

# Chapter II

## Increasing Sophistication of Industrial Structures

### Introduction

As pointed out in the World Bank report, the economic growth in the countries of East Asia from the late 1970s was striking, well worthy of being called a “miracle.”<sup>1</sup> The manner in which this high growth was inextricably linked with the deepening of these countries’ external trade relationships under their enacted export-oriented development strategies is also as described in Chapter 1. This chapter takes up the increasing sophistication of industrial structure that is taking place with high growth in Indonesia and Thailand from ASEAN, and in South Korea from the NIEs, and examines the characteristics of that sophistication in relation primarily to external trade, while carrying out a comparison with Japan.

### 1. The Deepening of Industrial Structure: A Skyline Analysis

#### 1-1. The Concept of the Industrial Skyline

Skyline analysis offers an effective perspective from which to understand a country’s industrial scale and structure in relation to its external trade. The skyline analysis method depicts each industry by analogy to a high-rise building. The resulting “skyline” formed by “buildings” of varying heights and sizes provides a comprehensive view of a single country’s industrial structure.

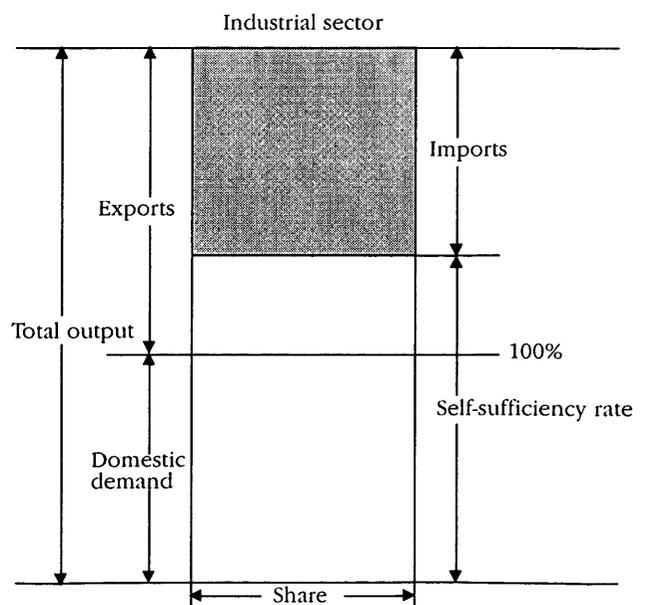
Figure 2-1 shows how the industrial skyline is derived. The various industrial sectors are displayed along the horizontal axis, and the width of each bar shows the share for that industry (in the whole industrial output).<sup>2</sup> The height of each bar shows the level of production in that industry that is induced directly and indirectly by domestic demand, by export demand and by imports. The 100% line indicates the level of production for that industry that fully satisfies domestic demand, and the portion that rises above that line shows production in excess of internal demand, in other words export-induced production. The shaded portion ex-

tending downward from the top of each bar indicates the portion that was substituted by imports and was actually not produced domestically. When the shaded portion extends downward past the 100% line, this means that the industry could not satisfy domestic demand with domestic production, and had to make up the difference with imports. To put this another way, the vertical axis of the graph allows us to read the level of production that each industry can meet by domestic production, i.e., its self-sufficiency rate.

#### 1-2. International Comparison of Industrial Skylines: Industrial Structure in 1975

Figures 2-2 to 2-5 show the skylines for the four target countries at two points in time, 1975 and 1990. By international comparison of these skylines, the following general trends can be observed:

Figure 2-1 Derivation of the Industrial Skyline



In 1975, Japan and the other three countries display contrasting skylines. The Japanese skyline is even in form, with relatively few sharp differences in height. Apart from agriculture, forestry and fisheries and mining, most of the industries are of a certain scale and they also show a self-sufficiency rate that is more than high enough to satisfy domestic demand. The manufacturing industries in particular display a pronounced tendency to have a favorable balance of trade, and thus form the so-called full-set type of industrial structure in which a country possesses the entire range from a production goods industry to consumption goods industry.

In other countries, by contrast, there were certain industries with high self-sufficiency rates that stand out high above the others. Mining in Indonesia, agriculture in Thailand, and textiles in South Korea were the industries of this kind. Heavy and chemical industries such as chemicals and machinery, on the other hand, showed extremely low self-sufficiency rates and moreover were small in scale. The skyline shows the large indentation, like deep valleys, as it moves from primary industry to secondary industry.<sup>3</sup> These countries mainly exported primary products such as grain and mineral resources or processed goods from those products. Since their domestic production goods and consumption goods industries were not developed, domestic demand was largely satisfied through reliance on imports. These countries could thus be said to have had the type of industrial structure of developing countries.

### **1-3. Changing View of the Industrial Skyline**

When we reach 1990, those countries show great change in the appearance of their skylines. In comparison to Japan, where the difference was relatively slight, the skylines of the East Asian countries present the following common characteristics:

#### **(1) Progress of Industrialization in the Heavy and Chemical Industries**

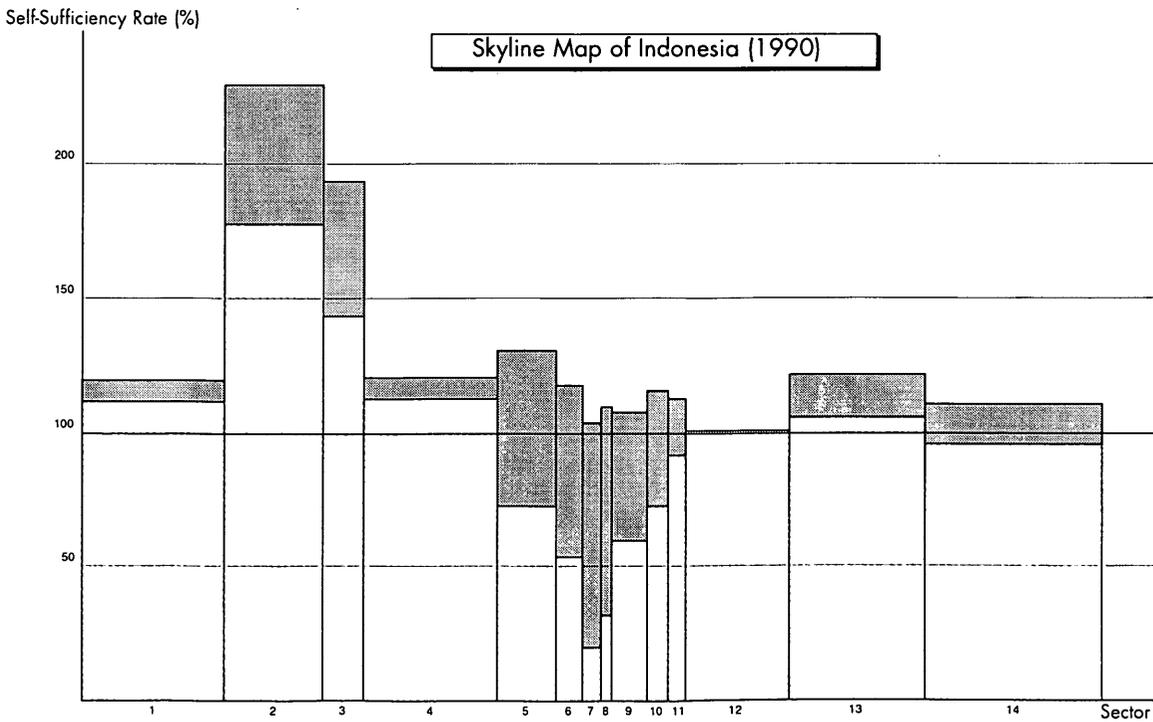
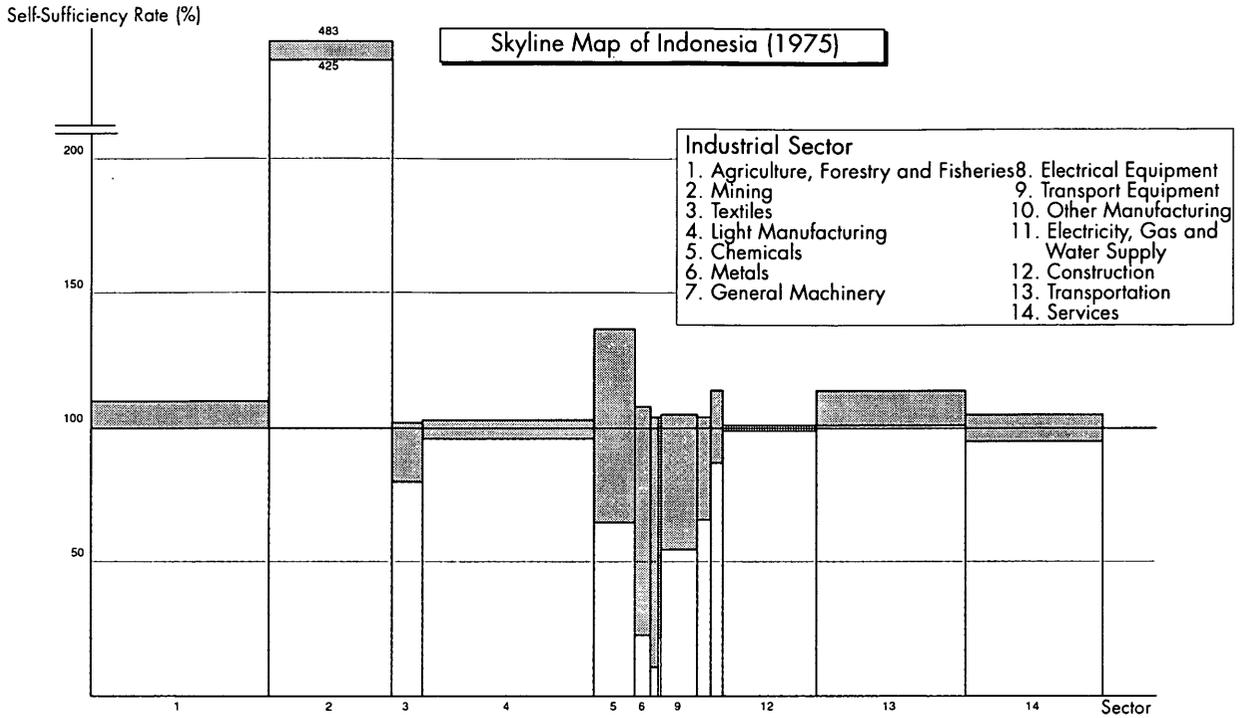
The first characteristic to be pointed out here is the progress of industrialization in the heavy and chemical industries. The industrial share of such primary industries as agriculture, forestry and fish-

eries and mining, which had been central to the industries of Indonesia, Thailand, and South Korea, showed large declines of 6.3%, 10.1%, and 7.9%, respectively, in the 1975-1990 period. The share of manufacturing industries (sectors 3-10), on the other hand, rose by 1.8%, 5.3%, and 0.3% in Indonesia, Thailand, and South Korea respectively. This may appear to be a small increase in Indonesia and South Korea, but when we look only at the heavy and chemical industries there (sectors 5-9), we find increases of 4.1% and 10.1%, which is considerably higher than in the manufacturing industries overall. Thus we can see that the transition took place to an industrial structure led by heavy and chemical industries. This signifies a shift from such traditional, labor-intensive industries as textiles and processed food to such technological- and capital-intensive industries as metals and machinery, showing an increasing sophistication of the industrial structure.

#### **(2) Increasing External Dependence**

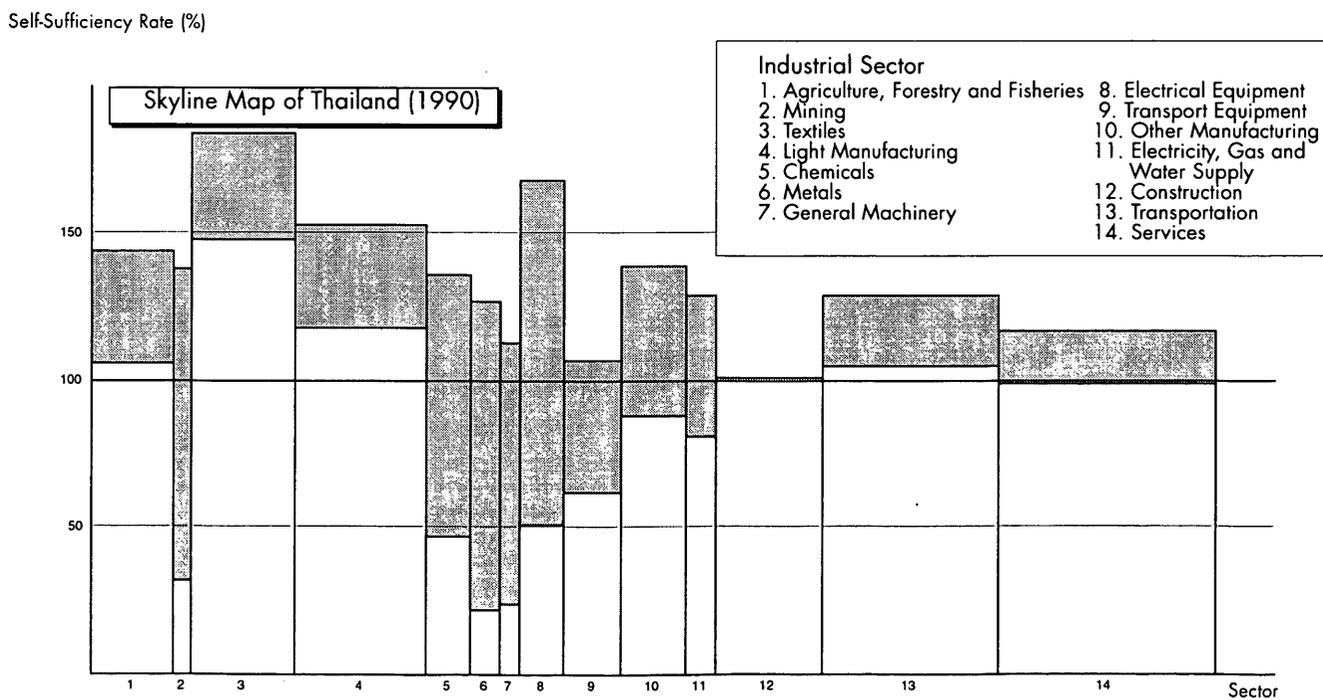
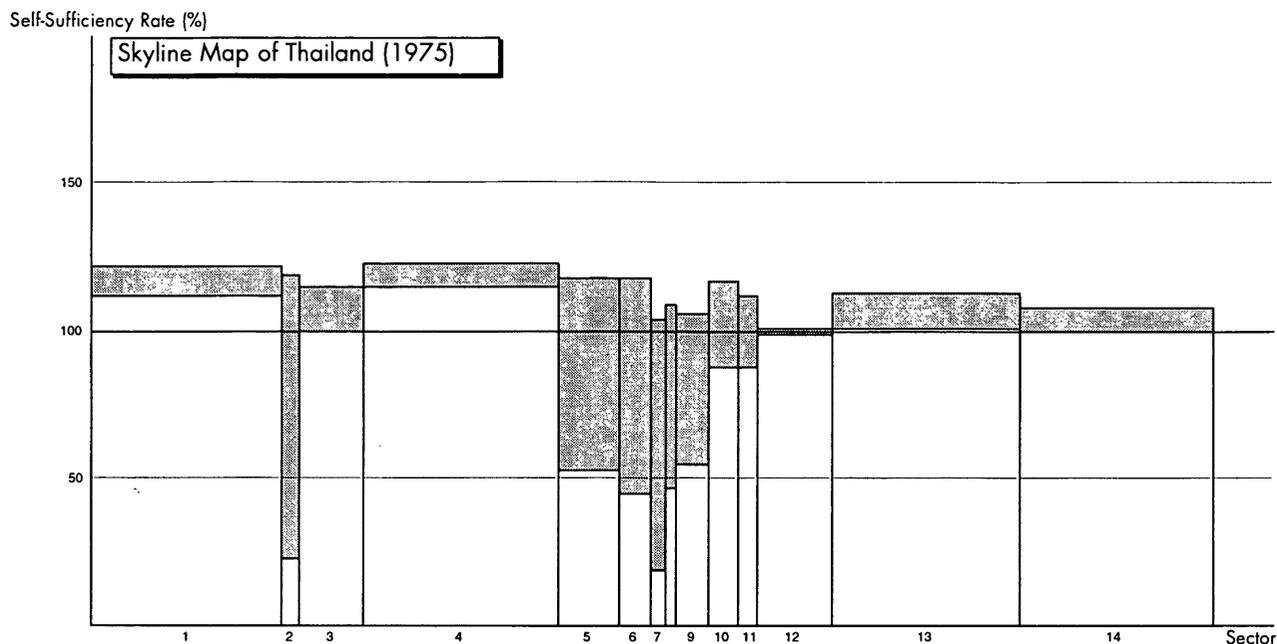
Another major characteristic to be pointed out here is the large-scale increase in external dependence. At the 1975 point, almost all industries in these countries, with the exception of specific export industries, had levels of production that barely rose above the 100% line that shows satisfaction of domestic demand. By 1990, however, not only do we find industries that rise substantially above the 100% line, but the cluster of industrial buildings has taken on an appearance of greater verticality. When we compare the average aggregate figures for the industries above the 100% mark, in other words those that are at the export level, we see that over the 1975-1990 period Japan lowered its export dependence from 23% to 19%, while Thailand and South Korea show a rise in export level from 13% to 35%, and from 36% to 45%, respectively. Indonesia shows a decline from 35% to 28%, but this is because the export level for the mining sector underwent a large fall from 383% to 130%, reflecting the sluggishness in crude oil prices from 1986. Looking only at manufacturing industries, Indonesia also shows a large rise from 8% to 25%. Although there are differences among countries in degree depending on the timing of policy shifts toward export-led industrialization, export orientation appears to have become the general rule in the countries of East Asia.

**Figure 2-2 Skyline Maps of Indonesia (1975 / 1990)**



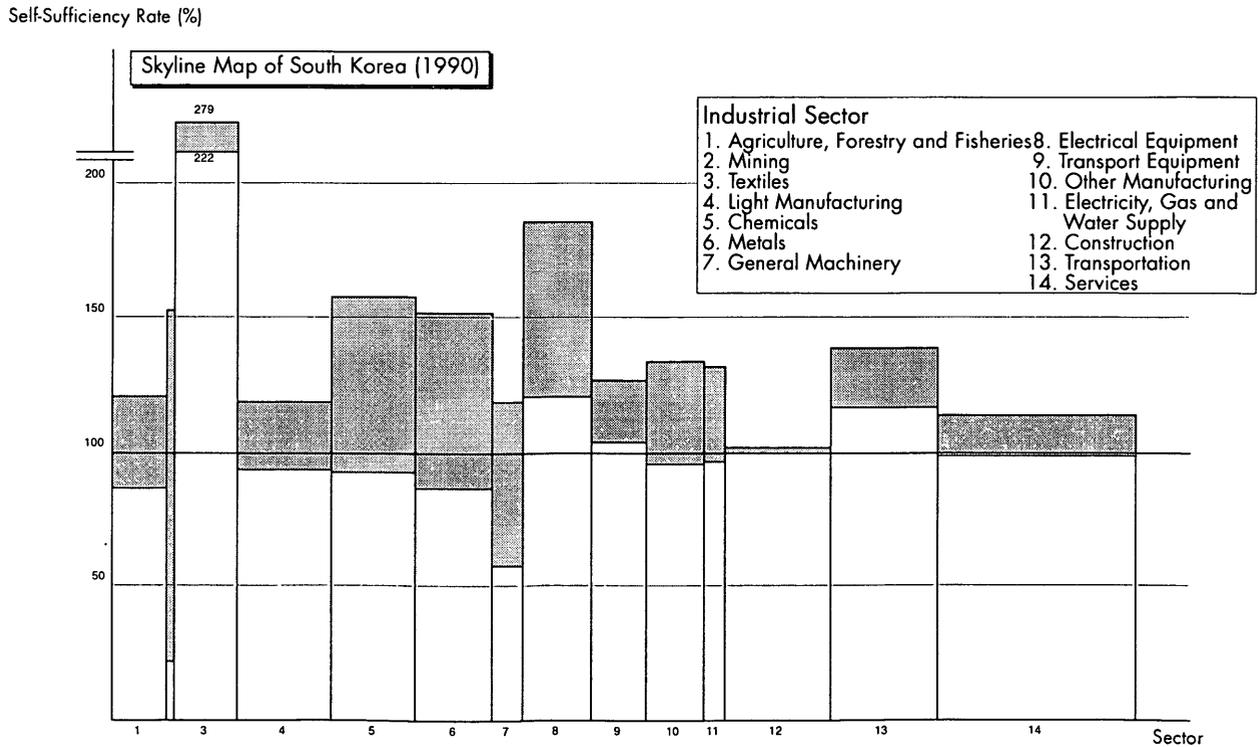
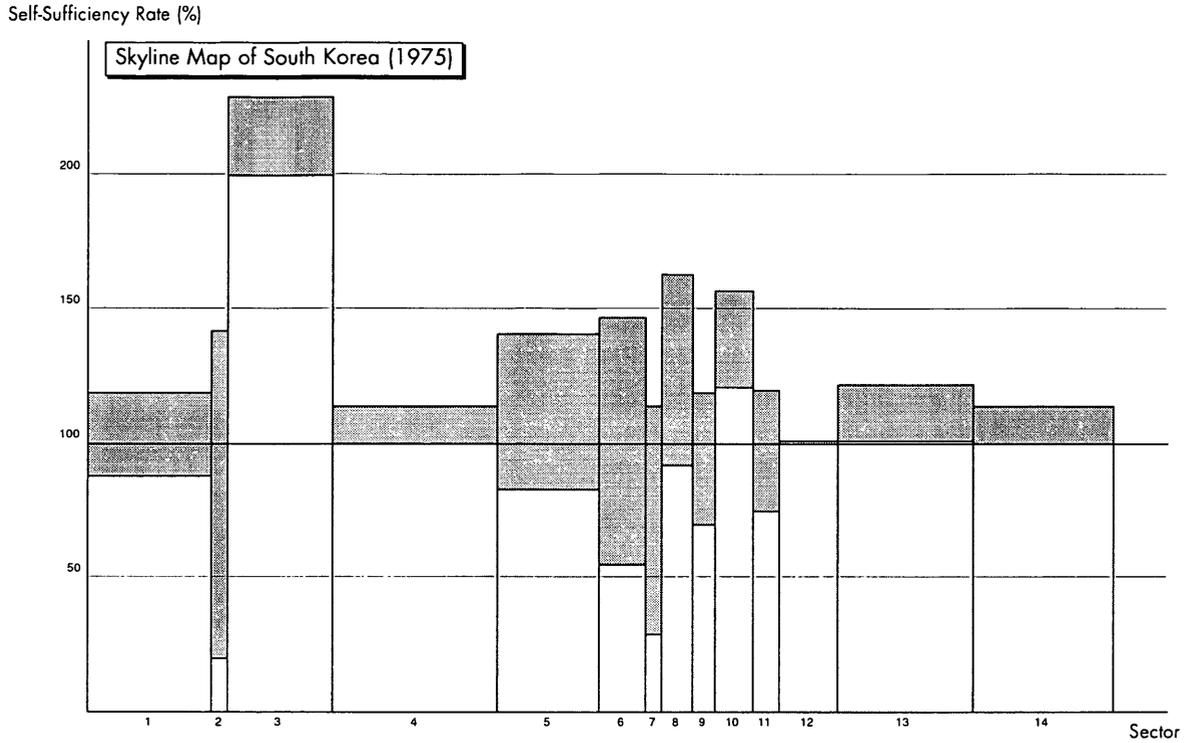
Sources: Prepared based on *International Input-Output Table for ASEAN Countries 1975*, IDE, 1982 and *Asian International Input-Output Table 1990*, IDE, 1998.

**Figure 2-3 Skyline Maps of Thailand (1975 / 1990)**



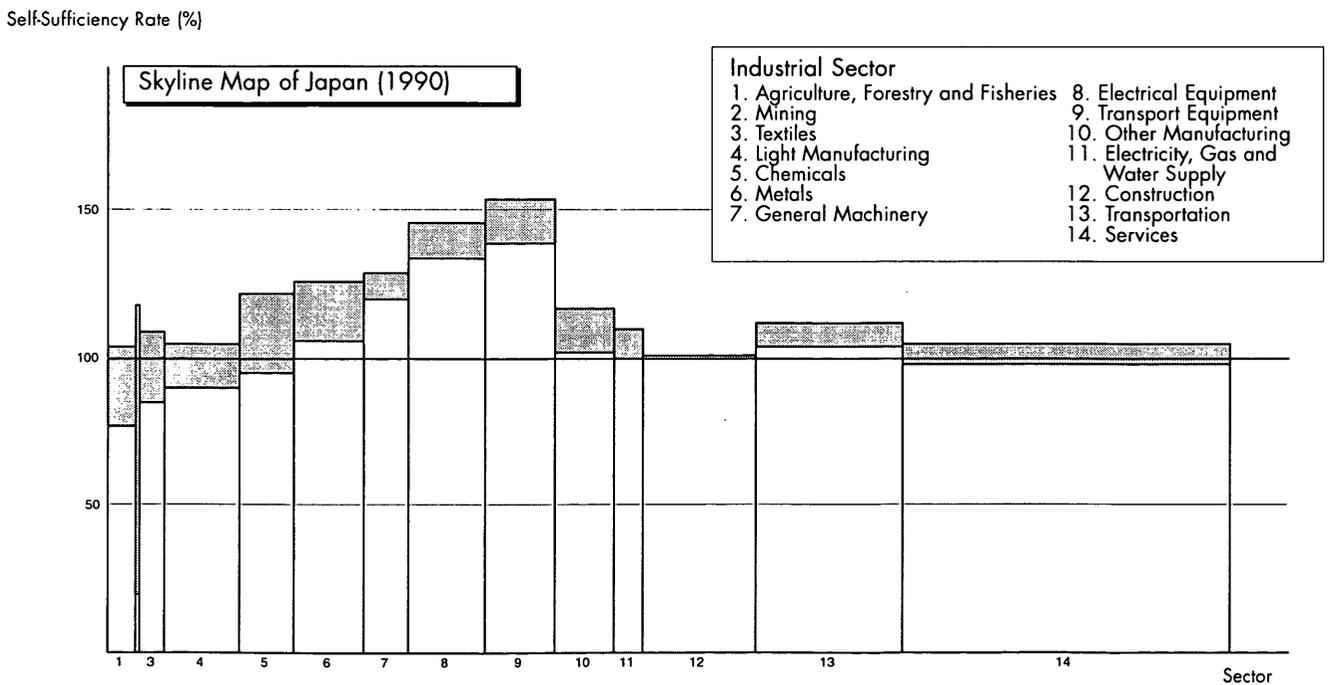
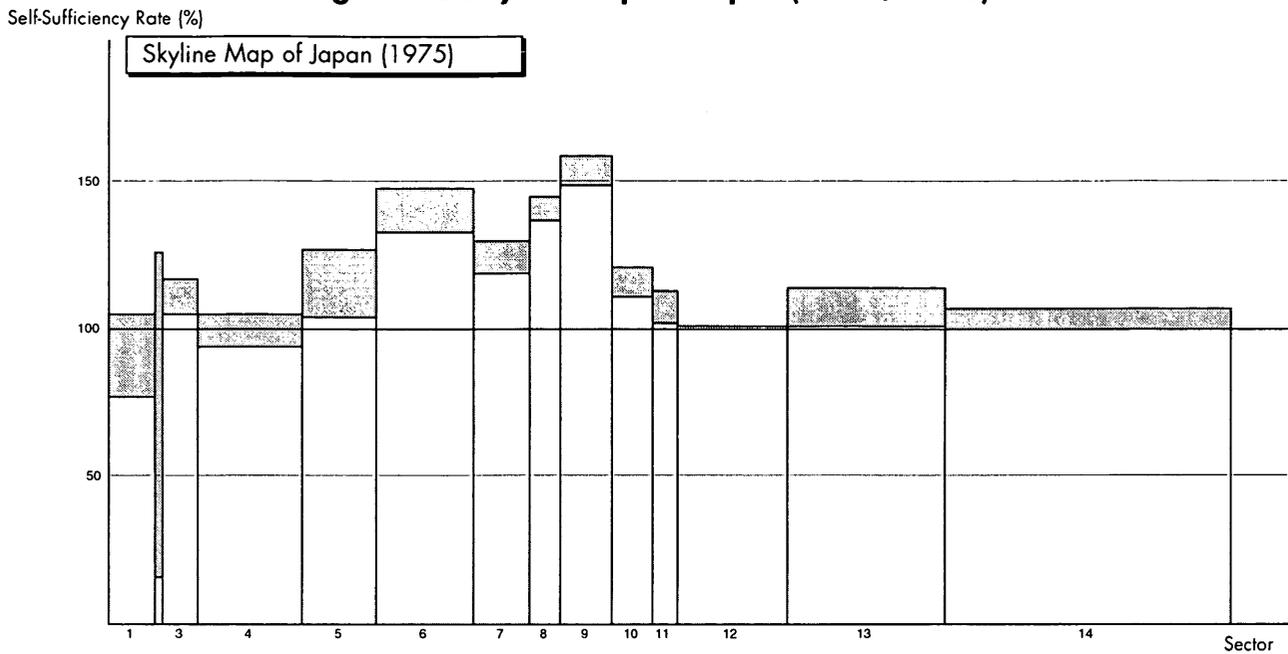
Sources: Same as for Figure 2-2.

**Figure 2-4 Skyline Maps of South Korea (1975 / 1990)**



Sources: Same as for Figure 2-2.

**Figure 2-5 Skyline Maps of Japan (1975 / 1990)**



Sources: Same as for Figure 2-2.

Further, when we look at the industries themselves, we find that all these countries have developed new export industries. To its traditional industry of mining, Indonesia added the textile industry, which showed the remarkable growth from an export level of barely 2% in 1975 to 94% in 1990. In Thailand, too, agriculture and light industry, which were its past performers, were joined by textiles and electrical equipment in showing large increases in export levels. None of the industries in South Korea experienced the same kind of outstanding increases found in the other two countries, but the combined export level in the heavy and chemical industries rose from 37% to 48%. We can observe that the export structures shifted their emphasis to manufactured products, moving together with the industrial structures toward increasing sophistication.

At the same time, however, we can say that the high level of dependence on imports is also characteristic of the East Asian countries. When we examine the self-sufficiency rate, we see that Indonesia and Thailand had similarly high import dependence in heavy and chemical industries in 1975, so that the skyline continues to show the same large indentation. In South Korea, we find industries such as electrical equipment and transport equipment make the shift toward a favorable balance of trade so that the skyline takes on a more even shape, but compared with Japan, the self-sufficiency rate still remains at a low level.

This kind of increasing sophistication in industrial structure in the countries of East Asia inevitably altered even Japan's skyline. During the period from 1975-1990, the skyline of Japan showed, however slightly, a decline in export levels and a rise in import levels. It is worth noting how the fall into an excess of imports is especially marked in the textile industry, which had so long been the exemplar of the export industries. This occurs in direct contrast to the growth of textile industries in Indonesia and Thailand, and we may infer from it that the international division of labor founded on structures of comparative advantage had progressed during that time period.

## 2. *Characteristics of Industrial Structure from the Perspective of Inter-Industry Linkage*

### **2-1. The Concept of Inter-Industry Linkage**

As the skyline analysis shows, when we look from the perspective of industrial composition and trade structure, the industrial structure in East Asian countries has shifted from labor-intensive industries such as agriculture and light manufacturing industry to technology- and capital-intensive heavy and chemical industries. Even when the share of heavy and chemical industries increases, however, the goods produced in those industries will differ greatly according to the level of technology in the industry of that particular country. The transport equipment industry, for example, includes products of varying levels of technology, from bicycles, which can be manufactured from just a few hundred simple parts and so require a relatively low level of technology, to automobiles, which are made from approximately fifty thousand parts and moreover require strict production controls. Furthermore, transportation equipment also includes aircraft that require on the order of three million parts as well as advanced technology, so that they are presently manufactured only in a few countries in Europe and the United States that possess the necessary technology. In other words, the higher the level of technological and capital intensity required for a product, then the greater the number of parts that will be needed as intermediate input for its production, and therefore the stronger the linkage with other industries. Conversely, the stronger an industry's linkage with other industries, then the more we can characterize it as an industry that makes products requiring a high level of technology. By measuring the degree of such a linkage, therefore, it becomes possible to gain a more accurate grasp of the true level of a country's industrial development.

Here we shall use the backward linkage effect as an index to show the quantitative degree of various industries' linkage with other industries. The backward linkage effect is an index that shows the amount of production directly and indirectly induced in industries overall when it experiences one additional unit of demand in a certain industry.

To put this another way, we might interpret it as an indicator of the ultimate multiplier effect on industry overall when production increases in one specific industry.<sup>4</sup>

## 2-2. An International Comparison of the Backward Linkage Effect

The results of measurement of the backward linkage effect in the above four countries at the three points of 1975, 1985, and 1990 are shown together in the appendix table at the end of this chapter. The International Input-Output tables used for this analysis are valued in nominal terms, so the following comparison of measurement results will center on comparison at those particular points in time rather than in chronological sequence.<sup>5</sup>

### (1) Progress in Catching Up

Table 2-1 gives comparative figures for the backward linkage effect in the target countries by industry-wide averages for 1975 and 1990. The topmost rank, column (1), shows a combined backward linkage effect that includes input of imported goods. In 1975, South Korea (2.5224), Japan (2.4484), Thailand (2.0622), and Indonesia (1.9729) displayed considerable differences in technological

level, but by 1990, the difference between the leading country, South Korea (2.4397), and the trailing country, Indonesia (2.1095), had shrunk to 0.3302 points, and it is evident that the disparities overall had diminished. This is thought to result primarily from the relative subsiding of domestic production that accompanied the transfer of production bases from South Korea and Japan overseas from the late 1980s, together with Indonesia's and Thailand's progress in catching up. The figures shown for South Korea and Thailand exceed those for Japan, and industry in Thailand in particular appears to have formed inter-industry linkage strong enough that it surpassed Japan in a period of just fifteen years.

### (2) Weakness in Domestic Technological Levels

As was pointed out in the skyline analysis in the preceding section, however, a conspicuous characteristic of the industrial structure of East Asian countries was the high import dependence level of the manufacturing industries. Therefore, the backward linkage effect of domestically produced goods alone, excluding import input, was measured and is shown in column (2) of the table. The figures in column (3) are the result of dividing the corresponding figures in (2) by those in (1). These

**Table 2-1 International Comparison of Backward Linkage Effects (Industry-Wide Average)**

(1) Backward Linkage Effect (Including Import Input)			
1975		1990	
1 South Korea	2.5224	1 South Korea	2.4397
2 Japan	2.4484	2 Thailand	2.3037
3 Thailand	2.0622	3 Japan	2.2184
4 Indonesia	1.9729	4 Indonesia	2.1095
(2) Backward Linkage Effect (Domestically Produced Goods Only)			
1975		1990	
1 Japan	2.1210	1 Japan	1.9909
2 South Korea	1.7728	2 South Korea	1.8540
3 Thailand	1.5973	3 Indonesia	1.6124
4 Indonesia	1.4193	4 Thailand	1.5571
(3) Domestic Share of Backward Linkage Effect [(2) / (1)]			
1975		1990	
1 Japan	0.8663	1 Japan	0.8975
2 Thailand	0.7746	2 Indonesia	0.7644
3 Indonesia	0.7194	3 South Korea	0.7601
4 South Korea	0.7028	4 Thailand	0.6759

Sources: Calculated from *International Input-Output Table for ASEAN Countries 1975*, IDE, 1982, and *Asian International Input-Output Table 1990*, IDE, 1998.

columns show only the domestic share of production induced by the backward linkage effect. In short, the figures in columns (2) and (3) show what portion of production of the industries of the country in question can be covered domestically, and this can be said to show the level of technology that country can supply.

Examination of column (2) shows that Japan instead of South Korea shows the strongest backward linkage effect. On the other hand, it is noteworthy that where Thailand had shown a figure for combined linkage inclusive of import input that exceeded that of Japan in 1990, the backward linkage effect of domestically produced goods alone for Thailand went down by 0.7466 points (32.4%), even lower than for Indonesia (1.6124). This is a straightforward indication that industry in Thailand has been deepening inter-industry linkage by increasing its dependence on imported goods, in other words on foreign technology. Examination of column (3) shows that Indonesia had taken second place behind Japan, and this probably reflects the fact that Indonesia had nurtured and strengthened the foundation of domestic industry under the consistent policies of import substitution development it had been carrying out up to 1986, when the rupiah was devalued and deregulation policies were introduced.

Differences in the level of technology among the countries become even clearer when the backward linkage effect in specific industries is compared. Table 2-2 presents the top five sectors of manufacturing industry ranked by magnitude of backward linkage effect.<sup>6</sup> The aggregate effect inclusive of import input is highest for every country in metals and machinery, and in this the differences from country to country are slight. This is an indication that these industries generally have strong links to other industries, and that they are technology- and capital-intensive industries. When we compare the backward linkage effect in domestic goods production alone, however, the picture changes considerably. In Japan, metals and machinery remain in the top position as before, and their decreases are also slight in comparison with the aggregate effect. In South Korea, too, the change is relatively slight, but when looking just at the domestic effect, we find that light manufacturing has moved into top place, and that the margin of decrease in the domestic effect compared to the aggregate effect was at 0.5857 points (24.0%) far larger than Japan's at 0.2275 points (10.2%). We also

see that South Korea's domestic base in technology- and capital-intensive industries is not as well established as Japan's. In Indonesia and Thailand, the industries in the top position change places entirely. The metals and machinery industries that had held the top positions in aggregate effect for both 1975 and 1990 were replaced by textiles, light manufacturing, and the category of other manufacturing, which includes sundry goods.

The above results lead to the following conclusion concerning the distinctive characteristics of industrial structure in the countries of East Asia: Although the development of heavy and chemical industries progressed in all the countries alike, the domestic foundations of those industries are extremely fragile, so that the levels of technology the industries are able to maintain domestically have not changed very much from 1975, remaining limited as before to the traditional sectors of textiles and light manufacturing.

### *Conclusion*

This chapter applied methods typical of input-output analysis in an attempt to elucidate the increasing sophistication and distinctive characteristics of industrial structures in the countries of East Asia. The results can be summarized roughly as follows:

1. The industrial structure of East Asian countries underwent great change during the period 1975 to 1990. In terms of the industrial composition ratio, there was a shift from primary industries such as agriculture, forestry and fisheries and mining, to manufacturing industries, and within manufacturing industries there was also a shift from labor-intensive light manufacturing to the capital- and technology-intensive heavy and chemical industries.
2. At the same time, export orientation also became observable as a general phenomenon in every country. Due to the development of new export industries, the primary products of the past were replaced by manufactured goods as the main component of exports.
3. As a consequence of the rapid sophistication of the industrial structure, however, the heavy and chemical industries that served particularly to

**Table 2-2 Industrial Sectors with Large Backward Linkage Effect (Top 5 Sectors)**

	Including Import Input			Domestic Goods Only				
	1975	1990	1990	1975		1990		
<b>Indonesia</b>								
1 General Machinery	2.5472	1 General Machinery	2.9104	1 Light Manufacturing	1.8171	1 Light Manufacturing	1.9053	
2 Electrical Equipment	2.5430	2 Textiles	2.5799	2 Textiles	1.7727	2 Textiles	1.8663	
3 Textiles	2.4637	3 Electrical Equipment	2.4071	3 Chemicals	1.7663	3 Other Manufacturing	1.7292	
4 Transport Equipment	2.4634	4 Metals	2.3356	4 Other Manufacturing	1.4443	4 Metals	1.7191	
5 Metals	2.3908	5 Other Manufacturing	2.2672	5 Metals	1.4417	5 Chemicals	1.6501	
<b>Thailand</b>								
1 Transport Equipment	2.6843	1 Electrical Equipment	3.2597	1 Textiles	1.9311	1 Textiles	1.8685	
2 General Machinery	2.4926	2 Transport Equipment	2.8038	2 Light Manufacturing	1.9019	2 Light Manufacturing	1.8579	
3 Metals	2.4593	3 Metals	2.7828	3 Electrical Equipment	1.7679	3 Other Manufacturing	1.6584	
4 Electrical Equipment	2.4528	4 Textiles	2.6288	4 Metals	1.7416	4 Metals	1.5083	
5 Textiles	2.4298	5 General Machinery	2.5800	5 Transport Equipment	1.6111	5 General Machinery	1.4724	
<b>South Korea</b>								
1 Metals	3.7391	1 Metals	3.2208	1 Textiles	2.1491	1 Metals	2.2371	
2 Transport Equipment	3.0280	2 Textiles	3.1332	2 Metals	2.1048	2 Textiles	2.1777	
3 General Machinery	3.0277	3 Electrical Equipment	2.8584	3 General Machinery	1.9755	3 Transport Equipment	2.1426	
4 Electrical Equipment	2.9734	4 Transport Equipment	2.8356	4 Light Manufacturing	1.9530	4 Light Manufacturing	2.0736	
5 Textiles	2.9367	5 General Machinery	2.7813	5 Other Manufacturing	1.9074	5 General Machinery	2.0051	
<b>Japan</b>								
1 Metals	3.0589	1 Transport Equipment	2.8852	1 Metals	2.6158	1 Transport Equipment	2.6885	
2 Chemicals	2.7744	2 Metals	2.6262	2 Transport Equipment	2.5267	2 Metals	2.2662	
3 Transport Equipment	2.7739	3 Textiles	2.4385	3 Textiles	2.3360	3 Electrical Equipment	2.2242	
4 Textiles	2.7600	4 Electrical Equipment	2.4324	4 General Machinery	2.3413	4 General Machinery	2.1703	
5 General Machinery	2.6727	5 Chemicals	2.3770	5 Electrical Equipment	2.3360	5 Light Manufacturing	2.1002	

Note: This comparison covers only manufacturing industries (sectors 3-10).

Source: Same as for Table 2-1.

drive growth and exports in all these countries became fixed in an import dependent mode. Thus the foundations of domestic industry in the countries of East Asia, and especially in Indonesia and Thailand, remained in their previous fragile condition in 1990, so that the domestic level of technology seems hardly to have improved from 1975 to 1990.

As shown in Chapter 1, trade and investment in Asia became increasingly vigorous after 1991. Coupled together with policies of deregulation there, that the degree of external dependence in the countries of East Asia is likely to have increased as well. Even as the East Asian countries increase their dependence with other countries and regions in this manner, they will have to strengthen their domestic industrial base through fostering independent supporting industries. Thus we can say that they are now facing the issue of this difficult structural adjustment.

### Notes

- 1 The World Bank, *East Asian Miracle: Economic Growth and Public Policy*, Oxford University Press, New York, 1993, p.1.
- 2 However, the "industrial composition ratio" here was calculated from production output that includes intermediate transactions, so it differs in concept from the commonly used "industrial composition ratio" that is measured on the basis of value added figures for GNP or GDP.
- 3 Leontief, W., "The Structure of Development," *Input-Output Economics: Second Edition*, Oxford University Press, New York, 1986, p. 184.
- 4 Concerning the concept of backward linkage effect, please see the appendix to this volume.
- 5 Strictly speaking, even comparison at the same point in time needs to be made real in terms of price factors, using purchasing power parity (PPP) and so on.
- 6 The comparison was confined to manufacturing industries because other infrastructure-related industries (electricity, gas and water supply, construction, etc.) and service industries naturally deal more in non-traded goods, which, unlike manufactured products that are traded, are difficult to compare in simple terms.

**Chapter 2 Appendix Table Backward Linkage Effect Measurement Results (1975-1990)**

Sector	Indonesia						South Korea											
	1975		1985		1990		1975		1985		1990							
	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)						
1	1.1503	1.1091	0.9642	1.2605	1.2094	0.9595	1.3746	1.2994	0.9453	1.5061	1.3351	0.8865	1.7736	1.5517	0.8749	1.7774	1.5693	0.8829
2	1.0804	1.0517	0.9734	1.2577	1.2101	0.9622	1.3191	1.2584	0.9540	1.6979	1.4392	0.8476	1.9124	1.6395	0.8573	1.7494	1.5637	0.8939
3	2.4637	1.7727	0.7195	2.3604	1.8465	0.7823	2.5799	1.8663	0.7234	2.9367	2.1491	0.7318	3.1689	2.1795	0.6878	3.1332	2.1777	0.6950
4	1.9331	1.8171	0.9400	2.0467	1.9325	0.9442	2.0453	1.9053	0.9316	2.4610	1.9530	0.7936	2.5622	2.0716	0.8085	2.5610	2.0736	0.8097
5	2.0722	1.7663	0.8524	2.0909	1.6882	0.8074	2.1249	1.6501	0.7765	2.6542	1.5642	0.5893	2.7769	1.5809	0.5693	2.7247	1.7339	0.6364
6	2.3908	1.4417	0.6030	2.1363	1.6109	0.7541	2.3356	1.7191	0.7361	3.7391	2.1048	0.5629	3.4348	2.2979	0.6690	3.2208	2.2371	0.6946
7	2.5472	1.2048	0.4730	2.7781	1.1470	0.4129	2.9104	1.1974	0.4114	3.0277	1.9755	0.6525	2.9667	2.0130	0.6785	2.7814	2.0051	0.7209
8	2.5430	1.2595	0.4953	2.5314	1.5170	0.5993	2.4071	1.6156	0.6712	2.9734	1.6925	0.5692	3.0597	1.8195	0.5947	2.8584	1.8796	0.6576
9	2.4634	1.3013	0.5282	2.1520	1.5466	0.7187	2.2659	1.5623	0.6895	3.0280	1.8074	0.5951	2.9850	2.0027	0.6709	2.8356	2.1426	0.7556
10	1.9257	1.4443	0.7500	2.1545	1.6023	0.7437	2.2672	1.7292	0.7627	2.6135	1.9074	0.7298	2.7145	2.0019	0.7375	2.5903	1.9961	0.7706
11	1.9797	1.4939	0.7546	2.6324	2.2903	0.8700	2.3326	1.9976	0.8564	2.6777	1.9210	0.7174	1.9884	1.5080	0.7584	2.0284	1.5481	0.7632
12	2.1783	1.5974	0.7333	2.2138	1.8566	0.8387	2.3841	1.9020	0.7978	2.6309	2.0432	0.7766	2.5638	2.0622	0.8043	2.3504	1.9651	0.8361
13	1.4214	1.2604	0.8867	1.4844	1.3562	0.9136	1.5141	1.3766	0.9092	1.6483	1.4102	0.8556	1.9193	1.5468	0.8059	1.8118	1.5293	0.8440
14	1.4711	1.3501	0.9178	1.4856	1.3887	0.9348	1.6722	1.4949	0.8940	1.7193	1.5224	0.8855	1.5775	1.4270	0.9046	1.7272	1.5352	0.8888
Average	1.9729	1.4193	0.7194	2.0418	1.5859	0.7767	2.1095	1.6124	0.7644	2.5224	1.7728	0.7028	2.5288	1.8359	0.7260	2.4393	1.8540	0.7601

Sector	Thailand						Japan											
	1975		1985		1990		1975		1985		1990							
	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)	(1)	(2)	(2)/(1)						
1	1.4078	1.3226	0.9395	1.7816	1.5552	0.8729	1.7138	1.4639	0.8542	1.9343	1.7605	0.9101	1.9787	1.8089	0.9142	1.8699	1.7513	0.9366
2	1.3433	1.2181	0.9068	1.7171	1.4940	0.8701	1.5826	1.3697	0.8655	2.0445	1.8917	0.9252	2.2121	1.9959	0.9023	2.0588	1.9227	0.9339
3	2.4298	1.9311	0.7948	2.5573	2.0034	0.7834	2.6288	1.8685	0.7108	2.7600	2.3413	0.8483	2.6643	2.2305	0.8372	2.4385	2.0979	0.8603
4	2.0545	1.9019	0.9257	2.2583	1.9743	0.8742	2.3082	1.8579	0.8049	2.6248	2.2347	0.8514	2.5347	2.1783	0.8594	2.3761	2.1002	0.8839
5	2.1179	1.4027	0.6623	2.2904	1.4219	0.6208	2.2675	1.4295	0.6305	2.7744	1.8389	0.6628	2.7110	1.8217	0.6719	2.3770	1.8163	0.7641
6	2.4593	1.7416	0.7082	2.6017	1.7175	0.6601	2.7828	1.5083	0.5420	3.0589	2.6158	0.8551	2.9564	2.4969	0.8446	2.6262	2.2662	0.8629
7	2.4926	1.4807	0.5940	2.4992	1.5575	0.6232	2.5800	1.4724	0.5707	2.6727	2.4403	0.9130	2.4651	2.2593	0.9165	2.3363	2.1703	0.9289
8	2.4528	1.7679	0.7208	2.0526	1.4313	0.6973	3.2597	1.3167	0.4039	2.6052	2.3360	0.8967	2.5688	2.3211	0.9036	2.4324	2.2242	0.9144
9	2.6843	1.6111	0.6002	2.6769	1.6742	0.6254	2.8038	1.3723	0.4894	2.7739	2.5267	0.9109	2.8795	2.6314	0.9139	2.8852	2.6885	0.9318
10	2.0084	1.5955	0.7944	2.1561	1.6634	0.7715	2.4196	1.6584	0.6854	2.5242	2.2135	0.8769	2.3810	2.1085	0.8856	2.2705	2.0703	0.9118
11	2.1637	1.7755	0.8206	2.1921	1.8900	0.8622	2.0004	1.8186	0.9091	2.1747	1.6963	0.7800	2.0685	1.5993	0.7732	1.8905	1.5989	0.8458
12	2.2608	1.8389	0.8134	2.5611	2.0448	0.7984	2.4230	1.7045	0.7035	2.4494	2.2488	0.9181	2.3873	2.1820	0.9140	2.1969	2.0395	0.9284
13	1.4845	1.3582	0.9149	1.8147	1.4825	0.8170	1.7020	1.4021	0.8238	1.9856	1.7872	0.9001	1.7583	1.6163	0.9192	1.6610	1.5700	0.9452
14	1.5106	1.4164	0.9376	1.6217	1.4543	0.8968	1.7801	1.5571	0.8747	1.8950	1.7617	0.9297	1.6273	1.5270	0.9384	1.6381	1.5563	0.9501
Average	2.0622	1.5973	0.7746	2.1986	1.6689	0.7591	2.3037	1.5571	0.6759	2.4484	2.1210	0.8663	2.3709	2.0555	0.8670	2.2184	1.9909	0.8975

Notes: 1. Column (1) shows backward linkage effect including import input.  
2. Column (2) shows backward linkage effect of domestically produced goods only, excluding import input.

Sources: Calculated from *International Input-Output Table for ASEAN Countries 1975, IDE, 1982, Asian International Input-Output Table 1985, IDE, 1992, and Asian International Input-Output Table 1990, IDE, 1998.*