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Competitiveness of ASEAN, China, and Japan

*Daisuke Hiratsuka**

I. Introduction

The allocation of foreign direct investments (FDI) in East Asia has drastically changed since 1992 when China accelerated her open door policy. Inflows of FDI into China have risen while those into ASEAN have fallen. Both before and after China's entry into the World Trade Organization (WTO), inflows of FDI into China have increased. Japanese firms, which were conservative about investing in China, have expanded their investment there. In the first half of fiscal 2002, the amount of outward direct investments to China, as revealed by the Ministry of Finance of Japan, for the first time exceeded those to the ten member states of ASEAN. Most Japanese firms operating in the ASEAN countries have for the time being stopped building new factories there, but their affiliates are building new factories in China. The Japanese firms seem to place as their top priority the establishment of production and distribution networks in China rather than in ASEAN.

The Chinese economy, driven by a large inflow of FDI and by a rise in exports coupled with expansion of fiscal policy, has sustained its high economic growth. The ASEAN countries import from China not only consumer goods such as apparel but also parts for assembling; meanwhile Chinese goods have been replacing indigenous goods in the ASEAN markets. The change of capital allocation in East Asia and rising sales of Chinese goods have forced the ASEAN countries to upgrade their industries and enhance their competitiveness.

The Japanese economy has matured. The population of 18 year old decreased to 1.5 million in 2002 from 2 million in 1990. A fall in the

number of children has caused problems, including the opening-up of large demand-supply gaps in various industries including service industries. This is shown by the fact that between 1990 and 2002, domestic passenger car sales declined from 4.3 million to 3.0 million units. In this context, Japanese firms, multinationals and small companies alike, rushed to enter the market within the newly-emerging coastal industrial belt that runs from the Zhu Jiang delta (Shenzhen), and the Chang Jiang delta (Shanghai), to Beijing, Tianjin and Dalian. Within this zone, economies are expanding rapidly and high rates of return are expected. This substantially promotes the market integration of the economies of East Asia. Firms in East Asia nowadays need an East Asia wide strategy.

Responding to the rise of China, ASEAN has promoted the ASEAN Free Trade Area (AFTA). The common effective preferential tariff (CEPT) program is the mechanism by which tariffs on those goods traded within the ASEAN region that meet a 40 percent ASEAN content requirement, will be reduced to less than 5 percent by 2003 for the original six members (Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand), by 2006 for Vietnam, by 2008 for Laos and Myanmar, and by 2010 for Cambodia, except in the following cases: 1) temporary exclusions by which tariff reduction will be delayed for purposes of protection; 2) sensitive agricultural products; 3) general exceptions which are deemed necessary for the protection of national security, public morals and so on. The temporary list has to be included in the CEPT scheme before 2005, and also the sensitive lists will be eliminated. The six original ASEAN members will accomplish AFTA in 2010 and the newly members in 2015. In parallel with tariff reductions, ASEAN initiated mechanisms to modernize and streamline custom administration; in addition there will be ASEAN wide adoption of the WTO valuation system, harmonization of custom procedures, the common interpretation of the Harmonized Code, and custom post clearance audit.

On the initiative of Japan, ASEAN is committed to the ASEAN-Japan Economic Partnership (AJCEP). In November 2002, summit meetings of ASEAN and Japan agreed the ASEAN-Japan free trade agreement (FTA) to be implemented as soon as possible within 10 years. The economic ministers' meeting has been asked to propose a framework of AJCEP in 2003. ASEAN and Japan have begun to work out the framework of the AJCEP.

The realization of ASEAN-Japan FTA will enable firms operating in ASEAN and Japan to produce goods at the regional scale at low production cost. Moreover, the proposed ASEAN FTA has been supported not only

by Japan but also by China, South Korea and the United States. ASEAN is expected to play the role of a hub, integrating markets throughout East Asia. This development will require firms in ASEAN and Japan to change their production and investment behavior at the wide regional scale of ASEAN-Japan-China-Korea-the U.S.

To earn the most benefit from the single market, each country has to allocate resources for industries in which competitiveness is high or is expected to increase, while each government has to change its policy of protecting industries whose competitiveness is weak. In the single market, each participant country will have more chance to enhance competitiveness and expand production in promising industries.

With these issues in mind, this study aims to measure the competitiveness of the ASEAN Six (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam), as well as China, Hong Kong, South Korea, Taiwan, the U.S. and Japan. The main focus of attention will be on the ASEAN Six, China and Japan, and industry will be examined within the area to evaluate the current state of its competitiveness.

II. Industrial Competitiveness According to the Catching-up Product Cycle

A. Measurement of Industrial Competitiveness

There are various methods of measuring industrial competitiveness. Competitiveness is determined by various factors: wages, material costs, technology, production management, logistics aspects such as transportation networks and custom clearance, but is also revealed in trade. Among the methods, assuming that competitiveness is revealed in trade, the revealed comparative advantage (RCA) index has been widely used since 1965, when it was introduced by Balassa.[1] However, the RCA index, which measures the *relative* degree of export specialization in comparison with world levels regarding specific commodities, is not a suitable index for the measurement of industrial competitiveness in East Asia where many industries have enhanced their competitiveness at the same time.[2] This study employs the international competitive coefficient (ICC) index, which shows the degree of competitiveness in an international perspective.

The ICC index is defined as net exports over total trade. It can be expressed as follows:

$$ICC = (exports - imports) / (exports + imports)$$

The ICC index considers implicitly demand and supply sides since the numerator, "exports minus imports" is identical to "domestic supply minus domestic demand."[3] In fact, by observing the simple ICC index computed over time, by commodity or by industry, we can discuss the demand and supply gap and measure the degree of competitiveness.

The ICC index takes the form of values between minus 1 and plus 1. When the ICC index shows a value below zero, the industry or commodity has weak competitiveness and domestic supply is less than domestic demand. However, when the index shows a value above zero, the industry or commodity has strong competitiveness and domestic supply exceeds domestic demand. In cases where the ICC index is rising, competitiveness is increasing and vice versa. Hence, using cross country comparison by way of the ICC index over time, we can identify competitive industries, promising industries in which competitiveness can be expected to increase, and uncompetitive industries, and we can judge whether trade relations are competitive or complementary.

B. Development Stage According to the Catching-up Product Cycle

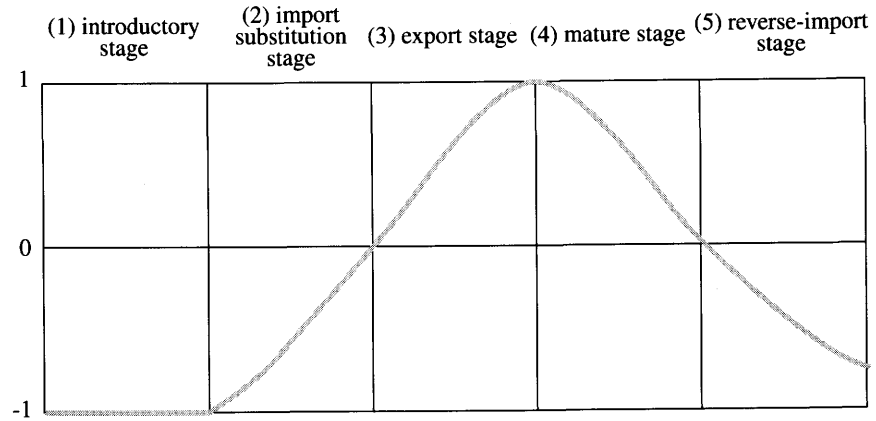
A characteristic of this method is that the locus chart, which traces the ICC index, reflects the catching-up aspect of an economy's development process in conjunction with the product cycle. In other words, it tells us which catching-up stage the economy is in. The catching-up development process in Japan has been empirically studied by Yamazawa (1990), who identifies five industrial development stages. Figure 9.1 depicts the "ICC curve" taking the following values, between minus 1 and plus 1, along the following five stages:

(1) In the "introductory stage" when a forerunner exports new products and a latecomer imports them, the ICC index of the latecomer takes the value of minus 1.

(2) The stage in which the ICC index is increasing between minus 1 and zero is defined as the "import substitution stage". In this stage, the industry shows weak competitiveness since the production level is not large enough for scale merit to work. The

Figure 9.1

The ICC Curve according to the Catching-up Product Cycle



Source: Author.

latecomer exports inferior-quality products to some extent, and yet at this point, domestic production is still less than domestic demand (i.e., the country is a net importer).

(3) In the "export stage", in which the ICC index is rising between zero and plus 1, the latecomer produces at large scales and expands exports rapidly, and eventually domestic production exceeds domestic demand. The latecomer exports low-end products and imports high-end products from the forerunner.

(4) In the "mature stage", the ICC index is declining between plus 1 and zero, and the product has "ripened" with the associated technology standardized. The forerunner slowly decreases exports, because it gradually fails to compete with the latecomer in its export markets, but domestic production still exceeds domestic demand. The forerunner in the mature stage exports high-end products and imports low-end products.

(5) Finally, the stage in which the ICC index is decreasing between zero and minus 1, is defined as the "reverse-import stage". In this stage, the forerunner fails to compete with the latecomer in its

domestic market, and domestic production is less than domestic demand.

According to the "catching-up product cycle" theory, a late-starter initiates its industrial development from the "introductory stage" or import stage, in which new products are introduced via imports, then it moves on to the "import substitution stage", and then to the "export stage", in which the latecomer catches up in terms of competitiveness with the forerunner. On the other hand, as the latecomer catches up, the forerunner fails to remain at the "export stage" and moves to a more advanced or "mature stage" in which competitiveness is decreasing. If the forerunner fails to upgrade to more advanced goods with high value and fails to differentiate its products from those of the latecomer, it will move further into the "reverse-import stage", and finally will be forced to the extremity of this stage in which the latecomer produces a few niche products.

C. Different Catching-up Time and Classification of Commodity Group

By employing the ICC index, which traces the catching-up product cycle, we can identify which stage of competitiveness each economy has reached by each industry, and by means of cross country comparisons, we can gain a rough understanding of the competitive stage of each economy in international perspective. We can also estimate which economies are catching up with other economies.

Although the ICC index is a very useful tool, it should be borne in mind, however, that the catching-up product cycle cannot be applied to a single commodity. Let us take as a typical example production of the 2.5 inches hard disc drive (HDD). Hitachi, Toshiba Fujitsu, and IBM are the only producers of 2.5 inch HDDs in the world. These companies have developed 2.5 inch HDD production in Japan and have operated in the Philippines and in Thailand. These operating countries did not experience the "import substitution stages" but instead started straight away with the "export stage" for 2.5 inch HDD production. Moreover countries importing 2.5 inch HDDs are few because the product is used for notebook PCs and for car navigators. This means that the Philippines and Thailand take the ICC index value of plus 1, a few countries take the value of minus 1, and the other countries take no value for the production of 2.5 inch HDDs.

For this reason, we have to apply the ICC index method to a commodity group or an industry, instead of to a single product. In obtaining a clear

catching up product cycle ICC curve, it should also be borne in mind that the catching-up time is different depending on the commodity group or industry. For instance, within machinery industries, the catching-up comes first in light machinery and very late in heavy machinery, because FDI is directed into the former industry for purposes of mass production, but not into the latter industry which is not suitable for mass production. More important, the catching-up time differs as between finished goods and intermediate goods, while within light machinery, catching-up comes fast in assembly and later in parts. These classifications, which depend on different catching-up times, make it possible to see the diffusion of the stage-climbing process within industries, and to address, to some extent, the development of regional intra-industry specialization.

D. Compilation of the ICC Index by Commodity Group

Focusing on different catching-up times, all the commodities, at the 4 digit or 5 digit levels of the U.N. Standard International Trade Classification, third revised edition, (SITC-R3), are classified into 43 commodity groups. Appendix Table 9.1 shows the list of 43 commodity groups and Appendix Table 9.2 gives the corresponding SITC codes. Standards of trade classification differ depending on period and country — SITC-R3, HS 88 Code, and HS 96 Code — and these HS codes are reclassified into SITC-R3. Trade data were obtained from IDE AID-XT (Ajiken Indicators on Developing Economies: Extended for Trade Statistics) which uses OECD trade statistics for OECD member countries, UN trade statistics for non-OECD but UN member countries, and Statistical Department Director General of Custom Ministry of Finance, The Republic of China for Taiwan.[4] The following industries are referred to here:

a) agricultural related products: (1) agricultural products, (2) processed agricultural products
b) light industries: (3) apparel, (4) footwear & leather articles, (5) furniture, (6) miscellaneous manufactured goods
c) light machinery: (7) home electrical appliances, (8) office & communication apparatus, (9) personal computers & peripheral equipment, (10) precision apparatus
d) supporting industries: (11) metal processing, (12) molds, (13) parts of home electrical appliances, (14) parts of office & communication apparatus, (15) electronic parts, (16) parts of precision apparatus, (17) motorcycle parts, (18) automobile parts,

(19) machine tool parts, (20) industrial machinery parts

e) heavy machinery: (21) motorcycles, (22) commercial vehicles, (23) passenger cars, (24) machine tools, (25) industrial machinery

f) material industries: (26) yarn & fabrics, (27) synthetic fiber textiles, (28) petrochemical products, (29) basic petrochemicals, (30) iron & steel, (31) glass & cement.

III. Position of Competitiveness Stage in East Asia

A. "Flying Geese Pattern" in East Asia

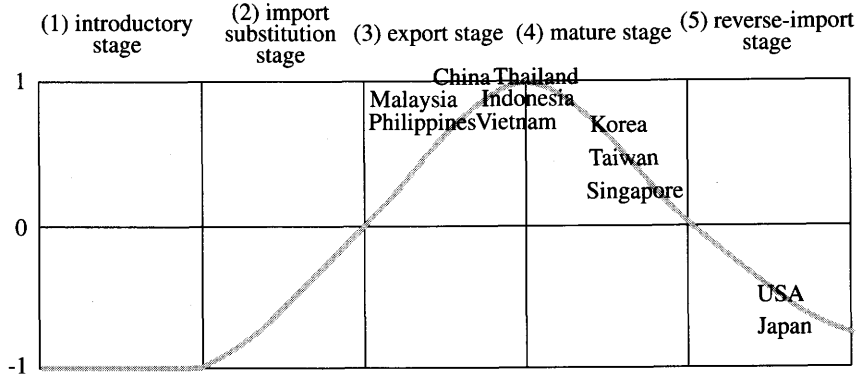
The catching-up product cycle assumes a classical paradigm, namely, the "flying geese pattern" in which the forerunner flies in front of the other groups. Second in the pattern come the forerunner-following groups and so on, with the latest starters bringing up the rear of the formation. The "flying geese pattern" can be seen in many industries in East Asia. The "flying geese pattern" in competitive stage in East Asia is assumed that the forerunner of Japan is flying in the front of the other groups in East Asia and followed by the forerunner-followers of Asian NIES (Korea, Taiwan and Singapore) and by the latecomers of ASEAN Four (Malaysia, Thailand, the Philippines and Indonesia) and by the latest starters of the ASEAN new members (Vietnam, Laos, Myanmar and Cambodia). Actually, many industries seem to take the "flying geese pattern," although different competitive stage depending on industry.

The extremely advanced "flying geese pattern," in catching-up with the forerunner by the latecomers, in East Asia, is appeared in apparel. Figure 9.2, which is obtained from the ICC curve in the Appendix Figure 9.3, gives the current position of competitive stage of apparel for ASEAN Five, China, Korea, Taiwan, Hong Kong, Singapore, Japan and the U.S. Figure 9.2 shows that apparel in Japan has been in the "reverse import stage", Korea, Taiwan, Singapore and Hong Kong are in the "mature stage," and ASEAN Five and China in the "export stage."

Similarly, the catching-up with Japan by ASEAN Five and China with the "flying geese pattern" has advanced to a large extent in several light machinery assemblies such as home electrical appliance, office & communication apparatus and personal computer & peripheral equipment. For instance, Figure 9.3 indicates, which plots the competitive stage of personal computer & peripheral equipment for East Asia from the ICC index in the Appendix Figure 9.9, the "flying geese pattern" in which

Figure 9.2

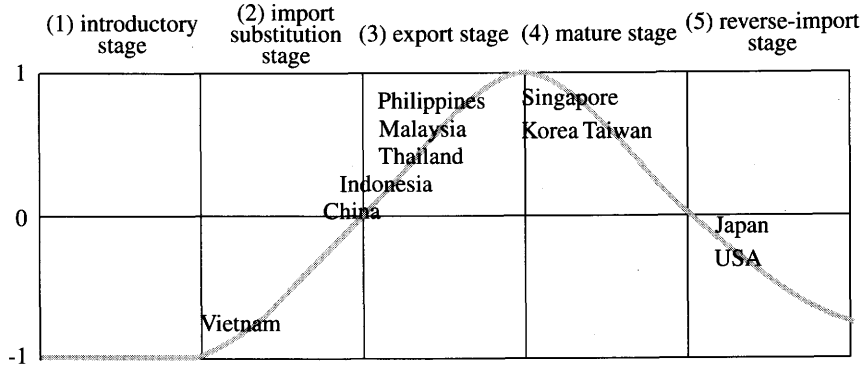
Position of Competitiveness: Apparel (Code 08)



Source: Author (Same as above)

Figure 9.3

Position of Competitiveness: Personal Computer & Peripheral Equipment (Code 25)

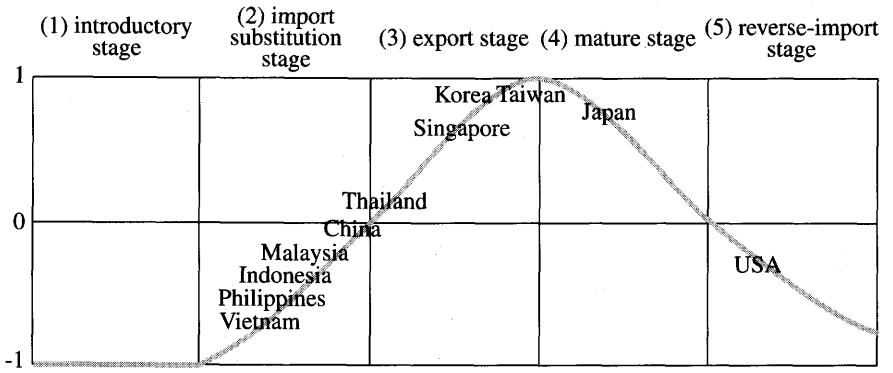


Source: Author.

the forerunner, Japan entered into the "reverse import stage", the forerunner-following economies, Korea and Taiwan moved down to the "mature stage," and the latecomers, ASEAN Four and China in the "export stage", and the latest starter, Vietnam still in the "import substitution stage."

Figure 9.4

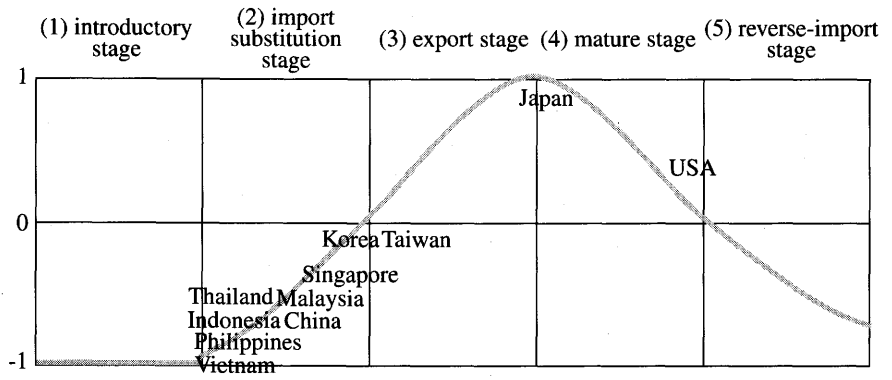
Position of Competitiveness: Parts of Home Electrical Appliances (Code 26)



Source: Author.

Figure 9.5

Position of Competitiveness: Industrial Machinery (Code 18)



Part industries take the "flying geese pattern" which the catching-up have advanced to some degree. For example, parts of home electrical appliances follows the "flying geese pattern" which Japan has been still competitive in the "mature stage," Korea, Singapore and Taiwan reached at the "export stage," and ASEAN Four between the "import substitution stage" and the "export stage," and Vietnam in the "import substitution stage," judging from the Figure 9.4 shows the competitive stage of parts of home electrical appliance for East Asia, derived of the Appendix Figure

9.13. This suggests that Japan exports high-value key parts to the other economies in the region.

Industrial machinery, machine tool, iron and steel, petrochemical take the primitive "flying geese pattern" which Japan has been in the export stage, followed by Korea, Taiwan and Singapore in the "import stage." This can be easily confirmed from the Figure 9.5 showing industrial machinery derived from the Appendix Figure 9.25.

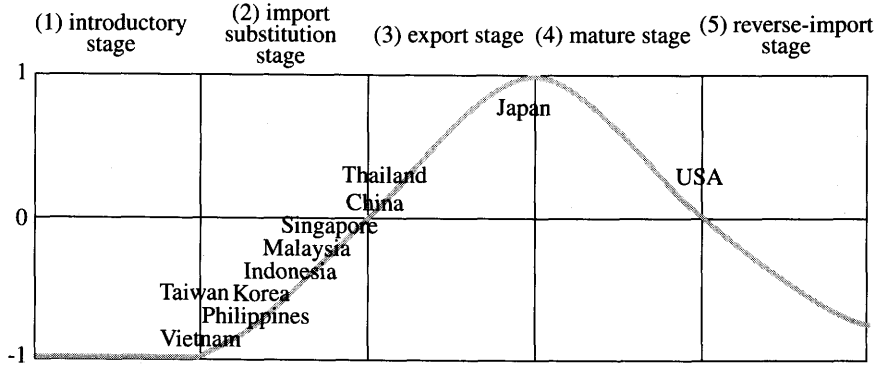
B. Partly Collapse of "Flying Geese Pattern"

The "flying geese pattern," in some industries, has been partly collapsed in that the forerunner-followers stayed the current stage long time and the latecomers proceeded to the more advanced competitive stage. For example, as shown in Figure 9.6, in precision apparatus, Thailand and China moved up to the "export stage" and Korea still stayed in the "import substitution stage."

What is the force that drives the latecomer to climb up from the "import substitution stage" to the "export stage"? Circumstances differ according to whether the ascent through the stages is slow or rapid. Domestic industry, with implementation of foreign technology, moves up slowly to the "export stage", in competitiveness, from the "import substitution stage." In this case, competitiveness is improving, with an increase in local sourcing and with the agglomeration of the parts industry. Moving up

Figure 9.6

Position of Competitiveness: Precision Apparatus (Code 29)



Source: Author.

rapidly to the "export stage" from the "import substitution stage" is fuelled by a large inflow of FDI, and can be motivated by a shorter product life. In the era of liberalization of capital, fuelled by FDI, the latest starter will climb up the "ladder", from the "import substitution" stage to the "export stage", and will overtake the forerunner-following groups. Therefore the classical paradigm of the "flying geese pattern," in which the forerunner is followed by the latecomer, and then by the latest starter, does not always exist in the era of liberalization of capital.

IV. Competitiveness of ASEAN Six, China, and Japan

Table 9.1 summarizes the position of competitiveness as regards the 31 industries for the ASEAN Six, China, Japan, South Korea and Taiwan, and Table 9.2 grades the industries, according to competitiveness; i) competitive industry, ii) promising industry which competitiveness is expected increase in future, iii) uncompetitive industry.

A. Competitiveness of ASEAN Six

1. *Singapore*

a) Agricultural products are uncompetitive in Singapore, and processed agricultural products are uncompetitive, either.
b) Light industries are uncompetitive except for miscellaneous manufactured goods.
c) Light machinery in Singapore is strong except for home electrical appliances whose competitiveness is slowly decreasing toward the "reverse import" stage.
d) Long operation in light machinery has nurtured the mold industry as well as light machinery parts manufacturing. The development of the parts industry has sustained the competitiveness of light machinery. Singapore is increasing its competitiveness in mold manufacture, because it has exported to neighboring countries including Indonesia, Malaysia, Thailand, and Vietnam where many Singapore companies operate overseas affiliates.
e) Heavy machinery industries in the industrial machinery and machine tools categories are increasingly competitive in the "import substitution" stage.
f) So far as the manufacture of petrochemicals products and basic petrochemicals are concerned, material industries are competitive.

2. *Malaysia*

a) Agricultural products are decreasing its competitiveness to the "reverse import stage," while processed agricultural products maintain competitiveness in the "export" stage. Malaysia has succeeded in increasing the income value-added of agricultural products.

b) Light industries, apparel, footwear & leather article and furniture are in the "export" stage. Miscellaneous manufactured goods are competitive, but decreasingly so.

c) Malaysia has become most competitive in home electric appliances throughout the 1990s. The office & communication apparatus industry of Malaysia climbed up to the "export" stage, and in this category, Malaysia has replaced Japan as the most competitive producer in East Asia. Also, the personal computer & peripheral equipment industries are moving up to the "export" stage. Precision apparatus production, though a promising industry, is in the "import substitution" stage.

d) Metal processing and molds production are promising industries, although in the "import substitution" stage. Except for electronics components, parts industries, however, have not succeeded in increasing their competitiveness, and in this category Malaysia is being left behind by Thailand.

e) Except for motorcycle production, the heavy machinery industry is uncompetitive. Commercial vehicle and passenger car production are uncompetitive industries in Malaysia.

f) The yarn & fabric industry and glass & cement manufacture are competitive, and petrochemical and basic petrochemical production are promising. Iron & steel is uncompetitive.

3. *Thailand*

a) In Thailand, besides processed agricultural products, agricultural products are competitive, and are higher in terms of the competitiveness index than the U.S.

b) Apparel, footwear & leather articles, and furniture are competitive in the "export" stage, while miscellaneous manufactured goods are competitive, but in the "mature" stage.

c) Light machinery industries in Thailand are very competitive; home electrical appliances, office & communications apparatus and personal computers & peripheral equipment are competitive, and precision apparatus is raising its competitiveness though still in the "import substitution" stage.

d) Supporting industries are developing in Thailand. Metal processing is

a promising industry, while mold production is uncompetitive. Home electrical appliance parts, office & communication apparatus, electronics, and precision apparatus are all competitive, and automobile parts and industrial machinery are promising though in the "import substitution" stage.

e) Among the heavy machinery industries, motorcycle and commercial vehicle production are competitive, and passenger car manufacture is a promising industry.

f) Yarn & fabric, synthetic fiber textiles and glass & cement production are competitive, and petrochemical products are promising, but basic petrochemical and iron & steel are uncompetitive.

4. *The Philippines*

a) Not only agricultural products but also processed agricultural products are uncompetitive.

b) Apparel and furniture are competitive, while footwear & leather articles and miscellaneous manufactured goods are uncompetitive.

c) Home electrical appliances and office & communications apparatus are competitive, but in these categories, the Philippines is not as competitive as Malaysia and Thailand. The most competitive light machinery industry in the Philippines is the manufacture of personal computers & peripheral equipment, because the Philippines is a large producer of the 2.5 inch hard disc drives used for notebook PCs.

d) Electronics parts, typical of which are advanced hard disc drives and central processing units, are very competitive in the Philippines. The motorcycle and automobile parts industries are competitive. Mold production is increasingly competitive though still in the import substitution stage.

e) The heavy machinery industry is uncompetitive in the Philippines.

f) Glass & cement manufacture is competitive, while the remaining material industries are uncompetitive.

5. *Indonesia*

a) As in the case of Malaysia, agricultural products are uncompetitive in Indonesia, while processed agricultural products are competitive.

b) Light industry, including miscellaneous manufactured goods, is very competitive in Indonesia as well as in China, reflecting the presence of low wages.

c) By way of FDI from Japan, Taiwan and Singapore, Indonesia in the 1990s succeeded in moving up to the "export stage" in the light

machinery categories of home electrical appliances, office & communications apparatus, and personal computers & peripheral equipment. Precision apparatus production is promising though still in the "import substitution" stage.

d) Metal processing is increasing its competitiveness in the "import substitution" stage. Home electrical appliance parts, office & communication apparatus and electronics are competitive, and precision apparatus parts production is promising. But, motorcycle parts, automobile parts, and machine tools and industrial machinery are uncompetitive.

e) Among heavy machinery, only motorcycle manufacture is competitive, but the rest are uncompetitive.

f) Yarn & fabric and glass & cement are competitive, but synthetic fiber textiles, petrochemical products, basic petrochemicals, and iron& steel are all competitive.

6. *Vietnam*

a) Agricultural products are competitive, and processed agricultural products too.

b) Light industries of apparel, footwear & leather articles, furniture and miscellaneous manufactured goods are competitive in the "export" stage.

c) Light machinery is in the "import substitution" stage, but home electrical appliances, office & communication apparatus and precision apparatus are promising.

d) Supporting industries have not developed in Vietnam, but metal processing and home electrical appliance parts, electronics and industrial machinery are promising.

e) The motorcycle industry is competitive, but the other heavy machinery categories are uncompetitive.

f) Synthetic fiber textiles are increasingly competitive though in the "import substitution" stage.

B. Competitiveness of China

a) Agricultural products and processed agricultural products are competitive, but in the "mature" stage.

b) China has raised competitiveness rapidly in many industries. Apparel, footwear & leather articles, furniture and miscellaneous manufactured goods are competitive. In particular, the manufacture of miscellaneous

manufactured goods is an example of a category in which China is becoming a winner and ASEAN a loser.

c) Home electrical appliances, office & communications apparatus, personal computers & peripheral equipment, and precision apparatus have increased their competitiveness, and are moving up to the "export stage." This implies that China has been in competition with the ASEAN countries.

d) China is very competitive in metal processing which is one of the basic industries supporting the manufacturing sector. Motorcycle parts are in the "export" stage. China, however, is less competitive in the parts industry than Thailand and Malaysia. Other parts industries are in the "import substitution" stage, but home electrical appliance parts, office & communications apparatus, electronics, precision apparatus, automobile, machine tool and industrial machinery are increasing their competitiveness. This is because China exports low price and low-end parts such as cable codes and printed circuit boards, and at the same time imports high-end parts and technology-intensive parts from Japan, the U.S., South Korea, Taiwan and the ASEAN countries. These include large-scale integration (LSI) chips, central processing units, semiconductors and fluid dynamic bearings. Home electrical appliance parts temporarily reached the "export stage" between 1995 and 1997, but thereafter decreased in competitiveness. This is because there has been an increase in parts imports as a result of the rapid expansion of home electrical appliance manufacturing.

e) Motorcycle and commercial vehicle production are competitive, while the passenger car, industrial machinery and machine tool industries are uncompetitive.

f) Except for glass & cement production, the material industries in China are still weak and remain in the "import substitution" stage, but yarn & fabrics, petrochemical products, basic petrochemical products, and iron & steel are promising industries which are raising their competitiveness.

C. Competitiveness of Japan

a) Agricultural products in Japan are a very weak industry. Processed agricultural products are also uncompetitive.

b) Light industry is also uncompetitive. Apparel, footwear & leather articles, furniture, and miscellaneous manufactured goods are all uncompetitive categories.

Table 9.1

The Summary of Position of Competitiveness by Commodity Group

	Import Substitution Stage	Export Stage	Mature Stage	Reverse Import Stage
Singapore	(11),(16),(18),(19),(20),(21) (22),(23),(24),(25),(26),(27) (30),(31)	(6),(8),(9),(10),(12),(13) (14),(15),(28),(29)	(7),(17)	(1),(2),(3),(4) (5)
Malaysia	(10),(11),(12),(13),(14),(16) (17),(18),(19),(20),(22),(23) (24),(25),(27),(28),(29),(30)	(2),(3),(4),(5),(7),(8),(9) (15),(21),(26),(31)	(6)	(1)
Thailand	(11),(12),(18),(19),(20),(23) (24),(25),(28),(29),(30)	(1),(2),(3),(4),(5),(7),(8),(9) (10),(13),(14),(15),(16),(17) (21),(22),(26),(27),(31)	(6)	
The Philippines	(10),(11),(12),(13),(14),(16) (19),(20),(21),(22),(23),(24) (25),(26),(27),(28),(29),(30)	(3),(5),(8),(9),(15),(17),(18) (31)	(6),(7)	(1),(2),(4)
Indonesia	(10),(11),(12),(16),(17),(18) (19),(20),(22),(23),(24),(25) (27),(28),(29),(30)	(2),(3),(4),(5),(6),(7),(8),(9) (13),(14),(15),(21),(26),(31)		(1)
Vietnam	(7),(8),(9),(10),(11),(13) (15),(18),(20),(21),(22),(23) (24),(25),(26),(27),(28),(29) (30)	(1),(2),(3),(4),(5),(6),(14) (31)		
China	(12),(13),(14),(15),(16),(18) (19),(20),(23),(24),(25),(26) (27),(28),(29),(30)	(3),(4),(5),(6),(7),(8),(9) (10),(11),(17),(21),(22),(31)	(1),(2)	
Japan	(1),(2)	(12),(16),(17),(18),(19),(20) (21),(22),(23),(24),(25),(26) (27),(28),(29),(30),(31)	(7),(8),(10) (11),(13) (14),(15)	(3),(4),(5) (6),(9)
South Korea	(1),(2),(10),(16),(19),(20) (24),(25),(28),(30),(31)	(3),(7),(11),(12),(13),(14) (15),(17),(18),(21),(22),(23) (26),(27),(29)	(4),(5),(6),(9)	(8)
Taiwan	(1),(20),(23),(25),(28),(29) (30)	(3),(5),(11),(12),(13),(14) (15),(17),(18),(21),(26),(27)	(4),(6),(7),(8) (9),(10),(19)	(2),(16),(22) (24),(31)

Source: Author.

Notes:

a) agricultural related industries: (1) agricultural products, (2) processed agricultural products

b) light industries: (3) apparel, (4) footwear & leather articles, (5) furniture, (6) miscellaneous manufactured goods;

c) light machinery: (7) home electrical appliances, (8) office & communication apparatus, (9) personal computer & peripheral equipment, (10) precision apparatus

d) supporting industries: (11) metal processing, (12) molds, (13) parts of home electrical appliances, (14) parts of office & communication apparatus, (15) electronic parts, (16) parts of precision apparatus, (17) motorcycle parts, (18) automobile parts, (19) machine tool parts, (20) industrial machinery parts

e) heavy machinery: (21) motorcycles, (22) commercial vehicles, (23) passenger cars, (24) machine tools, (25) industrial machinery

f) material industries: (26) yarn & fabrics, (27) synthetic fiber textiles, (28) petrochemical products, (29) basic petrochemicals, (30) iron & steel, (31) glass & cement.

Table 9.2

Grade of Competitiveness by Commodity

	Competitive Industry	Promising Industry	Uncompetitive Industry
Singapore	(6),(7),(8),(9),(10),(12),(13) (14),(15),(28),(29)	(16),(18),(20),(24),(25),(26) (30)	(1),(2),(3),(4),(5),(11),(17) (19),(21),(22),(23),(27),(31)
Malaysia	(2),(3),(4),(5),(6),(7)(8),(9) (15),(21),(26),(31)	(10),(11),(12),(13),(14),(16) (18),(20),(28),(29)	(1),(17),(19),(22),(23),(24) (25),(27),(30)
Thailand	(1),(2),(3),(4),(5),(6),(7),(8) (9),(10),(13),(14),(15),(16) (17),(21),(22),(26),(27),(31)	(11),(18),(20),(23),(29)	(12),(19),(24),(25),(28),(30)
The Philippines	(3),(5),(6),(7),(8),(9),(15) (17),(18),(31)	(10),(12),(19)	(1),(2),(4),(11),(13),(14) (16),(20),(21),(22),(23),(24) (25),(26),(27),(28),(29),(30)
Indonesia	(2),(3),(4),(5),(6),(7),(8),(9) (13),(14),(15),(21),(26),(31)	(10),(11),(16),(28),(29),(30)	(1),(12),(17),(18),(19),(20) (22),(23),(24),(25),(27)
Vietnam	(1),(2),(3),(4),(5),(6),(14)	(7),(8),(10),(11),(13),(15) (20),(21),(27),(18)	(9),(22),(23),(24),(25),(26) (28),(29),(30)
China	(1),(2),(3),(4),(5),(6),(7),(8) (9),(10),(11),(17),(21),(22) (31)	(13),(14),(15),(16),(18),(19) (20),(26),(28),(29),(30)	(12),(23),(24),(25),(27)
Japan	(7),(8),(10),(11),(12),(13) (14),(15),(16),(17),(18),(19) (20),(21),(22),(23),(24),(25) (26),(27),(28),(29),(30),(31)		(1),(2),(3),(4),(5),(6),(9)
South Korea	(3),(4),(6),(7),(9),(11),(12) (13),(14),(15),(17),(18),(21) (22),(26),(27),(29)	(20),(24),(28),(30),(31)	(1),(2),(5),(8),(10),(16),(19) (25)
Taiwan	(3),(4),(5),(6),(7),(8),(9) (11),(12),(13),(14),(15),(17) (18),(21),(26),(27)	(20),(28),(29),(30)	(1),(2),(10),(16),(19),(22) (23),(24),(25),(31)

Source: Author.

Notes:

a) agricultural related industries: (1) agricultural products, (2) processed agricultural products

b) light industry: (3) apparel, (4) footwear & leather articles, (5) furniture, (6) miscellaneous manufactured goods;

c) light machinery: (7) home electrical appliances, (8) office & communication apparatus, (9) personal computers & peripheral equipment, (10) precision apparatus

d) supporting industries: (11) metal processing, (12) molds, (13) parts of home electrical appliances, (14) parts of office & communication apparatus, (15) electronic parts, (16) parts of precision apparatus, (17) motorcycle parts, (18) automobile parts, (19) machine tool parts, (20) industrial machinery parts

e) heavy machinery: (21) motorcycles, (22) commercial vehicles, (23) passenger cars, (24) machine tools, (25) industrial machinery

f) material industries: (26) yarn & fabrics, (27) synthetic fiber textiles, (28) petrochemical products, (29) basic petrochemicals, (30) iron & steel, (31) glass & cement.

c) As regards the production of personal computers & peripheral equipment, competitiveness has fallen dramatically. This is firstly because the product life of personal computers and peripheral equipment is short, that is, six months, and overseas production is growing in locations such as the Philippines, Thailand, and China. Secondly, product differentiation is very difficult for personal & computers and peripheral equipment, the functions being standardized. Home electrical appliances, office & communications apparatus and precision apparatus, however, are still competitive, although their competitiveness is decreasing, and is in the "mature" stage.
d) Supporting industries are well developed in Japan. Molds production as well as the manufacture of precision apparatus parts, motorcycle parts, automobile parts, machine tools and industrial machinery are competitive and are in the "export" stage. Metal processing and home electrical appliance parts, office & communications apparatus and electronics, however, are in the "mature" stage, though still competitive.
e) Heavy machinery industries are competitive in Japan; motorcycles, commercial vehicles, passenger cars, machine tools, and industrial machinery are in the "export" stage.
f) Material industries, which require huge investment, are competitive, and are in the "export" stage.

V. Competing and Complementary Trade Relation within ASEAN Six, China and Japan

Table 9.3 summarizes the stages and grades of competitiveness for the ASEAN Six, China, Japan, South Korea and Taiwan so as to provide a survey of the whole of East Asia.

Agricultural products are competitive in Thailand and Vietnam. Other ASEAN countries, Korea, Taiwan and Japan are uncompetitive. Japan is the lowest in competitiveness, agricultural products there being produced for niche markets by a small number of producers. The low competitiveness of agricultural products may cause processed agricultural products to become uncompetitive.

Light industries are competitive in the ASEAN Six and China. Korea and Taiwan exhibit decreasing competitiveness, while Japan is uncompetitive, perhaps because she has failed to maintain product differentiation.

Table 9.3

Summary of Position and Grade of Competitiveness by Commodity

	SIG	MAL	THL	PHL	INE	VET	CHN	JAP	KOR	TWN
a) agricultural										
1. agricultural	R/U	R/U	E/C	R/U	R/U	E/C	M/C	I/U	I/U	I/U
2. processed	R/U	E/C	E/C	R/U	E/C	E/C	M/C	I/U	I/U	R/U
b) light ind.										
3. apparel	R/U	E/C	E/C	E/C	E/C	E/C	E/C	R/U	E/C	E/C
4. footwear	R/U	E/C	E/C	R/U	E/C	E/C	E/C	R/U	M/C	M/C
5. furniture	R/U	E/C	E/C	E/C	E/C	E/C	E/C	R/U	M/C	E/C
6. mis.goods	E/C	M/C	M/C	M/C	E/C	E/C	E/C	R/U	M/C	M/C
c) light mach										
7. home elec.	M/C	E/C	E/C	M/C	E/C	I/P	E/C	E/C	E/C	E/C
8. office	E/C	E/C	E/C	E/C	E/C	I/P	E/C	M/C	R/U	M/C
9. PC	E/C	E/C	E/C	E/C	E/C	I/P	E/C	R/U	M/C	M/C
10. precision	E/C	I/P	E/C	I/P	I/P	I/P	E/C	M/C	I/U	M/C
d) supporting										
11. metal	I/U	I/U	I/U	I/U	I/P	I/P	E/C	E/C	E/C	E/C
12. mold	E/C	I/P	I/U	I/P	I/U	–	I/U	E/C	E/C	E/C
13. parts home	E/C	I/P	E/C	I/U	E/C	I/P	I/P	M/C	E/C	E/C
14. parts office	E/C	I/P	E/C	I/U	E/C	E/C	I/P	M/C	E/C	E/C
15. electoronics	E/C	E/C	E/C	E/C	E/C	I/P	I/P	M/C	E/C	E/C
16. parts pre.	I/P	I/P	E/C	I/U	I/P	–	I/P	E/C	I/U	R/U
17. parts motor.	M/C	I/U	E/C	E/C	I/U	–	E/C	E/C	E/C	E/C
18. parts auto.	I/P	I/P	I/P	E/C	I/U	I/U	I/P	E/C	E/C	E/C
19. parts mach.	I/U	I/U	I/U	I/P	I/U	–	I/P	I/P	I/U	M/C
20. parts Indus.	I/P	I/P	I/P	I/U	I/U	I/P	I/P	E/C	I/P	I/P
e) heavy mach										
21. motorcycle	I/U	E/C	E/C	I/U	E/C	I/P	E/C	E/C	E/C	E/C
22. commercial	I/U	I/U	E/C	I/U	I/U	I/U	E/C	E/C	E/C	R/U
23. passenger	I/U	I/U	I/P	I/U	I/U	I/U	I/U	E/C	E/C	I/U
24. mach.-tool	I/P	I/U	I/U	I/U	I/U	I/U	I/U	E/C	I/P	I/U
25. indus.mach.	I/P	I/U	I/U	I/U	I/U	I/U	I/U	E/C	I/U	I/U
f) material										
26. yarn&fabric	I/P	E/C	E/C	I/U	E/C	I/U	I/P	E/C	E/C	E/C
27. syn. text.	I/U	I/U	E/C	I/U	I/U	I/P	I/U	E/C	E/C	E/C
28. petchemi	E/C	I/P	I/U	I/U	I/P	I/P	I/P	E/C	I/P	I/P
29. basic petc.	E/C	I/P	I/P	I/U	I/P	I/U	I/P	E/C	E/C	I/P
30. iron & steel	I/P	I/U	I/U	I/U	I/P	I/U	I/P	E/C	I/P	I/P
31. glass	I/U	E/C	E/C	E/C	E/C	E/C	E/C	E/C	I/P	R/U

Source: Author.

Notes: SIG, MAL, THL, PHL, INE, VET, CHN, JAP, KOR, TWN describe Singapore, Malaysia, Thailand, the Philippines, Indonesia, Vietnam, China,

Table 9.3 (Continued)

Japan, South Korea and Taiwan respectively. I, E, M, and R reveal the import substitution, export, mature and reverse import stages, and C, P and U indicate competitive, promising and uncompetitive categories. The first column lists the following: a) agricultural related industries (1) agricultural products, (2) processed agricultural products; b) light industries (3) apparel, (4) footwear & leather articles, (5) furniture, (6) miscellaneous manufactured goods; c) light machinery (7) home electrical appliances, (8) office & communications apparatus, (9) personal computers & peripheral equipment, (10) precision apparatus; d) supporting industries: (11) metal processing, (12) molds, (13) home electrical appliance parts, (14) office & communications apparatus parts, (15) electronics parts, (16) precision apparatus parts, (17) motorcycle parts, (18) automobile parts, (19) machine tool parts, (20) industrial machinery parts; e) heavy machinery: (21) motorcycles, (22) commercial vehicles, (23) passenger cars, (24) machine tools, (25) industrial machinery; f) material industries: (26) yarn & fabrics, (27) synthetic fiber textiles, (28) petrochemical products, (29) basic petrochemicals, (30) iron & steel, (31) glass & cement.

In light machinery, the ASEAN Six, China, Korea, Taiwan and Japan are competitive, but for different reasons. Thus the forerunner country of Japan produces high-technology intensive high-end products, while the latecomers of Korea, Singapore and Taiwan produce medium-end products. The latest starters, namely, the ASEAN Four, Vietnam and China all produce low-end products. The ASEAN Four, Vietnam and China are in competition with each other.

In supporting industries, Japan is the most competitive, followed by Korea, Singapore and Taiwan. Taking the ASEAN Five and China as a group, Thailand is competitive in not a few industries, and China is uncompetitive although raising its competitiveness. Heavy industry and the materials industry are competitive in Japan, uncompetitive in the ASEAN Four and Vietnam, and promising in China.

The ASEAN Four and China are at the same stage in competitive industries, especially in light industry and light machinery, in which they are competing with each other in trade. In each of the economies of the ASEAN Four, competitive industries need to be enhanced: Malaysia for home electrical appliances, office & communications apparatus and electronics parts; the Philippines for personal computers & peripheral equipment, electronics parts and automobile parts, and Thailand for the motorcycle and automobile parts industries.

The industries in which the ASEAN Four and China have increased their competitiveness are those in which competitiveness has dropped in

Japan. This indicates that Japanese firms have transferred their production sites to the ASEAN Four and to China, and as a result, the competitiveness of these countries has increased. Manufacture of short life products such as personal computers and hard disc drives, items in which the specification changes every six months, has been shifted to the ASEAN Four and to China. Japan, however, being in possession of high technology industries such as large-scale integration, digital equipment, environment equipment, and so on, has maintained complementarity of trade with the ASEAN Four and China.

VI. Enhancement of Competitiveness in ASEAN under the Rise of China

Will ASEAN be able to maintain its competitiveness despite the rise of China? In what ways are Japanese firms operating in ASEAN, and how are these firms, which have been the largest investors in ASEAN, responding to the increasing competitiveness of China?

Aoba Electronics, which produces cash registers and electric calculators as an original equipment manufacturer (OEM), is operating in Malaysia. The company is pursuing optimum production by localization of staff and by optimum purchasing, that is, it obtains 30 percent of its parts from indigenous firms in South China. It has an in-house R&D unit which has reduced the design and development costs.

Many Japanese firms operating in ASEAN have launched a product differentiation policy through which they have upgraded their products, responding to increasing competition from China. JVC Electronics Malaysia, a producer of home audio equipment, has followed the strategy of upgrading its products to those which can not be produced in China; currently it produces home audio equipment with mini-discs.

Some Japanese firms are engaged in producing technology-intensive products in ASEAN. At their factories in Thailand, Minebea and NIDEC produce fluid dynamic bearing motors for 2.5 inch HDDs, which require high precision in their manufacture. Fujikura Thailand produces the flexible printed integrated circuit including front-end processed products which are shipped to China for finishing as flexible printed circuits. Hitachi, Toshiba, and Fujitsu, companies which are all operating in the Philippines and Thailand, have completely pulled out of 3.5 inch HDD production for desktop PCs, and have shifted to high-end model HDDs, that is, 3.5 inch HDD servers and 2.5 inch HDDs. Denso Thailand is

planning to produce an electrical jet fuel injection units for diesel engines, a product that requires high precision technology.

The above cases suggest that Japanese affiliates will respond to the increasing competitiveness of China as follows. Firstly, as regards mature products with standardized technology, Japanese subsidiaries in order to maintain competitiveness have replaced low-end products with advanced ones, leaving China to produce low-end items. Secondly, technology-intensive products have been developed in Japan and partly produced by factories in ASEAN. Thirdly, Japanese affiliates operating in ASEAN have begun R&D especially in design, so as to reduce costs.

Differentiation of products from those made in China, manufacture of technology-intensive items, and R&D in product design will be promoted in ASEAN for the following reasons. Firstly, more than anything else it is beneficial for Japanese firms to utilize the intangible assets, including production know-how, that they have accumulated over a long period of operation in ASEAN. Engineers and management staff have become accustomed to the Japanese style of management and to Japanese engineering skills. Secondly, Japanese firms believe that so far as the manufacture of advanced and technology-intensive goods is concerned, ASEAN is preferable to China because logistics in Singapore, Malaysia, Thailand and the Philippines are superior to those of China, and the market for technology intensive goods is not confined to China, but is world-wide.

Lastly, we should note that ASEAN will play a significant role as an export base, since on the one hand producers will establish a stable production network to fulfill their responsibilities against all the risk assumed, while on the other hand, customers will purchase from several suppliers and countries, pursuing an optimum procurement over the long run. Consequently, ASEAN will maintain its present position, China will rise and Japan will decrease; Japan's economic stagnation will last because of the ageing of its population, and Japanese firms will continue to transfer factories to China, in search of markets there. This trend puts pressure on Japan to upgrade its products, maintaining product differentiation with respect to ASEAN and China.

How significant a role ASEAN will play as one of the polar export bases? To what extent can ASEAN continue to function as a saucer for investments from Japan? Much will depend on the extent to which ASEAN can strengthen its capacity, building on such aspects as human resource development, the nurturing of supporting industries, the improvement of production management to lessen lead times from procurement to

shipment, the development of efficient distribution systems, and administrative capacity and transparency. More importantly, much will depend on the extent to which the ASEAN market will prove to be an attractive one. Will Singapore, Malaysia, Thailand and the Philippines function essentially as trays for the technology-intensive products, establishing complementary trade relationships with China? Will goods made in Indonesia and Vietnam substitute for Chinese low-end products? The AJCEP will be expected to serve as a facilitator for many future developments in the region.

Notes

* The author is indebted to Yosuke Noda for compiling trade data by industry.

1 See also Bela Balassa (1979).

2 The RCA index shows the degree of export specialization in comparison with the world regarding specific commodities, since it is defined as *j* commodity's export share in *i* country's total export over the *j* commodity's export share in the total world export of the commodity.

3 It is because, domestic demand + export = domestic supply + import, and then export – import = domestic supply – domestic demand.

4 Vietnam trade data is not available by IDE AID-XT. Here the author uses trade statistics from National Statistical Office of Vietnam.

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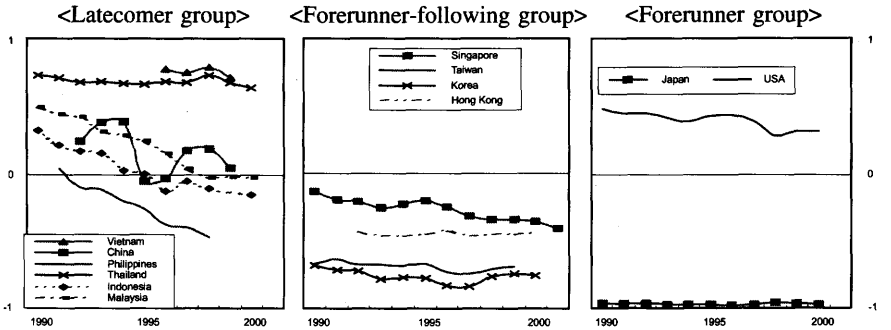
Appendix

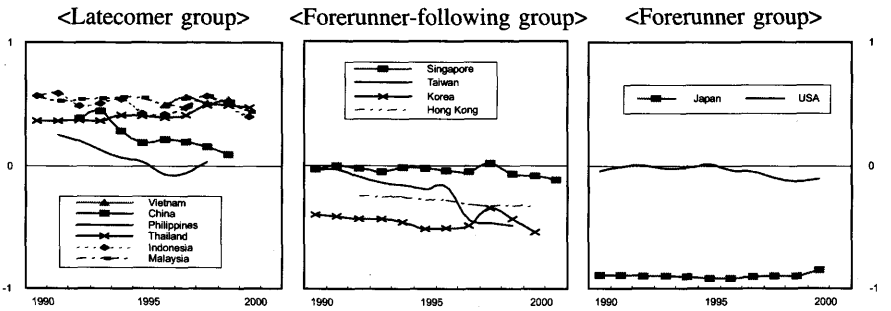
ICC Indicators by Industry (1999-2000)

Appendix Figure 9.1: Agricultural products (Code 01)



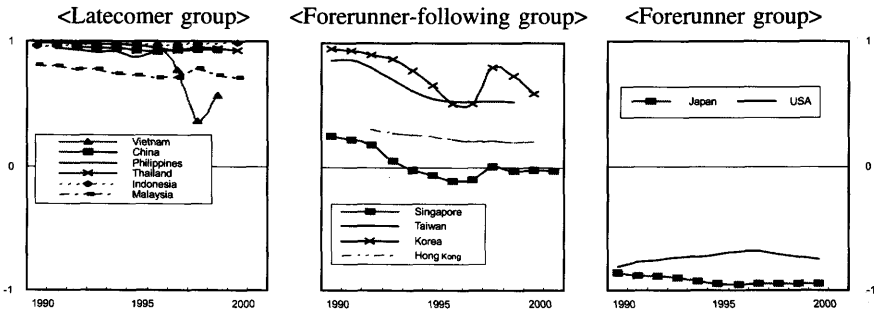
Source: IDE AIDXT system.

Appendix Figure 9.2: Processed agricultural products (Code 02)



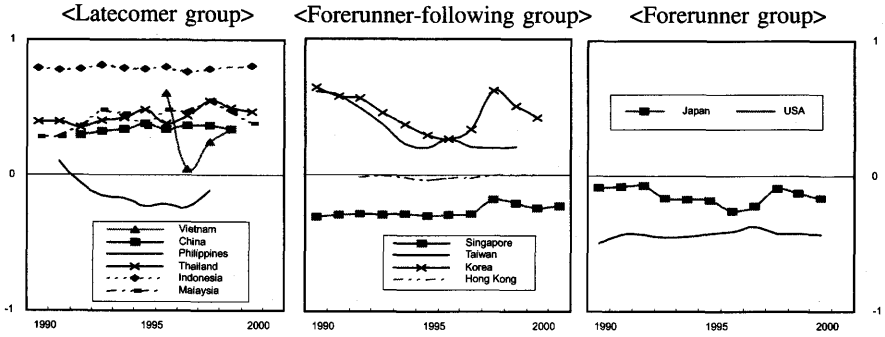
Source: See Appendix Figure 9.1.

Appendix Figure 9.3: Apparel (Code 08)



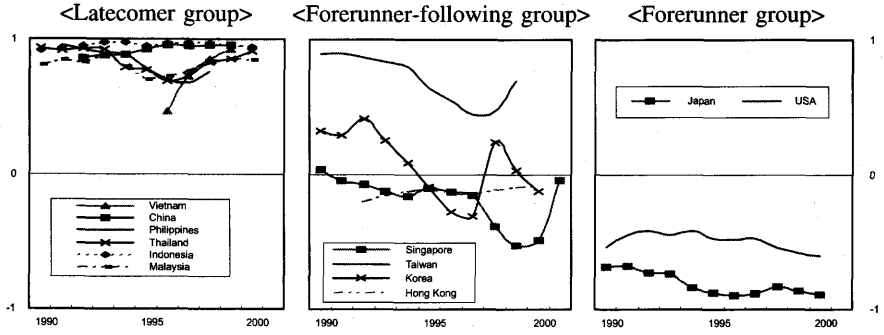
Source: See Appendix Figure 9.1.

Appendix Figure 9.4: Footwear & leather articles (Code 13)



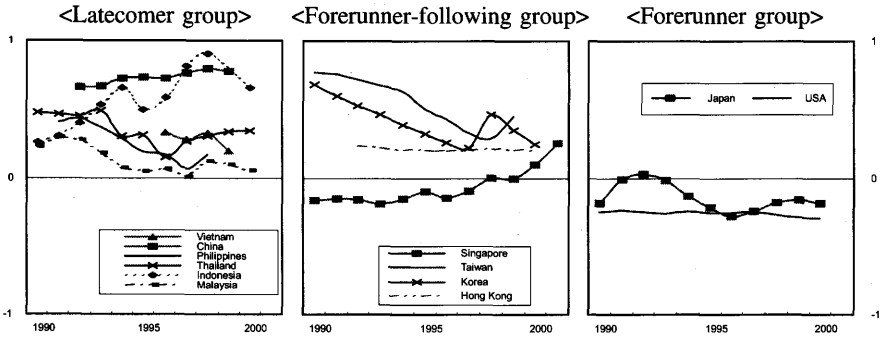
Source: See Appendix Figure 9.1.

Appendix Figure 9.5: Furniture (Code 14)



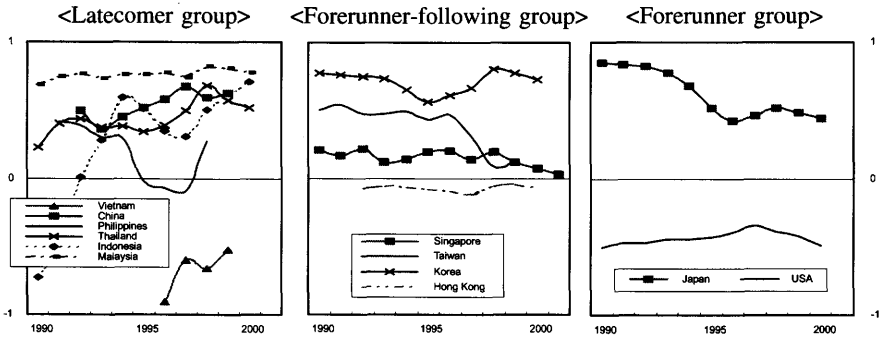
Source: See Appendix Figure 9.1.

Appendix Figure 9.6: Miscellaneous manufactured goods (Code 15)



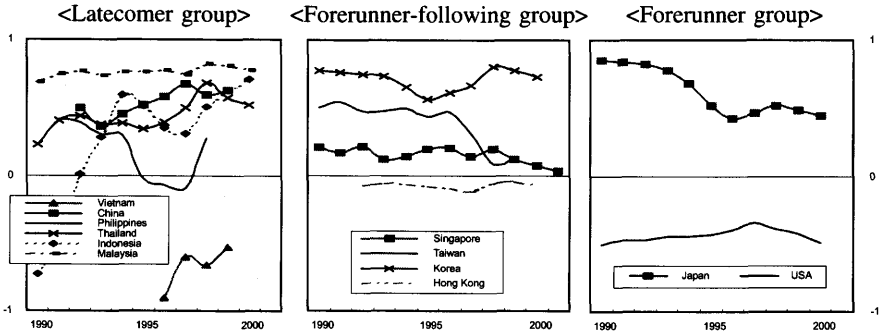
Source: See Appendix Figure 9.1.

Appendix Figure 9.7: Home electrical appliance (Code 27)



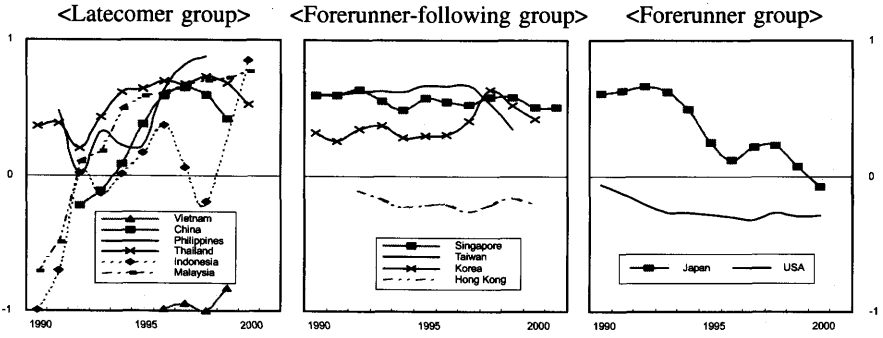
Source: See Appendix Figure 9.1.

Appendix Figure 9.8: Office & communication apparatus (Code 24)



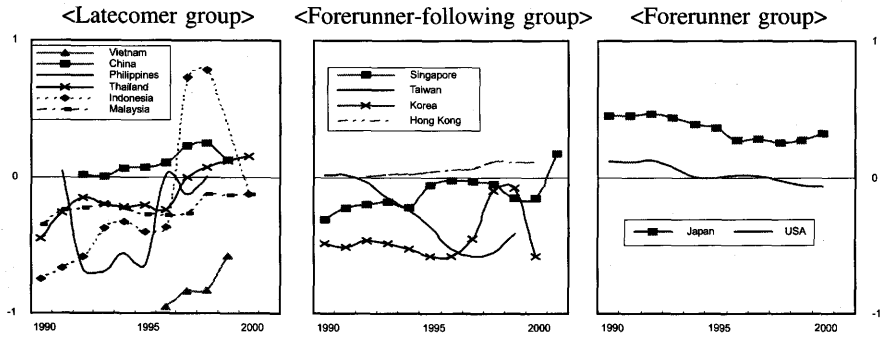
Source: See Appendix Figure 9.1.

Appendix Figure 9.9: Personal computer & peripheral equipment (Code 25)



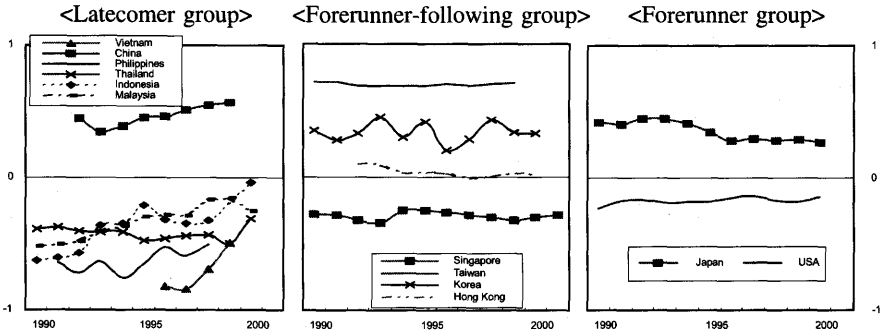
Source: See Appendix Figure 9.1.

Appendix Figure 9.10: Precision apparatus (Code 29)



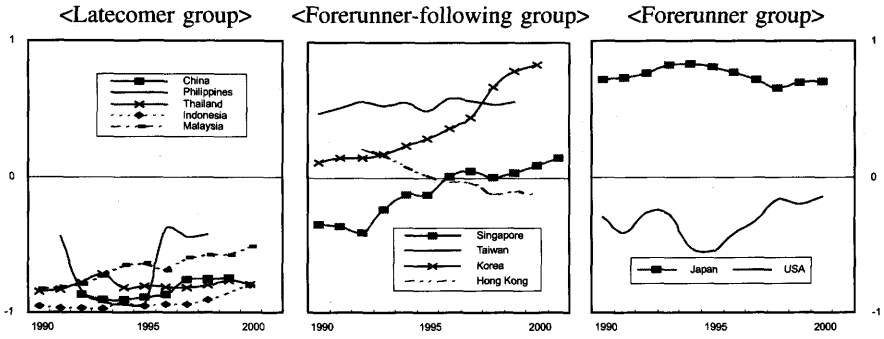
Source: See Appendix Figure 9.1.

Appendix Figure 9.11: Metal processing (Code 12)



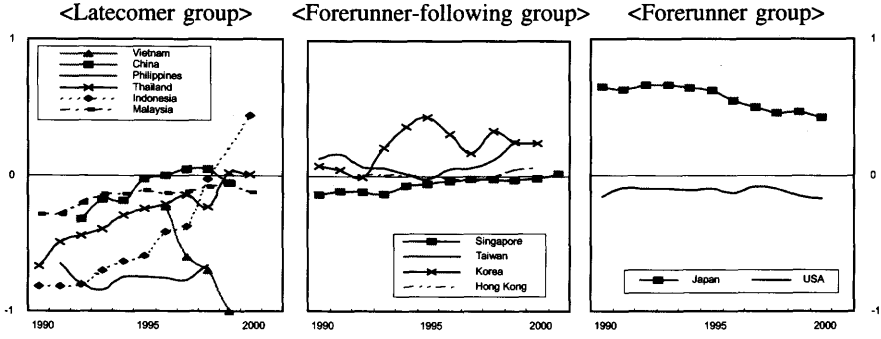
Source: See Appendix Figure 9.1.

Appendix Figure 9.12: Mold (Code 21)



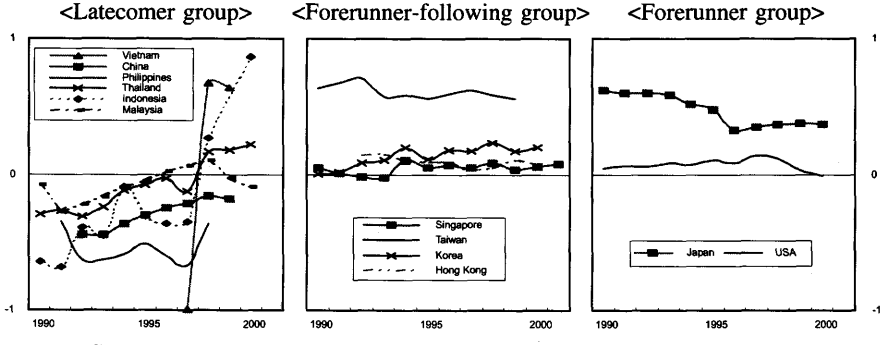
Source: See Appendix Figure 9.1.

Appendix Figure 9.13: Parts of home electrical appliances (Code 26)



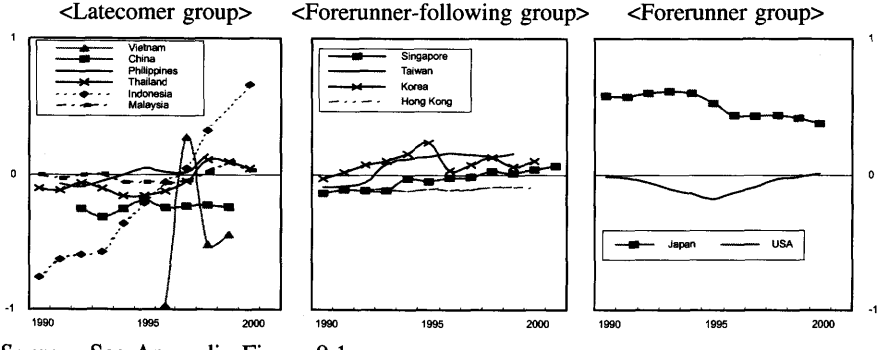
Source: See Appendix Figure 9.1.

Appendix Figure 9.14: Parts of office & communication apparatus (Code 23)



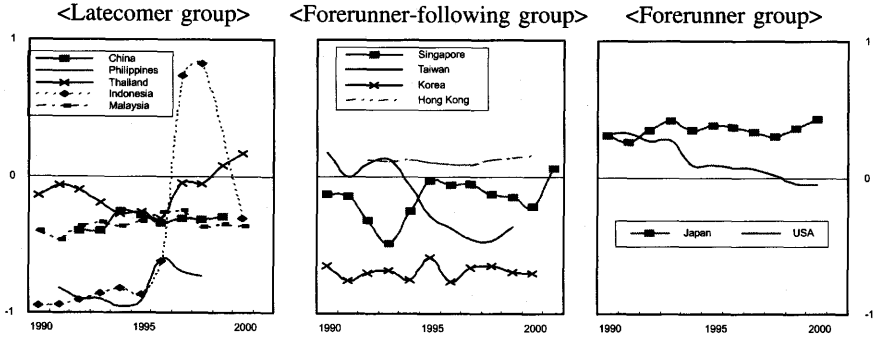
Source: See Appendix Figure 9.1.

Appendix Figure 9.15: Parts of electronics (Code 22)



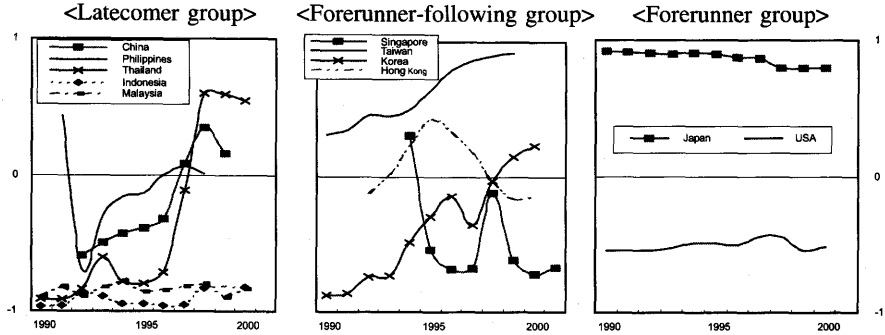
Source: See Appendix Figure 9.1.

Appendix Figure 9.16: Parts of precision apparatus (Code 28)



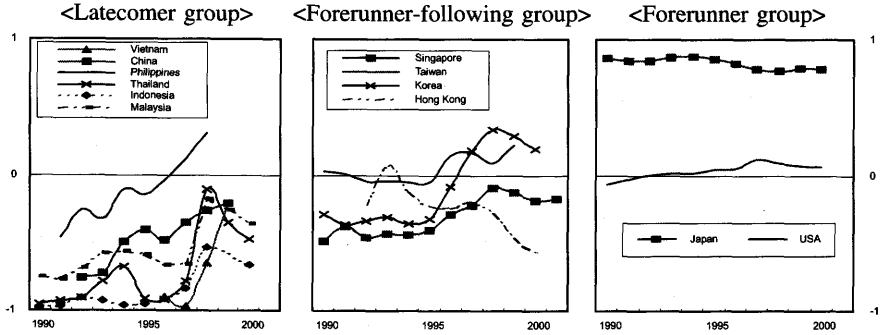
Source: See Appendix Figure 9.1.

Appendix Figure 9.17: Parts of motorcycle (Code 33)



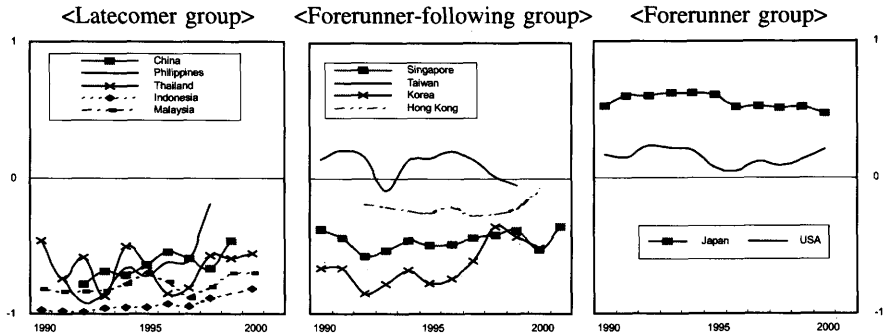
Source: See Appendix Figure 9.1.

Appendix Figure 9.18: Parts of automobile (Code 30)



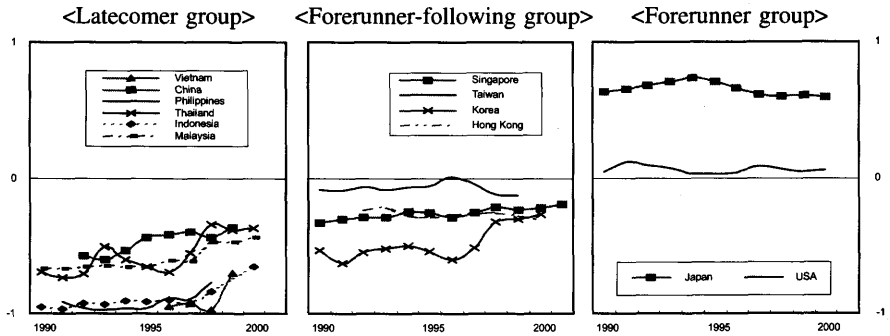
Source: See Appendix Figure 9.1.

Appendix Figure 9.19: Parts of machine tool (Code 19)



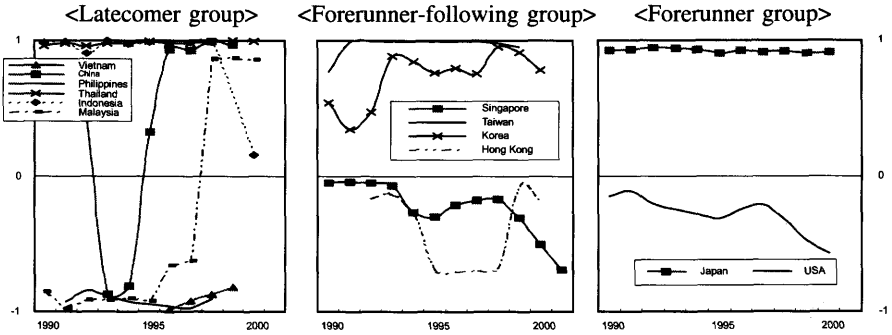
Source: See Appendix Figure 9.1.

Appendix Figure 9.20: Parts of industrial machinery (Code 17)



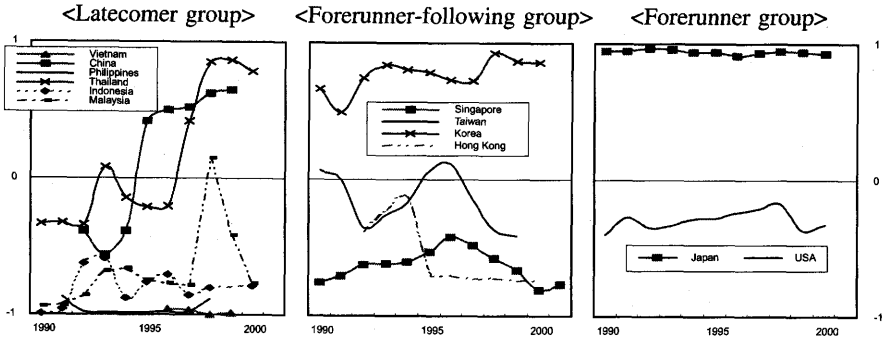
Source: See Appendix Figure 9.1.

Appendix Figure 9.21: Motorcycle (Code 34)



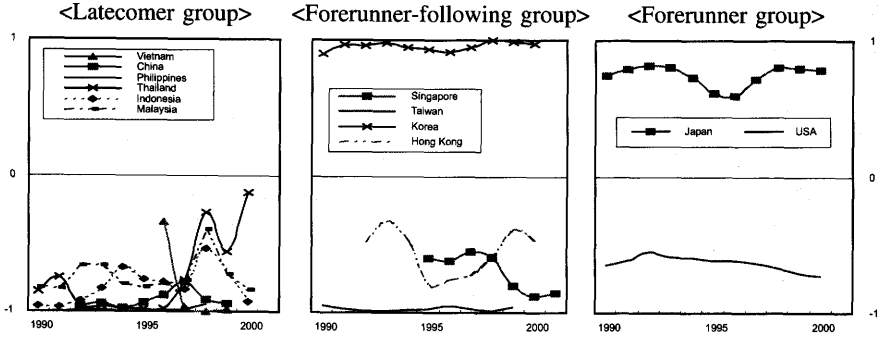
Source: See Appendix Figure 9.1.

Appendix Figure 9.22: Commercial vehicle (Code 31)



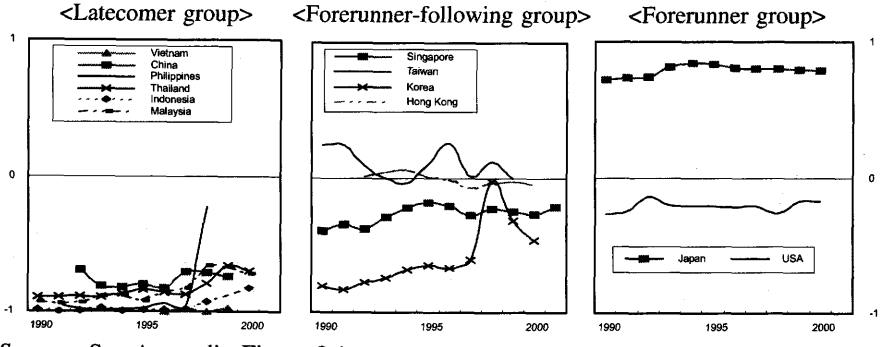
Source: See Appendix Figure 9.1.

Appendix Figure 9.23: Passenger car (Code 32)



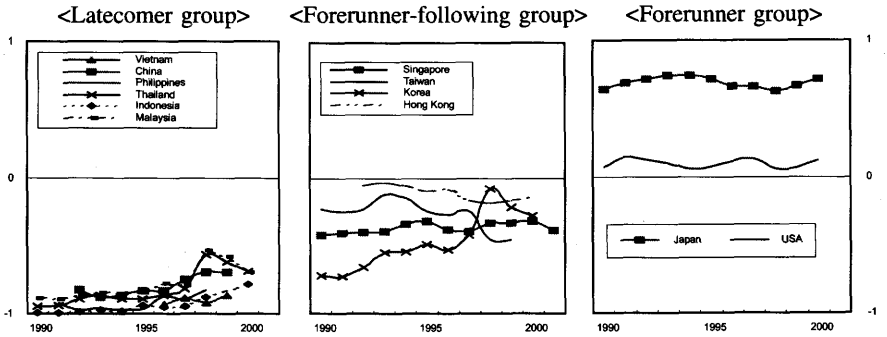
Source: See Appendix Figure 9.1.

Appendix Figure 9.24: Machine tool (Code 20)



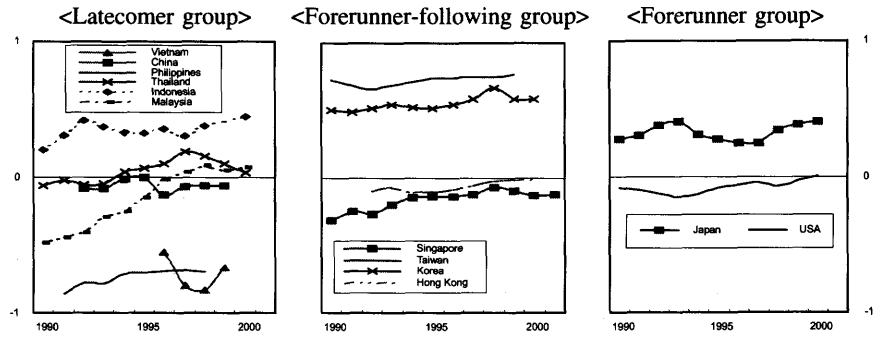
Source: See Appendix Figure 9.1.

Appendix Figure 9.25: Industrial machinery (Code 18)



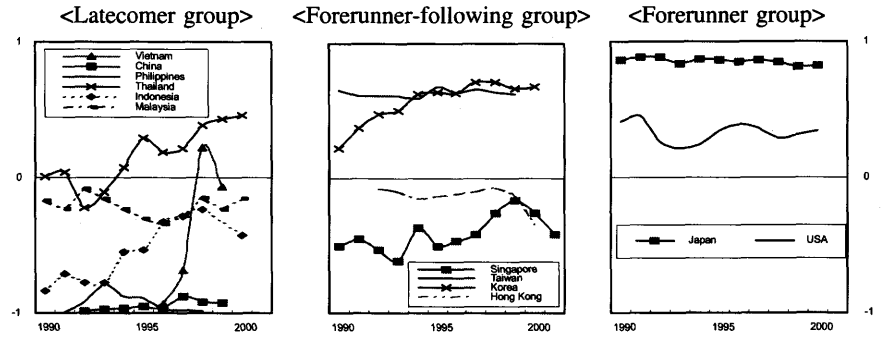
Source: See Appendix Figure 9.1.

Appendix Figure 9.26: Textile yarn & fabric (Code 07)



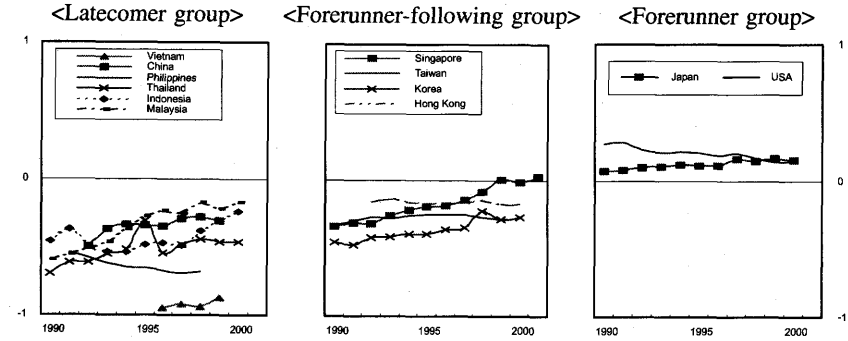
Source: See Appendix Figure 9.1.

Appendix Figure 9.27: Synthetic fiber textile (Code 06)



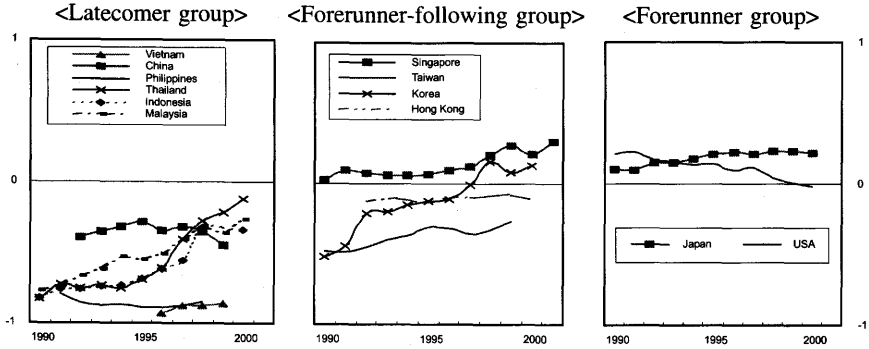
Source: See Appendix Figure 9.1.

Appendix Figure 9.28: Petrochemical products (Code 10)



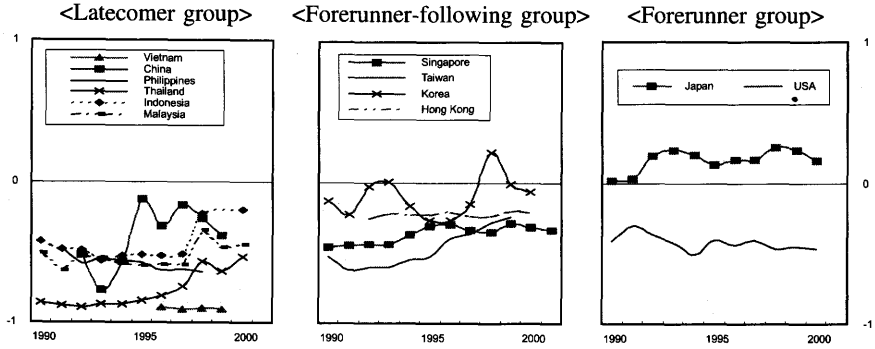
Source: See Appendix Figure 9.1.

Appendix Figure 9.29: Basic petrochemical products (Code 09)



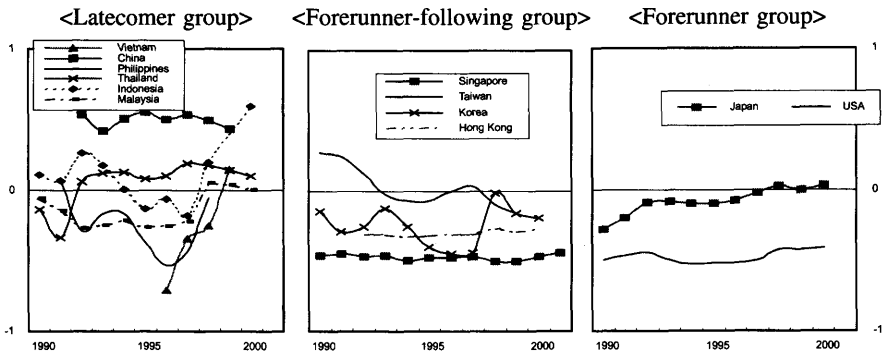
Source: See Appendix Figure 9.1.

Appendix Figure 9.30: Iron & steel (Code 11)



Source: See Appendix Figure 9.1.

Appendix Figure 9.31: Glass & cement (Code 16)



Source: See Appendix Figure 9.1.

Appendix Table 9.1

List of Commodity Classification

Code	Commodity Group	Example of Commodity
1	Agricultural products	cereals, vegetables, fruits, tobacco, oilseeds, natural rubber
2	Processed agricultural products	cereal preparation, sugars, coffee, spices, feeding stuff, beverages, tobacco manufactured, wood and pulp
3	Mineral products	Mineral, coal, crude petroleum, natural gas
4	Petroleum products & gases	ferrous and nonferrous metal, petroleum products
5	Natural fiber textile	silk, cotton, wool
6	Synthetic fiber textile	synthetic fiber for spinning
7	Yarn & fabric	textile yarn, cotton fabric, manmade fabric, knit fabric
8	Apparel	made-up articles, bed linen, apparel
9	Basic petrochemical products	synthetic rubber, inorganic chemicals, organic chemicals, dye, polymers
10	Petrochemical products	chemical fertilizer, plastic in non primary form
11	Iron & steel	pig iron, flat-rolled iron, iron and steel bar, wire, non-ferrous metal
12	Metal processing	Containers, nail, screw
13	Footwear & leather articles	footwear, leather products, rubber products, plywood, wood manufacture, bag,
14	Furniture	chair, bed
15	Miscellaneous manufactured goods	sink, sanitary, stationary goods, jewel, musical instruments
16	Glass & cement	cement, glass, ceramic
17	Parts of Industrial machinery	boiler-parts, turbine parts, filter for engine
18	Industrial machinery	boiler, condenser, boring machine, agricultural machine, weaving machine
19	Parts of machine tool	parts of machine tool
20	Machine tool	Machining, grinding machine, press for working metal, welding machine
21	Mold	mold, mold base
22	Electronic parts	printed circuit, condenser, CPU
23	Parts of office & communication apparatus	parts of photo copying machine
24	Office and communication apparatus	photo copying machine, other office machines, telephone receiver
25	Personal computer and peripheral equipments	personal computer, peripheral equipments
26	Parts of home electrical appliances	compressor, motor, trans, generator, TV tube
27	Home electrical appliances	air conditioner, color TV, video recorder
28	Parts of precision apparatus	parts of micro scope, medical instrument
29	Precision apparatus	micro scope, medical instrument, measurements
30	Parts of automobile	chassis, brakes, gear box, drive-axles
31	Commercial vehicle	truck, bus
32	Passenger cars	Passenger car
33	Parts of motorcycle	parts of motorcycle
34	Motorcycle	Motorcycle
35	Parts of bicycle	parts of bicycle
36	Bicycle	Bicycle
37	Parts of rail locomotive	parts of rail locomotive
38	Rail locomotive	electric rail locomotive
39	Parts of aircraft	parts of aircraft, helicopter
40	Aircraft	aircraft, helicopter
41	Vessel	ships, boat, yacht
42	TV games	video, game
43	Unclassified items	Electricity

Source: Author.

Appendix Table 9.2

List of SITC for Commodity Groups

1	001,041,042,043,044,045,054,057,121,222,223,231,244,245,246,247,291,292,411
2	011,012,016,017,022,023,024,025,034,035,036,037,046,047,048,056,058,059,061,062,071,072,073,074,075, 081,091,098,111,112,122,211,212,248,251,421,422,431
3	273,274,277,278,281,283,284,285,286,287,289,321,322,325,333
4	282,288,334,335,342,343,344,345
5	261,263,264,265,268
6	266,267
7	651,652,653,654,655,656,657
8	269,658,841,842,843,844,845,846
9	232,511,512,513,514,515,516,522,523,524,525,531,532,551,571,572,573,574,575,579
10	272,533,541,542,553,554,562,581,582,583,591,592,593,597,598,882,883
11	671,672,673,674,675,676,677,678,679,681,682,683,684,685,686,687,689
12	691,692,693,694,695,696,697,699
13	611,612,613,621,625,629,633,634,635,641,642,8311,848,851
14	82111,82113,82114,82115,82116,82117,82118,8212,8213,8215,8217,8724
15	8110,81221,81229,81311,8312,8313,8319,892,893,8941,8942,89433,89435,89437,89439,8944,8947,895,896, 897,898,899
16	659,661,662,663,664,665,666,667
17	7119,7128,713,7144,71481,7149,71819,71878,71879,71899,72119,72129,72139,72198,72199,7239,72439, 72449,72467,72468,72488,72491,72492,7259,72689,7269,72719,72729,72819,72839,7285,74128,74135,74139, 74149,74172,7419,7422,74291,74295,74363,74364,7438,74391,74395,74419,7449,74529,74539,74568,74593, 74597,746,747,748,7492,7499,81219
18	7111,7112,7121,71489,71811,71871,71877,71891,71892,71893,72111,72112,72113,72118,72121,72122,72123, 72126,72127,72131,72138,72138,72191,72195,72196,7223,72249,7231,7232,7233,7234,72433,72435,72441, 72442,72443,7245,72461,7247,72481,72483,72485,7251,7252,7263,7265,7266,72681,72711,72721,72722, 72811,72812,72831,72832,72833,72834,7284,74121,74123,74125,74131,74132,74133,74134,74136,74137, 74138,74143,74145,74171,74173,74174,74175,7418,74211,74219,7423,7424,7425,7426,74271,74275,74311, 74313,74319,74345,74351,74355,74359,74361,74362,74367,74369,74411,74412,74413,74414,744157442, 7443,7444,7447,7448,74521,74523,74523,74527,74531,74532,74561,74562,74563,74564,74565,74591,74595, 81211,81215,81217
19	7359,73729,73739,73749,74519
20	7311,7312,7313,7314,7315,7315,7316,7317,7331,7339,7351,7371,73721,73731,73732,73733,73734,73735, 73736,73737,73741,73742,73743,7451174512
21	7491
22	75997,77129,772,773,7741,77423,77429,77549,77579,7763,7764,7768,7781,77848,7786,7787,77881,77886
23	75991,75993,75995,7649
24	751,7641,752
25	752
26	7161,7162,7163,7164,7165,7169,74159,74315,74317,7711,77121,77123,77125,77588,77589,7761,7762,7782, 77833,77835,77882,77883,77885,77889,8138,8139,82119,8218
27	74151,74155,74341,74343,761,762,763,76421,76422,76423,76424,76425,76426,7643,7648,7751,7752,7753, 77541,77542,77571,77572,77573,77581,77582,77583,77584,77585,77586,77587,77831,77834,77841,77843, 77845,77884,81312,81313,81315,81317,8132
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31	72241,7811,7821,7831,7832,7861,7862,7863,78683,78685
32	7812
33	78535
34	7851
35	78536,78537
36	7852, 78531
37	7919
38	7911,7912,7916,7917,7918
39	7929
40	7921,7922,7923,7924,7925,7928
41	793
42	89431
43	351

Source: Author.