Chapter 2

Economic Development of ASEAN Countries and Their Economic Interdependency with Asia-Pacific Region

Paper 1

The Changes in the Industrial Structure of the ASEAN Countries and Their Economic Interdependence with the Asia-Pacific Region

Chiharu Tamamura

1. Introduction

The ASEAN nations entered the stage of export-led development in the 1970s through a period of production of substitutes for imported goods, thus expanding exports of industrial products and thereby attain higher economic growth. In other words, the production of industrial products is now being shifted from the stage where they were produced to meet domestic demands to the stage where they are now directed to international markets.

On the other hand, the individual countries in ASEAN whose production activities were at first based on light industry (or labor intensive industry), are now shifting gradually to heavy industry (or capital intensive/technologically more sophisticated industry).

In economic circumstances like this, the relationship of the individual member countries in ASEAN with countries inside and outside the ASEAN territory is now changing extensively. Accelerated by diversified areas for the procurement of intermediate goods and the advancement of the international division of labor for production, interdependence among industries can no longer be confined to one country. Accordingly it is now necessary to discuss this problem from the international point of view.

In this paper, based on the Multilateral International Input-Output Tables for 1975 and 1985 which were compiled by IDE, we will investigate and analyze the expected changes in the industrial structure of the ASEAN countries, with much emphasis on industrial products, from the viewpoint of their interdependence with neighboring countries in the Asia and Pacific regions.

2. The Economic Growth and the Changes in Industrial Structure of the Five ASEAN Countries

Table 1.1 shows the courses of the economic growth of the five ASEAN countries (except Brunei), depicted based on the Input-Output tables for 1975 and 1985. Looking at the average of annual growth rates of GDP in terms of Gross Value Added measured at current prices, all of the ASEAN countries registered high growth rates of about 10%, with the exception of the Philippines, whose growth rate was 6.7%. At the same time, the growth rates of their exports and imports also were expanded and either equal to or more than the GDP growth rates.

In the manufacturing industry sector alone, it showed a high growth rate comparatively similar with the entire economy's growth rate. One significant finding is that the growth of exports was more distinctive than that of imports.

Also, looking at the changes in the value added ratios in the manufacturing industry sector, it can be observed that increases were registered for Indonesia, the Philippines, and Thailand, while value added ratios for Malaysia and Singapore decreased.

As for Malaysia, the decrease may not be reflective of actual situation because the two base year tables were not comparable since the table for 1975 covered only the Peninsular area of Malaysia. For Singapore, even though it showed a decrease, the ratio is still high with more than 30%, so this change does not mean the drop of manufacturing production. Rather it was caused by changes in the overall industrial structure.

Table 1.2 shows the comparison between the industrial structures of the individual ASEAN countries in 1975 and 1985. It is apparent to note that each country exhibited considerable decrease in value added shares for the primary industries related to agriculture and forestry and fisheries, and their industrial structures were shifted to the manufacturing sector and construction-related sector. The service sector in Indonesia, Singapore, and Thailand, increased its proportion in the industrial structure.

As stated before, within the manufacturing sector, in all countries there had been a shift too from light to heavy industry as can be read from Table 1.2. Singapore and Malaysia are leading the group followed by Thailand, the Philippines, and Indonesia. It thus shows that the five ASEAN countries are now pushing their industrialization drives to attain high economic growths.

3. Changes in the Structure of the Manufacturing Industry Sector

On the subsectral level, the value added shares of 12 manufacturing industries are shown in Table 2, calculated based on the Input-Output Tables for 1975 and 1985. Also, Figure 1 shows in a graph form the changes in the share of the value added. Industries whose bar graphs are shown upward increased their shares in 1985, while ones whose bar graphs are shown downward decreased their shares.

From Table 2 and Figure 1, it is very evident that the weight of the industrial structure of the manufacturing industry sector as indicated in the preceding section has shifted from light industry to heavy industry.

What can be said commonly about the five ASEAN countries is that the foods processing sector (including beverages and tobacco industries) declined in its share. This is particularly evident for Indonesia, whose figure dropped from 48.8% to 31.0%, and for

Table 1.1 Economic Scale of ASEAN Five Countries in 1975 and 1985

		Indonesia			Malaysia			Philippines			Singapore			Thailand		
		1975	1985	Growth Rate	1975	1985	Growth Rate	1975	1985	Growth Rate	1975	1985	Growth Rate	1975	1985	Growth Rate
(1)	Gross Output	51,877	149,916	11.20	14,656	61,238	15.37	29,475	56,369	6.70	13,715	46,825	13.07	30,553	73,920	9.24
(2)	Value Added (GDP)	32,770	87,841	10.36	8,125	30,096	13.99	15,803	30,214	6.70	5,114	17,188	12.89	17,063	36,453	7.89
(3)	Value Added (Manuf.)	4,775	14,452	11.71	2,269	7,183	12.21	3,064	7,152	8.85	1,883	5,310	10.92	3,771	10,499	10.78
(4)	Export	7,698	20,852	10.48	3,088	16,308	18.11	2,240	6,818	11.77	3,471	20,645	19.52	2,536	10,424	15.18
(5)	Export (Manuf.)	859	4,822	18.83	2,884	8,631	11.59	1,301	3,191	9.39	3,160	15,262	17.06	1,468	6,163	15.43
(6)	Import	5,049	13,244	10.12	2,754	13,004	16.79	3,921	5,275	3.01	5,967	19,794	12.74	3,372	26,641	22.96
(7)	Import (Manuf.)	4,052	8,398	7.56	1,590	9,253	19.26	2,086	2,530	1.95	3,869	16,808	15.82	2,344	7,111	11.74
(8)	(3)/(2) × 100%	14.57	16.45		27.93	23.87		19.39	23.67		36.82	30.89		22.10	28.80	
(9)	(5)/(4) × 100%	11.16	23.12		93.39	52.92		58.08	46.80		91.04	73.93		57.89	59.12	
(10)	(7)/(6) × 100%	80.25	63.41		57.73	71.16		53.20	47.96		64.84	84.91		69.51	26.69	

Note: Manuf. = Manufacturing Sector
Growth Rate = Annual Average of Growth
Unit = Million US Dollars
Malaysia in 1975 covers only Peninsular area

Data Source: International Input-Output Table for ASEAN countries, 1975 (SDS series No. 39, IDE)
Asian International Input-Output Table, 1985 (SDS series No. 65, IDE)

Table 1.2 Value Added Share of Each Industry Group in GDP

(%)

		Indonesia		Malaysia		Philippines		Singapore		Thailand	
		1975	1985	1975	1985	1975	1985	1975	1985	1975	1985
001 ~ 005	Agriculture, Fishery, Forestry	27.2	21.4	19.7	13.0	26.9	23.7	2.5	0.8	24.3	13.0
006 ~ 007	Mining, Quarrying	18.7	17.4	3.6	15.8	2.6	2.1	0.1	0.4	1.5	2.7
008 ~ 011	Light manufacturing	9.5	7.7	13.1	9.2	13.3	13.8	12.5	5.8	14.0	17.2
012 ~ 019	Heavy manufacturing	5.0	8.9	11.8	14.6	6.1	10.5	24.3	25.1	8.1	11.6
020 ~ 021	Utility & construction	6.0	6.8	2.9	7.0	4.2	7.1	6.8	13.2	5.3	5.5
022 ~ 024	Services	33.6	37.8	48.9	40.4	46.9	42.8	53.8	54.7	46.8	50.0

Note: In 1975 Malaysia covered only Peninsular area.
Code will be referred in Appendix 1.

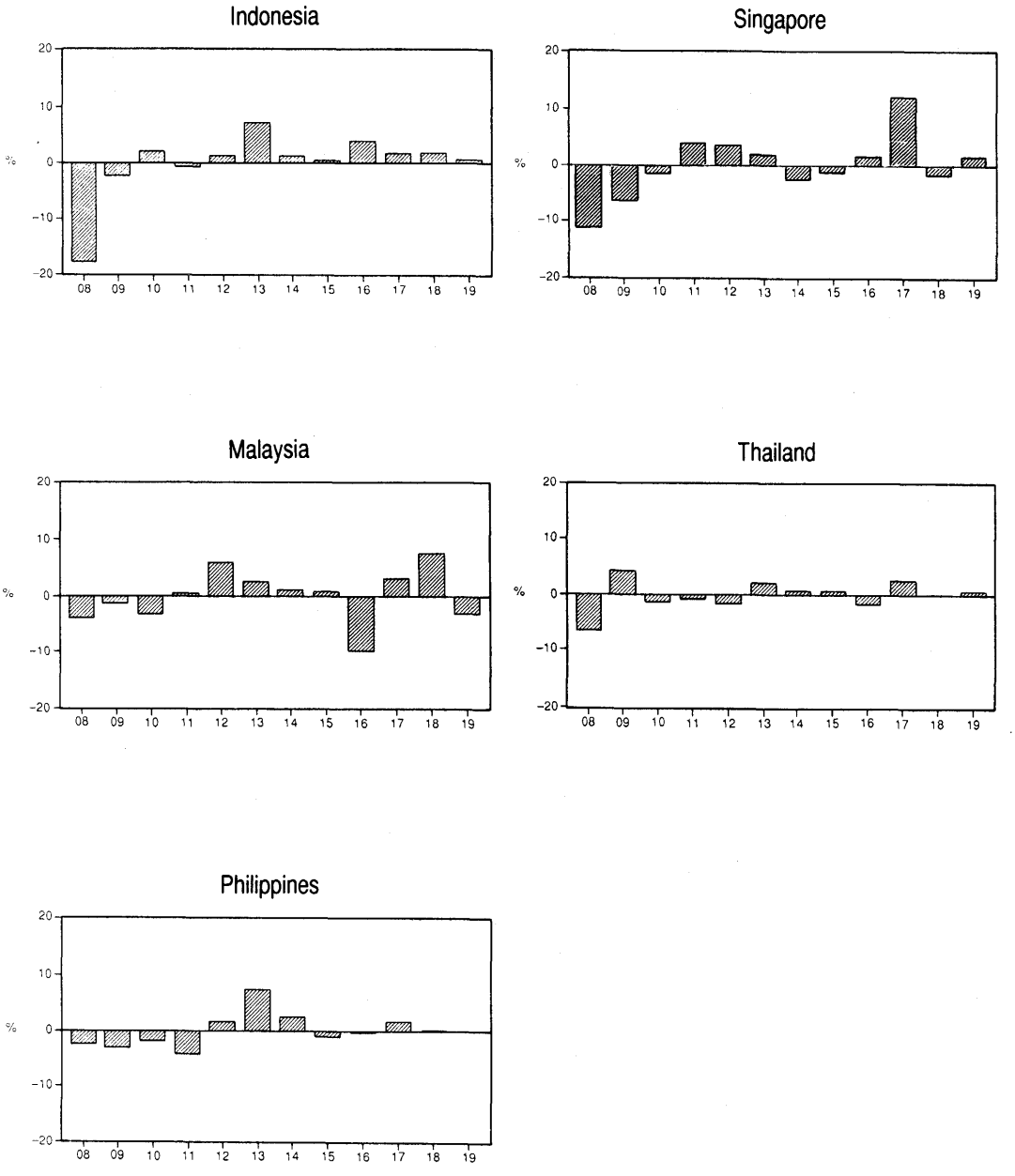
Data Source: Same as Table 1.

Table 2 Share of Value Added for Each Manufacturing Subsector in Manufacturing Industry Sector

		Indonesia		Malaysia		Philippines		Singapore		Thailand	
		1975	1985	1975	1985	1975	1985	1975	1985	1975	1985
008	Food, beverage & tobacco	48.76	31.02	31.04	26.95	47.39	44.74	16.88	5.76	40.17	33.82
009	Textile, leather	9.67	7.32	5.14	3.75	9.80	6.66	10.97	4.48	15.50	19.81
010	Timber & wooden products	4.16	6.28	8.25	4.93	4.63	2.66	3.78	2.23	4.47	3.19
011	Pulp paper & printing	2.81	2.10	2.57	3.07	6.92	2.58	2.43	6.20	3.15	2.46
012	Chemical products	4.18	5.51	3.08	9.05	5.82	7.70	3.61	7.44	4.73	3.13
013	Petroleum and petro products	4.37	11.70	3.61	6.15	4.52	11.86	12.39	14.28	5.38	7.47
014	Rubber products	2.53	3.73	12.93	14.04	1.32	3.95	2.85	0.39	2.97	3.73
015	Non metallic mineral	3.54	3.90	3.41	4.25	2.92	1.86	3.82	2.75	2.94	3.76
016	Metal products	3.46	7.34	14.49	4.68	6.67	6.29	5.87	7.43	5.77	4.15
017	Machinery	2.59	4.47	8.06	11.20	3.50	5.33	20.62	32.58	3.85	6.59
018	Transport equipment	12.80	14.76	1.94	9.56	4.72	4.76	12.54	10.82	5.56	5.67
019	Other manufacture	1.13	1.87	5.48	2.37	1.79	1.61	4.24	5.64	5.51	6.22

(Each columnwise total = 100.00%)

Figure 1



(Note)
These figures are drawn based on Table 2 as a share in 1985 minus one in 1975 for each corresponding sector.

Singapore from 16.9% to 5.8%. Also, when viewed more specifically, the four countries except Thailand, decreased in the weight of the manufacturing industry sector in the textile product industry, while in the wooden product industry, the four countries except Indonesia, decreased in their proportions.

On the other hand, industrial sectors whose shares increased on the whole, include chemical products, petrochemical products, rubber products, machinery, and transport equipment (automobile, etc.). In particular, in all of the five ASEAN countries, three industrial sectors, namely petrochemicals, machinery, and transport equipment, showed an increasing trend in shares of the value added. (As for Singapore, its share of transport equipment did not actually increase but due to the aggregation scheme as part of the machinery industry it appears that it had increased when viewed as the entire machinery industry.)

Such remarkable shifts in the industrial structure of these individual countries have drastically caused a change in the industrial relationship in the regions including these countries.

We will then examine the changes in import content ratios of inputs by country of origin for their production activities. Tables 3 shows the ratios pertinent to the textiles and chemicals industry which belong to the light manufacturing industry sector, and also to the machinery and transport equipment which belong to the heavy manufacturing industry sector.

In the textile product industry, the input ratios of domestic goods (local contents) of the four countries except Singapore increased while the import content ratio of inputs from Japan decreased considerably. On the other hand, each country increased the procurement ratio of intermediate goods from the member countries of ASEAN. It is worthy to note that their procurement ratios of intermediate goods from Korea also increased. As for the import content ratio of inputs from the United States and the rest of the world, there were no particular changes common among these countries. However, it is notable that Singapore showed a remarkable growth in its imported input ratio from the R.O.W., which is in contrast to decreasing or stable trends experienced by the remaining four countries.

In the chemical industry, it can be distinctly observed that the increasing procurement of intermediate goods was made within the ASEAN region, and that imports from Japan gradually diminished. The input ratio of domestic goods decreased by around 10% for both Indonesia, Malaysia, and Thailand, while it increased for Singapore by almost 6% and the Philippines by 8%.

The machinery industry is slightly different from the two sectors mentioned above. First of all, the import content ratio of input registered a fairly high figure in 1985, and the input ratio of domestic goods was at as low a level as 30% for the four countries, except for Thailand. (Although Indonesia has increased in the input ratio of domestic goods, it accounts for a mere 35.7%.) The procurement ratio of intermediate goods for each of five countries from within the ASEAN countries has increased considerably. And at the same time, the import component ratio of input from the United States has also increased, which is common to all the member countries. The import component ratio from Japan varies with each country. However, when looking at the ratios from advanced countries with Japan and the United States combined, it is at a fairly high level.

In the transport equipment sector, unlike the machinery sector, only Malaysia decreased in the input ratio of domestic goods, and it is characteristic that the country increased

Table 3 Import Component Ratio of Input in the Selected Industries in ASEAN Countries

Textile

		Local contents	Import Components				
			ASEAN 4	Korea	Japan	U.S.A.	R.O.W.
Indonesia	75	72.2	1.4	0.9	8.9	6.0	10.6
	85	75.6	1.5	1.6	3.0	7.3	11.0
Malaysia	75	61.0	2.8	0.2	10.8	5.5	19.7
	85	64.3	5.0	2.2	7.5	3.2	17.8
Philippines	75	67.3	0.2	0.2	10.4	8.2	13.7
	85	70.9	3.8	1.6	3.9	6.9	12.9
Singapore	75	64.3	3.6	0.8	4.5	4.0	22.8
	85	30.6	8.5	7.9	14.1	1.3	37.6
Thailand	75	81.6	0.3	0.6	6.1	1.5	9.9
	85	84.1	0.8	0.7	3.1	2.0	9.3

Note: R.O.W. = The Rest of the World Data Source: Same as Table 1

Machinery

		Local contents	Import Components				
			ASEAN 4	Korea	Japan	U.S.A.	R.O.W.
Indonesia	75	28.6	4.4	0.2	28.6	11.2	27.0
	85	35.7	4.5	1.8	19.1	16.4	22.5
Malaysia	75	55.9	5.6	0.1	13.7	8.2	16.5
	85	33.5	13.7	1.1	16.0	19.6	16.1
Philippines	75	84.2	0.3	0.1	5.9	4.3	5.2
	85	37.9	6.4	2.6	7.8	13.8	31.5
Singapore	75	51.8	2.8	0.3	11.1	14.6	19.4
	85	35.2	12.7	0.9	18.0	17.1	16.1
Thailand	75	61.3	1.0	0.2	18.7	1.5	17.3
	85	60.7	2.3	0.9	17.2	4.9	14.0

Chemical Products

		Local contents	Import Components				
			ASEAN 4	Korea	Japan	U.S.A.	R.O.W.
Indonesia	75	62.5	3.6	0.3	14.4	4.0	15.2
	85	50.2	4.9	0.6	8.6	6.1	29.6
Malaysia	75	68.6	2.9	0.0	7.3	4.7	16.5
	85	58.5	7.9	0.7	6.2	6.9	19.8
Philippines	75	66.2	0.8	0.1	8.4	7.1	17.4
	85	74.9	3.5	1.6	3.4	5.3	11.3
Singapore	75	50.3	3.8	0.9	10.2	6.6	28.2
	85	56.0	3.6	0.6	8.0	8.0	23.8
Thailand	75	69.4	0.6	0.5	12.6	3.1	13.8
	85	60.9	4.8	0.4	10.9	4.6	18.4

Transport Equipment

		Local contents	Import Components				
			ASEAN 4	Korea	Japan	U.S.A.	R.O.W.
Indonesia	75	40.9	1.8	0.1	40.3	4.5	12.4
	85	67.1	1.4	0.6	18.8	4.8	7.3
Malaysia	75	59.7	1.5	0.0	17.3	3.8	17.7
	85	36.3	2.3	0.2	44.9	1.6	14.7
Philippines	75	66.8	0.1	0.1	15.2	8.5	9.3
	85	89.1	0.7	0.6	2.7	1.7	5.2
Singapore	75	39.8	1.2	0.2	31.6	8.9	18.3
	85	85.0	0.8	0.2	4.7	3.0	6.3
Thailand	75	62.5	1.6	0.1	24.2	1.0	10.6
	85	66.3	1.5	0.8	17.7	2.2	11.5

Table 4 Imported Component Ratio of Input in the Entire Manufacturing Sector

		Local contents	Import Components				
			ASEAN 4	Korea	Japan	U.S.A.	R.O.W.
Indonesia	75	80.6	0.9	0.1	6.8	1.6	10.0
	85	80.7	1.1	0.4	3.7	2.5	11.6
Malaysia	75	74.3	2.4	0.3	4.1	1.9	17.0
	85	64.6	5.4	0.5	7.0	3.9	18.6
Philippines	75	73.6	0.8	0.1	4.2	3.2	18.1
	85	75.1	2.5	0.6	1.5	4.1	16.2
Singapore	75	38.4	11.4	0.3	7.0	4.7	38.2
	85	28.8	15.3	0.8	6.7	6.3	42.1
Thailand	75	77.5	0.3	0.2	5.4	1.0	15.6
	85	74.7	2.7	0.4	4.1	1.6	16.5

Note: R.O.W. = The Rest of the World
Data Source: Same as Table 1

considerably in the import content ratio of input from Japan, showing changes quite contrary to the remaining countries.

The machinery industry in the ASEAN region has increased considerably in the import content ratio of input from regions outside of the ASEAN, indicating that the ASEAN countries have tried to improve or are now improving the quality of products to strengthen their competitive power in international markets by getting direct investment in each of the countries from overseas countries. This is not so in the case of the transport equipment industry. Its reliance on imported inputs from non-ASEAN countries have even gone down except Malaysia.

Table 4 shows a summary of the entire manufacturing industry sector. When compared with the level in 1975, the following can be recognized as characteristics: the import content ratio of input from within the ASEAN territory has increased; the four member countries, except for Malaysia, decreased in the import component ratio of input from Japan, while imports from the United States, have increased; and the economic influence of Korea has grown still larger.

4. Changes in the International Division of Labor

As seen in the preceding section, diversification of areas for the procurement of intermediate input that are required by the individual ASEAN countries for their production activities implies changes in the international division of labor created not only in the ASEAN territory but also in the world economic sphere, including the East Asia region, Japan, and the United States. That is, when there occurs in a certain country a unit demand in the production process for a product made by a certain industry in another certain country, value added is generated and distributed to the industry of the supplying country. In short,

international division of labor is created when there is international trading. Table 5 quantifies the degree of the international division of labor with respect to the above mentioned four manufacturing industries. (Formula will be referred in APPENDIX 3.) As an illustration, let us take the textile-related industries of Indonesia. Value added is generated in each industry of each country, including the production of intermediate goods necessary for that production. In this case, for every US$10,000 generated, the shares of following eight countries are distributed, based on the figures of 1975, as follows:

Indonesia	=	US$8,078
Malaysia	=	US$ 8
Philippines	=	US$ 3
Singapore	=	US$ 76
Thailand	=	US$ 44
Korea	=	US$ 77
Japan	=	US$ 981
United States	=	US$ 733

The followings are the estimated changes in the structure of the international division of labor in the five ASEAN countries from 1975 to 1985.

In the textile industry, each country, except Singapore, increased its share of value added, and accordingly, the share of value added received by Japan decreased considerably. The amount of value added flowing to the remaining ASEAN countries other than any producing country also increased, with the exception of the production of the textile industry in Indonesia. Also, value added flow to Korea is clearly observed to be increasing. In other words, it can be stated that the international division of labor accompanied by the production of the textile industry in the ASEAN five countries is expanding to each of the ASEAN countries and Korea at the expense of Japan in particular.

In the machinery industry, on the other hand, there is no ASEAN country whose domestic share of value added increased remarkably. On the contrary in Malaysia, the Philippines, and Singapore, their shares have rather reduced considerably. In this industry, the relation with advanced countries (Japan and the United States) differs from that of the textile industry in that the degree of the international division of labor for advanced countries increased. The division of labor also expanded into the ASEAN nations and Korea showed considerable increases in its degree of the international division of labor.

However, the situation of the transport equipment industry is not necessarily similar to that of the machinery industry. Each of the member countries has increased on the whole in its degree of the international division of labor. The increase thus effected the degree of the international division of labor in Japan and the United States, particularly Japan, which has reduced very much. (The only exception is the transport equipment industry in Malaysia.) Although the expansion of the international division of labor into the member countries of ASEAN is also recognized here in this sector, Korea's participation in the international division of labor in this sector is more conspicuous.

On the other side of the fence, we will next survey the expansion of the international division of labor into the member countries of ASEAN from the advanced countries. It is conceivable that the industries of Japan are expanding their system of the division of labor in the whole ASEAN territory, but the degree of the division of labor is decreasing in the

Table 5 Degree of International Division of Labour for Selected Industries

Indonesia

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	8,078	8	3	76	44	77	981	733	10,000
	85	8,535	35	4	69	13	112	366	866	10,000
Chemical Product	75	8,464	14	7	120	20	19	1,000	356	10,000
	85	8,242	64	60	178	17	43	751	645	10,000
Machinery	75	6,598	17	11	191	9	14	2,190	970	10,000
	85	6,591	31	9	184	9	107	1,634	1,435	10,000
Transportation Equipment	75	6,907	11	6	62	5	10	2,627	372	10,000
	85	8,271	13	3	55	7	38	1,219	392	10,000

Malaysia

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	31	7,800	4	179	32	96	1,170	688	10,000
	85	100	8,027	9	163	174	178	885	464	10,000
Chemical Product	75	40	8,545	3	127	93	11	681	500	10,000
	85	108	8,195	16	295	54	50	601	681	10,000
Machinery	75	43	7,790	6	240	23	12	1,133	753	10,000
	85	50	5,928	220	397	57	79	1,500	1,769	10,000
Transportation Equipment	75	34	7,792	6	89	10	10	1,608	451	10,000
	85	30	6,447	5	132	18	17	3,152	199	10,000

Table 5 Degree of International Division of Labour for Selected Industries (Continued)

Philippines

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	37	4	7,856	6	17	24	1,078	978	10,000
	85	97	146	8,501	32	25	115	369	715	10,000
Chemical Product	75	94	3	8,505	10	4	9	701	674	10,000
	85	82	132	8,858	28	21	88	265	526	10,000
Machinery	75	42	22	8,688	4	1	6	742	495	10,000
	85	111	184	7,355	71	32	154	804	1,289	10,000
Transportation Equipment	75	27	5	7,642	4	2	9	1,466	845	10,000
	85	27	45	9,552	8	8	29	144	187	10,000

Singapore

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	341	229	10	8,274	52	59	543	492	10,000
	85	171	369	8	6,969	179	559	1,442	303	10,000
Chemical Product	75	282	504	12	6,460	67	84	1,486	1,105	10,000
	85	148	275	10	7,553	56	60	906	992	10,000
Machinery	75	107	200	7	6,857	41	27	1,216	1,545	10,000
	85	159	396	74	5,843	112	72	1,706	1,638	10,000
Transportation Equipment	75	123	101	12	7,117	19	14	1,910	704	10,000
	85	44	59	4	9,249	10	16	365	253	10,000

Table 5 Degree of International Division of Labour for Selected Industries (Continued)

Thailand

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	13	12	4	7	9,011	53	690	210	10,000
	85	19	81	4	43	9,138	60	374	281	10,000
Chemical Product	75	19	14	11	13	8,683	28	947	285	10,000
	85	32	99	10	101	8,518	28	793	419	10,000
Machinery	75	19	22	10	39	8,112	15	1,592	191	10,000
	85	24	93	19	63	8,276	45	1,105	375	10,000
Transportation Equipment	75	19	15	8	81	7,576	12	2,134	155	10,000
	85	43	120	10	52	7,828	59	1,595	293	10,000

Malaysia

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	45	8	7	4	50	83	9,545	258	10,000
	85	71	25	7	4	8	67	9,538	280	10,000
Chemical Product	75	138	12	12	9	8	15	9,480	326	10,000
	85	180	54	11	18	6	27	9,440	264	10,000
Machinery	75	53	8	11	3	4	16	9,719	186	10,000
	85	59	22	6	5	5	18	9,697	188	10,000
Transportation Equipment	75	52	6	10	2	5	11	9,746	168	10,000
	85	60	22	7	4	10	12	9,697	188	10,000

Table 5 Degree of International Division of Labour for Selected Industries (Continued)

U.S.A.

		Indonesia	Malaysia	Philippines	Singapore	Thailand	Korea	Japan	U.S.A.	Total
Textile	75	12	2	4	2	3	31	78	9,868	10,000
	85	16	6	6	4	9	46	103	9,810	10,000
Chemical Product	75	18	2	2	1	1	2	46	9,928	10,000
	85	23	4	4	2	2	4	51	9,910	10,000
Machinery	75	10	7	1	4	1	6	123	9,848	10,000
	85	7	13	8	12	4	23	200	9,733	10,000
Transportation Equipment	75	13	8	2	3	2	7	162	9,803	10,000
	85	10	6	3	6	2	15	222	9,736	10,000

Philippines. On the contrary, the Philippines is increasing the degree of the division of labor of the industries of the United States.

The member countries of ASEAN have gradually expanded their international division of labor into the industries of advanced countries. As of the year 1985, however, their incorporation into the division of labor of Japan is by far larger than that of the United States.

Generally speaking from the table, Singapore plays a major role in the division of labor in the five ASEAN countries, into which Korea has made inroads on a large scale. In particular, Korea is expanding quite aggressively its division of labor into the machinery industry of ASEAN. It should also be noted that the role of the Philippines is relatively small among the remaining ASEAN countries.

5. Changes in Economic Interdependence between the ASEAN Region and the Asia-Pacific Region

We have so far examined the changes in the industrial structure of each of the ASEAN member countries and the expansion of the division of labor into regions other than the ASEAN territory. In this section, with the ASEAN five countries looked upon as one nation (as one bloc), we will review changes in economic interdependence in production with countries other than those within the ASEAN territory, such as Korea, Japan, the United States, and "the rest of the world," based on the Input-Output Tables of 1975 and 1985.

Table 6 shows in percentages how the industries in ASEAN, which is united into one country, are induced by the final demand at home and abroad. Table 7 shows, also in percentages, to what degree value added is generated.

Looking at the entire economy from Table 6, the induced amount of production of the ASEAN industries (in nominal terms) increased about 2.8 times, from $140.3 billion in 1975 to $388.2 billion. Production induced by the final demand in ASEAN itself decreased to 74.6% from 80.4%. As a consequence, the production inducement from the outside countries increased from 19.4% in 1975 to 25.4% in 1985. Although Korea, Japan, and the United States made some contribution to the inducement of industrial production in ASEAN, it was the production inducement from "the rest of the world" that increased remarkably, from 8.7% to 14.7%. (Hong Kong plus "the rest of the world" for 1985.)

Seen from the viewpoint of the types of industrial sectors, it is also conspicuous that the ratio of production induced by the final demand of ASEAN itself has been diminished relatively. The industrial sectors in ASEAN that increased in the ratio of production induced by the final demand of ASEAN were only agricultural, and forestry and fishery industries; mining industry, including crude oil and natural gas; rubber processing industry; and non-metallic mineral industry. Since the eastern part of Malaysia was not included in the Input-Output Table of 1975, it is considered that the ratio of production increased in the crude oil and natural gas sectors. As for the rubber processing sector and the non-metallic mineral sector, the increase means that domestic production of these industries in ASEAN increased considerably to meet the demand of ASEAN. As an evidence, the ratio of the production inducement by the United States and "the rest of the world" into these two sectors of ASEAN has decreased considerably.

On the contrary, the ratio of production, especially in the manufacturing industry, induced by ASEAN itself has reduced, while that induced by countries other than ASEAN

Table 6 Impact of Final Demand on Output of ASEAN (Ratio)

(%)

Sector code		ASEAN	Korea	Japan	U.S.A.	H.K.	R.O.W.	S.D.	Production *
001 ~ 005	75	83.3	0.5	5.2	1.7		7.6	1.7	21,617
	85	83.3	0.7	4.0	3.4	0.6	9.0	-1.0	45,305
006 ~ 007	75	20.4	0.3	30.9	25.8		22.1	0.5	7,633
	85	25.5	3.0	36.7	14.6	1.1	15.5	3.6	26,618
008 ~ 011	75	85.0	0.2	2.8	2.6		7.9	1.5	30,667
	85	79.8	0.3	1.6	6.0	0.9	12.0	-0.6	69,092
012	75	78.4	0.2	3.6	2.1		11.4	4.3	2,157
	85	68.5	0.6	4.0	4.4	1.6	25.2	-4.3	8,171
013	75	56.1	0.2	10.9	4.4		26.0	2.4	5,281
	85	55.7	0.5	8.9	5.8	3.5	23.4	2.2	22,855
014 ~ 015	75	49.5	0.1	4.6	13.7		27.6	4.5	4,109
	85	66.4	0.1	4.9	2.7	0.6	23.0	2.3	9,219
016	75	60.5	0.3	5.0	11.8		20.0	2.4	3,353
	85	60.0	0.6	8.4	6.2	1.0	22.3	1.5	8,861
017	75	62.6	0.2	2.5	18.9		14.2	1.6	2,923
	85	38.0	0.6	2.6	38.9	2.3	21.7	-4.1	13,183
018	75	90.6	0.1	1.1	0.8		4.9	2.5	3,780
	85	87.5	0.4	1.9	3.4	0.3	8.2	-1.7	10,265
019	75	67.9	0.1	2.0	11.2		15.6	3.2	1,317
	85	59.5	0.3	2.6	13.4	5.2	21.3	-2.3	3,749
020 ~ 021	75	97.0	0.1	0.5	0.5		1.2	0.7	11,554
	85	95.0	0.1	0.6	0.8	0.2	3.3	0.0	40,633
022 ~ 023	75	88.4	0.3	1.8	1.5		5.2	2.8	41,385
	85	79.1	0.2	1.8	2.6	0.4	16.7	-0.8	119,187
Total	75	80.4	0.3	4.5	4.1		8.7	2.0	140,276
	85	74.6	0.5	5.0	5.5	0.9	13.8	-0.3	388,268

Note: * Unit of Production = Million U.S. Dollars
Name of Sector will be referred at Appendix 1
S.D. = Statistical Discrepancy
H.K. = Hong Kong
In 1975, R.O.W. included H.K.
Calculation Formula will be referred in (2) in Reference list

Data Source: Same as Table 1

Table 7 Contribution Ratios of Final Demand to Gross Value Added of ASEAN

(%)

Sector code		ASEAN	Korea	Japan	U.S.A.	H.K.	R.O.W.	S.D.	V.A.*
001 ~ 005	75	83.2	0.5	5.3	1.7		7.7	1.6	18,026
	85	82.8	0.7	4.2	3.5	0.6	9.3	−1.1	34,694
006 ~ 007	75	19.1	0.3	31.5	26.6		22.2	0.3	7,107
	85	23.8	3.1	37.7	15.0	1.1	15.5	3.8	21,740
008 ~ 011	75	82.0	0.2	2.7	2.6		9.5	3.0	9,308
	85	78.9	0.3	1.7	6.3	0.9	12.5	−0.6	20,949
012	75	78.5	0.2	3.6	2.1		11.4	4.2	694
	85	68.5	0.6	4.0	4.4	1.6	23.6	−2.7	2,735
013	75	56.1	0.2	10.9	4.4		26.0	2.4	864
	85	55.8	0.5	8.9	5.8	3.5	23.5	2.0	4,494
014 ~ 015	75	48.7	0.2	4.7	13.9		28.1	4.4	1,775
	85	66.2	0.1	4.9	2.7	0.6	23.1	2.4	3,616
016	75	60.5	0.3	5.0	11.8		20.0	2.4	1,026
	85	60.0	0.6	8.4	6.2	1.0	22.3	1.5	2,688
017	75	62.6	0.2	2.5	18.9		14.2	1.6	947
	85	38.0	0.6	2.6	38.9	2.3	21.8	−4.2	4,264
018	75	90.6	0.1	1.1	0.8		4.9	2.5	1,245
	85	87.5	0.5	1.9	3.4	0.3	8.2	−1.8	4,339
019	75	67.9	0.1	2.0	11.2		15.6	3.2	521
	85	59.6	0.3	2.6	13.4	5.2	21.3	−2.4	1,512
020 ~ 021	75	96.7	0.0	0.5	0.5		1.3	1.0	4,094
	85	94.8	0.1	0.7	0.9	0.2	3.4	−0.1	14,020
022 ~ 023	75	88.2	0.3	1.8	1.5		5.2	3.0	28,834
	85	79.2	0.2	1.8	2.6	0.4	16.6	−0.8	75,611
Total	75	80.4	0.3	4.5	4.1		8.7	2.0	78,875
	85	74.6	0.5	5.0	5.5	0.9	13.8	−0.3	201,791

Note: * Unit of Production = Million U.S. Dollars
Name of Sector will be referred at Appendix 1
S.D. = Statistical Discrepancy
H.K. = Hong Kong
In 1975, R.O.W. included H.K.
Calculation Formula will be referred in (2) in Reference list

Data Source: Same as Table 1

has increased. Especially in the machinery industry sector, the ratio of the inducement by ASEAN itself has diminished considerably, to 38.0% from 62.6%, while it has nearly doubled, from 18.9% to 38.9%, by the United States, and from 14.2% to 24.0% by "the rest of the world" (Hong Kong plus "the rest of the world" for 1985). Korea also has increased considerably in the ratio of the production inducement for ASEAN, although its share is still relatively small.

The reasons for this can be considered that by 1985, the machinery industry in ASEAN had improved its quality of products and attained competitive power in international markets, while during around 1975, it was producing products to meet demands only in the ASEAN territory, and thus inducing more demands from international markets. At the backdrop of this, the foreign direct investment gradually increased in this region.

Even the transport equipments sector, which included the automobile industry, was induced much in production by the ASEAN itself (87.5% in 1985) comparatively higher than other sectors. Although the production inducement triggered by countries other than ASEAN also increased, its production activities, unlike the machinery industry sector, was confined to meet the demands of the ASEAN territory only because direct investments from advanced countries were not yet sufficiently provided at the time of 1985.

As for the inducement of value added as shown in Table 7, similar findings are observed as those of the production inducement.

One general observation is the fact that the ASEAN countries are steadily making inroads into the international markets. About 26% of their production has been triggered to meet the demand from countries other than those in the ASEAN territory. The demands collectively placed by Japan and the United States have reached 10.5%. Especially in many sectors in the manufacturing industry, this tendency is recognized.

6. Summary

We have so far investigated and analyzed the changes in the industrial structure of the member countries of ASEAN and their economic interdependence with countries in the Asia-Pacific regions from the viewpoint of the production in the manufacturing industry sector based on the Multilateral International Input-Output Tables for 1975 and 1985.

The industrial structure in these countries is now placing more weight on the manufacturing industry sector and the construction-related sector. Also, the manufacturing industry sector, although a major portion of which is occupied by light industries, is now surely shifting its weight to heavy industry.

As for the manufacturing industry sector, observed from the viewpoint of production, the input ratio of domestic goods (i.e. local content ratio) has increased in various industries, while the import content of inputs from Japan has correspondingly decreased. On the other hand, another fact that should not go unheeded is the increased import component ratio of input from the countries within the ASEAN territory. And also, Korea has steadily risen its position as a major supplier of intermediate goods in ASEAN. In these circumstances, very remarkable changes are observed in the input structure of imported goods in the machinery industry, where imports from advanced countries have increased considerably.

The degree of the international division of labor in production has expanded into the

member countries of ASEAN and Korea, with the role of Japan diminishing.

Singapore is playing a major role also in the expansion of the input of imports and the degree of the international division of labor into the ASEAN territory. On the other hand, however, the role of the Philippines in the ASEAN territory is relatively low.

Looking at their economic interdependencies with the Asia-Pacific regions, the manufacturing industry sector in the ASEAN bloc is shifting its course of production from what is intended to meet only the final demand triggered within the ASEAN territory to what is intended to meet the demand placed not only by the ASEAN but also by countries outside ASEAN.

As seen above, what can be stated is that the member countries of ASEAN are shifting their industrial structures from the production of substitutes of imported goods to export-oriented production, thus expanding their exports to attain higher economic growth. But it is also true that they relied heavily on the absorbing power of the developed countries. This means that the future development of ASEAN will be controlled by the absorbing capacity of the developed countries.

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Appendix 1 Sector Classification (24 sectors)

001 Paddy
002 Other agricultural products
003 Livestock
004 Forestry
005 Fishery
006 Crude petroleum and natural gas
007 Other mining
008 Food, beverage and tobacco
009 Textile, leather, and the products theirof
010 Timber and wooden products
011 Pulp, paper and printing
012 Chemical products
013 Petroleum and petrol products
014 Rubber products
015 Non-metallic mineral products
016 Metal products
017 Machinery
018 Transport equipment
019 Other manufacturing products
020 Electricity, gas, and water supply
021 Construction
022 Trade and transport
023 Services
024 Public administration

Appendix 2 Layout of Asian International Input-Output Table, 1985

			Intermediate Demand (A)										Final Demand (F)										(LH)	(LW)	(QX)	(XX)
			(I) Indonesia	(M) Malaysia	(P) Philippines	(S) Singapore	(T) Thailand	(C) China	(N) Taiwan	(K) Korea	(J) Japan	(U) U.S.A.	(I) Indonesia	(M) Malaysia	(P) Philippines	(S) Singapore	(T) Thailand	(C) China	(N) Taiwan	(K) Korea	(J) Japan	(U) U.S.A.	Export to Hong Kong	Export to R.O.W.	Statistical Discrepancy	Total Outputs
Intermediate Inputs (A)	Indonesia	(I)	A^{II}	A^{IM}	A^{IP}	A^{IS}	A^{IT}	A^{IC}	A^{IN}	A^{IK}	A^{IJ}	A^{IU}	F^{II}	F^{IM}	F^{IP}	F^{IS}	F^{IT}	F^{IC}	F^{IN}	F^{IK}	F^{IJ}	F^{IU}	LH^{I}	LW^{I}	Q^{I}	X^{I}
	Malaysia	(M)	A^{MI}	A^{MM}	A^{MP}	A^{MS}	A^{MT}	A^{MC}	A^{MN}	A^{MK}	A^{MJ}	A^{MU}	F^{MI}	F^{MM}	F^{MP}	F^{MS}	F^{MT}	F^{MC}	F^{MN}	F^{MK}	F^{MJ}	F^{MU}	LH^{M}	LW^{M}	Q^{M}	X^{M}
	Philippines	(P)	A^{PI}	A^{PM}	A^{PP}	A^{PS}	A^{PT}	A^{PC}	A^{PN}	A^{PK}	A^{PJ}	A^{PU}	F^{PI}	F^{PM}	F^{PP}	F^{PS}	F^{PT}	F^{PC}	F^{PN}	F^{PK}	F^{PJ}	F^{PU}	LH^{P}	LW^{P}	Q^{P}	X^{P}
	Singapore	(S)	A^{SI}	A^{SM}	A^{SP}	A^{SS}	A^{ST}	A^{SC}	A^{SN}	A^{SK}	A^{SJ}	A^{SU}	F^{SI}	F^{SM}	F^{SP}	F^{SS}	F^{ST}	F^{SC}	F^{SN}	F^{SK}	F^{SJ}	F^{SU}	LH^{S}	LW^{S}	Q^{S}	X^{S}
	Thailand	(T)	A^{TI}	A^{TM}	A^{TP}	A^{TS}	A^{TT}	A^{TC}	A^{TN}	A^{TK}	A^{TJ}	A^{TU}	F^{TI}	F^{TM}	F^{TP}	F^{TS}	F^{TT}	F^{TC}	F^{TN}	F^{TK}	F^{TJ}	F^{TU}	LH^{T}	LW^{T}	Q^{T}	X^{T}
	China	(C)	A^{CI}	A^{CM}	A^{CP}	A^{CS}	A^{CT}	A^{CC}	A^{CN}	A^{CK}	A^{CJ}	A^{CU}	F^{CI}	F^{CM}	F^{CP}	F^{CS}	F^{CT}	F^{CC}	F^{CN}	F^{CK}	F^{CJ}	F^{CU}	LH^{C}	LW^{C}	Q^{C}	X^{C}
	Taiwan	(N)	A^{NI}	A^{NM}	A^{NP}	A^{NS}	A^{NT}	A^{NC}	A^{NN}	A^{NK}	A^{NJ}	A^{NU}	F^{NI}	F^{NM}	F^{NP}	F^{NS}	F^{NT}	F^{NC}	F^{NN}	F^{NK}	F^{NJ}	F^{NU}	LH^{N}	LW^{N}	Q^{N}	X^{N}
	Korea	(K)	A^{KI}	A^{KM}	A^{KP}	A^{KS}	A^{KT}	A^{KC}	A^{KN}	A^{KK}	A^{KJ}	A^{KU}	F^{KI}	F^{KM}	F^{KP}	F^{KS}	F^{KT}	F^{KC}	F^{KN}	F^{KK}	F^{KJ}	F^{KU}	LH^{K}	LW^{K}	Q^{K}	X^{K}
	Japan	(J)	A^{JI}	A^{JM}	A^{JP}	A^{JS}	A^{JT}	A^{JC}	A^{JN}	A^{JK}	A^{JJ}	A^{JU}	F^{JI}	F^{JM}	F^{JP}	F^{JS}	F^{JT}	F^{JC}	F^{JN}	F^{JK}	F^{JJ}	F^{JU}	LH^{J}	LW^{J}	Q^{J}	X^{J}
	U.S.A.	(U)	A^{UI}	A^{UM}	A^{UP}	A^{US}	A^{UT}	A^{UC}	A^{UN}	A^{UK}	A^{UJ}	A^{UU}	F^{UI}	F^{UM}	F^{UP}	F^{US}	F^{UT}	F^{UC}	F^{UN}	F^{UK}	F^{UJ}	F^{UU}	LH^{U}	LW^{U}	Q^{U}	X^{U}
Freight and Insurance		(BF)	BA^{I}	BA^{M}	BA^{P}	BA^{S}	BA^{T}	BA^{C}	BA^{N}	BA^{J}	BA^{J}	BA^{U}	BF^{I}	BF^{M}	BF^{P}	BF^{S}	BF^{T}	BF^{C}	BF^{N}	BF^{J}	BF^{J}	BF^{U}				
Import from Hong Kong		(CH)	HA^{I}	HA^{M}	HA^{P}	HA^{S}	HA^{T}	HA^{C}	HA^{N}	HA^{J}	HA^{J}	HA^{U}	HF^{I}	HF^{M}	HF^{P}	HF^{S}	HF^{T}	HF^{C}	HF^{N}	HF^{J}	HF^{J}	HF^{U}				
Import from R.O.W.		(CW)	WA^{I}	WA^{M}	WA^{P}	WA^{S}	WA^{T}	WA^{C}	WA^{N}	WA^{J}	WA^{J}	WA^{U}	WF^{I}	WF^{M}	WF^{P}	WF^{S}	WF^{T}	WF^{C}	WF^{N}	WF^{J}	WF^{J}	WF^{U}				
Import Duty and Sales Tax		(DT)	DA^{I}	DA^{M}	DA^{P}	DA^{S}	DA^{T}	DA^{C}	DA^{N}	DA^{J}	DA^{J}	DA^{U}	DF^{I}	DF^{M}	DF^{P}	DF^{S}	DF^{T}	DF^{C}	DF^{N}	DF^{J}	DF^{J}	DF^{U}				
Value Added		(VV)	V^{I}	V^{M}	V^{P}	V^{S}	V^{T}	V^{C}	V^{N}	V^{J}	V^{J}	V^{U}														
Total Inputs		(XX)	X^{I}	X^{M}	X^{P}	X^{S}	X^{T}	X^{C}	X^{N}	X^{J}	X^{J}	X^{U}														

Appendix 3 Technical Notes on Table 5

Taking up the part of Intermediate transaction from Appendix 2, set

$$X = (x_{ij}^{\alpha\beta}) = \begin{pmatrix} A^{II} & A^{IM} & A^{IP} & A^{IS} & A^{IT} & A^{IC} & A^{IN} & A^{IK} & A^{IJ} & A^{IU} \\ A^{MI} & A^{MM} & A^{MP} & A^{MS} & A^{MT} & A^{MC} & A^{MN} & A^{MK} & A^{MJ} & A^{MU} \\ A^{PI} & A^{PM} & A^{PP} & A^{PS} & A^{PT} & A^{PC} & A^{PN} & A^{PK} & A^{PJ} & A^{PU} \\ A^{SI} & A^{SM} & A^{SP} & A^{SS} & A^{ST} & A^{SC} & A^{SN} & A^{SK} & A^{SJ} & A^{SU} \\ A^{TI} & A^{TM} & A^{TP} & A^{TS} & A^{TT} & A^{TC} & A^{TN} & A^{TK} & A^{TJ} & A^{TU} \\ A^{CI} & A^{CM} & A^{CP} & A^{CS} & A^{CT} & A^{CC} & A^{CN} & A^{CK} & A^{CJ} & A^{CU} \\ A^{NI} & A^{NM} & A^{NP} & A^{NS} & A^{NT} & A^{NC} & A^{NN} & A^{NK} & A^{NJ} & A^{NU} \\ A^{KI} & A^{KM} & A^{KP} & A^{KS} & A^{KT} & A^{KC} & A^{KN} & A^{KK} & A^{KJ} & A^{KU} \\ A^{JI} & A^{JM} & A^{JP} & A^{JS} & A^{JT} & A^{JC} & A^{JN} & A^{JK} & A^{JJ} & A^{JU} \\ A^{UI} & A^{UM} & A^{UP} & A^{US} & A^{UT} & A^{UC} & A^{UN} & A^{UK} & A^{UJ} & A^{UU} \end{pmatrix}$$

Here α denotes a supplying country (α moves over 10 countries)
β denotes a demanding country (β moves over 10 countries)
i denotes the i-th industry of country α ($1 \leq i \leq n$)
j denotes the j-th industry of country β ($1 \leq j \leq n$)
n is the number of industries/sectors

Then X is the square matrix with the size of $10 \bullet n \times 10 \bullet n$

Let $\mathbf{x}' = (x_n^1, \ldots\ldots, x_n^1, \ldots\ldots, x_n^\beta, \ldots\ldots, x_n^\beta, \ldots\ldots, x_1^{10}, \ldots\ldots, x_n^{10})$

be the transposed vector of the gross output vector **x**, which appears the row vector at the bottom in Table 2.1

The "Input Coefficient Matrix" $A = (a_{ij}^{\alpha\beta})$ is defined as

$$a_{ij}^{\alpha\beta} = x_{ij}^{\alpha\beta} / x_j^{\beta} \qquad \ldots\ldots\ldots (1)$$

Then the "Inverse Matrix" B which is well known as "Leontief Inverse" is defined as

$$B = (b_{ij}^{\alpha\beta}) = (I - A)^{-1}$$

$$= \begin{pmatrix} B^{II} & B^{IM} & B^{IP} & B^{IS} & B^{IT} & B^{IC} & B^{IN} & B^{IK} & B^{IJ} & B^{IU} \\ B^{MI} & B^{MM} & B^{MP} & B^{MS} & B^{MT} & B^{MC} & B^{MN} & B^{MK} & B^{MJ} & B^{MU} \\ B^{PI} & B^{PM} & B^{PP} & B^{PS} & B^{PT} & B^{PC} & B^{PN} & B^{PK} & B^{PJ} & B^{PU} \\ B^{SI} & B^{SM} & B^{SP} & B^{SS} & B^{ST} & B^{SC} & B^{SN} & B^{SK} & B^{SJ} & B^{SU} \\ B^{TI} & B^{TM} & B^{TP} & B^{TS} & B^{TT} & B^{TC} & B^{TN} & B^{TK} & B^{TJ} & B^{TU} \\ B^{CI} & B^{CM} & B^{CP} & B^{CS} & B^{CT} & B^{CC} & B^{CN} & B^{CK} & B^{CJ} & B^{CU} \\ B^{NI} & B^{NM} & B^{NP} & B^{NS} & B^{NT} & B^{NC} & B^{NN} & B^{NK} & B^{NJ} & B^{NU} \\ B^{KI} & B^{KM} & B^{KP} & B^{KS} & B^{KT} & B^{KC} & B^{KN} & B^{KK} & B^{KJ} & B^{KU} \\ B^{JI} & B^{JM} & B^{JP} & B^{JS} & B^{JT} & B^{JC} & B^{JN} & B^{JK} & B^{JJ} & B^{JU} \\ B^{UI} & B^{UM} & B^{UP} & B^{US} & B^{UT} & B^{UC} & B^{UN} & B^{UK} & B^{UJ} & B^{UU} \end{pmatrix} \qquad \ldots\ldots\ldots (2)$$

Let **V** be the value added vector (total value added by sector) from the international input-output table, that is,

$$\mathbf{V}' = (V_1^1, V_2^1, \ldots\ldots, V_n^1, V_1^2, V_2^2, \ldots\ldots, V_n^2, \ldots\ldots, V_1^{10}, \ldots\ldots, V_n^{10})$$

where $\mathbf{V}'$ = the transposed vector of **V**

and

the superscript of the element denotes a country and the subscript denotes an industry.

Then the vector of value added ratio **v** is defined as

$$\mathbf{v}' = (v_1^1, v_2^1, \ldots\ldots, v_n^1, v_1^2, v_2^2, \ldots\ldots, v_n^2, \ldots\ldots, v_1^{10}, \ldots\ldots, v_n^{10})$$

and $v_i^\alpha = V_i^\alpha / x_i^\alpha$

where x_i^α = the gross output of the i-th industry in the country α.

Then when one unit of demand for commodity i in country α occurs, each industry in each country will be more or less affected directly and indirectly to produce some raw materials for producing this one unit of demand through trade.

Let V^x be the value added which will be borne in country α through the process mentioned just above.

Then $V^x = \sum_{K=1}^{n} V_{K\bullet}^X b_{Ki}^{X\alpha}$

Each figure in table 5 is the result after taking ratios among countries as

$$r^x = \frac{V^x}{\sum_X V^x} \times 10^4$$