decreased importance of machinery finished products is particularly noticeable in East Asia when compared to Europe and America. The proportion of all manufactured goods in total extra-regional imports has decreased markedly from 73% in 1994 to 58% in 2007, and behind this trend, the percentage of machinery finished products has declined by 8% points, i.e., more than half of the decline of 15% points, and stands at 14% in 2007. The percentage of parts & components, on the other hand, stands at 17% in 2007, at the same level as in 1994. As of 2007, more than half of East Asia's extra-regional imports of machinery are of parts & components, i.e., 17% points out of 31% points, in contrast to other two regions.

Another noteworthy pattern is that East Asian countries depend more on intra-regional transactions for the import side than for the export side, unlike Europe and America. The proportion of intra-regional imports in the total imports from the world differs only slightly from the corresponding intra-regional share for the export side in Europe, except for ICT-related machinery, and America's intra-regional shares are lower for the import side than for the export side. On the other hand, in East Asia, the intra-regional shares are high for the import side when compared to the export side,

[1] Table A2 shows how the values and the product compositions of East Asia's intra-regional exports and imports are affected when transactions between mainland China and Hong Kong are included in the sample without careful consideration of entrepôt trade. The changes in the values are more noticeable on the export side than on the import side. In particular, in 2007, the intra-regional exports of ICT-related machinery became 1.5 times larger in value after transactions between mainland China and Hong Kong were included. As a result, the proportion of intra-regional exports was pushed up by 4-9%, which is high compared to 2-3% on the import side.

particularly in ICT-related machinery. The intra-regional shares of the imports of ICT-related parts & components and ICT-related finished products have increased to reach 78% and 80% in 2007, respectively, reflecting the decreases in their extra-regional imports even in terms of value. As for the other two regions, on the other hand, the intra-regional shares of the imports of ICT-related machinery are notably lower when compared to other product groups at the aggregate level.

3.2. Ranking of Major Traded Products

This subsection further examines the product composition of intra-regional and extra-regional trade conducted by East Asia, not by calculating the proportions of product groups but by looking at the details of major exported and imported goods. In Table 6, the top 10 goods of intra-regional and extra-regional exports by East Asia, Europe, and America are listed. Goods are ranked in descending order of value by region for the years 1994 and 2007, and the lists include the HS 6-digit product codes, the commodity descriptions in the UN Comtrade database, the values of exports, and the cumulative shares in the total intra-regional or extra-regional exports of manufactured goods. Machinery parts & components are indicated by the shaded area and ICT-related machinery is highlighted in boldface type.

In each region, taken together, the top 10 goods account for a considerable portion of the total intra-regional or extra-regional exports of manufactured goods. As of 2007, for both intra-regional and extra-regional exports, 16-23% of the total exports are composed of only ten major goods, most of which are machinery, particularly in intra-regional exports. In this regard, however, East Asia's intra-regional exports contrast with those of Europe and America in the dominance of ICT-related parts & components. All of the top 10 goods of East Asia's intra-regional exports in 2007 are machinery, and seven of them are ICT-related parts & components. In other words, eight of the top 10 goods are parts & components and nine of them are ICT-related machinery.

Table 6. Top 10 Goods of Intra-regional and Extra-regional Exports by East Asia: Comparison with Europe and America.

Ranking	Intra-regional exports				Extra-regional exports			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
East Asia (ASEAN+6)								
Year 1994								
1	**854211**	**Monolithic integrated circuits, digital**	166,455	4%	870323	Automobiles, spark ignition engine of 1500	355,090	6%
2	**847330**	**Parts and accessories of data processi**	129,471	7%	**847330**	**Parts and accessories of data processi**	263,415	10%
3	**854219**	**Monolithic integrated circuits, except**	83,984	9%	**854211**	**Monolithic integrated circuits, digital**	181,607	12%
4	**852290**	**Parts and accessories of recorders exc**	73,720	10%	**847192**	**Computer input or output units**	162,537	15%
5	**852810**	**Colour television receivers/monitors/p**	57,746	11%	**847193**	**Computer data storage units**	161,461	18%
6	870323	Automobiles, spark ignition engine of 1500	52,132	13%	870322	Automobiles, spark ignition engine of 1000	124,657	19%
7	**854280**	**Electronic integrated circuits/microass**	51,086	14%	890190	Cargo vessels other than tanker or refriger	112,431	21%
8	710813	Gold, semi-manufactured forms, non-mone	47,983	15%	**852110**	**Video recording/reproducing apparatu**	82,361	23%
9	**852990**	**Parts for radio/tv transmit/receive equ**	47,137	16%	**854280**	**Electronic integrated circuits/microass**	74,409	24%
10	**847193**	**Computer data storage units**	44,975	17%	**852810**	**Colour television receivers/monitors/p**	71,070	25%
Year 2007								
1	**854239**	**Other Electronic integrated circuits, c**	536,222	5%	870323	Vehicles (excl. of 87.02 & 8703.10) princi	553,857	4%
2	**847330**	**Parts & accessories of the machines o**	262,860	7%	**847130**	**Portable automatic data processing ma**	446,324	7%
3	**854231**	**Electronic integrated circuits, process**	245,671	9%	**851712**	**Telephones for cellular networks/for o**	400,918	9%
4	**854232**	**Electronic integrated circuits, memor**	196,649	11%	870324	Vehicles (excl. of 87.02 & 8703.10) princi	326,561	12%
5	844399	Other parts & accessories for printing mac	180,614	13%	**847330**	**Parts & accessories of the machines o**	276,864	13%
6	**851770**	**Parts of telephone sets, incl. telephon**	170,663	14%	890190	Vessels for the transportof goods & for th	209,198	15%
7	**851712**	**Telephones for cellular networks/for o**	148,742	16%	870322	Vehicles (excl. of 87.02 & 8703.10) princi	189,934	16%
8	**901380**	**Liquid crystal devices not constituting**	129,851	17%	844399	Other parts & accessories for printing mac	173,818	17%
9	**847170**	**Storage units**	129,517	18%	**847170**	**Storage units**	172,400	18%
10	**852990**	**Other parts suitable for use solely/prin**	124,532	19%	**852990**	**Other parts suitable for use solely/prin**	171,064	20%
Europe (EU27)								
Year 1994								
1	870323	Automobiles, spark ignition engine of 1500	477,079	4%	870323	Automobiles, spark ignition engine of 1500	240,295	4%
2	870332	Automobiles, diesel engine of 1500-2500 c	250,601	6%	870324	Automobiles, spark ignition engine of >300	101,313	6%
3	870322	Automobiles, spark ignition engine of 1000	208,918	8%	300490	Medicaments nes, in dosage	100,349	8%
4	870899	Motor vehicle parts nes	153,655	9%	880240	Fixed wing aircraft, unladen weight > 15,0	99,875	9%
5	**847330**	**Parts and accessories of data processi**	144,999	10%	710231	Diamonds (jewellery) unworked or simply	88,113	11%
6	**847191**	**Digital computer cpu with some of sto**	137,834	12%	**847330**	**Parts and accessories of data processi**	69,735	12%
7	300490	Medicaments nes, in dosage	137,504	13%	711319	Jewellery and parts of precious metal exce	63,396	13%
8	**854211**	**Monolithic integrated circuits, digital**	110,549	14%	870899	Motor vehicle parts nes	58,323	14%
9	**847192**	**Computer input or output units**	102,930	15%	710239	Diamonds (jewellery) worked but not mou	52,837	15%
10	880240	Fixed wing aircraft, unladen weight > 15,0	90,964	15%	**854211**	**Monolithic integrated circuits, digital**	47,879	16%
Year 2007								
1	300490	Medicaments (excluding goods of heading	1,025,443	4%	300490	Medicaments (excluding goods of heading	530,260	4%
2	870332	Vehicles principally designed for the transp	915,641	8%	870323	Vehicles (excl. of 87.02 & 8703.10) princi	389,818	7%
3	870323	Vehicles (excl. of 87.02 & 8703.10) princi	504,283	9%	870324	Vehicles (excl. of 87.02 & 8703.10) princi	331,163	10%
4	870899	Other parts & accessories for the motor v	299,017	11%	880240	Aeroplanes & other aircraft, of an unlader	225,307	11%
5	870322	Vehicles (excl. of 87.02 & 8703.10) princi	282,441	12%	**851712**	**Telephones for cellular networks/for o**	138,167	12%
6	870333	Vehicles principally designed for the transp	240,617	13%	710231	Diamonds, non-industrial, unworked/simply	137,034	14%
7	**852872**	**Other colour reception apparatus for t**	215,595	13%	870899	Other parts & accessories for the motor v	122,348	14%
8	**847330**	**Parts & accessories of the machines o**	211,229	14%	841191	Parts of the turbo-jets/turbo-propellers of 8	111,650	15%
9	840820	Compression-ignition internal combustion p	202,199	15%	**854231**	**Electronic integrated circuits, process**	91,445	16%
10	870421	Motor vehicles for the transportof goods (c	199,715	16%	870332	Vehicles principally designed for the transp	87,930	17%
America (NAFTA & UNASUR)								
Year 1994								
1	870324	Automobiles, spark ignition engine of >300	307,678	7%	880240	Fixed wing aircraft, unladen weight > 15,0	210,092	6%
2	870323	Automobiles, spark ignition engine of 1500	149,002	10%	**854211**	**Monolithic integrated circuits, digital**	175,451	10%
3	870899	Motor vehicle parts nes	132,801	13%	**847330**	**Parts and accessories of data processi**	127,709	14%
4	870431	Spark ignition engine trucks weighing < 5 t	119,701	16%	880330	Aircraft parts nes	95,491	16%
5	870829	Parts and accessories of bodies nes for mo	96,346	18%	710812	Gold in unwrought forms non-monetary	78,885	19%
6	**847330**	**Parts and accessories of data processi**	83,800	20%	870323	Automobiles, spark ignition engine of 1500	59,927	20%
7	440710	Lumber, coniferous (softwood) thickness <	82,004	22%	**847191**	**Digital computer cpu with some of sto**	59,898	22%
8	**854211**	**Monolithic integrated circuits, digital**	70,982	23%	440710	Lumber, coniferous (softwood) thickness <	45,231	23%
9	840734	Engines, spark-ignition reciprocating, over	65,073	25%	**847193**	**Computer data storage units**	43,575	24%
10	480100	Newsprint	51,166	26%	470321	Chem wood pulp, soda or sulphate, conifer	40,970	25%
Year 2007								
1	870324	Vehicles (excl. of 87.02 & 8703.10) princi	396,323	5%	880240	Aeroplanes & other aircraft, of an unlader	386,175	6%
2	870323	Vehicles (excl. of 87.02 & 8703.10) princi	317,279	9%	710812	Gold (incl. gold plated with platinum), in un	175,027	8%
3	**852812**	**Reception app. for television, whether**	185,974	11%	880330	Parts of aeroplanes/helicopters, other than	151,456	11%
4	870431	Motor vehicles for the transportof goods (c	184,713	13%	740311	Cathodes & sections of cathodes, of refine	149,971	13%
5	870829	Parts & accessories of bodies (incl. cabs)	147,584	15%	870323	Vehicles (excl. of 87.02 & 8703.10) princi	134,333	15%
6	870899	Other parts & accessories for the motor v	121,625	17%	300490	Medicaments (excluding goods of heading	115,557	17%
7	840734	Spark ignition reciprocating piston engines	92,533	18%	**854231**	**Electronic integrated circuits, process**	106,058	18%
8	880240	Aeroplanes & other aircraft, of an unlader	89,455	19%	710239	Diamonds, non-industrial other than unwor	103,606	20%
9	**852520**	**Transmission app. for radio-telephony**	88,542	20%	**854239**	**Other Electronic integrated circuits, c**	101,879	21%
10	**847330**	**Parts & accessories of the machines o**	82,108	21%	841191	Parts of the turbo-jets/turbo-propellers of 8	97,358	23%

Notes: All figures are calculated using export statistics for bilateral trade in manufactured goods. ICT goods are highlighted in boldface type and parts & components are indicated by the shaded area. For reference, a part of commodity description is shown in the columns next to HS code

ICT-related machinery is also dominant in East Asia's extra-regional exports though ICT-related finished products are frequently highly-ranked unlike in its intra-regional exports. While only two ICT-related machinery codes are ranked in the top 10 for extra-regional exports by Europe and America in 2007, half of the top 10 goods of East Asia's extra-regional exports are ICT-related. In addition, all of the top 10 goods of East Asia's extra-regional exports are machinery, as with intra-regional exports. For the other two regions, on the other hand, manufactured goods other than machinery are frequently observed in the ranking for extra-regional exports compared to intra-regional exports.

Table 7 corresponds to Table 6 and lists the top 10 goods of intra-regional and extra-regional imports by East Asia, Europe, and America. Although the rankings for the intra-regional imports in Table 7 are somewhat different from those for intra-regional exports in Table 6, East Asia's intra-regional trade is also marked by the dominance of ICT-related parts & components, based on import statistics. As with intra-regional trade and extra-regional exports, together the top 10 goods account for about 20% of extra-regional imports in each region. Compared to the other trade flows, however, ICT-related machinery is no longer dominant in East Asia's extra-regional imports, but is ranked high in the top 10 for extra-regional imports by Europe and America. As of 2007, only three ICT-related parts & components and no ICT-related finished products are ranked in the top 10 for East Asia's extra-regional imports, whereas half of the top 10 goods are ICT-related and many of them are finished products for the other two regions.

Table 7. Top 10 Goods of Intra-regional and Extra-regional Imports by East Asia: Comparison with Europe and America.

Ranking	Intra-regional imports				Extra-regional imports			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
East Asia (ASEAN+6)								
Year 1994								
1	**854211**	**Monolithic integrated circuits, digital**	139,846	3%	880240	Fixed wing aircraft, unladen weight > 15,0	164,349	4%
2	**847330**	**Parts and accessories of data processi**	130,439	6%	**854290**	**Parts of electronic integrated circuits**	106,216	6%
3	**854219**	**Monolithic integrated circuits, except**	96,773	8%	870323	Automobiles, spark ignition engine of 1500	102,244	8%
4	**852290**	**Parts and accessories of recorders exc**	72,767	10%	**854211**	**Monolithic integrated circuits, digital**	85,358	10%
5	**852990**	**Parts for radio/tv transmit/receive equ**	58,619	11%	**847330**	**Parts and accessories of data processi**	74,948	12%
6	**847193**	**Computer data storage units**	55,777	12%	710812	Gold in unwrought forms non-monetary	66,110	14%
7	**852810**	**Colour television receivers/monitors/p**	53,586	14%	847989	Machines and mechanical appliances nes	57,439	15%
8	870323	Automobiles, spark ignition engine of 1500	53,213	15%	**854219**	**Monolithic integrated circuits, except**	50,702	16%
9	**854290**	**Parts of electronic integrated circuits**	50,595	16%	870324	Automobiles, spark ignition engine of >300	49,915	17%
10	847989	Machines and mechanical appliances nes	50,326	17%	710239	Diamonds (jewellery) worked but not mou	45,694	18%
Year 2007								
1	**854231**	**Electronic integrated circuits, proces**	636,694	6%	880240	Aeroplanes & other aircraft, of an unlader	225,766	3%
2	**854239**	**Other Electronic integrated circuits,**	529,204	10%	**854231**	**Electronic integrated circuits, proces**	169,299	5%
3	**847330**	**Parts & accessories of the machines o**	327,461	13%	**854239**	**Other Electronic integrated circuits,**	155,932	7%
4	**854232**	**Electronic integrated circuits, memor**	252,879	15%	**854290**	**Parts of electronic integrated circuits**	150,547	9%
5	**901380**	**Liquid crystal devices not constituting**	195,938	17%	300490	Medicaments (excluding goods of heading	137,041	11%
6	**847170**	**Storage units**	195,175	19%	870323	Vehicles (excl. of 87.02 & 8703.10) princi	109,166	12%
7	844399	Other parts & accessories for printing mac	166,333	20%	710812	Gold (incl. gold plated with platinum), in un	103,763	14%
8	**852990**	**Other parts suitable for use solely/prin**	149,867	21%	740311	Cathodes & sections of cathodes, of refine	95,437	15%
9	**851712**	**Telephones for cellular networks/for o**	140,839	23%	710813	Gold (incl. gold plated with platinum), non-	91,662	16%
10	**854290**	**Parts of electronic integrated circuits**	131,595	24%	870324	Vehicles (excl. of 87.02 & 8703.10) princi	90,537	17%
Europe (EU27)								
Year 1994								
1	870323	Automobiles, spark ignition engine of 1500	448,565	4%	**847330**	**Parts and accessories of data processi**	160,637	3%
2	870332	Automobiles, diesel engine of 1500-2500 c	240,247	6%	**854211**	**Monolithic integrated circuits, digital**	120,829	6%
3	870899	Motor vehicle parts nes	217,898	8%	**847192**	**Computer input or output units**	98,002	7%
4	870322	Automobiles, spark ignition engine of 1000	215,805	10%	**847193**	**Computer data storage units**	92,097	9%
5	300490	Medicaments nes, in dosage	143,947	11%	870323	Automobiles, spark ignition engine of 1500	76,600	11%
6	**847330**	**Parts and accessories of data processi**	125,341	12%	880240	Fixed wing aircraft, unladen weight > 15,0	54,827	12%
7	**847191**	**Digital computer cpu with some of sto**	106,335	13%	**847191**	**Digital computer cpu with some of sto**	54,171	13%
8	880240	Fixed wing aircraft, unladen weight > 15,0	81,119	14%	870322	Automobiles, spark ignition engine of 1000	53,977	14%
9	**847192**	**Computer input or output units**	76,631	15%	710812	Gold in unwrought forms non-monetary	50,185	15%
10	**854211**	**Monolithic integrated circuits, digital**	74,682	15%	710239	Diamonds (jewellery) worked but not mou	47,330	16%
Year 2007								
1	300490	Medicaments (excluding goods of heading	916,920	4%	**847330**	**Parts & accessories of the machines o**	259,308	2%
2	870332	Vehicles principally designed for the transp	865,253	7%	300490	Medicaments (excluding goods of heading	231,124	4%
3	870323	Vehicles (excl. of 87.02 & 8703.10) princi	631,892	10%	**851712**	**Telephones for cellular networks/for o**	188,615	6%
4	870899	Other parts & accessories for the motor v	432,344	12%	**847130**	**Portable automatic data processing ma**	165,050	7%
5	870322	Vehicles (excl. of 87.02 & 8703.10) princi	289,354	13%	870332	Vehicles principally designed for the transp	154,520	8%
6	870829	Parts & accessories of bodies (incl. cabs)	206,819	14%	**851762**	**Machines for the reception, conversio**	142,848	9%
7	870421	Motor vehicles for the transportof goods (c	202,781	15%	**852990**	**Other parts suitable for use solely/prin**	141,642	11%
8	870333	Vehicles principally designed for the transp	191,898	15%	844399	Other parts & accessories for printing mac	132,712	12%
9	**851712**	**Telephones for cellular networks/for o**	188,745	16%	870323	Vehicles (excl. of 87.02 & 8703.10) princi	121,929	13%
10	**852872**	**Other colour reception apparatus for t**	183,815	17%	710231	Diamonds, non-industrial, unworked/simply	121,257	14%
America (NAFTA & UNASUR)								
Year 1994								
1	870324	Automobiles, spark ignition engine of >300	314,117	7%	870323	Automobiles, spark ignition engine of 1500	389,098	7%
2	870323	Automobiles, spark ignition engine of 1500	167,063	11%	**854211**	**Monolithic integrated circuits, digital**	251,930	11%
3	870431	Spark ignition engine trucks weighing < 5 t	118,387	14%	**847330**	**Parts and accessories of data processi**	159,385	14%
4	870899	Motor vehicle parts nes	104,345	16%	**847193**	**Computer data storage units**	149,832	16%
5	440710	Lumber, coniferous (softwood) thickness <	83,265	18%	**847192**	**Computer input or output units**	134,386	18%
6	870829	Parts and accessories of bodies nes for mo	77,117	20%	870324	Automobiles, spark ignition engine of >300	92,231	20%
7	**847330**	**Parts and accessories of data processi**	61,700	21%	710239	Diamonds (jewellery) worked but not mou	65,381	21%
8	840734	Engines, spark-ignition reciprocating, over	61,066	23%	870899	Motor vehicle parts nes	58,423	22%
9	480100	Newsprint	52,163	24%	**852110**	**Video recording/reproducing apparatu**	51,522	23%
10	**854211**	**Monolithic integrated circuits, digital**	46,748	25%	870322	Automobiles, spark ignition engine of 1000	48,156	24%
Year 2007								
1	870324	Vehicles (excl. of 87.02 & 8703.10) princi	420,744	6%	870323	Vehicles (excl. of 87.02 & 8703.10) princi	448,215	4%
2	870323	Vehicles (excl. of 87.02 & 8703.10) princi	303,245	10%	870324	Vehicles (excl. of 87.02 & 8703.10) princi	424,248	7%
3	870431	Motor vehicles for the transportof goods (c	202,980	12%	300490	Medicaments (excluding goods of heading	350,587	10%
4	**852872**	**Other colour reception apparatus for t**	154,460	14%	**847130**	**Portable automatic data processing ma**	298,007	13%
5	870829	Parts & accessories of bodies (incl. cabs)	132,276	16%	**847330**	**Parts & accessories of the machines o**	225,042	14%
6	870899	Other parts & accessories for the motor v	112,561	17%	**851712**	**Telephones for cellular networks/for o**	217,166	16%
7	840734	Spark ignition reciprocating piston engines	97,535	19%	710239	Diamonds, non-industrial other than unwor	174,163	18%
8	300490	Medicaments (excluding goods of heading	75,396	20%	**847170**	**Storage units**	138,231	19%
9	740311	Cathodes & sections of cathodes, of refine	72,616	21%	**851762**	**Machines for the reception, conversio**	108,779	20%
10	880240	Aeroplanes & other aircraft, of an unlader	69,467	22%	844399	Other parts & accessories for printing mac	102,759	21%

Notes: All figures are calculated using import statistics for bilateral trade in manufactured goods. ICT goods are highlighted in boldface type and parts & components are indicated by the shaded area. For reference, a part of commodity description is shown in the columns next to HS code

3.3. Details of East Asia's Trade Structure: Comparison between Subgroups

Table 8 provides further information on intra-regional and extra-regional exports of all manufactured goods by East Asia, as an extension of Table 4 in Section 3.1, by looking into the trade patterns of five subgroups of East Asian countries. East Asia is divided into five countries/regions: Japan, the Newly Industrialized Economies (NIEs: Rep. of Korea and Singapore), ASEAN4 (Indonesia, Malaysia, the Philippines, and Thailand), China, and others. The values of exports by the five subgroups of East Asian countries, annual average growth rates of export values, the product compositions of exports, and the shares by export destination region are reported in the four respective tables in Table 8. Export destination regions are divided into four: East Asia, Europe, America, and the rest of the world (ROW). As for East Asia, the figures limited to the major East Asian countries including Japan, the NIEs, the ASEAN4, and China are also reported for reference. The following is a more detailed review of the features of East Asia's intra-regional and extra-regional exports summarized in Section 3.1.

First, the increasing importance of machinery parts & components in intra-regional exports is a feature common to Japan, the NIEs, the ASEAN4, and China. As for Japan, the NIEs, and the ASEAN4, the proportion of machinery parts & components in total intra-regional exports of all manufactured goods is already high at 34-37% as of 1994, and has increased to 39-53% in 2007. In contrast to the rise in the percentage of parts & components, the proportion of finished products has declined from 23-36% in 1994 to 18-22% in 2007 in Japan and the NIEs and the rate has hovered around 20% in the ASEAN4. More noteworthy is the remarkable rise in the proportion of machinery in China's intra-regional exports. The percentage of machinery has risen from 35% in 1994 to levels similar to those of Japan, the NIEs, and the ASEAN4, at 53% in 2007, and the rates for both parts & components and finished products continue to rise simultaneously. The value of China's intra-regional exports of machinery has increased by 7.6 times during the period, and that of parts & components has increased up to eight times, at an annual average growth rate of 18%. In the cases of exports to Europe and America by these four subgroups, the proportions of machinery are approximately the same or even higher than the corresponding figures for intra-regional exports; however, in clear contrast to intra-regional exports, the percentages of parts &

components are limited and those of finished products are notably high.

Second, besides the increasing importance of machinery parts & components, the high proportion of ICT-related parts & components in intra-regional exports is another feature common to the NIEs, the ASEAN4, and China, although not in the case of Japan. Particularly in the NIEs and the ASEAN4, as of 2007, 27-35% of the intra-regional exports of manufactured goods are accounted for by ICT-related parts & components. As for China, while the percentage of ICT-related parts & components remains at a low level compared to the NIEs and the ASEAN4, at 16% in 2007, more than half of China's intra-regional exports of machinery parts & components are of ICT goods, i.e., 16% points out of 29% points. The exception is Japan, whose percentage of ICT-related parts & components is the same as China's, at 16% in 2007. However, this figure is relatively low compared to 41% for parts & components as a whole. In the case of exports to Europe and America, on the other hand, the proportions of ICT-related parts & components are limited compared to intra-regional exports, for all of the four subgroups.

Third, the pattern of exports by other countries in East Asia is distinctly different from Japan, the NIEs, the ASEAN4, and China. The proportion of machinery in intra-regional exports by the rest of East Asia is only approximately 20% although half of these are accounted for by parts & components, and the product composition differs only slightly between intra-regional and extra-regional exports. Also, the percentages of ICT-related parts & components are limited to 5% at most, even in the case of intra-regional exports.

Table 8. East Asian Exports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Destination.

Value (millions US$)

Destination	East Asia (ASEAN+6)			Core East Asia (Japan, NIEs, ASEAN4, China)			Europe (EU27)			America (NAFTA & UNASUR)			ROW		
Exporter	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
Japan															
Machineries	1,297	1,269	1,681	1,164	1,149	1,498	672	741	768	1,502	1,513	1,342	326	285	581
Parts & components	655	803	1,091	618	766	1,041	263	320	342	644	636	518	51	57	91
(ICT-related goods)	289	434	431	284	428	425	103	129	74	242	217	84	4	6	5
Finished products	642	466	590	546	383	456	409	421	427	859	877	824	275	228	490
(ICT-related goods)	156	112	85	142	99	73	156	155	80	260	228	103	29	16	16
All manufactured goods, total	1,781	1,801	2,651	1,613	1,646	2,403	791	868	925	1,711	1,735	1,553	389	337	677
NIEs															
Machineries	612	953	2,083	552	871	1,888	257	396	592	443	636	662	138	167	464
Parts & components	366	655	1,560	347	622	1,462	103	184	260	200	299	340	23	37	100
(ICT-related goods)	259	514	1,022	252	498	998	68	156	161	156	254	202	11	16	18
Finished products	245	298	522	205	249	426	154	212	332	242	337	322	115	131	363
(ICT-related goods)	129	171	274	109	144	233	107	116	126	174	205	132	38	28	53
All manufactured goods, total	1,051	1,434	2,959	942	1,291	2,635	319	483	760	578	790	848	210	267	631
ASEAN4															
Machineries	402	757	1,134	380	708	1,021	128	265	327	254	402	403	24	39	117
Parts & components	252	544	740	246	526	700	71	153	169	136	238	170	6	14	37
(ICT-related goods)	192	455	509	190	445	495	58	132	120	119	210	110	1	5	6
Finished products	150	213	394	134	182	321	57	112	158	118	164	233	18	26	80
(ICT-related goods)	90	144	239	86	127	212	41	84	98	96	136	189	8	14	23
All manufactured goods, total	733	1,121	1,891	680	1,025	1,641	263	394	501	412	591	625	89	116	277
China incl. Hong Kong															
Machineries	209	466	1,580	181	424	1,294	159	361	1,490	256	491	1,639	60	105	634
Parts & components	102	259	831	92	245	736	43	125	486	80	164	512	15	35	175
(ICT-related goods)	67	165	456	61	159	427	27	74	260	44	90	223	3	10	34
Finished products	107	207	749	89	179	558	116	236	1,004	177	327	1,126	45	70	458
(ICT-related goods)	46	98	423	40	88	310	61	123	668	93	181	786	17	25	161
All manufactured goods, total	589	1,000	2,914	516	877	2,293	446	715	2,486	696	1,052	2,863	209	326	1,652
Others in East Asia															
Machineries	59	68	130	35	46	89	17	28	70	21	34	74	21	31	103
Parts & components	31	40	70	18	29	55	9	15	39	14	19	36	10	12	38
(ICT-related goods)	8	17	16	5	14	14	2	3	6	4	4	5	1	2	3
Finished products	29	28	60	16	17	34	8	13	31	7	15	38	11	19	65
(ICT-related goods)	7	6	15	6	4	9	2	2	8	2	3	8	2	2	5
All manufactured goods, total	314	322	620	244	257	464	126	170	370	97	168	336	78	130	392

Table 8 (cont.). East Asian Exports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Destination.

Annual average growth

Destination	East Asia (ASEAN+6)		Core East Asia (Japan, NIEs, ASEAN4, China)		Europe (EU27)		America (NAFTA & UNASUR)		ROW	
Exporter	1994-2000	2000-2007	1994-2000	2000-2007	1994-2000	2000-2007	1994-2000	2000-2007	1994-2000	2000-2007
Japan										
Machineries	0%	4%	0%	4%	2%	1%	0%	-2%	-2%	11%
Parts & components	3%	4%	4%	4%	3%	1%	0%	-3%	2%	7%
(ICT-related goods)	7%	0%	7%	0%	4%	-8%	-2%	-13%	4%	-1%
Finished products	-5%	3%	-6%	3%	0%	0%	0%	-1%	-3%	12%
(ICT-related goods)	-5%	-4%	-6%	-4%	0%	-9%	-2%	-11%	-9%	0%
All manufactured goods, total	0%	6%	0%	6%	2%	1%	0%	-2%	-2%	10%
NIEs										
Machineries	8%	12%	8%	12%	8%	6%	6%	1%	3%	16%
Parts & components	10%	13%	10%	13%	10%	5%	7%	2%	8%	15%
(ICT-related goods)	12%	10%	12%	10%	15%	1%	8%	-3%	7%	1%
Finished products	3%	8%	3%	8%	6%	7%	6%	-1%	2%	16%
(ICT-related goods)	5%	7%	5%	7%	1%	1%	3%	-6%	-5%	9%
All manufactured goods, total	5%	11%	5%	11%	7%	7%	5%	1%	4%	13%
ASEAN4										
Machineries	11%	6%	11%	5%	13%	3%	8%	0%	9%	17%
Parts & components	14%	5%	13%	4%	14%	1%	10%	-5%	14%	15%
(ICT-related goods)	15%	2%	15%	2%	15%	-1%	10%	-9%	32%	2%
Finished products	6%	9%	5%	8%	12%	5%	6%	5%	7%	18%
(ICT-related goods)	8%	7%	7%	8%	13%	2%	6%	5%	9%	8%
All manufactured goods, total	7%	8%	7%	7%	7%	3%	6%	1%	4%	13%
China incl. Hong Kong										
Machineries	14%	19%	15%	17%	15%	22%	11%	19%	10%	29%
Parts & components	17%	18%	18%	17%	19%	21%	13%	18%	15%	26%
(ICT-related goods)	16%	16%	17%	15%	18%	20%	13%	14%	20%	19%
Finished products	12%	20%	12%	18%	13%	23%	11%	19%	8%	31%
(ICT-related goods)	13%	23%	14%	20%	12%	27%	12%	23%	7%	31%
All manufactured goods, total	9%	17%	9%	15%	8%	19%	7%	15%	8%	26%
Others in East Asia										
Machineries	2%	10%	5%	10%	9%	14%	9%	12%	7%	19%
Parts & components	5%	8%	8%	9%	8%	15%	6%	9%	4%	17%
(ICT-related goods)	13%	-1%	18%	0%	10%	8%	0%	2%	4%	10%
Finished products	0%	11%	0%	11%	9%	13%	13%	14%	10%	19%
(ICT-related goods)	-4%	14%	-7%	14%	-1%	21%	8%	15%	0%	17%
All manufactured goods, total	0%	10%	1%	9%	5%	12%	10%	10%	9%	17%

Table 8 (cont.). East Asian Exports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Destination.

Product composition

Destination	East Asia (ASEAN+6)			Core East Asia (Japan, NIEs, ASEAN4, China)			Europe (EU27)			America (NAFTA & UNASUR)			ROW		
Exporter	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
Japan															
Machineries	73%	70%	63%	72%	70%	62%	85%	85%	83%	88%	87%	86%	84%	85%	86%
Parts & components	37%	45%	41%	38%	47%	43%	33%	37%	37%	38%	37%	33%	13%	17%	13%
(ICT-related goods)	16%	24%	16%	18%	26%	18%	13%	15%	8%	14%	13%	5%	1%	2%	1%
Finished products	36%	26%	22%	34%	23%	19%	52%	49%	46%	50%	51%	53%	71%	68%	72%
(ICT-related goods)	9%	6%	3%	9%	6%	3%	20%	18%	9%	15%	13%	7%	7%	5%	2%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NIEs															
Machineries	58%	66%	70%	59%	67%	72%	80%	82%	78%	77%	81%	78%	66%	63%	74%
Parts & components	35%	46%	53%	37%	48%	55%	32%	38%	34%	35%	38%	40%	11%	14%	16%
(ICT-related goods)	25%	36%	35%	27%	39%	38%	21%	32%	21%	27%	32%	24%	5%	6%	3%
Finished products	23%	21%	18%	22%	19%	16%	48%	44%	44%	42%	43%	38%	55%	49%	58%
(ICT-related goods)	12%	12%	9%	12%	11%	9%	33%	24%	17%	30%	26%	16%	18%	10%	8%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ASEAN4															
Machineries	55%	67%	60%	56%	69%	62%	49%	67%	65%	62%	68%	65%	27%	34%	42%
Parts & components	34%	48%	39%	36%	51%	43%	27%	39%	34%	33%	40%	27%	7%	12%	13%
(ICT-related goods)	26%	41%	27%	28%	43%	30%	22%	34%	24%	29%	36%	18%	1%	5%	2%
Finished products	21%	19%	21%	20%	18%	20%	22%	29%	32%	29%	28%	37%	20%	22%	29%
(ICT-related goods)	12%	13%	13%	13%	12%	13%	16%	21%	20%	23%	23%	30%	9%	12%	8%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
China incl. Hong Kong															
Machineries	35%	47%	54%	35%	48%	56%	36%	50%	60%	37%	47%	57%	29%	32%	38%
Parts & components	17%	26%	29%	18%	28%	32%	10%	17%	20%	11%	16%	18%	7%	11%	11%
(ICT-related goods)	11%	17%	16%	12%	18%	19%	6%	10%	10%	6%	9%	8%	2%	3%	2%
Finished products	18%	21%	26%	17%	20%	24%	26%	33%	40%	25%	31%	39%	22%	21%	28%
(ICT-related goods)	8%	10%	15%	8%	10%	14%	14%	17%	27%	13%	17%	27%	8%	8%	10%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Others in East Asia															
Machineries	19%	21%	21%	14%	18%	19%	13%	17%	19%	22%	21%	22%	26%	24%	26%
Parts & components	10%	12%	11%	7%	11%	12%	7%	9%	10%	14%	12%	11%	13%	10%	10%
(ICT-related goods)	3%	5%	3%	2%	5%	3%	1%	2%	1%	4%	2%	1%	2%	1%	1%
Finished products	9%	9%	10%	7%	6%	7%	6%	8%	8%	7%	9%	11%	14%	15%	17%
(ICT-related goods)	2%	2%	2%	2%	1%	2%	2%	1%	2%	2%	2%	2%	2%	1%	1%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 8 (cont.). East Asian Exports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Destination.

Share by destination

Destination	East Asia (ASEAN+6)			Core East Asia (Japan, NIEs, ASEAN4, China)			Europe (EU27)			America (NAFTA & UNASUR)			ROW		
Exporter	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
Japan															
Machineries	34%	33%	38%	31%	30%	34%	18%	19%	18%	40%	40%	31%	9%	8%	15%
Parts & components	41%	44%	53%	38%	42%	51%	16%	18%	17%	40%	35%	25%	3%	3%	5%
(ICT-related goods)	45%	55%	73%	45%	54%	72%	16%	16%	12%	38%	28%	14%	1%	1%	1%
Finished products	29%	23%	25%	25%	19%	20%	19%	21%	18%	39%	44%	35%	14%	13%	27%
(ICT-related goods)	26%	22%	30%	24%	19%	26%	26%	30%	28%	43%	45%	36%	5%	3%	6%
All manufactured goods, total	38%	38%	46%	35%	35%	41%	17%	18%	16%	37%	37%	27%	9%	8%	13%
NIEs															
Machineries	42%	44%	55%	38%	40%	50%	18%	18%	16%	31%	30%	17%	11%	8%	14%
Parts & components	53%	56%	69%	50%	53%	65%	15%	16%	11%	29%	25%	15%	3%	3%	5%
(ICT-related goods)	52%	55%	73%	51%	53%	71%	14%	17%	11%	32%	27%	14%	2%	2%	1%
Finished products	32%	30%	34%	27%	25%	28%	20%	22%	22%	32%	34%	21%	18%	15%	31%
(ICT-related goods)	29%	33%	47%	24%	28%	40%	24%	22%	22%	39%	39%	23%	9%	6%	10%
All manufactured goods, total	49%	48%	57%	44%	43%	51%	15%	16%	15%	27%	27%	16%	11%	10%	14%
ASEAN4															
Machineries	50%	52%	57%	47%	48%	52%	16%	18%	17%	31%	27%	20%	3%	3%	6%
Parts & components	54%	57%	66%	53%	55%	63%	15%	16%	15%	29%	25%	15%	1%	1%	3%
(ICT-related goods)	52%	57%	68%	51%	55%	66%	16%	16%	16%	32%	26%	15%	0%	1%	1%
Finished products	44%	41%	46%	39%	35%	37%	17%	22%	18%	34%	32%	27%	5%	5%	10%
(ICT-related goods)	38%	38%	43%	37%	34%	38%	18%	22%	18%	41%	36%	34%	4%	4%	4%
All manufactured goods, total	49%	50%	57%	45%	46%	50%	18%	18%	15%	27%	27%	19%	6%	5%	9%
China incl. Hong Kong															
Machineries	31%	33%	30%	27%	30%	24%	23%	25%	28%	37%	35%	31%	10%	8%	13%
Parts & components	42%	44%	41%	38%	42%	37%	18%	21%	24%	33%	28%	26%	7%	6%	10%
(ICT-related goods)	47%	49%	47%	44%	47%	44%	19%	22%	27%	31%	27%	23%	2%	3%	4%
Finished products	24%	25%	22%	20%	21%	17%	26%	28%	30%	40%	39%	34%	11%	9%	16%
(ICT-related goods)	21%	23%	21%	18%	21%	15%	28%	29%	33%	43%	42%	39%	8%	6%	9%
All manufactured goods, total	30%	32%	29%	27%	28%	23%	23%	23%	25%	36%	34%	29%	12%	12%	20%
Others in East Asia															
Machineries	50%	42%	34%	30%	28%	24%	14%	17%	19%	18%	21%	20%	17%	19%	27%
Parts & components	48%	46%	38%	29%	34%	30%	15%	17%	21%	22%	22%	20%	16%	14%	21%
(ICT-related goods)	54%	66%	55%	34%	53%	46%	12%	13%	19%	25%	15%	15%	9%	6%	11%
Finished products	53%	37%	31%	30%	22%	18%	14%	17%	16%	13%	20%	20%	20%	25%	34%
(ICT-related goods)	57%	47%	42%	43%	30%	26%	17%	17%	22%	14%	24%	23%	12%	13%	13%
All manufactured goods, total	51%	41%	36%	40%	33%	27%	21%	22%	22%	16%	21%	20%	13%	16%	23%

Notes: East Asia is divided into 5 subgroups: Japan, NIEs, ASEAN4, China (including Hong Kong), and others. All figures are calculated using export statistics for bilateral trade in manufactured goods.

Fourth, a significant increase in the importance of intra-regional transactions in the exports of machinery parts & components, in particular, ICT-related ones, is commonly observed for Japan, the NIEs, and the ASEAN4. The proportion of intra-regional exports in the total exports of machinery parts & components to the world was already high compared to the aggregate level, at 41-54% as of 1994, and has increased to 53-69% in 2007; for ICT-related parts & components, in particular, the intra-regional share has increased sharply to 68-73% in 2007. In stark contrast to parts & components, the intra-regional share of the exports of finished products by these three subgroups has remained steady at a relatively low level, around 25-45%, over the same period. As for China, the intra-regional share of the exports of parts & components has not increased, but remains high at more than 40%, compared to the aggregate level, while the rate for finished products has hovered around 22-25%. Changes in the geographical distribution of East Asia's exports as well as the relative importance of intra-regional transactions are further discussed in Section 4.4.

Lastly, the higher annual average growth rate of the value of intra-regional exports of machinery finished products during the latter period 2000-2007 than during the earlier period 1994-2000 is commonly observed for Japan, the NIEs, the ASEAN4, and China. Particularly in the ASEAN4 and China, intra-regional exports of finished products have grown at a rapid pace exceeding that for those of parts & components, since 2000. In addition, compared to the exports of finished products to Europe and America by the ASEAN4 and China, their intra-regional exports of finished products have grown at relatively high or at least comparable rates.

Table 9 corresponds to Table 8 and shows the patterns of intra-regional and extra-regional imports of all manufactured goods by five subgroups of East Asian countries. One of the noticeable trends in the intra-regional imports by the five subgroups is the increasing importance of machinery parts & components in intra-regional imports by Japan and China. Their proportions of parts & components have doubled from 15% and 26% in 1994 to 30% and 53% respectively in 2007. Meanwhile, as for the NIEs and the ASEAN4, the percentages of parts & components were already around 40% as of 1994 and have fluctuated between 40% and 50% over the same period. In contrast to parts & components, the percentages of finished products in the intra-regional imports by the NIEs, the ASEAN4, and China have

declined, although the rate trends slightly upward in the case of Japan. Accordingly, as of 2007, the importance of parts & components in intra-regional imports becomes more prominent for each of the four subgroups. In this regard, however, the same does not hold true for the intra-regional imports by the rest of East Asia, for which the percentage of finished products remains twice as high as that of parts & components though the rate for machinery as a whole reaches levels similar to other subgroups.

Second, as with intra-regional exports, the importance of machinery parts & components in the intra-regional imports by the NIEs, the ASEAN4, and China is backed by high proportions of ICT-related parts & components. As of 2007, 24-38% of the intra-regional imports of manufactured goods by these three subgroups are accounted for by ICT-related parts & components while the corresponding percentages for the export side are 16-35%.

Third, the product compositions of the imports from Europe and America by five subgroups of East Asian countries are relatively similar to those of the intra-regional imports, as compared to the export side. As of 2007, the proportions of machinery parts & components in the imports from Europe and America by Japan, the NIEs, the ASEAN4, and China exceed those of finished products, except for Japan's imports from Europe. In addition, it is striking that the percentages of ICT-related parts & components in the ASEAN4's imports from Europe and America remain at a high level compared to other subgroups, and stand at 25% and 41% as of 2007, respectively. In particular, the percentage of ICT-related parts & components in the ASEAN4's imports from America, ranging from 31% to 50%, continues to be higher than the corresponding rate for intra-regional exports, ranging from 23% to 33%, from 1994 to 2007.

Table 9. East Asian Imports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Origin.

Value (millions US$)

Origin / Importer	East Asia (ASEAN+6)			Core East Asia (Japan, NIEs, ASEAN4, China)			Europe (EU27)			America (NAFTA & UNASUR)			ROW		
	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
Japan															
Machineries	218	554	890	213	545	867	189	228	258	343	433	343	21	32	44
Parts & components	114	295	511	111	289	494	44	68	116	150	234	199	4	8	10
(ICT-related goods)	76	194	248	76	193	245	11	24	15	81	128	64	1	3	3
Finished products	104	259	379	102	255	373	144	159	142	193	199	144	18	24	34
(ICT-related goods)	64	176	231	63	176	230	23	43	13	64	76	26	2	3	1
All manufactured goods, total	735	1,124	1,727	646	1,046	1,614	427	456	527	675	696	591	127	141	207
NIEs															
Machineries	788	1,000	1,472	777	986	1,446	201	209	378	308	404	442	33	43	63
Parts & components	461	679	1,009	455	669	994	100	130	248	172	263	321	7	27	34
(ICT-related goods)	304	507	572	302	504	571	29	66	69	91	181	115	2	20	14
Finished products	327	321	463	322	317	452	100	79	130	136	141	121	26	15	29
(ICT-related goods)	162	168	234	160	167	229	16	25	14	54	68	24	1	3	2
All manufactured goods, total	1,152	1,402	2,350	1,093	1,331	2,244	340	330	579	473	554	660	89	109	177
ASEAN4															
Machineries	707	760	1,131	694	746	1,103	222	156	246	247	265	250	24	20	28
Parts & components	468	581	787	462	570	772	95	100	150	148	214	198	13	13	16
(ICT-related goods)	252	390	497	251	385	491	34	66	94	108	174	147	4	9	9
Finished products	239	179	344	232	175	331	127	55	96	99	51	52	10	7	12
(ICT-related goods)	44	53	122	43	52	119	19	15	19	24	19	16	2	1	1
All manufactured goods, total	1,099	1,168	1,906	1,034	1,108	1,779	341	241	370	349	347	361	92	84	138
China incl. Hong Kong															
Machineries	632	895	2,726	622	887	2,698	264	334	778	205	266	483	50	40	127
Parts & components	292	630	2,125	288	626	2,111	79	185	396	72	148	289	9	13	68
(ICT-related goods)	174	433	1,545	173	431	1,541	17	90	87	40	92	147	1	3	40
Finished products	340	265	601	334	261	588	185	149	382	133	117	194	41	27	59
(ICT-related goods)	118	118	260	116	116	255	29	43	39	37	62	41	2	6	6
All manufactured goods, total	1,101	1,575	4,037	1,039	1,485	3,800	444	534	1,236	356	444	952	170	185	469
Others in East Asia															
Machineries	202	309	772	188	293	741	128	145	362	139	152	237	12	20	66
Parts & components	65	95	235	60	90	225	52	58	138	63	69	85	5	7	19
(ICT-related goods)	20	36	67	19	35	66	7	11	14	17	20	12	0	1	5
Finished products	137	214	536	128	203	516	76	87	224	76	83	151	7	13	47
(ICT-related goods)	37	71	223	36	70	219	13	21	33	25	29	30	1	2	9
All manufactured goods, total	365	569	1,489	305	506	1,347	262	321	666	215	234	387	72	124	371

Table 9 (cont.). East Asian Imports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Origin

Annual average growth

Origin / Importer	East Asia (ASEAN+6)		Core East Asia (Japan, NIEs, ASEAN4, China)		Europe (EU27)		America (NAFTA & UNASUR)		ROW	
	1994-2000	2000-2007	1994-2000	2000-2007	1994-2000	2000-2007	1994-2000	2000-2007	1994-2000	2000-2007
Japan										
Machineries	17%	7%	17%	7%	3%	2%	4%	-3%	7%	5%
Parts & components	17%	8%	17%	8%	7%	8%	8%	-2%	14%	3%
(ICT-related goods)	17%	4%	17%	3%	14%	-6%	8%	-9%	28%	-1%
Finished products	16%	6%	17%	6%	2%	-2%	1%	-5%	5%	5%
(ICT-related goods)	18%	4%	19%	4%	11%	-16%	3%	-14%	6%	-10%
All manufactured goods, total	7%	6%	8%	6%	1%	2%	1%	-2%	2%	6%
NIEs										
Machineries	4%	6%	4%	6%	1%	9%	5%	1%	4%	6%
Parts & components	7%	6%	7%	6%	4%	10%	7%	3%	26%	3%
(ICT-related goods)	9%	2%	9%	2%	15%	1%	12%	-6%	46%	-5%
Finished products	0%	5%	0%	5%	-4%	7%	1%	-2%	-8%	9%
(ICT-related goods)	1%	5%	1%	5%	8%	-9%	4%	-14%	18%	-6%
All manufactured goods, total	3%	8%	3%	8%	-1%	8%	3%	3%	3%	7%
ASEAN4										
Machineries	1%	6%	1%	6%	-6%	7%	1%	-1%	-3%	5%
Parts & components	4%	4%	4%	4%	1%	6%	6%	-1%	-1%	4%
(ICT-related goods)	8%	4%	7%	4%	12%	5%	8%	-2%	14%	1%
Finished products	-5%	10%	-5%	10%	-13%	8%	-11%	0%	-6%	7%
(ICT-related goods)	3%	13%	3%	12%	-5%	4%	-4%	-2%	-10%	2%
All manufactured goods, total	1%	7%	1%	7%	-6%	6%	0%	1%	-2%	7%
China incl. Hong Kong										
Machineries	6%	17%	6%	17%	4%	13%	4%	9%	-4%	18%
Parts & components	14%	19%	14%	19%	15%	11%	13%	10%	6%	27%
(ICT-related goods)	16%	20%	16%	20%	32%	-1%	15%	7%	16%	43%
Finished products	-4%	12%	-4%	12%	-4%	14%	-2%	7%	-7%	12%
(ICT-related goods)	0%	12%	0%	12%	7%	-1%	9%	-6%	19%	0%
All manufactured goods, total	6%	14%	6%	14%	3%	13%	4%	11%	1%	14%
Others in East Asia										
Machineries	7%	14%	8%	14%	2%	14%	2%	6%	9%	19%
Parts & components	7%	14%	7%	14%	2%	13%	2%	3%	6%	16%
(ICT-related goods)	11%	9%	11%	9%	6%	4%	2%	-7%	15%	25%
Finished products	8%	14%	8%	14%	2%	14%	2%	9%	11%	20%
(ICT-related goods)	11%	18%	12%	18%	9%	7%	2%	1%	14%	22%
All manufactured goods, total	8%	15%	9%	15%	3%	11%	1%	7%	9%	17%

Table 9 (cont.). East Asian Imports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Origin

Product composition

Importer \ Origin	East Asia (ASEAN+6)			Core East Asia (Japan, NIEs, ASEAN4, China)			Europe (EU27)			America (NAFTA & UNASUR)			ROW		
	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
Japan															
Machineries	30%	49%	52%	33%	52%	54%	44%	50%	49%	51%	62%	58%	17%	23%	21%
Parts & components	15%	26%	30%	17%	28%	31%	10%	15%	22%	22%	34%	34%	3%	6%	5%
(ICT-related goods)	10%	17%	14%	12%	18%	15%	3%	5%	3%	12%	18%	11%	1%	2%	2%
Finished products	14%	23%	22%	16%	24%	23%	34%	35%	27%	29%	29%	24%	14%	17%	16%
(ICT-related goods)	9%	16%	13%	10%	17%	14%	5%	10%	2%	9%	11%	4%	2%	2%	1%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NIEs															
Machineries	68%	71%	63%	71%	74%	64%	59%	63%	65%	65%	73%	67%	37%	39%	36%
Parts & components	40%	48%	43%	42%	50%	44%	30%	39%	43%	36%	48%	49%	8%	25%	19%
(ICT-related goods)	26%	36%	24%	28%	38%	25%	9%	20%	12%	19%	33%	17%	2%	18%	8%
Finished products	28%	23%	20%	29%	24%	20%	30%	24%	23%	29%	25%	18%	30%	14%	16%
(ICT-related goods)	14%	12%	10%	15%	13%	10%	5%	8%	2%	11%	12%	4%	1%	3%	1%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ASEAN4															
Machineries	64%	65%	59%	67%	67%	62%	65%	65%	67%	71%	76%	69%	26%	24%	20%
Parts & components	43%	50%	41%	45%	51%	43%	28%	42%	40%	42%	62%	55%	14%	15%	12%
(ICT-related goods)	23%	33%	26%	24%	35%	28%	10%	27%	25%	31%	50%	41%	4%	11%	7%
Finished products	22%	15%	18%	22%	16%	19%	37%	23%	26%	28%	15%	14%	11%	9%	9%
(ICT-related goods)	4%	5%	6%	4%	5%	7%	6%	6%	5%	7%	5%	5%	2%	1%	1%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
China incl. Hong Kong															
Machineries	57%	57%	68%	60%	60%	71%	60%	63%	63%	57%	60%	51%	30%	22%	27%
Parts & components	26%	40%	53%	28%	42%	56%	18%	35%	32%	20%	33%	30%	5%	7%	14%
(ICT-related goods)	16%	27%	38%	17%	29%	41%	4%	17%	7%	11%	21%	15%	1%	2%	9%
Finished products	31%	17%	15%	32%	18%	15%	42%	28%	31%	37%	26%	20%	24%	15%	13%
(ICT-related goods)	11%	7%	6%	11%	8%	7%	6%	8%	3%	10%	14%	4%	1%	3%	1%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Others in East Asia															
Machineries	55%	54%	52%	62%	58%	55%	49%	45%	54%	65%	65%	61%	16%	16%	18%
Parts & components	18%	17%	16%	20%	18%	17%	20%	18%	21%	29%	30%	22%	7%	5%	5%
(ICT-related goods)	5%	6%	5%	6%	7%	5%	3%	3%	2%	8%	8%	3%	1%	1%	1%
Finished products	38%	38%	36%	42%	40%	38%	29%	27%	34%	35%	35%	39%	10%	10%	13%
(ICT-related goods)	10%	12%	15%	12%	14%	16%	5%	7%	5%	12%	12%	8%	1%	2%	2%
All manufactured goods, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 9 (cont.). East Asian Imports by Subgroup: Value, Annual Average Growth, Product Composition, and Share by Origin

Share by origin

Origin / Importer	East Asia (ASEAN+6)			Core East Asia (Japan, NIEs, ASEAN4, China)			Europe (EU27)			America (NAFTA & UNASUR)			ROW		
	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007	1994	2000	2007
Japan															
Machineries	28%	44%	58%	28%	44%	56%	24%	18%	17%	45%	35%	22%	3%	3%	3%
Parts & components	36%	49%	61%	36%	48%	59%	14%	11%	14%	48%	39%	24%	1%	1%	1%
(ICT-related goods)	45%	56%	75%	45%	55%	74%	6%	7%	5%	48%	37%	19%	0%	1%	1%
Finished products	23%	40%	54%	22%	40%	53%	31%	25%	20%	42%	31%	21%	4%	4%	5%
(ICT-related goods)	42%	59%	85%	41%	59%	85%	15%	15%	5%	42%	26%	9%	1%	1%	1%
All manufactured goods, total	37%	47%	57%	33%	43%	53%	22%	19%	17%	34%	29%	19%	6%	6%	7%
NIEs															
Machineries	59%	60%	63%	58%	60%	61%	15%	13%	16%	23%	24%	19%	2%	3%	3%
Parts & components	62%	62%	63%	61%	61%	62%	14%	12%	15%	23%	24%	20%	1%	2%	2%
(ICT-related goods)	71%	66%	74%	71%	65%	74%	7%	9%	9%	21%	23%	15%	0%	3%	2%
Finished products	55%	58%	62%	55%	57%	61%	17%	14%	18%	23%	25%	16%	4%	3%	4%
(ICT-related goods)	69%	63%	86%	68%	63%	84%	7%	10%	5%	23%	26%	9%	0%	1%	1%
All manufactured goods, total	56%	59%	62%	53%	56%	60%	17%	14%	15%	23%	23%	18%	4%	5%	5%
ASEAN4															
Machineries	59%	63%	68%	58%	62%	67%	19%	13%	15%	21%	22%	15%	2%	2%	2%
Parts & components	65%	64%	68%	64%	63%	67%	13%	11%	13%	20%	24%	17%	2%	1%	1%
(ICT-related goods)	63%	61%	67%	63%	60%	66%	9%	10%	13%	27%	27%	20%	1%	1%	1%
Finished products	50%	61%	68%	49%	60%	66%	27%	19%	19%	21%	17%	10%	2%	2%	2%
(ICT-related goods)	49%	61%	77%	48%	60%	74%	22%	17%	12%	27%	21%	10%	2%	1%	1%
All manufactured goods, total	58%	63%	69%	55%	60%	64%	18%	13%	13%	19%	19%	13%	5%	5%	5%
China incl. Hong Kong															
Machineries	55%	58%	66%	54%	58%	66%	23%	22%	19%	18%	17%	12%	4%	3%	3%
Parts & components	65%	65%	74%	64%	64%	73%	18%	19%	14%	16%	15%	10%	2%	1%	2%
(ICT-related goods)	75%	70%	85%	74%	70%	85%	7%	15%	5%	17%	15%	8%	1%	1%	2%
Finished products	49%	47%	49%	48%	47%	48%	26%	27%	31%	19%	21%	16%	6%	5%	5%
(ICT-related goods)	63%	52%	75%	63%	51%	74%	15%	19%	11%	20%	27%	12%	1%	3%	2%
All manufactured goods, total	53%	58%	60%	50%	54%	57%	21%	20%	18%	17%	16%	14%	8%	7%	7%
Others in East Asia															
Machineries	42%	49%	54%	39%	47%	52%	27%	23%	25%	29%	24%	16%	2%	3%	5%
Parts & components	35%	41%	49%	32%	39%	47%	28%	25%	29%	34%	30%	18%	3%	3%	4%
(ICT-related goods)	44%	54%	68%	43%	52%	67%	17%	16%	14%	38%	29%	12%	1%	2%	5%
Finished products	46%	54%	56%	43%	51%	54%	26%	22%	23%	26%	21%	16%	2%	3%	5%
(ICT-related goods)	49%	58%	75%	47%	57%	74%	17%	17%	11%	33%	23%	10%	1%	2%	3%
All manufactured goods, total	40%	46%	51%	33%	40%	46%	29%	26%	23%	24%	19%	13%	8%	10%	13%

Notes: As with Table 8, East Asia is divided into 5 subgroups. All figures are calculated using import statistics for bilateral trade in manufactured goods.

Fourth, Japan has experienced a noticeable increase in the importance of intra-regional transactions in its imports of machinery. The intra-regional share of imports of machinery has doubled from 28% in 1994 to 58% in 2007, along with simultaneous increases in its intra-regional shares for both parts & components and finished products, regardless of whether they are ICT-related or not. The intra-regional shares of the NIEs, the ASEAN4, and China have also increased steadily, though not to the extent of Japan, irrespective of the product type. In stark contrast, the proportions of imports from America in the total imports from all countries have decreased dramatically for Japan, and have decreased steadily for the NIEs, the ASEAN4, and China. Additionally, European import origin percentages have trended downward, with few exceptions, for all of the four subgroups. As a result of these trends, it is striking that the intra-regional shares of imports of ICT-related finished products stand at the extremely high rates of 75-86% in 2007, with significant decreases in the importance of America as an import origin of those goods.

The top 5 goods in intra-regional exports as well as exports to Europe and America by five subgroups of East Asian countries are listed in Table 10, in a similar way to Table 6. Compared with exports to Europe and America, the top 5 goods of the intra-regional exports by Japan, the NIEs, the ASEAN4, and China are composed of more machinery parts & components, in particular, ICT-related ones, and such a difference becomes more noticeable in 2007. If we look at the intra-regional exports by the NIEs, for example, we can see that 14% is accounted for by just one product code at the HS 6-digit level of ICT-related parts & components, i.e., electronic integrated circuits, other than amplifiers/memories/processors & controllers (HS854239). Unlike these four subgroups, however, none of the top 5 goods of both extra-regional and intra-regional exports by the rest of East Asia are machinery, except for their exports to America in 1994.

Table 10. East Asian Exports by Subgroup: Top 5 Exported Goods by Destination.

Ranking	Export destination											
	East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
Japan												
Year 1994												
1	**854211**	**Monolithic integrated circuits,**	90,163	5%	870323	Automobiles, spark ignition engine	46,104	6%	870323	Automobiles, spark ignition engine	258,511	15%
2	870323	Automobiles, spark ignition engine	45,738	8%	870322	Automobiles, spark ignition engine	40,498	11%	**847330**	**Parts and accessories of data p**	85,730	20%
3	847989	Machines and mechanical applian	32,531	9%	**847192**	**Computer input or output unit**	34,688	15%	**854211**	**Monolithic integrated circuits,**	72,716	24%
4	**847330**	**Parts and accessories of data p**	27,096	11%	**847330**	**Parts and accessories of data p**	33,746	20%	**847192**	**Computer input or output unit**	54,364	28%
5	**852290**	**Parts and accessories of recor**	26,007	12%	**854211**	**Monolithic integrated circuits,**	22,595	22%	870324	Automobiles, spark ignition engine	45,281	30%
Year 2007												
1	**854239**	**Other Electronic integrated ci**	95,036	4%	870323	Vehicles (excl. of 87.02 & 8703.1	55,211	6%	870324	Vehicles (excl. of 87.02 & 8703.1	220,203	14%
2	**854231**	**Electronic integrated circuits,**	67,787	6%	870332	Vehicles principally designed for t	54,421	12%	870323	Vehicles (excl. of 87.02 & 8703.1	199,449	27%
3	870323	Vehicles (excl. of 87.02 & 8703.1	62,752	9%	844399	Other parts & accessories for pri	44,158	17%	870322	Vehicles (excl. of 87.02 & 8703.1	71,712	32%
4	844399	Other parts & accessories for pri	36,751	10%	**852580**	**Television cameras, digital car**	35,925	21%	870840	Gear boxes & parts thereof, of th	45,002	35%
5	**854232**	**Electronic integrated circuits,**	36,167	11%	870322	Vehicles (excl. of 87.02 & 8703.1	24,278	23%	844399	Other parts & accessories for pri	39,229	37%
NIEs												
Year 1994												
1	**854211**	**Monolithic integrated circuits,**	55,757	5%	**847193**	**Computer data storage units**	33,236	10%	**847193**	**Computer data storage units**	63,501	11%
2	**854219**	**Monolithic integrated circuits,**	33,723	9%	**847330**	**Parts and accessories of data p**	20,905	17%	**847330**	**Parts and accessories of data p**	44,469	19%
3	**847330**	**Parts and accessories of data p**	32,064	12%	**854211**	**Monolithic integrated circuits,**	16,799	22%	**854211**	**Monolithic integrated circuits,**	44,068	26%
4	**852290**	**Parts and accessories of recor**	24,009	14%	854800	Electrical parts of machinery and	15,676	27%	**854219**	**Monolithic integrated circuits,**	27,159	31%
5	**847120**	**Digital computers with cpu and**	20,232	16%	**847192**	**Computer input or output unit**	15,339	32%	**847192**	**Computer input or output unit**	24,809	35%
Year 2007												
1	**854239**	**Other Electronic integrated ci**	401,075	14%	**851712**	**Telephones for cellular networ**	69,780	9%	870323	Vehicles (excl. of 87.02 & 8703.1	82,136	10%
2	844399	Other parts & accessories for pri	116,067	17%	**854239**	**Other Electronic integrated ci**	49,758	16%	**851712**	**Telephones for cellular networ**	64,029	17%
3	**854232**	**Electronic integrated circuits,**	103,827	21%	870332	Vehicles principally designed for t	45,929	22%	**854239**	**Other Electronic integrated ci**	51,726	23%
4	**854231**	**Electronic integrated circuits,**	96,604	24%	890190	Vessels for the transportof goods	39,318	27%	**901380**	**Liquid crystal devices not cons**	37,290	28%
5	**901380**	**Liquid crystal devices not cons**	78,379	27%	**901380**	**Liquid crystal devices not cons**	32,423	31%	**852990**	**Other parts suitable for use so**	34,437	32%
ASEAN4												
Year 1994												
1	**847330**	**Parts and accessories of data p**	48,692	7%	**854280**	**Electronic integrated circuits/m**	21,207	8%	**854280**	**Electronic integrated circuits/m**	39,115	10%
2	**854280**	**Electronic integrated circuits/m**	37,820	12%	**847330**	**Parts and accessories of data p**	10,903	12%	**847330**	**Parts and accessories of data p**	26,971	16%
3	441211	Plywood 1 or 2 outer ply tropical l	25,632	15%	**847192**	**Computer input or output unit**	7,765	15%	**852110**	**Video recording/reproducing a**	16,498	20%
4	**854219**	**Monolithic integrated circuits,**	20,698	18%	400122	Technically specified natural rubb	6,169	18%	**847192**	**Computer input or output unit**	14,141	23%
5	**852810**	**Colour television receivers/mo**	18,109	21%	640319	Sports footwear, except ski, upper	5,655	20%	**852810**	**Colour television receivers/mo**	11,519	26%
Year 2007												
1	**847330**	**Parts & accessories of the mac**	96,706	5%	**854221**	**Monolithic integrated circuits,**	36,835	7%	**847130**	**Portable automatic data proces**	68,015	11%
2	**854270**	**Electronic microassemblies**	84,812	10%	**847170**	**Storage units**	24,068	12%	**847170**	**Storage units**	38,508	17%
3	**854221**	**Monolithic integrated circuits,**	71,223	13%	**847330**	**Parts & accessories of the mac**	17,991	16%	**847330**	**Parts & accessories of the mac**	35,500	23%
4	**847170**	**Storage units**	70,127	17%	**847160**	**Input/output units, whether/no**	16,340	19%	400122	Technically spec. natural rubber (	19,627	26%
5	**847160**	**Input/output units, whether/no**	48,111	20%	**847180**	**Other units of automatic data p**	14,931	22%	**854260**	**Hybrid integrated circuits**	13,413	28%

Table 10 (cont.). East Asian Exports by Subgroup: Top 5 Exported Goods by Destination

Ranking	Export destination											
	East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
China incl. Hong Kong												
Year 1994												
1	**847330**	**Parts and accessories of data p**	16,406	3%	**847330**	**Parts and accessories of data p**	13,434	3%	640399	Footwear, sole rubber, plastics up	41,236	6%
2	**854211**	**Monolithic integrated circuits,**	12,086	5%	**852731**	**Radio-telephony receiver, witl**	10,640	5%	640299	Footwear, outer soles/uppers of ru	29,120	10%
3	611010	Pullovers, cardigans etc of wool o	12,032	7%	910211	Wrist-watch, base-metal case, ba	9,915	8%	**847330**	**Parts and accessories of data p**	18,694	13%
4	**852290**	**Parts and accessories of recor**	11,302	9%	**852711**	**Radio receivers, portable, witl**	9,147	10%	910211	Wrist-watch, base-metal case, bat	15,822	15%
5	910211	Wrist-watch, base-metal case, bat	8,612	10%	420292	Containers nes, outer surface plas	8,891	12%	**852711**	**Radio receivers, portable, witl**	13,666	17%
Year 2007												
1	**847330**	**Parts & accessories of the mac**	91,042	3%	**847130**	**Portable automatic data proces**	177,465	7%	**847130**	**Portable automatic data proces**	166,552	6%
2	**851712**	**Telephones for cellular netwo**	79,492	6%	**851712**	**Telephones for cellular netwo**	88,973	11%	**851712**	**Telephones for cellular netwo**	110,450	10%
3	**847130**	**Portable automatic data proces**	69,655	8%	**847330**	**Parts & accessories of the mac**	81,620	14%	**847330**	**Parts & accessories of the mac**	81,790	13%
4	**851770**	**Parts of telephone sets, incl. te**	61,578	10%	**852851**	**Other monitors, of a kind sole**	56,541	16%	**852851**	**Other monitors, of a kind sole**	57,920	15%
5	**854231**	**Electronic integrated circuits,**	56,955	12%	**851762**	**Machines for the reception, co**	54,815	18%	**847141**	**Other automatic data processi**	54,354	16%
Others in East Asia												
Year 1994												
1	710813	Gold, semi-manufactured forms, n	43,589	14%	510111	Greasy shorn wool, not carded or	10,951	9%	710239	Diamonds (jewellery) worked but	16,596	17%
2	710239	Diamonds (jewellery) worked but	24,435	22%	710239	Diamonds (jewellery) worked but	9,383	16%	620630	Womens, girls blouses & shirts, ot	3,561	21%
3	760110	Aluminium unwrought, not alloyed	16,774	27%	420310	Articles of apparel of leather or c	3,614	19%	**847330**	**Parts and accessories of data p**	2,840	24%
4	510111	Greasy shorn wool, not carded or	10,410	30%	620520	Mens, boys shirts, of cotton, not k	3,596	22%	620520	Mens, boys shirts, of cotton, not k	2,692	26%
5	510121	Degreased shorn wool, not cardec	8,598	33%	510121	Degreased shorn wool, not cardec	2,773	24%	711319	Jewellery and parts of precious m	2,511	29%
Year 2007												
1	710239	Diamonds, non-industrial other tha	49,565	8%	710813	Gold (incl. gold plated with platinu	21,440	6%	710239	Diamonds, non-industrial other tha	28,837	9%
2	710813	Gold (incl. gold plated with platinu	46,371	15%	710239	Diamonds, non-industrial other tha	17,226	10%	711319	Articles of jewellery & parts there	18,727	14%
3	760110	Aluminium, not alloyed, unwrough	33,206	21%	610910	T-shirts, singlets & other vests, kr	8,391	13%	610910	T-shirts, singlets & other vests, kr	7,347	16%
4	740311	Cathodes & sections of cathodes,	21,585	24%	300490	Medicaments (excluding goods of	7,649	15%	300490	Medicaments (excluding goods of	7,027	18%
5	510111	Wool, not carded/combed, greasy.	15,109	27%	640399	Other footwear without outer sol	7,630	17%	294200	Organic comps. n.e.s. in Ch.29	5,580	20%

Notes: All figures are calculated using export statistics for bilateral trade in manufactured goods. ICT goods are highlighted in boldface type and parts & components are indicated by the shaded area. For reference, a part of commodity description is shown in the columns next to HS code.

Another noticeable trend is the drastic change in the top 5 goods of China's exports to each region from 1994 to 2007. Regardless of whether intra-regional or extra-regional exports, two or three manufactured goods other than machinery are ranked in the top 5 as of 1994, whereas in 2007, all the top 5 goods are ICT-related machinery. In this regard, it is striking that three out of five major goods are parts & components in the case of intra-regional exports while four out of five major goods are finished products in the cases of exports to Europe and America.

Table 11 corresponds to Table 10 and lists the top 5 goods of intra-regional imports as well as imports from Europe and America by five subgroups of East Asian countries, in a similar way to Table 7.[1] Compared with intra-regional exports, as of 1994, more ICT-related parts & components are already ranked in the top 5 goods of the intra-regional imports by the NIEs, the ASEAN4, and China. As indicated by an increase in the cumulative shares of the five major goods, these three subgroups further concentrate on importing a limited number of ICT-related parts & components from intra-regional partners. ICT-related parts & components are also ranked, though not to the extent of intra-regional transactions, in the top 5 for the extra-regional imports by the three subgroups, as on the export side. Particularly in the case of the ASEAN4's imports from America, 35% of them are accounted for by only four of the HS 6-digit product codes of ICT-related parts & components in 2007.

More noteworthy is a change in the ranking of Japan's intra-regional imports. Although three out of five major goods of Japan's intra-regional imports are manufactured goods other than machinery in 1994, ICT goods including four product codes of parts & components hold all the top 5 positions in 2007. By contrast, ICT-related machinery is not ranked in the top 5 for Japan's imports from Europe. And, again, the lists of the major goods imported by the rest of East Asia are distinctly different from other subgroups, in terms of the dominance of machinery, in particular, those of ICT-related parts & components.

[1] The detailed lists of the top 5 exported/imported goods for individual countries of the ASEAN4 and the NIEs are presented in Appendix Tables A3 and A4.

Table 11. East Asian Imports by Subgroup: Top 5 Imported Goods by Origin.

Ranking	Import origin: East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
Japan												
Year 1994												
1	**854211**	**Monolithic integrated circuits,**	25,877	4%	870323	Automobiles, spark ignition engine	41,006	10%	440710	Lumber, coniferous (softwood) th	37,428	6%
2	441211	Plywood 1 or 2 outer ply tropical l	21,797	6%	870324	Automobiles, spark ignition engine	19,250	14%	**854211**	**Monolithic integrated circuits,**	35,798	11%
3	**847330**	**Parts and accessories of data p**	16,583	9%	300490	Medicaments nes, in dosage	10,852	17%	880240	Fixed wing aircraft, unladen weigl	33,196	16%
4	710812	Gold in unwrought forms non-mor	14,862	11%	710239	Diamonds (jewellery) worked but	7,332	18%	440320	Logs, poles, coniferous not treatec	28,905	20%
5	760110	Aluminium unwrought, not alloyed	13,304	13%	880240	Fixed wing aircraft, unladen weigl	7,105	20%	**847330**	**Parts and accessories of data p**	19,478	23%
Year 2007												
1	**847130**	**Portable automatic data proces**	36,795	2%	870323	Vehicles (excl. of 87.02 & 8703.1	33,524	6%	880240	Aeroplanes & other aircraft, of ar	33,724	6%
2	**854239**	**Other Electronic integrated ci**	34,804	4%	300490	Medicaments (excluding goods of	26,790	11%	**854239**	**Other Electronic integrated ci**	21,834	9%
3	**847330**	**Parts & accessories of the mac**	33,049	6%	870324	Vehicles (excl. of 87.02 & 8703.1	21,408	16%	841191	Parts of the turbo-jets/turbo-prope	17,787	12%
4	**852990**	**Other parts suitable for use so**	30,978	8%	293399	Heterocyclic comps. with nitrogen	13,276	18%	841112	Turbo-jets, of a thrust >25 kN	13,872	15%
5	**854231**	**Electronic integrated circuits,**	30,095	10%	440710	Wood sawn/chipped length wise, :	8,733	20%	848620	Machines & apparatus for the ma	13,831	17%
NIEs												
Year 1994												
1	**854219**	**Monolithic integrated circuits,**	55,694	5%	880240	Fixed wing aircraft, unladen weigl	7,506	2%	880240	Fixed wing aircraft, unladen weigl	26,659	6%
2	**854211**	**Monolithic integrated circuits,**	48,103	9%	**854211**	**Monolithic integrated circuits,**	7,260	4%	**854219**	**Monolithic integrated circuits,**	23,964	11%
3	**847330**	**Parts and accessories of data p**	40,801	13%	**854219**	**Monolithic integrated circuits,**	6,537	6%	**854211**	**Monolithic integrated circuits,**	17,083	14%
4	**847193**	**Computer data storage units**	38,195	16%	870323	Automobiles, spark ignition engine	4,193	7%	**847330**	**Parts and accessories of data p**	16,259	18%
5	**852290**	**Parts and accessories of recor**	24,548	18%	847989	Machines and mechanical applian	4,176	9%	847989	Machines and mechanical applian	10,976	20%
Year 2007												
1	**854239**	**Other Electronic integrated ci**	270,049	11%	**854239**	**Other Electronic integrated ci**	43,536	8%	**854239**	**Other Electronic integrated ci**	51,522	8%
2	844399	Other parts & accessories for prir	95,347	16%	848620	Machines & apparatus for the ma	17,541	11%	880240	Aeroplanes & other aircraft, of ar	30,360	12%
3	**854231**	**Electronic integrated circuits,**	79,727	19%	300490	Medicaments (excluding goods of	10,303	12%	880330	Parts of aeroplanes/helicopters, ot	29,813	17%
4	**851712**	**Telephones for cellular networ**	65,064	22%	**854231**	**Electronic integrated circuits,**	9,835	14%	848620	Machines & apparatus for the ma	25,389	21%
5	**847330**	**Parts & accessories of the mac**	29,363	23%	870323	Vehicles (excl. of 87.02 & 8703.1	9,648	16%	**854231**	**Electronic integrated circuits,**	25,353	25%
ASEAN4												
Year 1994												
1	**847330**	**Parts and accessories of data p**	46,661	4%	**854290**	**Parts of electronic integrated c**	14,580	4%	**854290**	**Parts of electronic integrated c**	75,940	22%
2	**854290**	**Parts of electronic integrated c**	36,559	8%	870323	Automobiles, spark ignition engine	10,018	7%	880240	Fixed wing aircraft, unladen weigl	33,926	31%
3	870899	Motor vehicle parts nes	25,144	10%	**851730**	**Telephonic or telegraphic swit**	5,115	9%	**847330**	**Parts and accessories of data p**	9,000	34%
4	**854219**	**Monolithic integrated circuits,**	23,286	12%	**851790**	**Parts of line telephone/telegra**	4,929	10%	520100	Cotton, not carded or combed	6,086	36%
5	**854280**	**Electronic integrated circuits/i**	22,717	14%	710812	Gold in unwrought forms non-mor	4,192	11%	**854219**	**Monolithic integrated circuits,**	5,859	37%
Year 2007												
1	**847330**	**Parts & accessories of the mac**	132,407	7%	**854290**	**Parts of electronic integrated**	56,160	15%	**854290**	**Parts of electronic integrated**	80,619	22%
2	**854290**	**Parts of electronic integrated**	108,739	13%	880240	Aeroplanes & other aircraft, of ar	24,210	22%	**854229**	**Monolithic integrated circuits,**	24,634	29%
3	**854229**	**Monolithic integrated circuits,**	44,324	15%	**854229**	**Monolithic integrated circuits,**	8,507	24%	**847330**	**Parts & accessories of the mac**	13,049	33%
4	**854260**	**Hybrid integrated circuits**	33,041	17%	300490	Medicaments (excluding goods of	8,041	26%	**854260**	**Hybrid integrated circuits**	7,330	35%
5	**854221**	**Monolithic integrated circuits,**	29,959	18%	**852520**	**Transmission app. for radio-te**	4,366	27%	880240	Aeroplanes & other aircraft, of ar	6,807	37%

Table 11 (cont.). East Asian Imports by Subgroup: Top 5 Imported Goods by Origin.

Ranking	Import origin: East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
China incl. Hong Kong												
Year 1994												
1	**854211**	**Monolithic integrated circuits,**	53,125	5%	847989	Machines and mechanical applian	17,331	4%	880240	Fixed wing aircraft, unladen weigl	36,783	10%
2	**852810**	**Colour television receivers/m**	24,464	7%	870323	Automobiles, spark ignition engine	11,609	7%	710812	Gold in unwrought forms non-mor	16,500	15%
3	**852290**	**Parts and accessories of recor**	20,573	9%	**851730**	**Telephonic or telegraphic swit**	11,322	9%	**854211**	**Monolithic integrated circuits,**	13,926	19%
4	**847330**	**Parts and accessories of data p**	19,045	11%	710239	Diamonds (jewellery) worked but	7,407	11%	310530	Diammonium phosphate, in packs	10,007	22%
5	**852990**	**Parts for radio/tv transmit/rece**	15,887	12%	850213	Generating sets, diesel, output > 3	7,215	12%	**847330**	**Parts and accessories of data p**	9,767	24%
Year 2007												
1	**854231**	**Electronic integrated circuits,**	510,309	13%	880240	Aeroplanes & other aircraft, of ar	44,639	4%	**854231**	**Electronic integrated circuits,**	59,255	6%
2	**854239**	**Other Electronic integrated c**	206,671	18%	870324	Vehicles (excl. of 87.02 & 8703.1	35,486	6%	740311	Cathodes & sections of cathodes,	50,824	12%
3	**854232**	**Electronic integrated circuits,**	195,801	23%	**854231**	**Electronic integrated circuits,**	27,219	9%	880240	Aeroplanes & other aircraft, of ar	45,512	16%
4	**901380**	**Liquid crystal devices not cons**	165,599	27%	870323	Vehicles (excl. of 87.02 & 8703.1	23,744	11%	**847330**	**Parts & accessories of the mac**	20,761	19%
5	**847170**	**Storage units**	119,998	30%	740400	Copper waste & scrap	19,266	12%	**854232**	**Electronic integrated circuits,**	19,135	21%
Others in East Asia												
Year 1994												
1	870323	Automobiles, spark ignition engine	23,519	6%	710231	Diamonds (jewellery) unworked c	18,203	7%	880240	Fixed wing aircraft, unladen weigl	10,163	5%
2	**847330**	**Parts and accessories of data p**	7,348	8%	870323	Automobiles, spark ignition engine	6,501	9%	**847330**	**Parts and accessories of data p**	9,132	9%
3	870421	Diesel powered trucks weighing <	7,318	10%	300490	Medicaments nes, in dosage	6,402	12%	880330	Aircraft parts nes	9,081	13%
4	870899	Motor vehicle parts nes	7,088	12%	**852520**	**Transmit-receive apparatus for**	2,523	13%	852490	Sound recordings other than photo	4,056	15%
5	870431	Spark ignition engine trucks weigh	6,837	14%	490199	Printed reading books, except dict	2,375	14%	**847120**	**Digital computers with cpu and**	3,959	17%
Year 2007												
1	870323	Vehicles (excl. of 87.02 & 8703.1	54,262	4%	710231	Diamonds, non-industrial, unwork	46,793	7%	880240	Aeroplanes & other aircraft, of ar	22,377	6%
2	**852520**	**Transmission app. for radio-tel**	39,584	6%	300490	Medicaments (excluding goods of	35,880	12%	880330	Parts of aeroplanes/helicopters, ot	9,152	8%
3	710813	Gold (incl. gold plated with platinu	38,441	9%	870323	Vehicles (excl. of 87.02 & 8703.1	16,476	15%	300490	Medicaments (excluding goods of	8,609	10%
4	**847130**	**Portable automatic data proces**	26,131	11%	710813	Gold (incl. gold plated with platinu	16,269	17%	310530	Diammonium hydrogenorthophosp	7,881	12%
5	710812	Gold (incl. gold plated with platinu	24,083	12%	880240	Aeroplanes & other aircraft, of ar	11,589	19%	870410	Dumpers designed for off-highwa	6,004	14%

Notes: All figures are calculated using import statistics for bilateral trade in manufactured goods. ICT goods are highlighted in boldface type and parts & components are indicated by the shaded area. For reference, a part of commodity description is shown in the columns next to HS code.

4. Evidence on the Development of International Production Networks in East Asia

The examination of East Asia's trade structure in the last section highlights the increasing importance of machinery parts & components, which is a feature specific to intra-regional transactions within East Asia. In other words, East Asian countries have expanded and strengthened transactions of parts & components to a greater degree with intra-regional partners than with outsiders, which suggests the formation and development of international production networks in the region. This section provides some evidence for the development of international production networks in East Asia as well as in a more global sense, with a focus on trade in machinery, in particular, that in machinery parts & components. The following subsection examines whether East Asian countries are present in the process of the formation of international production networks around the world. In order to assess the extent to which individual East Asian countries are involved in international production networks, Sections 4.2 and 4.3 examine the proportion of machinery in total exports/imports and the degree of specialization in exports/imports of machinery. Section 4.4 reconsiders the importance of intra-regional partners as a destination of the exports of machinery by East Asian countries. The last subsection compares intra-regional exports/imports by East Asian countries with their extra-regional exports/imports in terms of the status of the product composition and its changes.

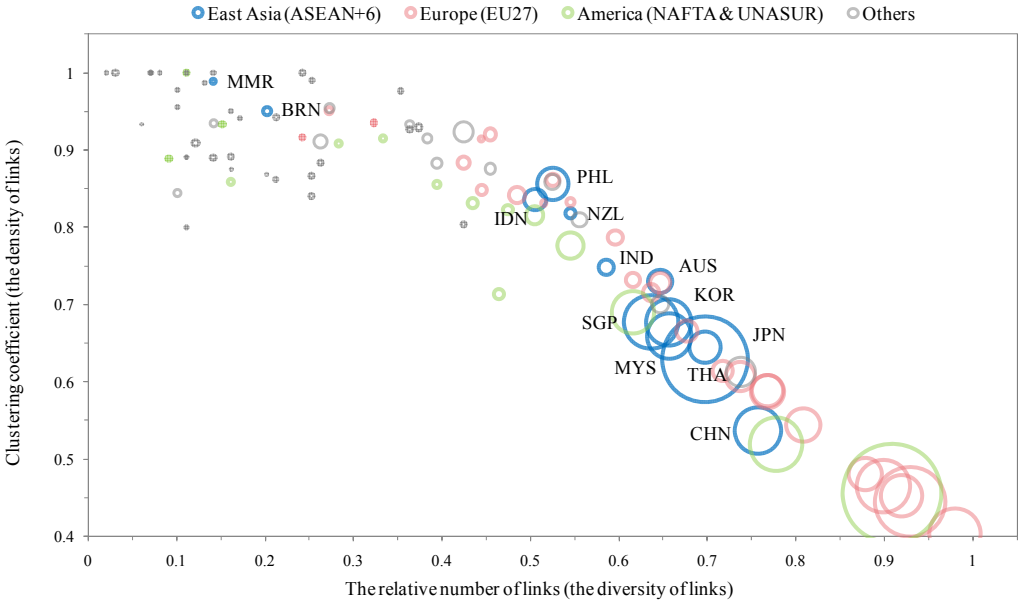
4.1. The presence of East Asian Countries in the Formation of Global Production Networks

In Figure 1, the bubble charts show the interconnectivity of international production networks, by illustrating the distribution patterns of two indicators for the interconnectivity of the networks, i.e., the number of links and the clustering coefficient. We define "link" as a two-way linkage of bilateral trade in machinery parts & components, assuming that a substantial portion of trade in machinery parts & components is accounted for by the transactions within international production networks. The number of links is counted for each country, and is divided by the maximal possible number of links, i.e., the number of potential partner countries.

"Clustering coefficient" is the ratio of the number of links among the partner countries that a country of interest actually has links with, to the maximal possible number of links among the partner countries. The size of the bubble represents the total volume of two-way trade in parts & components. Differently-colored bubbles represent different regions: blue bubbles for East Asian countries, red ones for European countries, green ones for American countries, and gray ones for other countries.[1]

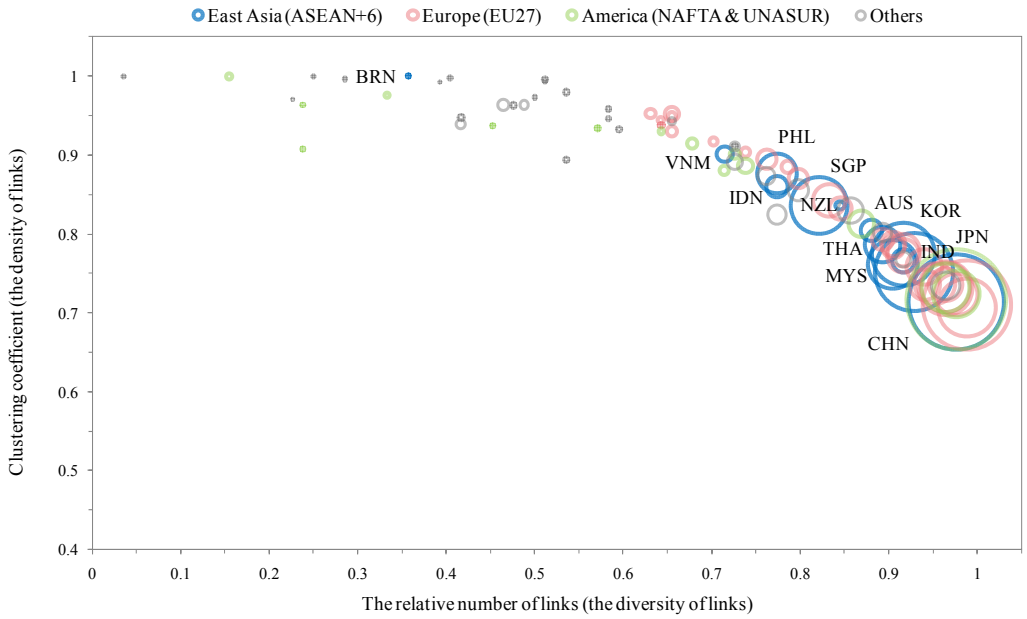
Figure 1. Interconnectivity of international production networks.

Year 1994



[1] Similar exercises for the case of international financial networks are performed by Imakubo (2009).

Year 2007



Notes: The definitions of "link" and "clustering coefficient" are explained in the text. The size of bubble represents the total volume of two-way trade in machinery parts & components for each country.

More specifically, as 100 countries engage in two-way bilateral trade in machinery parts & components with at least one country in 1994, we assume that international production networks consist of 100 countries and that each country could establish links with a maximum of 99 countries. By the same token, the networks are considered as consisting of 85 countries as of 2007. For example, as Indonesia (labeled as IDN in the charts of Figure 1) engages in two-way bilateral trade in parts & components with 50 countries out of 99 potential partner countries in 1994, the relative number of links is 50 / 99 = 0.51. There exist 1,024 links among Indonesia's partner countries though there is a possibility of the emergence of 50 * 49 / 2 = 1,225 links, and the clustering coefficient is 1,024 / 1,225 = 0.84. While the number of links represents the diversity of two-way bilateral trade linkages, the clustering coefficient represents the density of the links that a country of interest has developed.

The larger the size of the bubble, and the higher the levels of the two indicators for the interconnectivity of international production networks, the more actively a country participates in the networks. In this regard, however, there is a trade-off between the number of links and the clustering coefficient, whose denominator depends on the

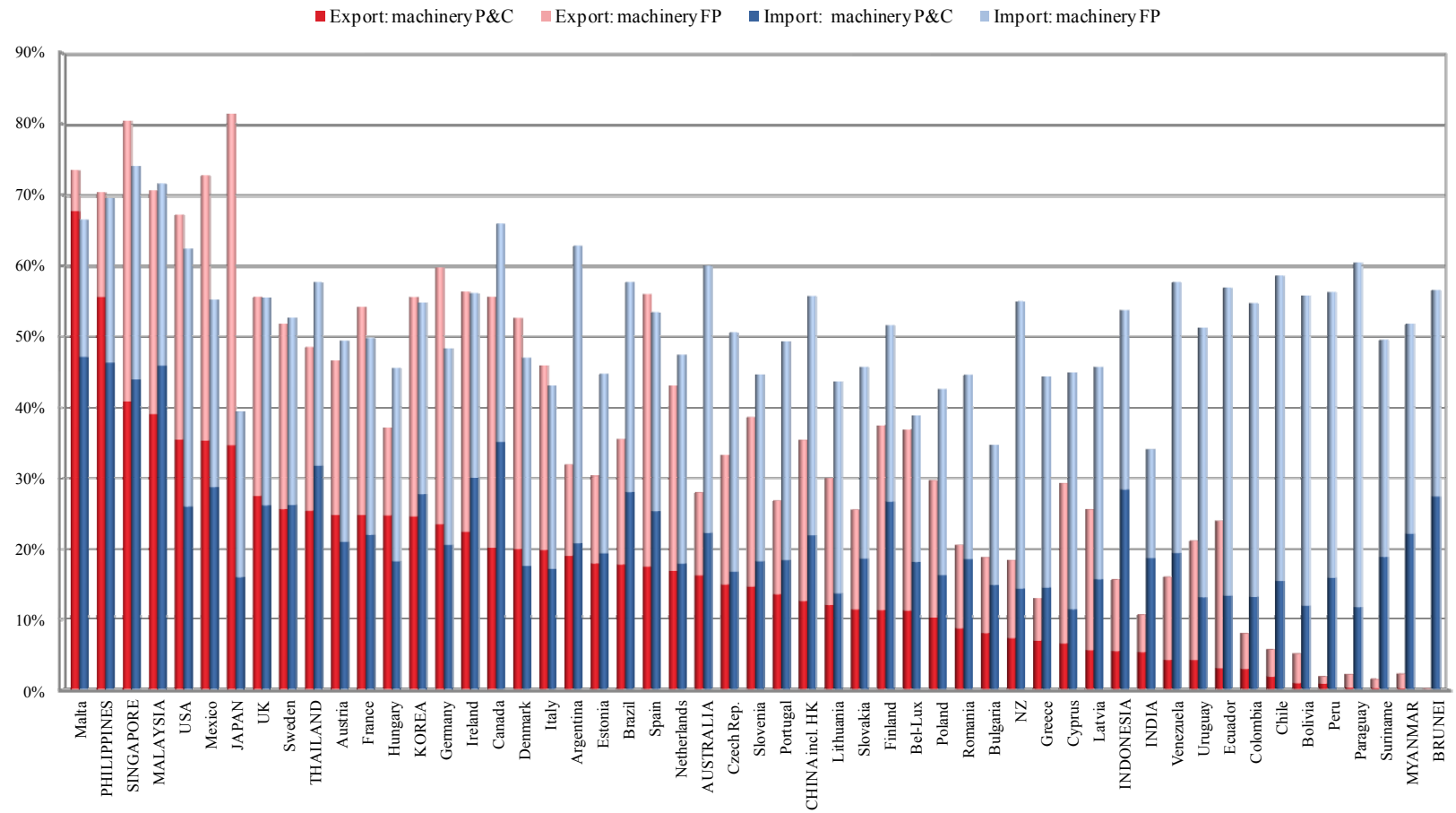
number of partners, i.e., the number of links. On the whole, despite such a trade-off, bubbles shift toward the upper right of the plot region from 1994 to 2007, which indicates the networking in the two-way trade linkages of machinery parts & components, or the development of international production networks stretched across more countries. It is noteworthy that all East Asian countries except Brunei shift significantly to the upper right. As of 2007, with larger bubble sizes, China, Japan, Korea and others are concentrated in the right part of the plot region, suggesting that these East Asian countries have played a more important role in the development of international production networks in a global sense.

4.2. The Importance of Trade in Machinery

This and the next subsections aim at assessing the degree of participation of East Asian countries in international production networks. To this end, this subsection examines the proportion of machinery in the total exports of manufactured goods, which can be regarded as the extent to which a country is involved in international production networks though the percentage for the import side does not differ greatly among countries. In particular, the proportion of machinery parts & components in total exports is a good proxy for the degree of participation in the networks.

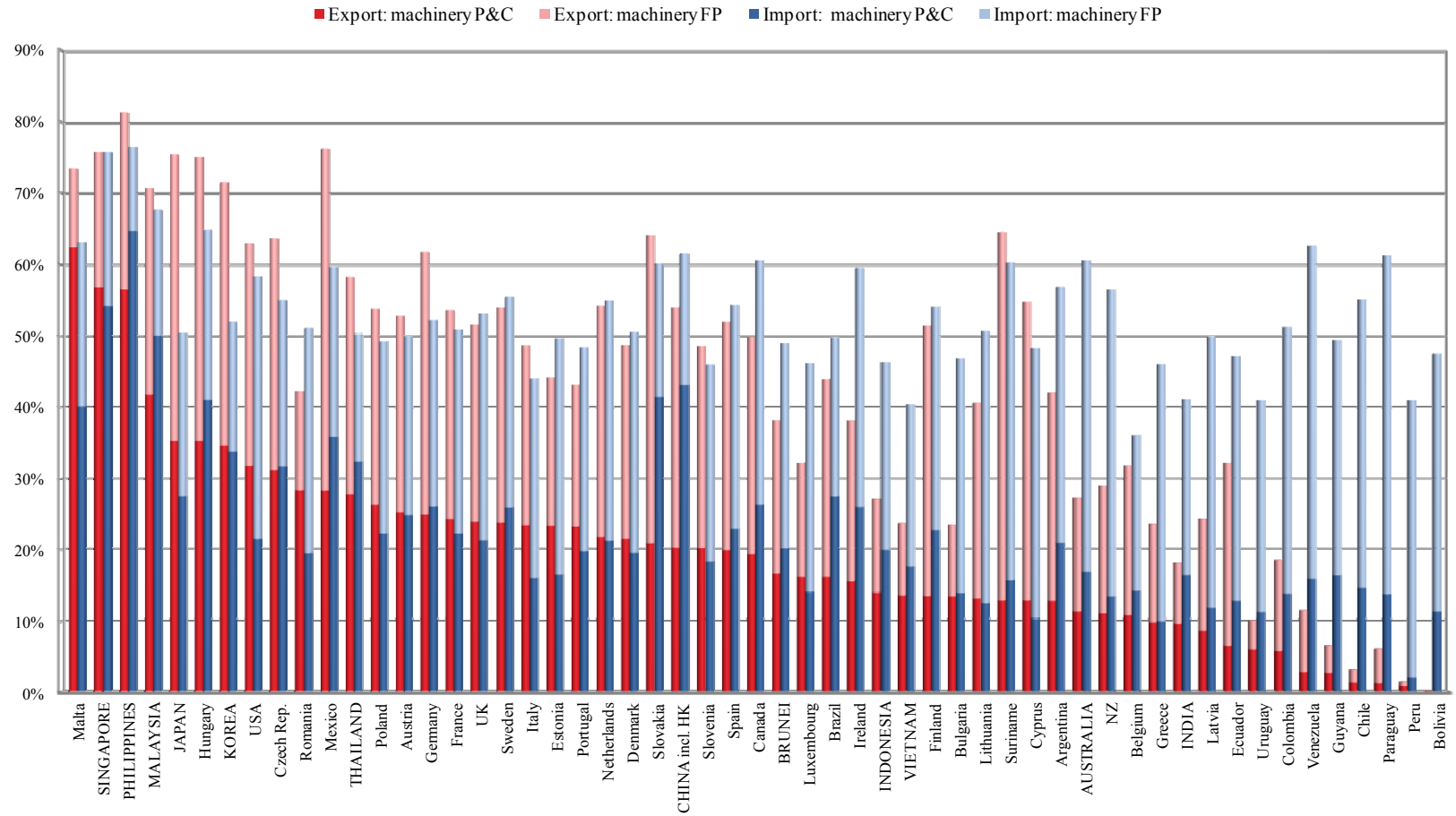
In Figures 2 and 3, the stacked bar charts show the proportions of machinery in the total exports and imports of manufactured goods to/from the world in 1994 and in 2007, respectively, for East Asian, European, and American countries. The red stacked bars indicate the percentages of machinery in total exports, and the blue bars show the import side. For both the red and blue bars, the dark colored portions represent the percentages accounted for by parts & components and the light colored portions for finished products. The bars are in descending order of the percentage of parts & components in total exports, from left to right.

Figure 2. Shares of Machinery in the Total Exports/Imports of Manufactured Goods to/from the World in 1994.



Note: All figures are calculated using export and import statistics for bilateral trade in manufactured goods.

Figure 3. Shares of Machinery in the Total Exports/Imports of Manufactured Goods to/from the World in 2007.



Note: See the note of Figure 2.

In the cases of Singapore, the Philippines, Malaysia, as of 1994, the proportions of machinery stood at 70% or more and those of parts & components stood at 40% or more for both the export and import sides, indicating that these countries have already participated in international production networks more than a decade ago. These three countries have further increased the proportions of parts & components from 1994 to 2007 particularly for the import side. As of 2007, the figures for Japan, Korea, and Thailand also show their active participation in the networks: their proportions of machinery exceed 50% and those of parts & components reach almost 30% or more for both the export and import sides. European countries such as Malta, Hungary, and the Czech Rep., as well as Mexico are also highly dependent on both exports and imports of machinery, along with high percentages of parts & components, compared to other countries in the sample. In 2007, while Malta has the highest percentage of parts & components in exports, at more than 60%, it is striking that Singapore and the Philippines achieve notably high percentages of parts & components both in exports and in imports. To be precise, 57% and 54% of Singapore's exports and imports of manufactured goods are accounted for by parts and components, and the corresponding percentages for the Philippines are 56% and 64%. The high percentages of parts & components not only for the export side but also for the import side seem to reflect brisk back-and-forth transactions of intermediate goods across borders, as a result of the fragmentation of production.

China has experienced a noticeable change in the composition of its imports of machinery over the last decade. The proportion of machinery in China's imports has remained largely unchanged, as compared to the export side whose corresponding percentage increased significantly from 35% in 1994 to 54% in 2007. More noteworthy is a doubling of the percentage of parts & components in China's imports, which is associated with s dramatic decrease in that of finished products. As a result, as of 2007, although China also seems to be actively involved in the networks, as indicated by the percentages of machinery exceeding 50% for both the export and import sides, the relative importance of parts & components in its exports and imports of machinery is distinctly different from other East Asian countries. While parts & components account for less than 40% of China's exports of machinery, i.e., 20% points out of 54% points, approximately 70% of China's imports of machinery are parts &

components, i.e., 43% points out of 61% points. This contrast between the export and import sides appears to highlight the role of China as the world's factory, in the sense that China imports a large amount of intermediate goods for assembly or for manufacturing products to be exported. Among European countries, Slovakia seems to now perform a similar role to China.

In the cases of Indonesia and Vietnam, as of 2007, the percentages of parts & components in exports are much higher than most of the UNASUR member countries except Brazil, although the corresponding rates for the import side are not much different. Still, Indonesia, Vietnam, Australia, New Zealand, and India seem to be far behind other East Asian countries, in terms of their degree of participation in international production networks.[1]

4.3. Specialization Patterns for Trade in Machinery

Further to the last subsection, this subsection examines the degrees of specialization in exports and imports of machinery, with an emphasis on parts & components, so as to assess the degree of participation of East Asian countries in international production networks. The most commonly used measure of revealed comparative advantage (RCA) is the Balassa (1965) index. To evaluate the RCA of country *i* in sector *j*, Balassa (1965) proposed the following index:

$$B_{ij} = \frac{x_{ij}}{x_{wj}} \Big/ \frac{x_i}{x_w}, \quad i = 1, \cdots, N, \; j = 1, \cdots, m.$$

The Balassa index also can be written as

$$B_{ij} = \frac{x_{ij}}{x_i} \Big/ \frac{x_{wj}}{x_w},$$

which is the relative export structure of country *i* to the world in sector/good *j*. In this regard, although the Balassa index has been used not only as an ordinal but also as a cardinal measure, the index is not designed for making comparisons between countries

[1] The detailed charts that are compiled by further dividing each of the portions of machinery parts & components and finished products into ICT-related goods and others are presented in Appendix Figures A1 and A2. We can see that the high proportions of machinery parts & components in both exports and imports by Singapore, the Philippines, and Malaysia are greatly attributed to massive transactions of ICT-related parts & components. For these three countries, the percentages of ICT-related finished products in exports are also relatively high compared to those of non-ICT goods.

in a given sector because its upper bound varies across countries as well as across time, leading to non-constant mean and standard deviations across countries and time. Therefore, in order to conduct a cross-country comparison of export competitiveness in a given sector, Amador et al. (2007) and Amador and Cabral (2009) suggest that we employ the alternative index:

$$B_{ij}^{n} = \frac{x_{ij}}{x_i} \Big/ \frac{1}{N}\sum_{i=1}^{N}\frac{x_{ij}}{x_i}, \quad i = 1, \cdots, N, \; j = 1, \cdots, m,$$

which is the relative proportion of sector/good *j* in the total exports from country *i* compared to the average proportion among *N* countries in the sample.[2] In other words, this alternative index shows country *i*'s degree of specialization in exports in sector *j* relative to the world average. The index, hereafter called the international specialization index, has fixed lower and upper bounds across countries and time, given by 0 and *N*, i.e., the number of countries in the sample, and its mean value is always equal to 1. Such proper cardinal properties across countries in a given sector make the international specialization index suitable for a cross-country comparison. Following Amador *et al*. (2007) and Amador and Cabral (2009), we calculate the international specialization index not only for the export side but also for the import side, so as to assess the degrees of specialization in exports and imports of machinery in a consistent manner as well as examining the correlation between the two indices.

In Figure 4, the scatter plots illustrate the degrees of specialization in the total exports/imports of machinery to/from the world for respective countries in 1994 and in 2007. The horizontal axis indicates the international specialization index for exports of machinery, which ranges from 0 to the number of countries in the sample, i.e., 103 in 1994 and 85 in 2007, with the constant mean value of 1 as indicated by the solid line in the plot region.[3] The vertical axis indicates the corresponding specialization index for the import side, which has the same upper and lower bounds as for the export side as well as the constant mean value. The higher the international specialization index, the larger the proportion of machinery in the total exports/imports of manufactured goods to/from the world compared to other countries. Points are plotted in different colors by

[2] The alternative index is just based on a different denominator, i.e., a different way of normalizing the proportion of sector/good *j* in total exports from country *i*, from the original Balassa index.

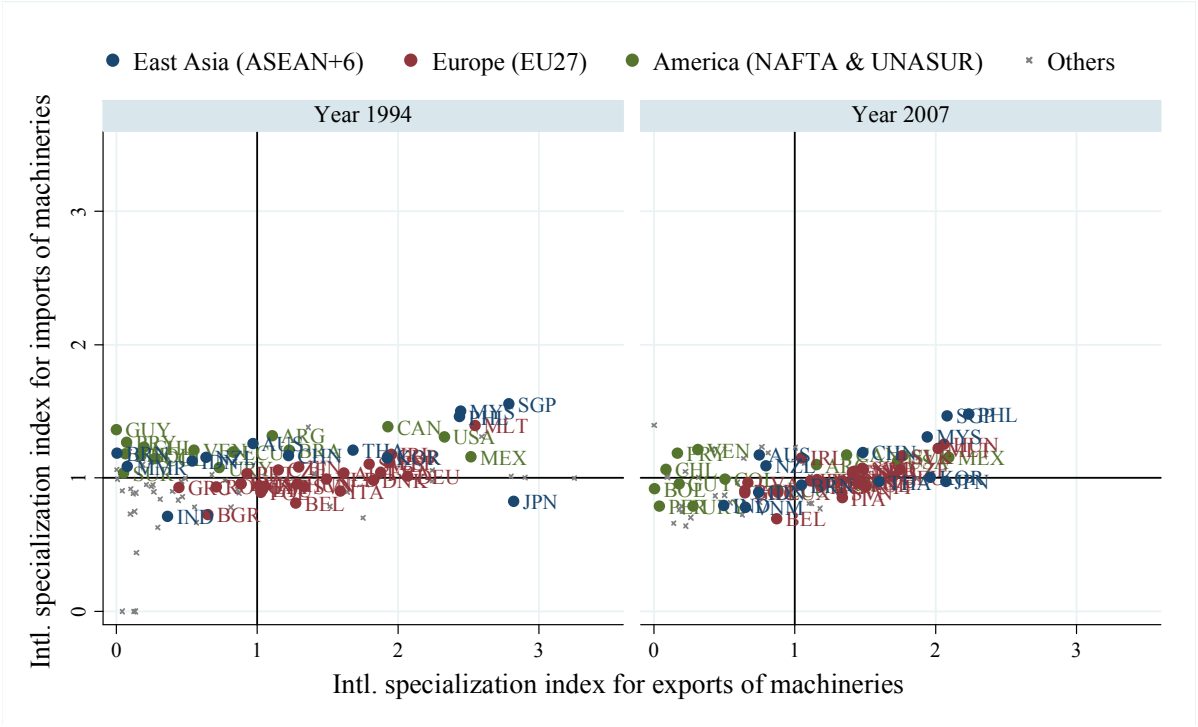
[3] Only countries that export and import any manufactured goods are included in the sample for each year.

region: blue circles for East Asian countries, red ones for European countries, green ones for American countries, and gray x-marks for other countries.

While the international specialization index for exports of machinery varies among countries, the corresponding index for the import side differs only slightly among countries, and is concentrated around the mean value. Even for the export side, the distribution of the international specialization index has converged somewhat from 1994 to 2007 though the upper bound of the index, i.e., the number of countries in the sample, decreases in 2007. As of 2007, Singapore and the Philippines specialize not only in exports of machinery but also, to a great extent, in imports of machinery, compared to other countries, as indicated by the fact that their points are slightly ahead of others in the upper right of the plot region. In contrast to Singapore and the Philippines, most UNASUR member countries are left far behind in terms of the degree of specialization in exports of machinery, as is clear from the group of green circles situated close to the vertical axis.

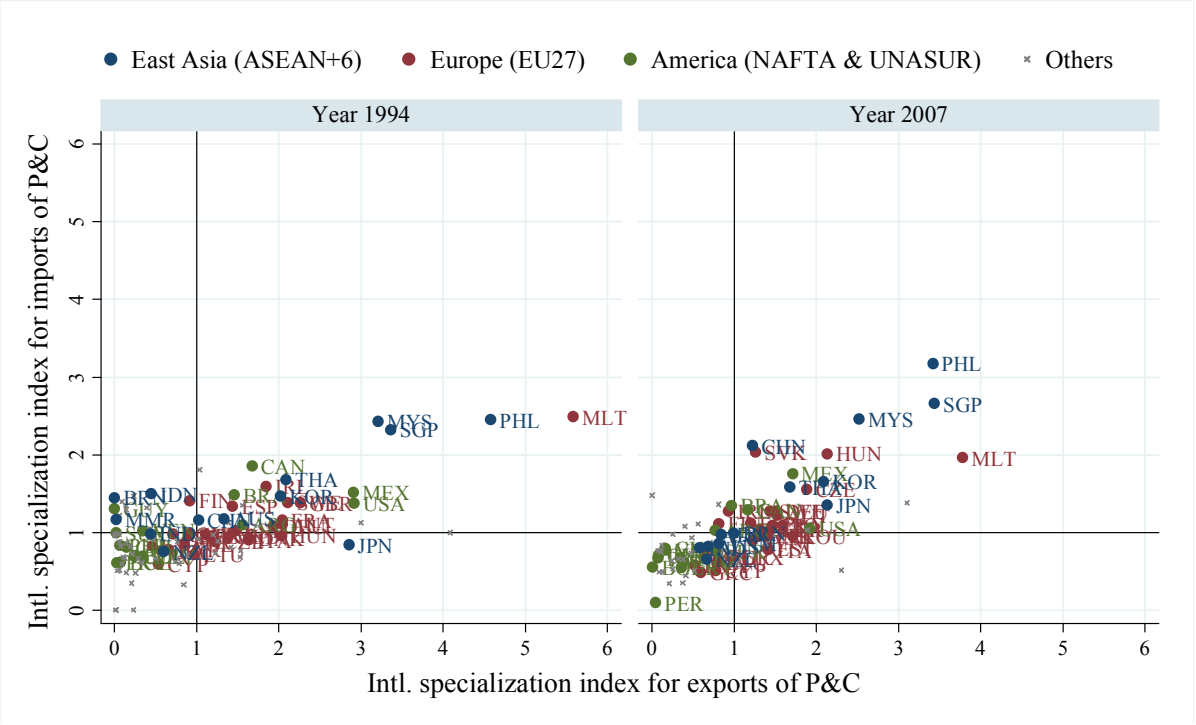
The scatter plots in Figure 5 correspond to those in Figure 4, but focus only on exports and imports of machinery parts & components. Although lower and upper bounds of the international specialization index for parts & components are the same as those for all machinery, the variation in the index is more noticeable both for the export and import sides in the case of parts & components. As of 1994, the Philippines, Singapore, and Malaysia are already far ahead of other countries in terms of their degree of specialization both in exports and imports of parts & components, with the international specialization indices ranging from 3 to 5 for the export side and more than 2 for the import side. Although Malta has the highest degree of specialization in exports of parts & components, its degree of specialization for the import side is not markedly different from the above three East Asian countries. In addition, many UNASUR member countries represented by green circles are situated in the lower left of the plot region, meaning that they specialize neither in exports nor imports of parts & components, compared to the world average.

Figure 4. Specialization Patterns for the Total Exports and Imports of Machinery to/from the World.



Notes: All figures are calculated using export and import statistics for bilateral trade in manufactured goods. The definition of the international specialization index is explained in the text.

Figure 5. Specialization Patterns for the Total Exports and Imports of Machinery Parts & Components to/from the World.



Note: See the notes of Figure 4.

One of the noticeable changes in the specialization patterns is that most of the countries situated in the upper left in 1994 have moved to other parts of the plot region by 2007. In a global sense, fewer countries specialize in imports of machinery parts & components but not in their exports, which can be interpreted as suggesting that import substitution industrialization has become less common. As of 2007, the Philippines, Singapore, and Malaysia remain high in the upper right of the plot region. Of these, the Philippines is the most outstanding: the international specialization index has developed to a higher degree for the import side, and as a result, the indices exceed 3 both for the export and import sides. Korea, Thailand, Japan, and China are also situated in the upper right, meaning that their degrees of specialization are relatively high when compared to the world average. China and Japan experience considerable increases in the international specialization index for the import side from 1994 to 2007, and, in particular, Japan has moved upwards beyond the solid line of a mean value. Yet, all other East Asian countries still seem to lag far behind the forerunners in the region. Of the European countries, not only Malta but also Hungary achieves a high degree of specialization both for the export and import sides. Among American countries, many UNASUR member countries remain in the lower left.

Returning to the original Balassa index, we also examine the proportion of machinery parts & components in which a country has comparative advantage, following Aminian *et al.* (2009). The export-based and import-based RCA indices are calculated at the HS 6-digit level, using data for merchandise exports to and imports from the world. Then, the percentage of the HS 6-digit product codes with the RCA indices exceeding the value of 1 is calculated based on the maximal possible number of product codes. In Figures 6 and 7, the stacked bar charts show the percentages of parts & components of which a country has comparative advantage in exports and imports, in 1994 and in 2007, respectively. The red stacked bars indicate the percentages of parts & components with comparative advantages in exports and the blue bars for the import side. The dark colored portions represent the percentages of parts & components of which a country simultaneously has comparative advantages both in exports and imports.[1] The bars for East Asian, European, and American countries are in

[1] The dark colored portions of the red bars for the export side are exactly the same as those of the

descending order of the percentage of parts & components with dual comparative advantages, from top to bottom.

On the whole, the percentages of machinery parts & components with dual comparative advantages in exports and imports have risen for respective countries from 1994 to 2007. This trend suggests that back-and-forth transactions of a broader range of parts & components are conducted intensively by respective countries. Among East Asian countries, Singapore is ranked in the top 5 both in 1994 and 2007. Not only does Singapore specialize both in exports and imports of parts & components to a great extent, but it also has dual comparative advantages in a broad range of parts & components. In contrast, the Philippines and Malta have been ranked far lower though they also have high degrees of specialization both in exports and imports of parts & components. These two countries seem to specialize in exports and imports of a relatively limited number of parts & components. As for Malaysia, Thailand, and China, the percentages of parts & components with comparative advantages in exports have increased markedly along with the increase in the percentages for dual comparative advantages. The corresponding percentages for the import side have not changed greatly, despite the increased percentages for dual comparative advantages. On the other hand, Japan has experienced a decrease in the percentage of parts & components with comparative advantages in exports, but a threefold increase in the percentage for dual comparative advantages. As of 2007, other East Asian countries are relatively low in rank and have limited percentages of dual comparative advantages, at 10% or less.

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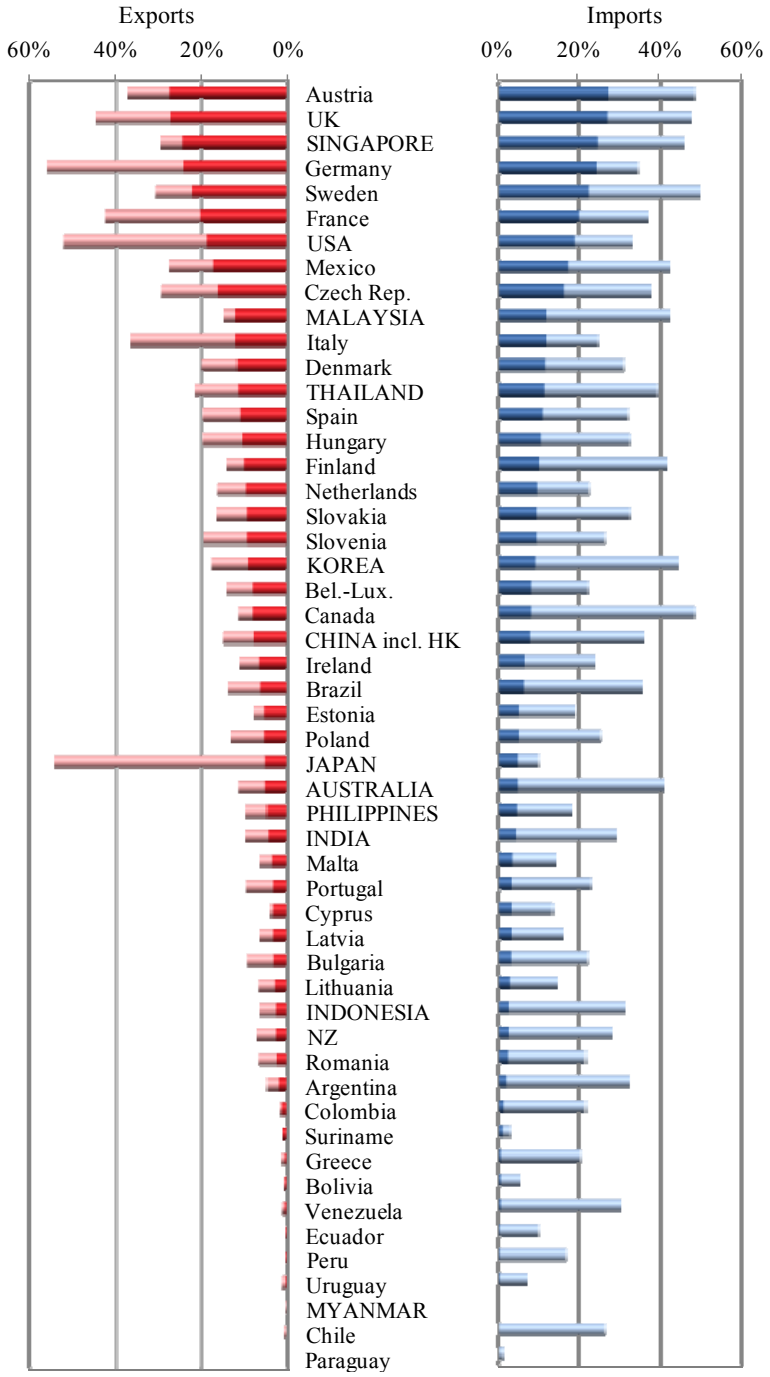
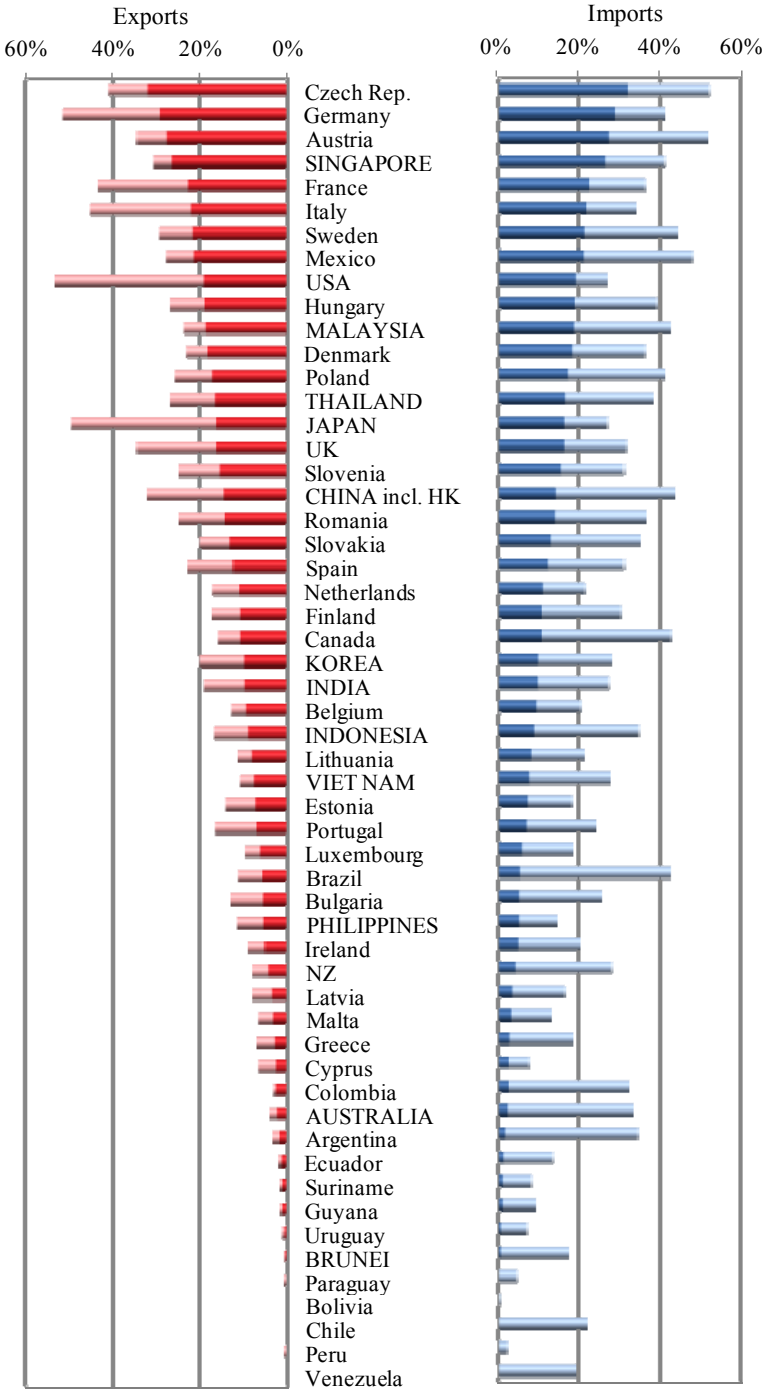
blue bars for the import side.

Figure 6. The Percentages of Machinery Parts & Components with Comparative Advantages in Exports and Imports in 1994.



Notes: All figures are calculated using export and import statistics for bilateral merchandise trade. The dark colored portions represent the percentages for the dual comparative advantages.

Figure 7. The Percentages of Machinery Parts & Components with Comparative Advantages in Exports and Imports in 2007.



Note: See the notes of Figure

4.4. Geographical Distribution of East Asia's Exports of Machinery

This subsection revisits the fact that the importance of intra-regional transactions in the exports of machinery parts & components has been increasing or at least remains relatively high during the period 1994-2007, as compared to finished products. East Asian countries have actively participated in worldwide international production networks as well as obtaining an increased intra-regional share in the exports of parts & components, which can be regarded as suggesting the development of regional production networks within East Asia. In this regard, some may argue that East Asian countries depend largely on countries outside the region, centering on the US, as an ultimate source of demand for their exports. However, in what follows, we would emphasize that the intra-regional share in the exports of finished products generally remains unchanged and that East Asian countries tend to diversify export destinations.

The stacked bar charts in Figure 8 show the composition of East Asia's exports of machinery by export destination region. East Asia is divided into five subgroups, as in Section 3.3. The blue portions represent intra-regional exports within East Asia, the red ones show exports to Europe, the green ones for exports to America, and the gray ones for exports to the rest of the world (ROW). The percentages by destination are reported for the years 1994 and 2007.

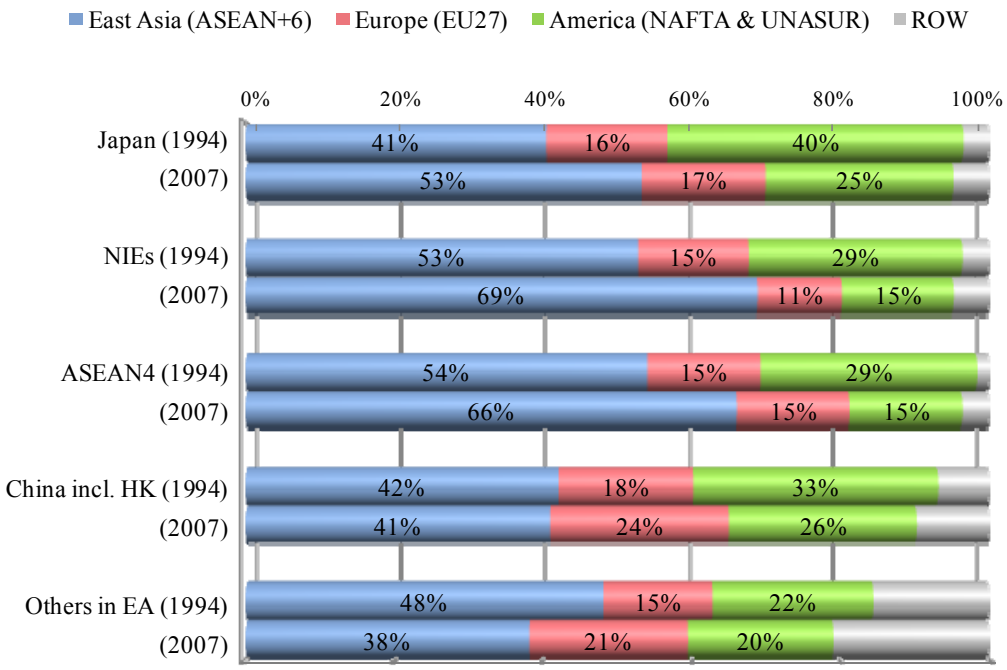
As for machinery parts & components, Japan, the NIEs, and the ASEAN4 increased their proportions of intra-regional exports from 1994 to 2007. It is striking that intra-regional transactions account for nearly 70% of the exports of parts & components by the NIEs and the ASEAN4 in 2007. Although the intra-regional shares remain mostly unchanged for China and have decreased by 10% for other countries in East Asia, intra-regional transactions account for about 40% or more of the exports by each subgroup. Meanwhile, the proportions of exports to the US have decreased for all subgroups, and, in particular, the US shares have fallen to one-half for the NIEs and the ASEAN4.

Compared to exports of machinery parts & components, the intra-regional shares are relatively low for finished products. Also, the intra-regional shares remained relatively unchanged from 1994 to 2007, except for other countries in East Asia. As of 2007, intra-regional transactions accounted for 34% and 46% of the exports of finished

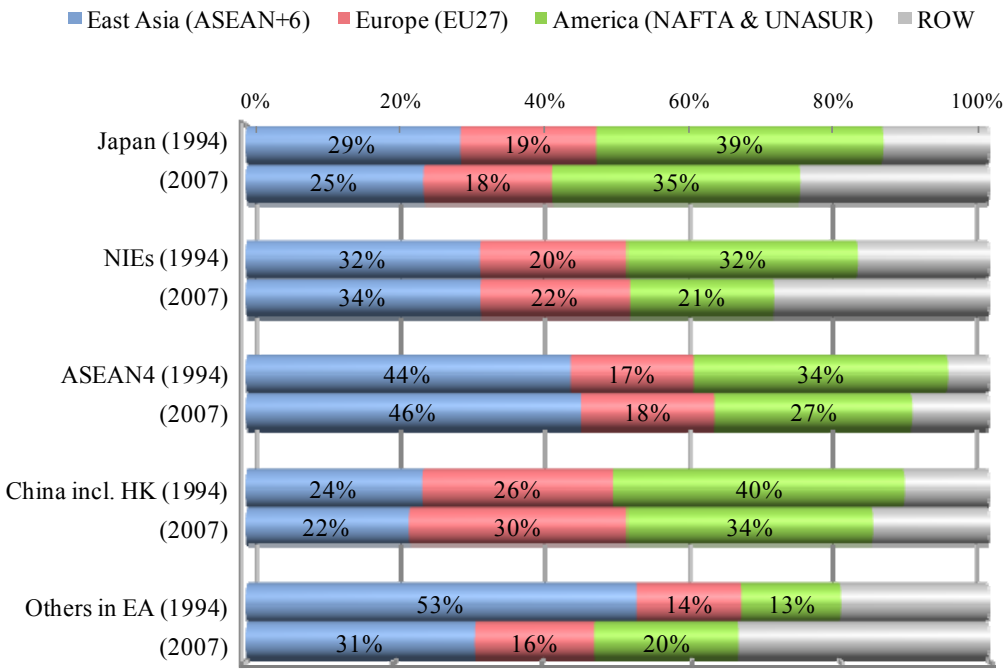
products by the NIEs and the ASEAN4, respectively. Japan and China depend on intra-regional transactions of finished products to a lesser extent, at 25% and 22%, respectively. It is more noteworthy that there is no evidence that East Asian countries have increased their dependence on the US even as an ultimate source of demand for exports of finished products. Rather, Japan, the NIEs, the ASEAN4, and China have lessened their dependence on the US by 4-11%. These subgroups seem to diversify their export destinations, as indicated by the increased proportions of exports to ROW as well as the decreased proportions of exports to the US.

Figure 8. Shares by Destination: East Asia's Exports of Machinery.

Parts & components



Finished products



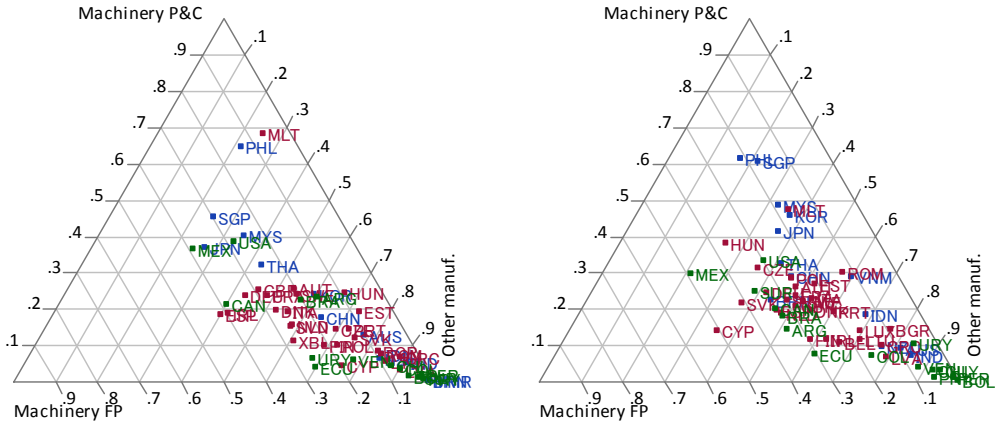
Notes: East Asia is divided into 5 subgroups: Japan, NIEs, ASEAN4, China (including Hong Kong), and others. All figures are calculated using export statistics for bilateral trade in machinery.

4.5. Intra-regional Trade vs. Extra-regional Trade by East Asia

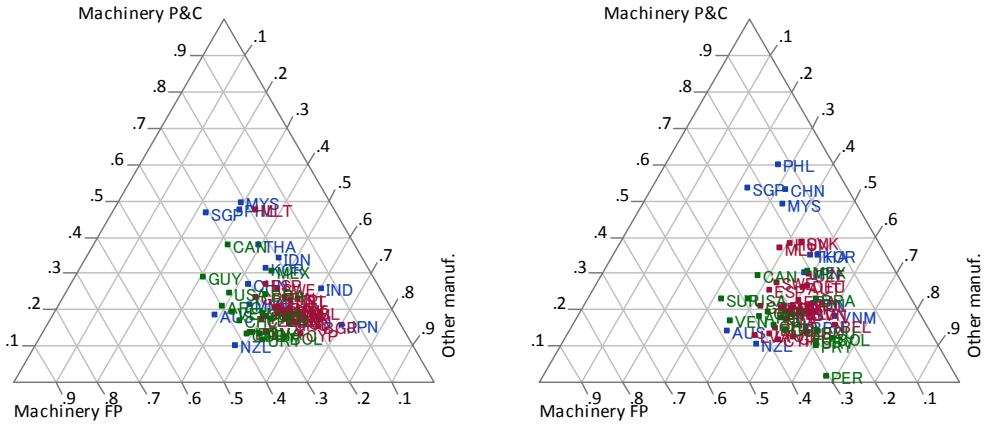
As shown throughout the last section, the increased proportion of machinery parts & components is a prominent feature of intra-regional exports and imports by East Asia. This fact is further examined by applying the method of triangular representation by Leamer (1987) to the product composition of exports and imports of manufactured goods. To be more precise, the coordinate point in our triangle represents a country's product composition, i.e., the proportions of machinery parts & components, finished products, and other manufactured goods. Each vertex represents a product composition that exports/imports of manufactured goods consist entirely of that type of product. The midpoint indicates that the proportions of each of three types of products are equally 33.3%. The triangles are drawn for intra-regional exports and imports in Figure 9 and for extra-regional exports and imports in Figure 10. Countries, represented by dots, are indicated in different colors by region: blue dots for East Asian countries, red ones for European countries, and green ones for American countries.

Figure 9. Product Composition of Intra-regional Trade in Manufactured Goods.

Intra-regional exports in 1994 (left) and in 2007 (right)



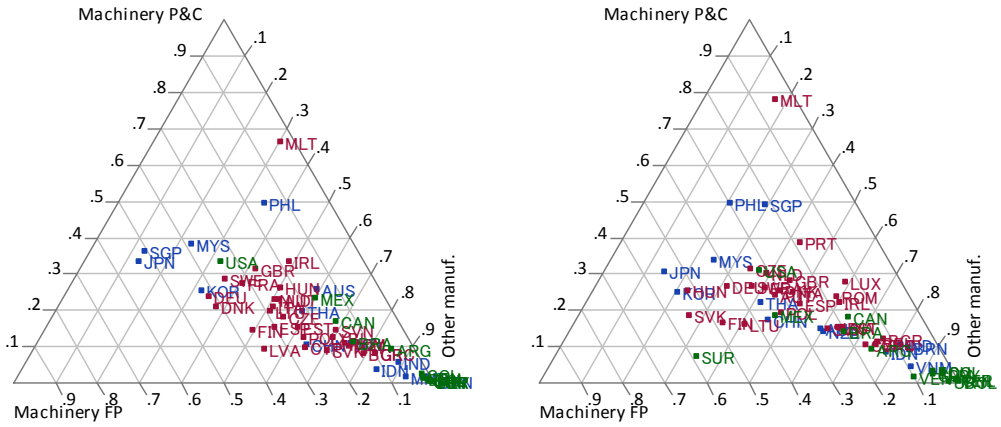
Intra-regional imports in 1994 (left) and in 2007 (right)



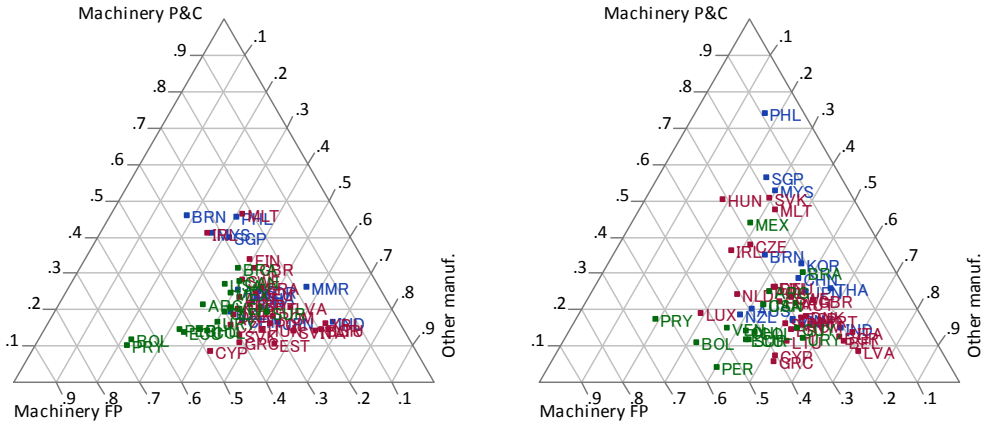
Notes: All figures are calculated using export and import statistics for bilateral trade in manufactured goods. Dots are shown in different colors by region: the blue dots for East Asian countries, the red ones for European countries, and the green ones for American countries.

Figure 10. Product Composition of Extra-regional Trade in Manufactured Goods.

Extra-regional exports in 1994 (left) and in 2007 (right)



Extra-regional imports in 1994 (left) and in 2007 (right)



Note: See the notes of Figure 9.

In the case of intra-regional exports of manufactured goods, as of 1994, Malta and the Philippines are distinctly different from other countries inasmuch as they depend largely on machinery parts & components for more than 65% of their exports. Japan and Singapore also have a high proportion of machinery, at more than 70%, but their proportions of machinery are shared equally by parts & components and finished products. Malaysia, Mexico, and the US are similar in their product composition to Japan and Singapore. As of 2007, Singapore has shifted upward to reach a position similar to that of the Philippines, which has remained close to the top vertex of parts &

components, by increasing its proportion of parts & components and by decreasing that of finished products. Meanwhile, Japan and Malaysia have shifted to the right with a decreased proportion of finished products. In contrast to Singapore and other East Asian countries, Malta and Mexico have increased their proportions of finished products. Other countries have remained in the lower right area of the triangle, indicating limited dependence on exports of machinery.

Compared to the export side, the product compositions of intra-regional imports of manufactured goods are concentrated on the lower right area of the triangle. Yet, as of 1994, Malaysia, Malta, the Philippines, and Singapore are situated slightly closer to the top vertex of machinery parts & components than other countries. Of this group, it is the three East Asian countries that have moved upward from 1994 to 2007 and have become more distinct in their dependence on imports of parts & components from the others, while Malta has moved downwards by decreasing the proportion of parts & components. Also, China experienced a noticeable upward shift to reach a similar position to the above-mentioned three East Asian countries.

In the case of extra-regional exports of manufactured goods, the distribution of the product composition is biased toward the bottom-left vertex of machinery finished products, as compared to intra-regional exports. As of 1994, Singapore and Japan are situated further to the left and depend on finished products for more than half of their extra-regional exports. Malta and the Philippines, on the other hand, are situated relatively close to the top vertex of parts & components, as in the cases of intra-regional exports and imports. From 1994 to 2007, the distribution of the product composition has, on the whole, shifted to the left, indicating an increased dependence on extra-regional exports of finished products in a global sense. Among East Asian countries, while Korea has moved leftwards to reach a similar position to Japan, which depends on finished products for more than half of its extra-regional exports, Singapore has moved to the upper right to reach a similar position to the Philippines, which depends on parts & components for half of its extra-regional exports. Interestingly, although the proportions of machinery stand at 70-80% for all four of these East Asian countries, the figures for Japan and Korea now contrast with those for the Philippines and Singapore, in terms of the relative importance of parts & components in the extra-regional exports of machinery.

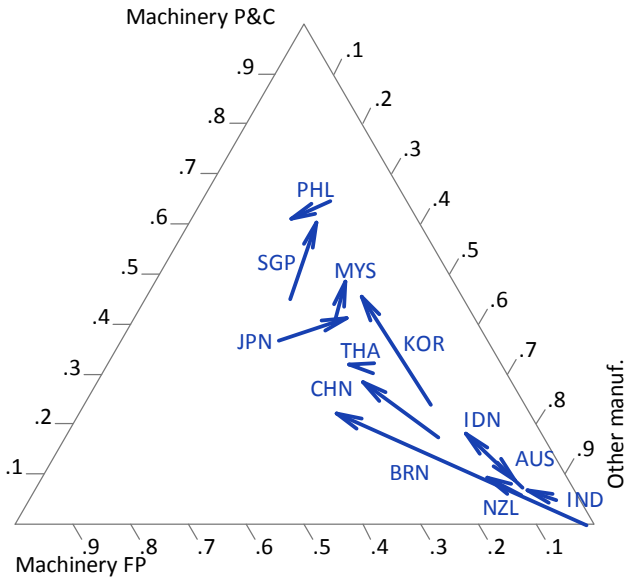
We see the most dramatic change in the distribution of the product composition in the case of extra-regional imports of manufactured goods. As of 1994, the product compositions are concentrated on the lower right area of the triangle with some exceptions, as with intra-regional imports. However, the product compositions have diversified among countries and have been distributed over a larger area in two directions. While American and European countries tend, on the whole, to move toward the bottom-left vertex of machinery finished products, East Asian countries are more likely to move toward the top vertex of parts & components. As of 2007, the Philippines, followed by Malaysia and Singapore, are the most prominent in terms of their dependence on extra-regional imports of parts & components. More noteworthy is the considerable importance of transactions of parts & components in any direction for these three East Asian countries. The Philippines and Singapore, in particular, are largely dependent on parts & components not only for major proportions of their intra-regional exports and imports but also for their extra-regional exports and imports of manufactured goods. About half of Malaysia's trade is also accounted for by parts & components except in the case of extra-regional exports.

In Figures 11 and 12, the status of product composition in 1994 and 2007 is illustrated by using arrows, so as to compare changes in the product composition between East Asian countries. The change in product composition from 1994 to 2007 is represented by the direction of the arrows. The extent of the change is represented by the length of the arrows. The triangles are drawn for intra-regional exports and imports in Figure 11 and for extra-regional exports and imports in Figure 12.

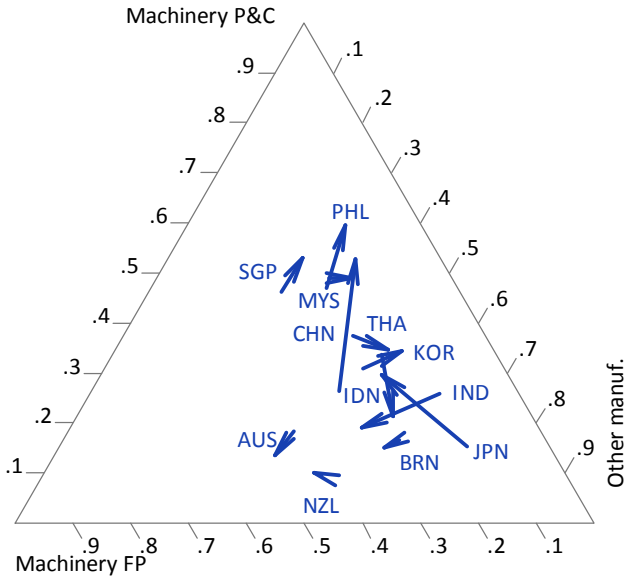
As for intra-regional exports, most East Asian countries, except Japan and the Philippines, simultaneously experience an increase in the proportion of machinery, which is biased toward parts & components, as indicated by arrows pointing to the upper left. Compared to the export side, East Asian countries experience relatively small changes in the product composition of intra-regional imports. An exception is the case of China, whose upward-pointing arrow is notably long. Also, in the case of Japan, an increase in the proportion of machinery is biased toward parts & components.

Figure 11. Changes in Product Composition of East Asia's Intra-regional Trade in Manufactured Goods from 1994 to 2007.

Intra-regional exports



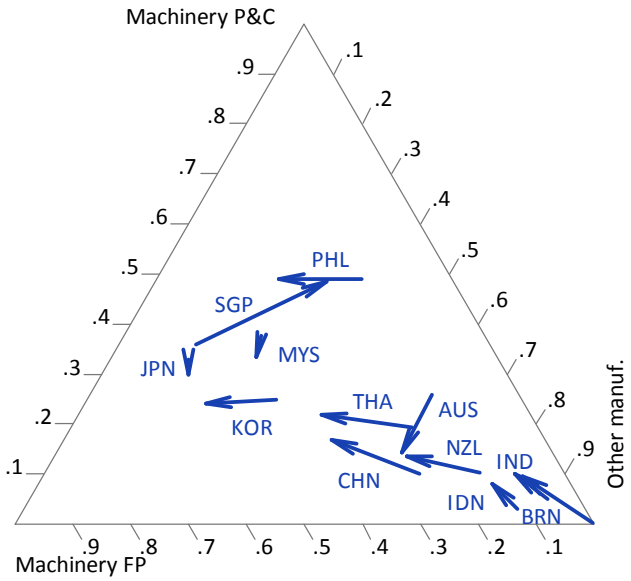
Intra-regional imports



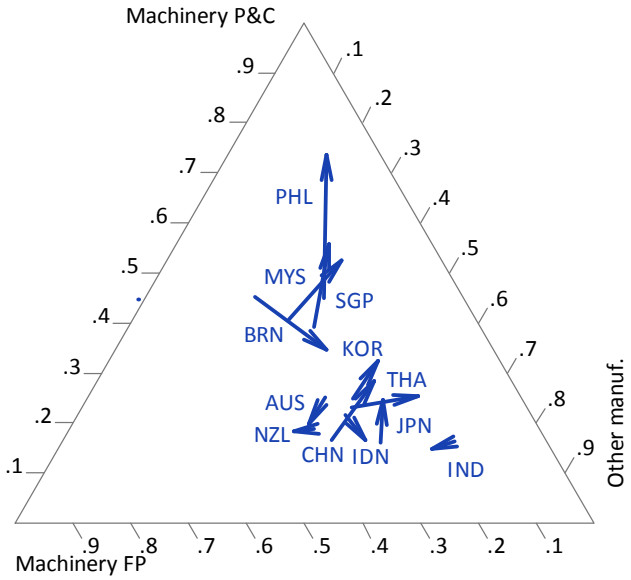
Note: All figures are calculated using export and import statistics for bilateral trade in manufactured goods.

Figure 12. Changes in Product Composition of East Asia's Extra-regional Trade in Manufactured Goods from 1994 to 2007.

Extra-regional exports



Extra-regional imports



Note: See the note of Figure11.

By comparing the directions of the arrows, the differences in the changes in product composition between intra-regional and extra-regional exports become more noticeable. Although most East Asian countries experienced an increase in the proportion of machinery in both intra-regional and extra-regional exports, the increase is clearly biased toward parts & components in the case of intra-regional exports while it is relatively more biased to finished products in the case of extra-regional exports. An exception is the case of Singapore, whose long arrow points to the upper right, indicating the decreased proportion of finished products along with simultaneous increases in the proportions of parts & components and other manufactured goods.

As for extra-regional imports, most East Asian countries, except the Philippines, Malaysia and Singapore, still remain located in the lower right area of the triangle, indicating a limited proportion of machinery, in particular, parts & components. By contrast, it is striking that the Philippines experiences a further increase in the proportion of parts & components, as indicated by the long arrow pointing upward.

5. Conclusion

This paper provides strong evidence supporting the view that East Asian countries have, to a very significant degree, participated in international production networks, compared to countries in other regions, as well as providing an overview of East Asia's trade structure. East Asian countries have expanded and strengthened transactions of machinery parts & components with intra-regional partners to a greater extent than with outsiders, leading to the increasing importance of parts & components in the intra-regional exports and imports of manufactured goods as well as the increasing importance of intra-regional transactions in the total exports and imports of parts & components to/from the world. In particular, the proportions of ICT-related parts & components in intra-regional exports and imports have remained notably high, and the intra-regional shares for the exports and imports of ICT-related parts & components have increased. Moreover, ICT-related parts & components dominate the major exported/imported goods of East Asia's intra-regional exports and imports. Their increasing importance can be regarded as suggesting the development of international

production networks within East Asia. In addition, since 2000, East Asian countries have begun to increase intra-regional exports of not only parts & components but also finished products, which indicates a potential importance of intra-regional markets as an ultimate source of demand for their exports of machinery.

The formation of international production networks is not limited to within the East Asian region, and the networks have stretched across more countries. Nonetheless, East Asian countries seem to have played a more important role in the development of global production networks though the degree of the participation in the networks varies among countries. It is striking that China, Japan, and Korea have engaged in two-way bilateral trade in machinery parts & components with more countries and have connected to denser networks, along with an increase in volume of trade. The Philippines, Singapore, and Malaysia specialize in both exports and imports of parts & components, and major proportions of exports and imports by these countries are accounted for by parts & components irrespective of whether intra-regional or extra-regional, except in the case of Malaysia's extra-regional exports. By contrast, East Asian countries can be said to fall into two broad categories with Japan, the NIEs, the ASEAN4, and China at the forefront of international production network participation whilst other countries in the region still seem to lag far behind.

Appendix A. Data Construction

As of February 2010, the UN Comtrade provides annual trade statistics reported by 249 countries/regions in total, including country groups provided by default. The number of countries/regions/country groups that are listed in the UN Comtrade reference table as a trade partner, i.e., export destination or import origin, reaches 288. In order to focus on bilateral trade between specified countries and to avoid possible overlaps, it is necessary to exclude data for country groups such as World (0), EU27 (97), and Southern African Customs Union (711).[i]

In addition, the UN Comtrade database includes data on a number of countries' exports to and imports from countries not specified or included elsewhere. The following trade data without a specified single trade partner country are dropped from the sample: Eastern Europe, not elsewhere specified (nes) (221), Northern Africa, nes (290), CACM, nes (471), Africa CAMEU region, nes (472), South America, nes (473), Asia, nes (490), Oceania, nes (527), Europe, nes (568), Africa, nes (577), United States Minor Outlying Islands (581), North America, the Caribbean and Central America nes (637), Europe EFTA, nes (697), US Miscellaneous Pacific Islands (849), Western Asia, nes (879), and Areas, nes (899). Data for unspecified regions such as Neutral zone (536), Bunkers (837), Free Zones (838), and Special categories, Secret & Difference (839) must also be excluded.

As for France, Italy, and the United States, since some countries/regions are subsumed within two or more country codes, we need to deselect codes so as to eliminate the possibility of overlaps. In the case of France, for example, France (including Monaco) (251) is selected, while Monaco (492)[ii] is excluded from the sample. As for Italy, Italy (including San Marino and Holy See) (381) is included in the sample, but other relevant codes, such as Holy See (Vatican City State) (336) and San Marino (674), are excluded. As for the United States, USA (including Puerto Rico and US Virgin Islands) (842) is included, but other relevant codes, such as Puerto Rico (630) and US Virgin Islands (850), are excluded. Similarly, Saint Kitts, Nevis and Anguilla (658) is dropped from the sample because trade statistics for Saint Kitts and

[i] The corresponding ISO 3166-1 numeric country codes are in parentheses.
[ii] Monaco (492) has been mapped to Europe, nes (568) since 2005.

Nevis (659) and Anguilla (660) are also reported separately.[iii]

As for import statistics, whether the original producer or the last exporter is reported as a trade partner country differs among customs/countries. In the former case, some countries report the importer country itself as a trade counterpart as if only a single country engages in the transaction, which partially reflects active entrepôt transactions. To eliminate the possibility of counting trade flows with no substantial value added at the port of shipment, we exclude seemingly bilateral import data composed only of a single country from the sample.

We use trade data at the 6-digit level of the Harmonized System (HS) product classification, which is the most detailed disaggregated level of trade data that is both internationally comparable and publicly available. At the HS 6-digit level, since the annual data below $500 (current US$) are not reported before 2000, trade flows below $500 are treated as if there was no trade at all for all the years in the sample. After the cutoff value of $500 is applied, all trade data are deflated by the consumer price index (CPI) in the United States to obtain a constant dollar series.

Appendix B. Possible Multiple Counting of Entrepôt Trade between Mainland China and Hong Kong

In the case of export statistics, exports to Hong Kong that are reported by a given country are likely to be confused with exports to mainland China via Hong Kong because the final destination market cannot necessarily be specified at the time of export. Indeed, all reported exports from a third country to Hong Kong seem not to be consumed within Hong Kong though it is difficult to assess what percentage of the exports to Hong Kong is actually consumed locally, based on publicly available data. Meanwhile, reported exports from Hong Kong to mainland China are likely to include exports originally from a third country without substantial value added in Hong Kong. We must suppose that the exports from a third country to mainland China via Hong Kong tend to be counted multiple times in export statistics reported by different

[iii] Among these codes, only the codes 336, 492, and 674 actually exist in the database though all the codes are listed in the UN Comtrade reference table.

countries.[iv] By the same token, it is also possible that there exists some overlapping in mainland China's exports via Hong Kong in export statistics because a large portion of the exports from mainland China to Hong Kong may be re-exported back to mainland China or exported to other countries without substantial value added.

Conversely, mainland China's imports via Hong Kong and a third country's imports from mainland China via Hong Kong may cause some overlap between import statistics reported by different countries. Despite the fact that the country of origin is carefully verified due to tariff regulations, as compared to the final destination in the case of export statistics, reported imports to mainland China from Hong Kong seem to include imports originally from other countries via Hong Kong.[v] Also, if reported imports to Hong Kong from mainland China are actually reshipped to other countries without substantial value added, they could be simultaneously counted by the third country's customs as cargoes imported from mainland China.

[iv] Such overlaps can be partly tackled by utilizing data on Hong Kong's re-exports, i.e., deducting Hong Kong's re-exports to China from its gross exports, which theoretically equal the net volume of exports from Hong Kong to China.

[v] Fung and Lau (2001) state that Chinese customs have strived to report the ultimate destination market as a trade partner country in export statistics and the original place of production as a partner in import statistics since 1993. Nevertheless, China's trade statistics for exports to and imports from Hong Kong seem to include transactions with the third country but via Hong Kong.

References

Amador, J., and Cabral, S., (2009). "Vertical specialization across the world: A relative measure." *North American Journal of Economics and Finance* no. 20: 267-280.

Amador, J., Cabral, S., and Maria, J.R., (2007). "Relative export structures and vertical specialization: A simple cross-country index." *Working Paper 1*-2007, Banco de Portugal.

Aminian, N., Fung, K.C., and Ng, F., (2009). "A comparative analysis of trade and economic integration in East Asia and Latin America." *Economic Change and Restructuring* no.42: 105-137.

Ando, M., and Kimura, F., (2005). "The formation of international production and distribution networks in East Asia." In *International Trade in East Asia* eds. Ito, T., and Rose, A. K. Chicago: University of Chicago Press, 177-213.

Athukorala, P.-C.and Yamashita, N., (2006). "Production fragmentation and trade integration: East Asia in a global context." *The North American Journal of Economics and Finance* no. 17: 233-256.
Available at: http://www.boj.or.jp/type/ronbun/rev/data/rev09j09.pdf

Balassa, B., (1965). "Trade liberalization and "revealed" comparative advantage." *The Manchester School of Economic and Social Studies* no.33: 99-123.

Fukao, K., Ishido, H., and Ito, K., (2003)."Vertical intra-industry trade and foreign direct investment in East Asia." *Journal of the Japanese and International Economies* no.17: 468-506.

Fung, K.C., and Lau. L.J., (2001). "New estimates of the United States-China bilateral trade balances." *Journal of the Japanese and International Economies* no.15: 102-130.

Imakubo, K., (2009). "Kokusaikinyu network karamita sekaitekina kinyukiki." *Bank of Japan Review* 2009-J-9, Bank of Japan (in Japanese).

Kimura, F., (2006). "International production and distribution networks in East Asia: Eighteen facts, mechanics, and policy implications." *Asian Economic Policy Review* 1, 326-344.

Leamer, E., (1987). "Factor scarcity, factor abundance and attitudes toward protection." *Journal of Political Economy* no.95: 961-999.

OECD, (2003). *A proposed classification of ICT goods*. Paris: OECD Working Party on Indicators for the Information Society, OECD.
Available at: http://www.oecd.org/dataoecd/5/61/22343094.pdf.

OECD, (2008). "Information economy product definitions based on the central product classification (version 2)." Working Party on Indicators for the Information Society, OECD.
Available at: http://www.oecd.org/dataoecd/16/46/42978297.pdf.

Figure A1. Shares of ICT/non-ICT Machinery in Total exports/imports of Manufactured Goods to/from the World in 1994.

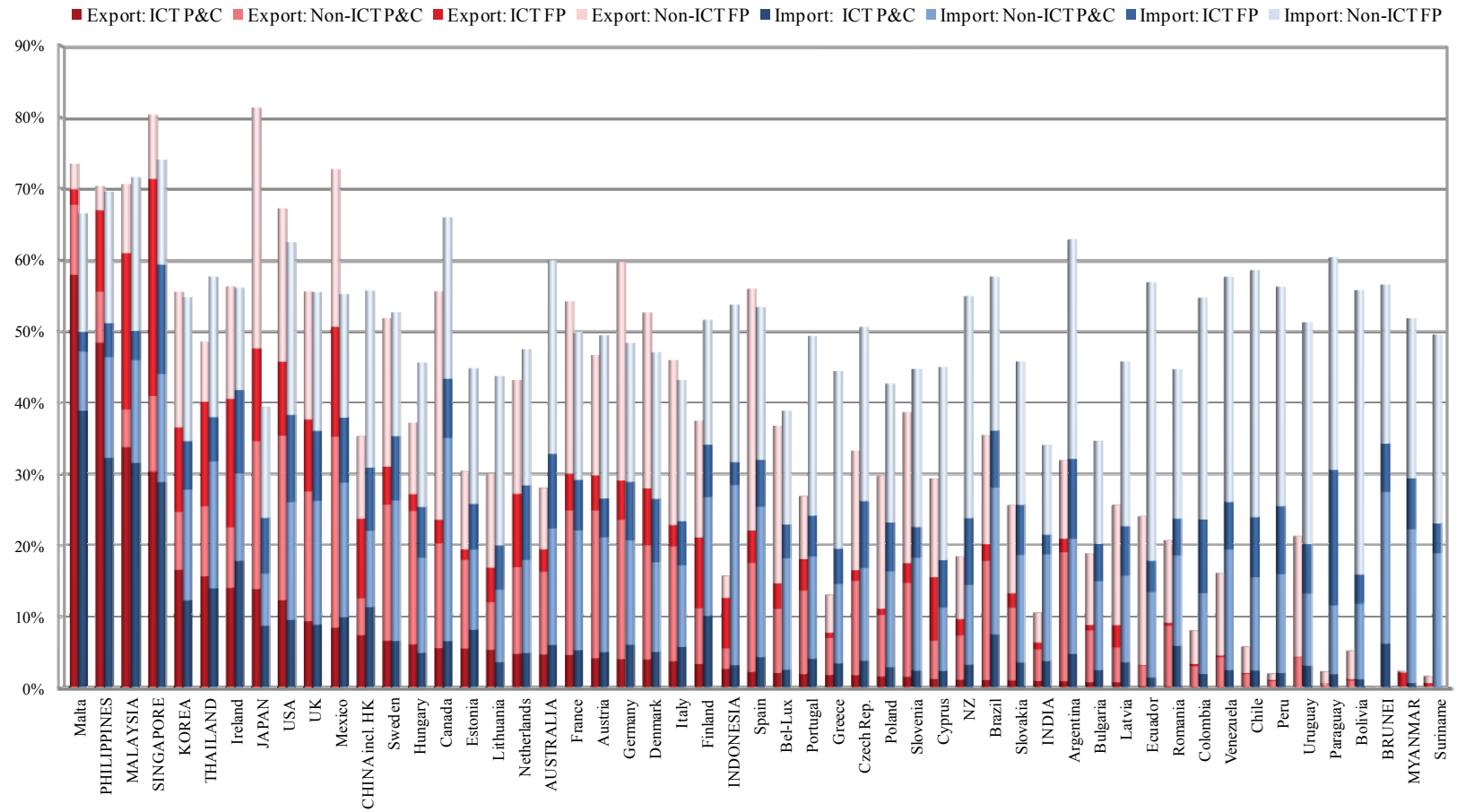


Figure A2. Shares of ICT/non-ICT Machinery in Total exports/imports of Manufactured Goods to/from the World in 2007.

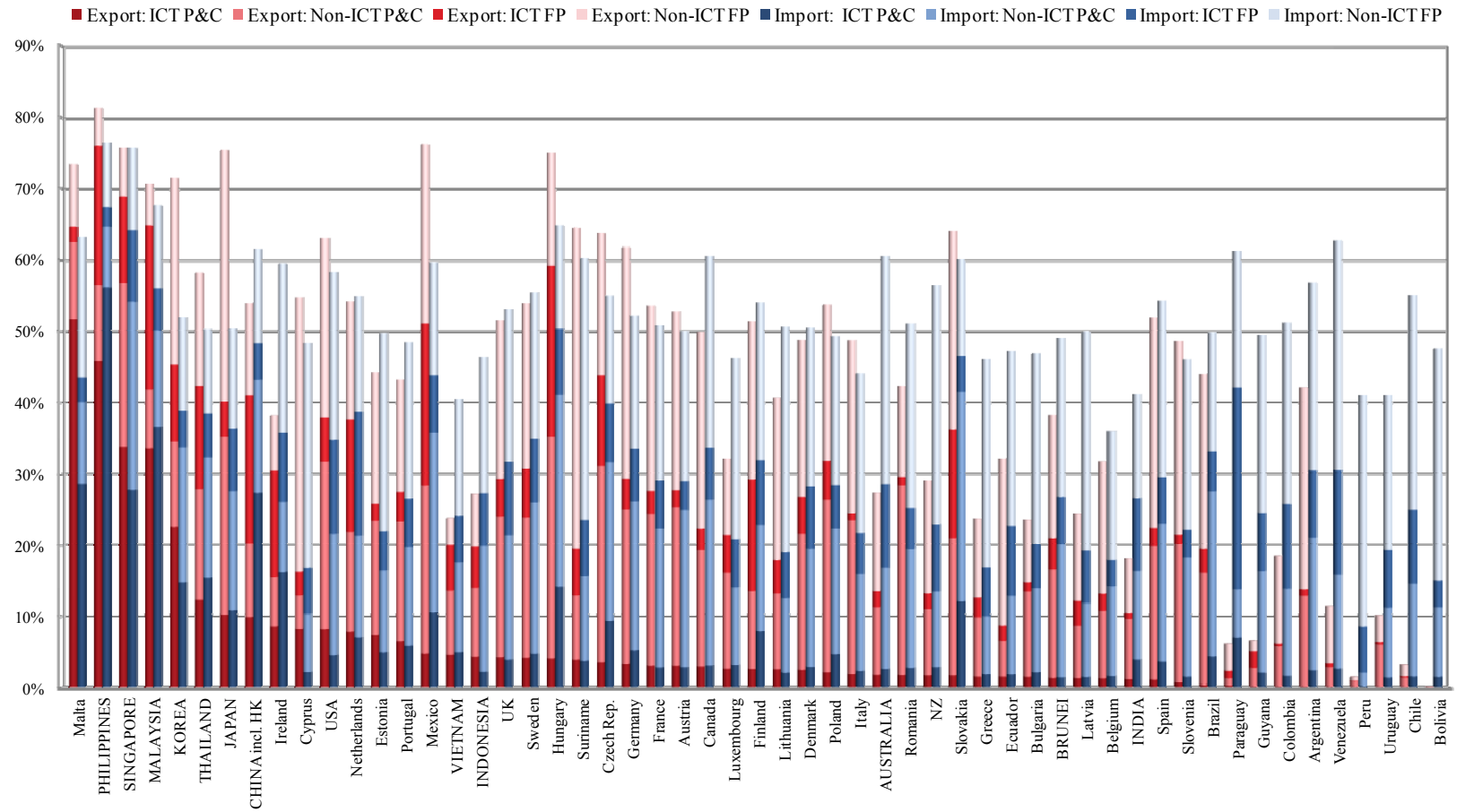


Table A1. Exceptions to the Reported Year and the Version of the HS Classification: by Year of Interest.

Country	The reported year	The version of the HS classification
Year 1994 (instead of data in 1994, based on the HS 1992 classification)		
Guyana (import statistics)	1992	HS 1992
Myanmar	1992	HS 1992
Belgium-Luxembourg	1995	HS 1992
Estonia	1995	HS 1992
Philippines	1996	HS 1992
Bulgaria	1996	HS 1996
Cambodia		*n.a.*
Guyana (export statistics)		*n.a.*
Viet Nam		*n.a.*
Year 2000 (instead of data in 2000, based on the HS 1996 classification)		
Suriname	2000	HS 1992
Myanmar (import statistics)	2001	HS 1996
Brunei	2002	HS 1996
Myanmar (export statistics)		*n.a.*
Year 2007 (instead of data in 2007, based on the HS 2007 classification)		
Brunei	2006	HS 1996
Venezuela	2006	HS 2002
Suriname	2007	HS 1992
Indonesia	2007	HS 1996
Brazil	2007	HS 2002
Ecuador	2007	HS 2002
India	2007	HS 2002
Malaysia	2007	HS 2002
Mexico	2007	HS 2002
Peru	2007	HS 2002
Philippines	2007	HS 2002
Viet Nam	2007	HS 2002
Cambodia		*n.a.*
Myanmar		*n.a.*

Note: "*n.a.*" indicates that no appropriate data is reported by the country for the relevant year.

Table A2. Intra-East Asian exports and imports: Transactions between Mainland China and Hong Kong.

	Intra-regional exports						Intra-regional share		
	Value (millions US$)			Product composition			in exports to world		
	1994	2000	2007	1994	2000	2007	1994	2000	2007
East Asia (ASEAN+6) excluding transactions between China and Hong Kong									
All manufactured goods	4,468	5,678	11,035	80%	80%	78%	41%	41%	43%
Machineries	2,579	3,513	6,607	46%	49%	47%	38%	39%	42%
Parts & components	1,405	2,301	4,292	25%	32%	30%	46%	50%	56%
(ICT-related goods)	816	1,585	2,433	15%	22%	17%	49%	55%	65%
Finished products	1,174	1,212	2,315	21%	17%	16%	31%	28%	28%
(ICT-related goods)	428	530	1,035	8%	7%	7%	28%	29%	30%
Other manufactured goods	1,889	2,165	4,428	34%	31%	31%	47%	45%	44%
Merchandise trade, total	5,585	7,099	14,106	100%	100%	100%	44%	43%	45%
East Asia (ASEAN+6) including transactions between China and Hong Kong									
All manufactured goods	5,419	6,872	14,186	81%	82%	81%	46%	46%	49%
Machineries	2,950	4,101	8,958	44%	49%	51%	41%	43%	49%
Parts & components	1,593	2,702	5,889	24%	32%	34%	49%	54%	64%
(ICT-related goods)	913	1,849	3,635	14%	22%	21%	52%	59%	74%
Finished products	1,357	1,399	3,069	20%	17%	18%	34%	30%	34%
(ICT-related goods)	485	622	1,561	7%	7%	9%	31%	32%	39%
Other manufactured goods	2,470	2,771	5,228	37%	33%	30%	54%	51%	48%
Merchandise trade, total	6,666	8,396	17,431	100%	100%	100%	48%	48%	50%

	Intra-regional imports						Intra-regional share		
	Value (millions US$)			Product composition			in imports from world		
	1994	2000	2007	1994	2000	2007	1994	2000	2007
East Asia (ASEAN+6) excluding transactions between China and Hong Kong									
All manufactured goods	4,451	5,839	11,509	79%	80%	78%	50%	55%	60%
Machineries	2,546	3,518	6,991	45%	48%	47%	52%	56%	63%
Parts & components	1,399	2,281	4,668	25%	31%	32%	58%	60%	67%
(ICT-related goods)	825	1,560	2,929	15%	21%	20%	65%	64%	78%
Finished products	1,147	1,237	2,323	20%	17%	16%	46%	51%	56%
(ICT-related goods)	425	586	1,070	8%	8%	7%	58%	58%	80%
Other manufactured goods	1,905	2,321	4,518	34%	32%	31%	48%	53%	56%
Merchandise trade, total	5,665	7,330	14,785	100%	100%	100%	48%	51%	53%
East Asia (ASEAN+6) including transactions between China and Hong Kong									
All manufactured goods	5,238	6,828	13,071	79%	81%	79%	54%	59%	63%
Machineries	2,838	3,986	7,988	43%	47%	48%	54%	59%	66%
Parts & components	1,504	2,493	5,283	23%	29%	32%	60%	62%	70%
(ICT-related goods)	877	1,687	3,367	13%	20%	20%	66%	66%	80%
Finished products	1,335	1,493	2,705	20%	18%	16%	49%	55%	60%
(ICT-related goods)	521	731	1,323	8%	9%	8%	63%	64%	83%
Other manufactured goods	2,400	2,843	5,083	36%	34%	31%	54%	58%	59%
Merchandise trade, total	6,593	8,478	16,512	100%	100%	100%	52%	54%	56%

Table A3. Top 5 Exported Goods by Destination: the ASEAN4 and the NIEs Countries.

Ranking	Export destination											
	East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
Indonesia												
Year 1994												
1	441211	Plywood 1 or 2 outer ply tropical l	24,981	18%	640319	Sports footwear, except ski, uppe	3,552	7%	400122	Technically specified natural rubb	8,420	13%
2	711319	Jewellery and parts of precious m	8,945	24%	400122	Technically specified natural rubb	2,239	11%	640319	Sports footwear, except ski, uppe	7,377	24%
3	400122	Technically specified natural rubb	3,925	27%	441211	Plywood 1 or 2 outer ply tropical l	2,234	15%	441211	Plywood 1 or 2 outer ply tropical l	4,447	31%
4	441212	Plywood, 1 or 2 outer ply non-con	3,840	30%	640411	Sports footwear, sole rubber or pl	1,925	19%	**852110**	**Video recording/reproducing a**	3,605	37%
5	750110	Nickel mattes	2,959	32%	441300	Densified wood, in blocks, plates,	1,736	22%	640411	Sports footwear, sole rubber or pl	1,987	40%
Year 2007												
1	750110	Nickel mattes	20,476	6%	400122	Technically spec. natural rubber (	5,579	7%	400122	Technically spec. natural rubber (	15,042	15%
2	400122	Technically spec. natural rubber (	17,803	12%	640319	Sports footwear other than ski-bo	3,755	12%	640319	Sports footwear other than ski-bo	2,645	17%
3	800110	Tin, not alloyed, unwrought	9,427	15%	844351	Ink-jet printing machine	2,407	16%	620520	Men's/boys' shirts (excl. knitted/c	2,412	20%
4	740311	Cathodes & sections of cathodes,	9,165	18%	**852540**	**Still image video camara**	2,055	18%	621210	Brassieres and parts thereof, whe	2,185	22%
5	470329	Chemical wood pulp, soda/sulphat	7,286	20%	640330	Footwear, wood base, uppers leat	1,536	20%	610610	Women's/girls' blouses, shirts & s	1,767	24%
Malaysia												
Year 1994												
1	**847330**	**Parts and accessories of data p**	23,948	8%	**854280**	**Electronic integrated circuits/m**	11,364	12%	**854280**	**Electronic integrated circuits/m**	21,346	13%
2	**854280**	**Electronic integrated circuits/m**	20,326	14%	**847330**	**Parts and accessories of data p**	4,952	17%	**847330**	**Parts and accessories of data p**	16,386	23%
3	441212	Plywood, 1 or 2 outer ply non-con	12,874	19%	440721	Lumber, Meranti red, Meranti Bal	4,513	21%	**854220**	**Hybrid integrated circuits**	10,327	29%
4	**852810**	**Colour television receivers/mo**	12,676	23%	400122	Technically specified natural rubb	3,931	25%	**852110**	**Video recording/reproducing a**	9,180	34%
5	**854219**	**Monolithic integrated circuits,**	10,243	26%	**852731**	**Radio-telephony receiver, with**	3,234	29%	**847192**	**Computer input or output units**	8,189	39%
Year 2007												
1	**854221**	**Monolithic integrated circuits,**	67,129	10%	**847180**	**Other units of automatic data p**	14,638	8%	**847130**	**Portable automatic data proces**	57,259	22%
2	**847330**	**Parts & accessories of the mac**	56,332	19%	**854260**	**Hybrid integrated circuits**	13,141	15%	**847330**	**Parts & accessories of the mac**	27,611	32%
3	**854229**	**Monolithic integrated circuits,**	31,665	23%	**847330**	**Parts & accessories of the mac**	12,302	22%	**854260**	**Hybrid integrated circuits**	13,412	37%
4	**854260**	**Hybrid integrated circuits**	30,769	28%	**847160**	**Input/output units, whether/no**	9,134	27%	**852520**	**Transmission app. for radio-tel**	12,826	42%
5	**854129**	**Transistors (excl. photosensiti**	11,248	30%	**854221**	**Monolithic integrated circuits,**	8,466	31%	**854221**	**Monolithic integrated circuits,**	12,269	46%
Philippines												
Year 1994												
1	**854280**	**Electronic integrated circuits/m**	16,936	20%	**854280**	**Electronic integrated circuits/m**	9,666	25%	**854280**	**Electronic integrated circuits/m**	17,392	22%
2	**847330**	**Parts and accessories of data p**	12,955	35%	**854211**	**Monolithic integrated circuits,**	3,674	35%	**854211**	**Monolithic integrated circuits,**	7,431	32%
3	**854211**	**Monolithic integrated circuits,**	7,247	44%	**847330**	**Parts and accessories of data p**	3,220	44%	**851710**	**Telephone sets**	4,499	38%
4	**847192**	**Computer input or output units**	4,870	49%	**847192**	**Computer input or output units**	2,735	51%	**847330**	**Parts and accessories of data p**	4,015	43%
5	740311	Copper cathodes and sections of c	3,202	53%	710813	Gold, semi-manufactured forms, n	2,521	57%	**847192**	**Computer input or output units**	3,701	47%
Year 2007												
1	**854270**	**Electronic microassemblies**	83,005	34%	**854221**	**Monolithic integrated circuits,**	28,369	38%	**847170**	**Storage units**	10,881	14%
2	**847160**	**Input/output units, whether/no**	36,900	49%	**854270**	**Electronic microassemblies**	12,570	55%	**847130**	**Portable automatic data proces**	10,714	28%
3	**847330**	**Parts & accessories of the mac**	13,875	54%	870839	Brakes & servo-brakes & parts th	4,623	62%	**854270**	**Electronic microassemblies**	5,140	35%
4	740311	Cathodes & sections of cathodes,	11,271	59%	900659	Photographic cameras, other n.e.s	3,215	66%	854430	Ignition wiring sets & other wiring	4,254	41%
5	**854150**	**Semiconductor devices n.e.s. i**	10,040	63%	**847160**	**Input/output units, whether/no**	2,721	70%	850440	Static converters	3,883	46%

Table A3 (cont.). Top 5 Exported Goods by Destination: the ASEAN4 and the NIEs Countries.

Ranking	Export destination											
	East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
Thailand												
Year 1994												
1	**847193**	**Computer data storage units**	17,087	8%	710239	Diamonds (jewellery) worked but	2,922	4%	**847330**	**Parts and accessories of data p**	6,302	6%
2	**847330**	**Parts and accessories of data p**	10,843	14%	**847330**	**Parts and accessories of data p**	2,678	8%	**854219**	**Monolithic integrated circuits,**	4,482	11%
3	400121	Natural rubber in smoked sheets	10,221	19%	**852810**	**Colour television receivers/mo**	2,516	11%	**852810**	**Colour television receivers/mo**	4,021	15%
4	**854219**	**Monolithic integrated circuits,**	10,014	24%	400121	Natural rubber in smoked sheets	2,354	14%	**852110**	**Video recording/reproducing a**	3,713	18%
5	**852810**	**Colour television receivers/mo**	4,602	26%	620342	Mens, boys trousers & shorts, of	2,343	17%	**847193**	**Computer data storage units**	3,596	22%
Year 2007												
1	**847170**	**Storage units**	49,852	8%	**847170**	**Storage units**	17,490	10%	**847170**	**Storage units**	19,483	11%
2	**854231**	**Electronic integrated circuits,**	23,953	11%	870421	Motor vehicles for the transportof	9,524	16%	**847330**	**Parts & accessories of the mac**	6,109	14%
3	**847330**	**Parts & accessories of the mac**	20,875	14%	841510	Window/wall type air-conditioning	4,980	19%	**852872**	**Other colour reception appara**	4,466	17%
4	**854239**	**Other Electronic integrated ci**	14,510	16%	**854231**	**Electronic integrated circuits,**	4,180	22%	711319	Articles of jewellery & parts there	4,453	19%
5	870323	Vehicles (excl. of 87.02 & 8703.1	13,085	18%	**847160**	**Input/output units, whether/no**	3,998	24%	711311	Articles of jewellery & parts there	3,636	21%
Korea												
Year 1994												
1	**854211**	**Monolithic integrated circuits,**	41,076	8%	854800	Electrical parts of machinery and	15,636	10%	**854211**	**Monolithic integrated circuits,**	32,977	10%
2	540760	Woven fabric >85% non-textured	15,867	11%	890190	Cargo vessels other than tanker o	11,122	17%	**847192**	**Computer input or output units**	17,061	15%
3	**854219**	**Monolithic integrated circuits,**	11,395	14%	**847192**	**Computer input or output units**	8,511	23%	870322	Automobiles, spark ignition engine	16,503	20%
4	410439	Bovine and equine leather, nes	7,741	15%	**854211**	**Monolithic integrated circuits,**	7,676	28%	**854219**	**Monolithic integrated circuits,**	16,160	25%
5	**854011**	**Colour cathode-ray television**	7,288	17%	870322	Automobiles, spark ignition engine	6,957	32%	854800	Electrical parts of machinery and	11,666	29%
Year 2007												
1	**854232**	**Electronic integrated circuits,**	102,580	7%	**851712**	**Telephones for cellular networ**	68,297	13%	870323	Vehicles (excl. of 87.02 & 8703.1	82,090	14%
2	**854231**	**Electronic integrated circuits,**	89,325	13%	870332	Vehicles principally designed for t	45,924	22%	**851712**	**Telephones for cellular networ**	57,207	25%
3	**901380**	**Liquid crystal devices not cons**	76,686	18%	890190	Vessels for the transportof goods	39,318	30%	**901380**	**Liquid crystal devices not cons**	37,207	31%
4	**851770**	**Parts of telephone sets, incl. te**	60,195	22%	**901380**	**Liquid crystal devices not cons**	32,356	36%	870324	Vehicles (excl. of 87.02 & 8703.1	27,292	36%
5	**847330**	**Parts & accessories of the mac**	46,266	25%	890120	Tankers	29,591	42%	870899	Other parts & accessories for the	23,882	40%
Singapore												
Year 1994												
1	**847330**	**Parts and accessories of data p**	27,568	5%	**847193**	**Computer data storage units**	32,615	20%	**847193**	**Computer data storage units**	62,028	25%
2	**854219**	**Monolithic integrated circuits,**	22,328	9%	**847330**	**Parts and accessories of data p**	20,686	33%	**847330**	**Parts and accessories of data p**	41,546	42%
3	**847120**	**Digital computers with cpu and**	19,949	13%	**854211**	**Monolithic integrated circuits,**	9,123	38%	**854211**	**Monolithic integrated circuits,**	11,091	46%
4	**852290**	**Parts and accessories of recor**	18,752	16%	**852110**	**Video recording/reproducing a**	7,399	43%	**854219**	**Monolithic integrated circuits,**	10,999	51%
5	**847193**	**Computer data storage units**	16,327	19%	**847192**	**Computer input or output units**	6,828	47%	**847120**	**Digital computers with cpu and**	8,770	54%
Year 2007												
1	**854239**	**Other Electronic integrated ci**	383,127	26%	**854239**	**Other Electronic integrated ci**	47,768	19%	**854239**	**Other Electronic integrated ci**	50,678	18%
2	844399	Other parts & accessories for prin	112,393	34%	292250	Amino-alcohol-phenols, amino-aci	32,291	33%	844399	Other parts & accessories for prin	31,526	29%
3	**851712**	**Telephones for cellular networ**	40,421	36%	844399	Other parts & accessories for prin	22,050	42%	300490	Medicaments (excluding goods of	30,445	40%
4	**854290**	**Parts of electronic integrated**	39,964	39%	**847170**	**Storage units**	15,683	48%	**847170**	**Storage units**	21,761	48%
5	**852329**	**Magnetic media for the record**	29,811	41%	300490	Medicaments (excluding goods of	8,128	51%	**852990**	**Other parts suitable for use so**	14,699	53%

Note:..For reference, a part of commodity description is shown in the columns next to HS code

Table A4. Top 5 Imported Goods by Origin: the ASEAN4 and the NIEs countries.

Ranking	Import origin: East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
Indonesia												
Year 1994												
1	870899	Motor vehicle parts nes	10,354	6%	890110	Cruise ships, excursion boats, ferr	2,944	4%	520100	Cotton, not carded or combed	3,322	6%
2	871419	Motorcycle parts except saddles	4,815	8%	843910	Machinery for pulping fibrous cell	2,501	7%	890520	Floating, submersible drilling or pr	1,642	10%
3	840734	Engines, spark-ignition reciprocati	3,437	10%	880240	Fixed wing aircraft, unladen weigl	1,722	9%	470329	Chem wood pulp, soda/sulphate, n	1,331	12%
4	840820	Engines, diesel, for motor vehicles	3,130	12%	**851730**	**Telephonic or telegraphic swit**	1,633	11%	740311	Copper cathodes and sections of c	1,294	15%
5	520100	Cotton, not carded or combed	3,113	14%	853710	Electrical control and distribution b	1,191	12%	843149	Parts of cranes, work-trucks, sho	1,124	17%
Year 2007												
1	290243	p-Xylene	7,003	3%	880240	Aeroplanes & other aircraft, of ar	9,144	14%	880240	Aeroplanes & other aircraft, of ar	3,854	9%
2	**852520**	**Transmit-receive apparatus fo**	5,758	5%	**851722**	**Teleprinters**	2,941	18%	520100	Cotton, not carded/combed	3,591	17%
3	870322	Vehicles (excl. of 87.02 & 8703.1	4,108	7%	**852520**	**Transmit-receive apparatus fo**	2,441	22%	470321	Chemical wood pulp, soda/sulphat	1,651	21%
4	840991	Parts suit. for use solely/principall	3,487	8%	**847130**	**Portable automatic data proces**	1,289	24%	310420	Potassium chloride	1,494	25%
5	843149	Parts suit. for use solely/principall	2,588	9%	**851790**	**Parts of line telephone/telegra**	1,282	26%	843143	Parts suit. for use solely/principall	897	27%
Malaysia												
Year 1994												
1	**854280**	**Electronic integrated circuits/m**	19,063	5%	**854290**	**Parts of electronic integrated c**	7,262	7%	**854290**	**Parts of electronic integrated c**	36,895	28%
2	**854290**	**Parts of electronic integrated c**	17,343	9%	890120	Tankers	4,061	10%	880240	Fixed wing aircraft, unladen weigl	24,227	47%
3	**847330**	**Parts and accessories of data p**	12,399	12%	890190	Cargo vessels other than tanker o	3,746	14%	**847330**	**Parts and accessories of data p**	3,892	50%
4	**852290**	**Parts and accessories of recor**	12,068	15%	710812	Gold in unwrought forms non-mor	3,549	17%	**854280**	**Electronic integrated circuits/m**	3,183	52%
5	**854219**	**Monolithic integrated circuits,**	12,021	19%	**854211**	**Monolithic integrated circuits,**	2,353	19%	**854150**	**Semiconductor devices, not lig**	2,606	54%
Year 2007												
1	**847330**	**Parts & accessories of the mac**	57,809	8%	**854290**	**Parts of electronic integrated**	31,709	21%	**854290**	**Parts of electronic integrated**	36,712	24%
2	**854229**	**Monolithic integrated circuits,**	37,004	13%	880240	Aeroplanes & other aircraft, of ar	8,574	27%	**854229**	**Monolithic integrated circuits,**	9,193	30%
3	**854290**	**Parts of electronic integrated**	36,864	19%	**854229**	**Monolithic integrated circuits,**	6,100	31%	**854260**	**Hybrid integrated circuits**	7,329	35%
4	**854260**	**Hybrid integrated circuits**	32,991	23%	**847330**	**Parts & accessories of the mac**	2,750	32%	**854221**	**Monolithic integrated circuits,**	4,656	38%
5	**854221**	**Monolithic integrated circuits,**	20,198	26%	**854221**	**Monolithic integrated circuits,**	2,600	34%	**847330**	**Parts & accessories of the mac**	4,081	41%
Philippines												
Year 1994												
1	**847330**	**Parts and accessories of data p**	18,037	10%	**854290**	**Parts of electronic integrated c**	6,196	14%	**854290**	**Parts of electronic integrated c**	29,280	37%
2	**854290**	**Parts of electronic integrated c**	13,991	18%	**851730**	**Telephonic or telegraphic swit**	2,007	18%	880240	Fixed wing aircraft, unladen weigl	7,711	47%
3	870390	Automobiles nes including gas turi	7,739	22%	**851790**	**Parts of line telephone/telegra**	1,711	22%	**851790**	**Parts of line telephone/telegra**	1,628	49%
4	**854211**	**Monolithic integrated circuits,**	5,847	25%	880240	Fixed wing aircraft, unladen weigl	1,368	25%	**847330**	**Parts and accessories of data p**	1,601	51%
5	**852990**	**Parts for radio/tv transmit/rece**	5,620	28%	**852510**	**Transmission apparatus for rad**	1,027	27%	**852510**	**Transmission apparatus for rad**	1,242	53%
Year 2007												
1	**854290**	**Parts of electronic integrated**	49,997	21%	**854290**	**Parts of electronic integrated**	19,931	42%	**854290**	**Parts of electronic integrated**	35,492	50%
2	**847330**	**Parts & accessories of the mac**	40,231	37%	880240	Aeroplanes & other aircraft, of ar	4,336	51%	**854229**	**Monolithic integrated circuits,**	15,441	71%
3	**854221**	**Monolithic integrated circuits,**	9,762	41%	**854229**	**Monolithic integrated circuits,**	2,407	56%	**847330**	**Parts & accessories of the mac**	3,045	76%
4	**854229**	**Monolithic integrated circuits,**	7,320	44%	**851790**	**Parts of the app. & equip. of 85**	1,888	60%	**854221**	**Monolithic integrated circuits,**	1,140	77%
5	870323	Vehicles (excl. of 87.02 & 8703.1	3,499	46%	300490	Medicaments (excluding goods of	1,595	63%	847989	Other machines & mechanical ap	891	78%

Table A4 (cont.). Top 5 Imported Goods by Origin: the ASEAN4 and the NIEs Countries.

Ranking	Import origin: East Asia (ASEAN+6)				Europe (EU27)				America (NAFTA & UNASUR)			
	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share	HS 6-digit code	Commodity description	Value (ths. US$)	Cumul. share
Thailand												
Year 1994												
1	**847330**	**Parts and accessories of data p**	16,079	5%	870323	Automobiles, spark ignition engine	7,044	7%	**854290**	**Parts of electronic integrated c**	9,748	11%
2	870899	Motor vehicle parts nes	12,043	8%	**852520**	**Transmit-receive apparatus for**	2,729	10%	**854219**	**Monolithic integrated circuits,**	4,837	17%
3	870600	Motor vehicle chassis fitted with c	10,631	11%	870324	Automobiles, spark ignition engine	2,510	12%	**847330**	**Parts and accessories of data p**	3,399	20%
4	**854219**	**Monolithic integrated circuits,**	10,443	14%	710239	Diamonds (jewellery) worked but	1,766	14%	**852320**	**Unrecorded magnetic discs**	3,348	24%
5	870323	Automobiles, spark ignition engine	5,665	16%	847989	Machines and mechanical applian	1,279	15%	**852520**	**Transmit-receive apparatus for**	2,012	26%
Year 2007												
1	**847330**	**Parts & accessories of the mac**	33,824	5%	**854290**	**Parts of electronic integrated**	4,512	4%	**854290**	**Parts of electronic integrated**	8,414	9%
2	**854290**	**Parts of electronic integrated**	21,856	8%	300490	Medicaments (excluding goods of	3,303	8%	**847330**	**Parts & accessories of the mac**	5,692	15%
3	**854239**	**Other Electronic integrated ci**	16,795	10%	850239	Electric generating sets n.e.s. in 8	2,190	10%	880240	Aeroplanes & other aircraft, of ar	2,756	18%
4	**854231**	**Electronic integrated circuits,**	13,754	12%	880240	Aeroplanes & other aircraft, of ar	2,156	12%	**854231**	**Electronic integrated circuits,**	2,544	20%
5	870899	Other parts & accessories for the	13,363	14%	732690	Articles of iron/steel, n.e.s.	1,645	13%	520100	Cotton, not carded/combed	2,196	23%
Korea												
Year 1994												
1	847989	Machines and mechanical applian	15,215	3%	880240	Fixed wing aircraft, unladen weigl	6,483	4%	**854219**	**Monolithic integrated circuits,**	18,484	7%
2	**854211**	**Monolithic integrated circuits,**	12,638	6%	847989	Machines and mechanical applian	2,900	5%	880240	Fixed wing aircraft, unladen weigl	11,289	11%
3	**854219**	**Monolithic integrated circuits,**	11,021	8%	**854219**	**Monolithic integrated circuits,**	2,779	7%	410121	Bovine hides, whole, fresh or wet-	8,959	14%
4	710812	Gold in unwrought forms non-mor	6,716	10%	720449	Ferrous waste or scrap, nes	2,430	8%	847989	Machines and mechanical applian	8,441	17%
5	**854290**	**Parts of electronic integrated c**	6,211	11%	840820	Engines, diesel, for motor vehicles	2,153	9%	**852520**	**Transmit-receive apparatus for**	7,655	20%
Year 2007												
1	**854231**	**Electronic integrated circuits,**	78,268	6%	848620	Machines & apparatus for the ma	15,718	5%	**854231**	**Electronic integrated circuits,**	24,885	7%
2	**854239**	**Other Electronic integrated ci**	33,834	9%	**854231**	**Electronic integrated circuits,**	9,108	8%	848620	Machines & apparatus for the ma	24,866	14%
3	720851	Flat-rolled products of iron/non-all	26,657	11%	870324	Vehicles (excl. of 87.02 & 8703.1	7,813	10%	880240	Aeroplanes & other aircraft, of ar	16,901	19%
4	**854232**	**Electronic integrated circuits,**	25,854	13%	300490	Medicaments (excluding goods of	6,807	12%	740311	Cathodes & sections of cathodes,	11,548	22%
5	**847330**	**Parts & accessories of the mac**	20,709	15%	382490	Chemical products&preparations	5,603	14%	**854232**	**Electronic integrated circuits,**	10,457	25%
Singapore												
Year 1994												
1	**854219**	**Monolithic integrated circuits,**	44,673	6%	**854211**	**Monolithic integrated circuits,**	6,529	4%	880240	Fixed wing aircraft, unladen weigl	15,370	8%
2	**847330**	**Parts and accessories of data p**	36,807	12%	**854219**	**Monolithic integrated circuits,**	3,758	7%	**847330**	**Parts and accessories of data p**	12,600	14%
3	**854211**	**Monolithic integrated circuits,**	35,465	17%	870323	Automobiles, spark ignition engine	3,567	9%	**854211**	**Monolithic integrated circuits,**	11,820	21%
4	**847193**	**Computer data storage units**	34,188	22%	**847330**	**Parts and accessories of data p**	2,432	10%	381800	Chemical element/compound wafe	6,083	24%
5	**852290**	**Parts and accessories of recor**	19,666	25%	890190	Cargo vessels other than tanker o	2,070	12%	**854290**	**Parts of electronic integrated c**	5,624	27%
Year 2007												
1	**854239**	**Other Electronic integrated ci**	236,214	22%	**854239**	**Other Electronic integrated ci**	41,857	16%	**854239**	**Other Electronic integrated ci**	45,976	15%
2	844399	Other parts & accessories for prir	89,590	30%	843143	Parts suit. for use solely/principall	6,044	19%	880330	Parts of aeroplanes/helicopters, ot	26,442	24%
3	**851712**	**Telephones for cellular networ**	60,762	36%	844399	Other parts & accessories for prir	5,963	21%	843143	Parts suit. for use solely/principall	17,435	30%
4	890190	Vessels for the transportof goods	16,915	37%	880330	Parts of aeroplanes/helicopters, ot	5,137	23%	880240	Aeroplanes & other aircraft, of ar	13,459	34%
5	**847170**	**Storage units**	16,249	39%	870323	Vehicles (excl. of 87.02 & 8703.1	4,250	25%	844399	Other parts & accessories for prir	11,766	38%

Note: For reference, a part of commodity description is shown in the coulumns next to HS code.

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