

Chapter V

Japanese Direct Investment and Changes in East Asian Industrial Structure

Introduction

International input-output (I-O) tables, with an extensive use of various statistics, are designed to make quantitative analyses over the mechanism of industrial linkages among several countries. In this chapter, we will examine how the industrial structures of three major East Asian countries, Republic of Korea, Thailand, and Indonesia, changed in terms of the cross-national industrial linkages with Japan, for the period between 1975 and 1990 during which the advances of Japan-based corporations into East Asian region were very prominent.

1. Technological Transfer by Japanese Direct Investment

Japanese direct investment from 1985 onwards was characterized by a "package transfer" of production factors, ranging from raw materials and component parts to producing machinery, into neighboring Asian countries through which Japanese corporations, facing a sharp appreciation of yen, sought to establish manufacturing bases for the foreign export market. In the light of production techniques, such a measure has functioned to "cut and paste" the input structure of Japan onto those of the countries invested in. As a result, it was observed that the compositions of intermediate input (dubbed as technical coefficients) of the countries invested in was approximating to that of Japan.

Figure 5-1 (Table 5-1) is constructed from the international I-O tables of Korea, Thailand, and Indonesia for the years 1975, 1985, and 1990. It shows the degree of similarity to Japanese technical coefficients using the index called the "inequality coefficient." This is obtained by taking the reciprocals of the "differences" between the technical coefficients of each country and that of Japan. The larger the value, the closer to Japan's technical coefficient. The changes in Japanese direct investment of major industries are also shown for reference.

Of the three countries considered, the one with the highest degree of similarity is Korea. The only case in which the degree of similarity decreased was transport equipment, dropping in 1985 from 2.53 points to 1.25 points. For all other industries, the degree of similarity increased, although some to a greater extent than others. This tendency was particularly apparent in the case of machine manufacturing industries, such as the general machinery and the electrical equipment. The degree of similarity for the general machinery rose from 2.06 points in 1975 to 4.98 points in 1990, and that for the electrical equipment rose from 1.90 points in 1975 to 4.67 points in 1990. In both cases, there was a high increase ratio of around 45%. As the right-hand portion of Figure 5-1.a shows, there was a sustained inflow of capital from Japan into machine manufacturing industries from the first half of the 1980s onward, and this inflow increased substantially in 1985. The direct investment was already showing to cool off by 1987, but since a time lag of two or three years is generally expected between an investment proposal and its actual operation, those applied for during the peak period of 1987 and 1988 are very likely to have had the largest effect on the production system of 1990. Consequently, if we also take into account the constant inflow of capital before 1985, it is unsurprising to see that the technical coefficients of Korea's machine manufacturing industries were catching up so fast to approximate to that of Japan during the three years under study.

On the other hand, the metal products industry has been showing the similarity to that of Japan for a comparatively longer period. This is explained by the amount of direct investment that occurred before 1979. Between 1951 and 1978, Japanese direct investment in Korea's metal products industry totaled \$63.54 million. This was about eight times the corresponding figure for Taiwan, five times for Thailand, and three times for the Philippine, ... considerably larger than any other Asian countries (except Indonesia).

Figure 5-1.a Degree of Similarity to Japanese Industry and Trend of Japanese Direct Investment: Korea

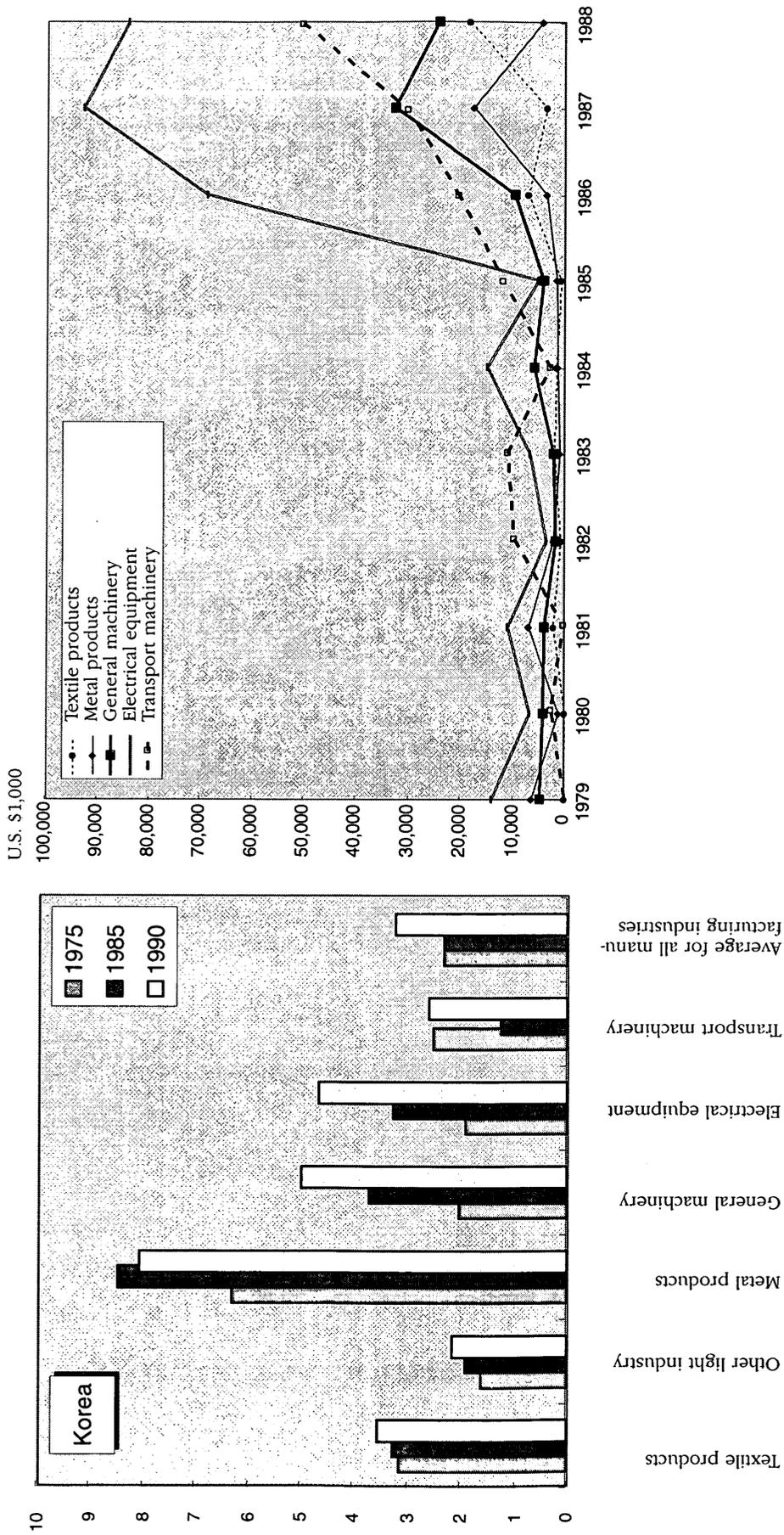


Figure 5-1.b Degree of Similarity to Japanese Industry and Trend of Japanese Direct Investment: Thailand

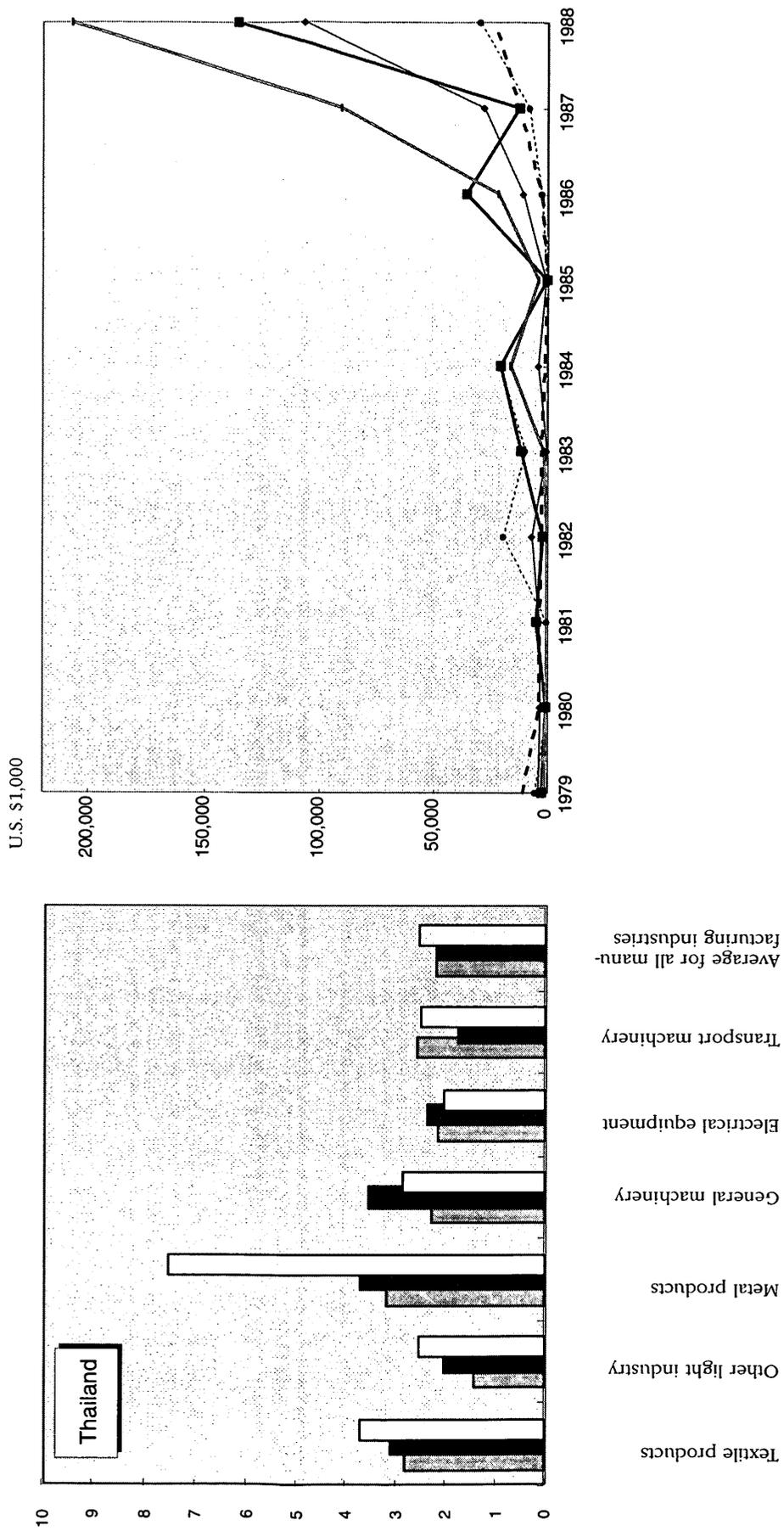
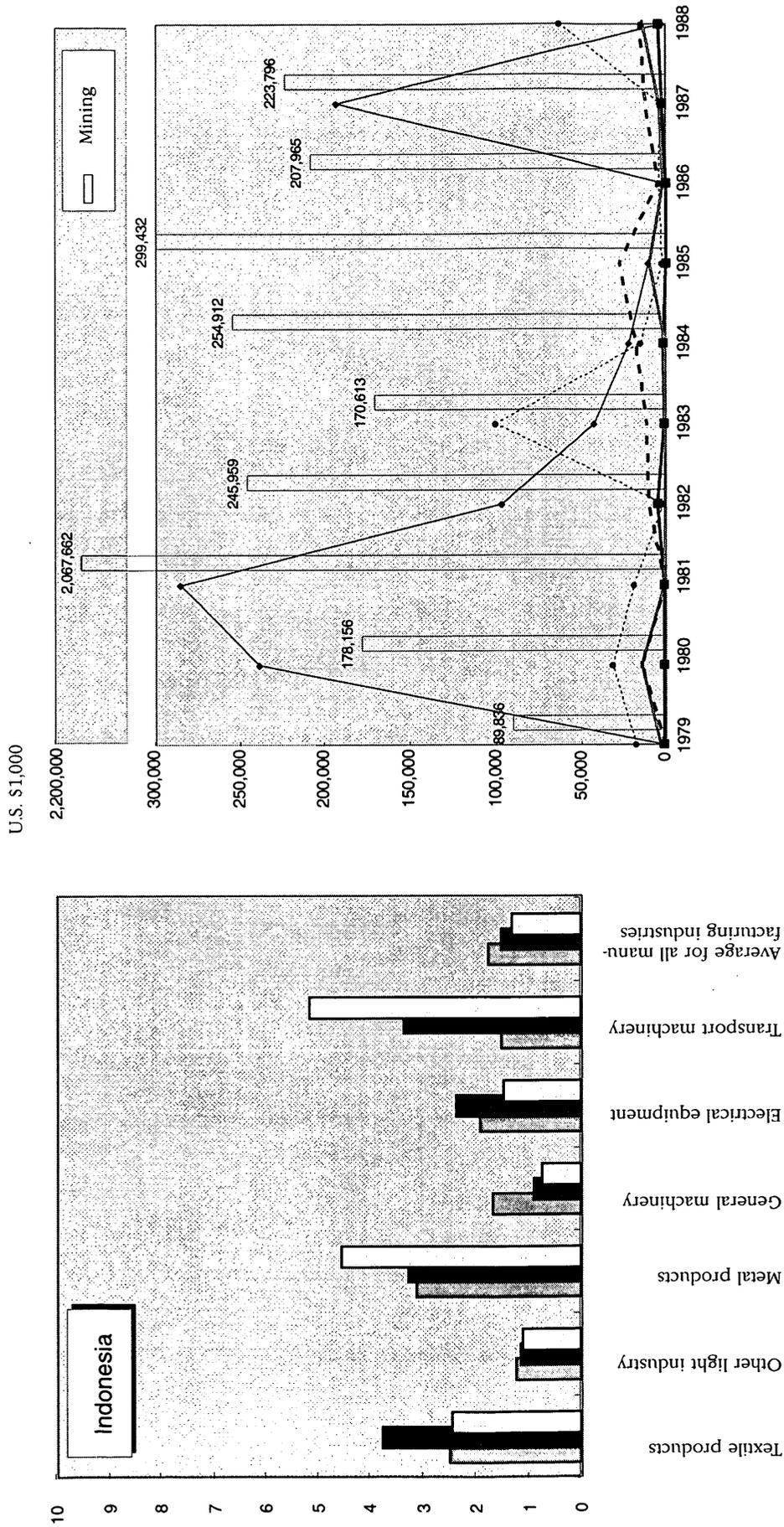


Figure 5-1.c Degree of Similarity to Japanese Industry and Trend of Japanese Direct Investment: Indonesia



Sources for investment data: Ministry of Finance, International Finance Bureau Annual Report
Japanese direct investment abroad (based on the projects applied for)

Thailand, too, shows some upward trends in the degree of similarity, at least for the average figure, but in sectorial details the ups & downs depend on the industry in concern. Relatively speaking, there is a trend for greater similarity in light industries such as the textiles and the food processing, and a substantial increase between 1985 and 1990 in the metal products industry. For the latter, the index doubled, from 3.73 to 7.53 points in the five-year period beginning in 1985. As can be seen from the right-hand side of Figure 5-1.b, the observation synchronizes with the facts that Japanese direct investment in light industries (such as the textiles) was seen from the early stage, and that the investment in the metal products industry accelerated every year from 1985 onward.

On the other hand, the degree of similarity for most machinery manufacturing industries in Thailand has not increased. In particular, the electrical equipment industry, which enjoyed rapidly increasing investment in the latter half of the 1980s, actually saw its degree of similarity decrease. This case would seem to contradict our general thesis.

Possibly, this is a reflection of the fact that the rapidly increasing investment in the electrical equipment industry in 1987 and 1988 was centered around high-tech goods such as communications equipment and computers, and that the technical coefficient of Thai electrical equipment industry thus became heavily biased toward highly sophisticated, technology-intensive products.

Finally, the industrial structure of Indonesia is most dissimilar to Japan among the three countries. An examination of the data for the three years under study shows that the average degree of similarity for all manufacturing industries has steadily dropped, from 1.73 to 1.51 and then to 1.28 points. In particular, the general machinery industry had dropped further by 0.96 points, even if the industry had had a sufficiently low degree of similarity in the beginning.

This situation is due to the strict regulations on investment that were in force from the late 1970s through the mid-1980s. The anti-Japanese riot in Jakarta in 1974 triggered a string of government policies such as limitations on the share of foreign capital, on the employment of foreigners, and enlargement of the fields in which foreigners were not allowed to work. These policies remained in force for approximately ten years. Also to note is that Japanese direct investment during this period was concentrated in "enclave" projects such as mining

and quarrying of minerals (see "mining" on the right-hand side of Figure 5-1.c), which resulted in circumscribing the area of technological transfers to local manufacturers.

On the other hand, in the metal products, the textile products, and the transport equipment industries, in which Japanese investment was noteworthy, there was a much higher degree of similarity in comparison with other industries. In particular, in the metal product industry, where several large-scale projects in the areas such as aluminum refining had been in operation, the similarity to Japanese industrial structure became prominent from the very early stage.

2. *International Industrial Linkages to Goods and Services in Japan*

As we saw in the preceding section, there is a discernible correlation between the flow of foreign direct investment and the degree of similarity of technical coefficients. This shows that direct investment is serving as an important vehicle for technological transfer. It is clear, however, that whether the new technology thus introduced to the country can be promptly absorbed and established in the local production system is largely affected by the technological level of related local industries. In particular, if the production and distribution sectors of component parts and production materials are not well developed, a sudden increase of the investment in new areas may cause a demand bias and dependency onto foreign suppliers of goods and services, particularly those in the country where the investment originated. This may result in the distortion of local production system.

In the following discussion, we will examine the changes in dependency on Japanese goods and services, of the industries in those countries which we have compared the degree of similarity to Japanese industry in the preceding section. We will also look at the trends of foreign direct investment. If Japanese direct investment and the consequent increase in the similarity of input structure is followed by a deepening dependency on Japanese goods and services, it seems likely that this is due to the immaturity of local supply system in the country receiving the investment. At the very least, it indicates that the country did not yet own the ground for receiving Japanese direct investment in terms

of the logistics for component parts. On the other hand, if increased similarity of the input structure is accompanied by a trend toward independence from Japanese goods and services, this would indicate that local industry is already well established. In this case, it is quite possible that direct investment could lead to wide-ranging transfers of technology.

In order to measure the degree of cross-border dependency, an index called the "international backward linkage" (see the Appendix) is used for international input-output analyses. It shows which country's which goods and services are required by how much, in order to carry out the production activities meeting a unit increase in the demand for a commodity of a certain industry of a certain country. In the subsequent discussion, we will examine changes in the international backward linkage to all of Japanese goods and services for the three countries under study.

Figure 5-2 (Table 5-2) shows the changes in international backward linkages to Japan for six major manufacturing industries. Every industry of the countries concerned dropped the figures from 1975 to 1985. This is probably due to the adoption of deflationary policies and import restrictions during the mid-1980s to remedy trade deficits, coupled with a cooling of demand for Japanese products in response to the steep appreciation of yen following the Plaza Agreement.

From 1985 through 1990, some notable differences in the figures are observed for the three countries. First, in the case of Korean industries, the international backward linkage continued to shrink. Through the three points of time indicated, the figures for most industries have dropped. The change is particularly notable for the metal products industry. Yet, this is perhaps simply due to the increase in the wage ratio of this industry, which led to a relative fall in input ratio of production materials (both domestic and imported). Rather, a close attention should be paid to the figures for the general machinery/electrical equipment and the transport machinery industries. Both of these industries had had their figures nearly as high as the metal products industry's in 1975, but by 1990, they dropped the figures substantially, to 0.16 points and 0.28 points, respectively. It would appear that the technological level of the local manufacturers with a support of the chaebol conglomerates had risen, to acquire the ability to meet the demand for technology-intensive industrial goods such as

machinery products.

In contrast, Indonesia followed what is known as a "full-set type" approach to industrialization since the founding of the nation. This strategy aims to domestically produce all major industrial products in full: everything from raw materials, parts, and capital goods to finished consumer products. It seems to be a reflection of the people's sentiment for "national toughness" and for unyielding strength against foreign pressure, which could be a reasonable product of the experience of being colonized.

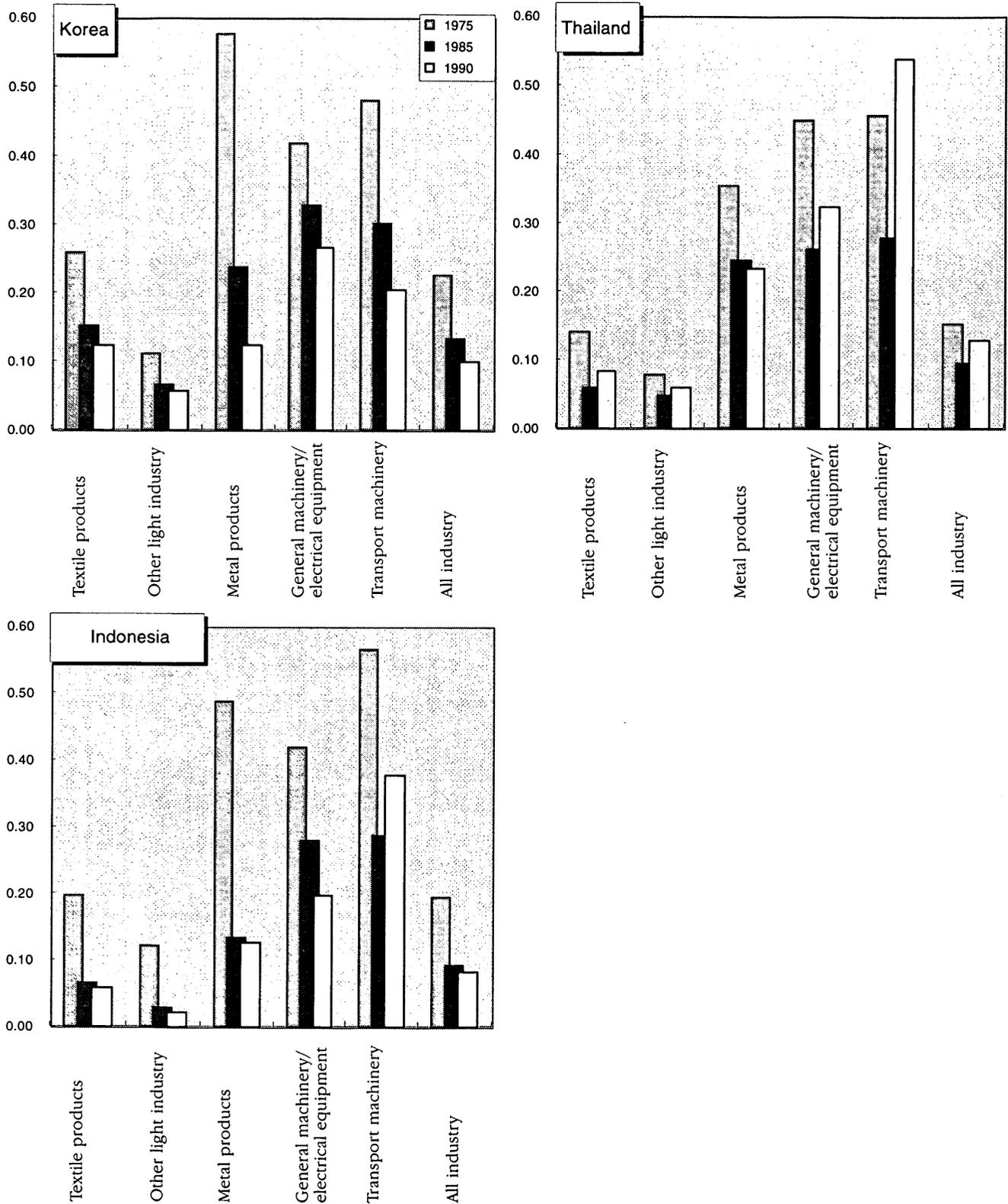
The Indonesian manufacturing industry has also long enjoyed being of import substitution type, afforded by the gigantic domestic market with a population in excess of 100 million, and by the country's ability to obtain foreign currency through abundant exports of petroleum and natural gas. Such an environment provided local industries with opportunities to develop further (with heavy industries such as the metal products and the machinery manufacturing taking the central role), and the domestic supply ratio has been steadily increased.

From the 1980s onward, Indonesia started to open its door to foreign capitals in order to foster export-oriented industries, which were expected to make up for the decrease in export revenue from petroleum and natural gas following the collapse of world oil prices. With a support of sufficiently mature local manufacturers, the inflow of foreign capital did not lead to the deepening of dependence on foreign production materials, or, even observed was a trend towards the independence from Japanese goods and services.

Finally, we will examine the industries in Thailand. After 1985, the preceding downward trend in international backward linkage to Japan reversed itself. In particular, in the five years from 1985 onward the transport machinery industry exhibited a notable change, with the figure rising by 0.26 points. An examination of the average figures for the industries as a whole also shows that Thailand is the only one that exhibited an upward trend from 1985 to 1990 among the three countries in concern.

The metal products and the transport machinery industries provide a particularly striking contrast. For the former, the degree of similarity to Japanese industry was growing while the dependence on Japanese goods and services was decreasing. For the latter, both similarity to Japanese industry and dependence on Japanese goods and

Figure 5-2 International Backward Linkage to Japanese Goods and Services



services went up. In other words, local industries in Thailand are capable of meeting the demand for Japan-based manufacturers of the metal products, but not of the transport machinery. The difference can be considered as a "threshold" of technological level which the local industries of Thailand are able to accommodate.

Also, as was touched on in the preceding section, the sudden growth in direct investment in the electrical equipment industry at the end of the 1980s was almost entirely accounted for by high-tech industries. An examination of backward linkage to Japan in a more detailed categorization would also reveal that the highest figures were for the manufacturers of communications and computer equipment.

Conclusion

We have examined how the rapid advances of Japan-based companies into East Asia from 1985 onward has led to the changes in industrial structures of the countries of the region. The analyses were conducted along two coordinate axes: the degree of similarity to Japanese industry's input structure and the degree of dependence on Japanese goods and services. The findings of the study are summarized as follows.

The Republic of Korea

Of the three countries studied, Korea's industrial structure exhibits the greatest degree of similarity to that of Japan. This trend is particularly notable in the machinery manufacturing industry. Dependence on goods and services from Japan is also decreasing overall, and a comparatively independent production system has been established. Local industries proved their high capacity to meet the demand for sophisticated production materials accompanied by Japanese investment.

Indonesia

Indonesia's industrial structure exhibits the least degree of similarity to that of Japan, and further the degree of similarity declined over the period under study. One of the big factors behind this trend was the restriction on foreign direct investment imposed during the latter half of the 1970s. In this line, import-substitution policies based on the so-called "full-set model" were implemented, resulting in the maturation

of upstream producers such as light industries and the machine components manufacturing industries by the mid-1980s. As a result, even when the foreign direct investment began to be introduced in the latter half of the 1980s, the economy managed to avoid a biased dependence on foreign producers for production materials.

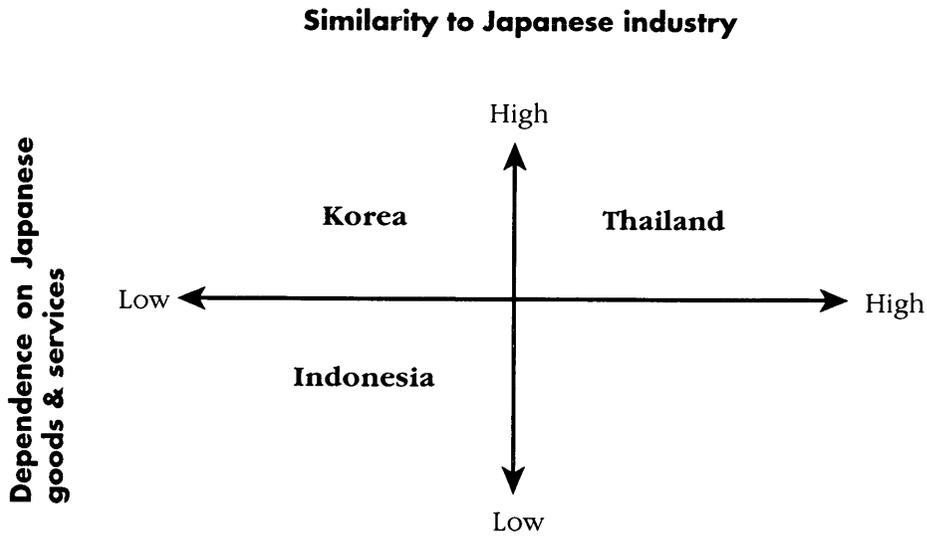
Thailand

Manufacturing sectors, especially light manufacturing and metal products, show a gradual trend of approximation to Japanese industries. At the same time, dependence on goods and services from Japan has deepened in most industries since 1985. Local industry was not able to accommodate the demand generated by the sudden increase in investment from Japan. Thai industries seem to have fallen into chronic dependency on Japanese goods and services, no matter how costly they may be due to the persistent appreciation of yen.

Of course, it is quite arguable whether or not lessening the dependence on foreign suppliers is a "good" thing. One should not care whether an item was produced locally or imported, as long as the desired quality can be obtained cheaply.

However, the direct investment armed with a sophisticated production technology may impose some risks on the production system of the country invested in. This is because with a technology intensive product the capacity to supply the production materials for that product is likely to be concentrated in the investing country. The production system of the country invested in, therefore, becomes over-exposed and vulnerable to the changes in international environment, of which the investing country is a part. The example of Thailand, which was unable to make a distance from Japanese goods and services even during the period of yen appreciation, shows this clearly.

Also, an excessive dependence on imports can stunt the growth of domestic industry and cause the leakage of demand spillover effects to overseas suppliers. For example, if in 1990 the automobile industries of the countries concerned were to experience respectively a rise in demand for the same amount, Japan keeps 93% of the overall demand spillover effect within domestic industries. The corresponding figure for Thailand would be half that, or 49%, and that for Indonesia would be 69%. Even in Korea, where a high self-supply ratio has been



established, only 75% of the spillover effect would remain within the country. This is not to be taken as a trivial, as it does mean to lose the income and employment opportunities as well as to question the effectiveness of public investment and related macro economic policies aimed at spurring the whole economy.

It is incontestable that Japanese direct investment over the past ten years or more has led the

rapid economic growth in East Asia, yet at the same time, it left some significant traces on the industrial structures of the countries in the region. Having the superficially "bubble" climate burst out, the real effects of the process are now showing up. In the years to come, there is no doubt that the countries of East Asia will face a variety of structural problems, which renders a further international cooperation imperative and indispensable.

Chapter 5 Appendix Table 1 Degree of Similarity to Japanese Industry (1975, 1985 and 1990)

	Textile products	Other light industry	Metal products	General machinery	Electrical equipment	Transport machinery	Average for all manufacturing industries
Korea							
1975	3.1374	1.6447	6.3258	2.0658	1.9076	2.5334	2.3385
1985	3.2791	1.9381	8.4633	3.7409	3.2977	1.2568	2.3225
1990	3.5469	2.1763	8.0592	4.9884	4.6736	2.6217	3.2472
Indonesia							
1975	2.4712	1.2060	3.1116	1.6825	1.9144	1.5022	1.7348
1985	3.7727	1.1486	3.2542	0.8976	2.3751	3.3392	1.5100
1990	2.4385	1.1109	4.5285	0.7250	1.4493	5.1331	1.2868
Thailand							
1975	2.8402	1.4142	3.2171	2.2819	2.1768	2.5871	2.1999
1985	3.1036	2.0672	3.7343	3.5829	2.3649	1.7511	2.2302
1990	3.7340	2.5381	7.5353	2.8816	2.0462	2.4815	2.5454

Chapter 5 Appendix Table 2 International Backward Linkage to Japanese Goods and Services (1975, 1985 and 1990)

	Textile products	Other light industry	Metal products	General machinery/ electrical equipment	Transport machinery	Average for all industries
Korea						
1975	0.2593	0.1113	0.5767	0.4190	0.4804	0.2263
1985	0.1519	0.0658	0.2387	0.3281	0.3020	0.1339
1990	0.1248	0.0579	0.1238	0.2655	0.2042	0.0996
Indonesia						
1975	0.1968	0.1229	0.4875	0.4187	0.5652	0.1960
1985	0.0668	0.0295	0.1331	0.2811	0.2887	0.0921
1990	0.0592	0.0209	0.1259	0.1978	0.3782	0.0818
Thailand						
1975	0.1414	0.0776	0.3551	0.4503	0.4580	0.1528
1985	0.0593	0.0467	0.2450	0.2616	0.2780	0.0943
1990	0.0828	0.0600	0.2334	0.3228	0.5390	0.1282