The 1985 Japan-US-EC-Asia Input-Output Table: Its Compilation and Some Results of Analysis

By
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Abstract

In this paper we introduce the compilation methods of "the 1985 Japan-US-EC-Asia Input-Output Table", compiled by the Ministry of International Trade and Industry, and some analyses on international economic dependency based on the table. In the compilation, the following main items are introduced, (1) common sector classification, (2) adjustment of each country's input-output table, (3) estimation of the trade matrices, and (4) integration of each table into an international table and balancing adjustment. In the analysis, we examine the followings, (1) the dependency of a country on other country's domestic final demand, and (2) the effect of a $10 billion increase in the domestic final demand of each country.

1. Introduction

The 1985 Japan-US-EC-Asia international input-output table compiled by MITI (Ministry of International Trade and Industry), Japan, was published in May 1993, and we have also published the I-O account data in August 1993. This paper[1] presents the compilation method of "the 1985 Japan-US-EC-Asia Input-Output Table," compiled by MITI. The major compilation procedures for this table are as follows:

1. construction of the common sector classification,
2. adjustment of each country's input-output table,
3. estimation of the trade sectors, and
4. integration of each table into an international table and balancing adjustment.

In addition, this paper also presents some results of the analysis on international economic dependency based on the table.

2. The Compilation of the 1985 International I-O Table

2.1. Some features of the 1985 Japan-US-EC-Asia Input-Output Table

Figure 1 shows the format of the 1985 Japan-US-EC-Asia table. We can obtain much information from the table. In this section, firstly, the major features of the table are introduced as follows:

1. time of measurement: 1985,

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[1] Views expressed in this paper are those of the author and not those of MITI (Ministry of International Trade and Industry).

(Unit: $10 billion)

	(Intermediate Demand) JPN 1～24	U.S. 1～24	E C 1～24	ASIA 1～24	(domestic Final Demand) JPN C^PJ O	U.S. C^PJ O	E C C^PJ O	ASIA C^PJ O	(Export) EX^{ROW} Ex+Adj	OUTPUT CT
J P N 1 ～ 24	(← J→J 992	Japanese producer's price J→US 27	J→EC 6	J→A 21	J→J 1,260	J→US 41	J→EC 8	J→A 15	→ 81 0 0 0	) 2,451
U. S. 1 ～ 24	(← US→J 18	U.S.'s producer's price US→US 2,206	US→EC 15	US→A 15	US→J 6	US→US 3,883	US→EC 13	US→A 8	→ 0 190 0 0	) 6,354
E C 1 ～ 24	(← EC→J 4	EC's Producer's price EC→US 20	EC→EC 844	EC→A 8	EC→J 2	EC→US 22	EC→EC 1,345	EC→A 6	→ 0 0 297 0	) 2,548
A S A 1 ～ 24	(← A→J 24	Asia's producer's price A→US 20	A→EC 4	A→ A 507	A→J 4	A→US 24	A→EC 5	A→A 596	→ 0 0 0 71	) 1255
Ocean freight and insurance on imported goods from countries concerned 1	6	4	1	5	1	5	1	2		
R O W 1 ～ 24	(imported goods from J^{cif} 77	US^{cif} 123	EC^{cif} 181	R.O.W. A^{cif} 48	at CIF price & imported non-goods) J^{cif} 10	US^{cif} 116	EC^{cif} 92	A^{cif} 16		
Customs duty & import tax on imported goods 1	4	5	5	8	1	9	3	8		
Total of inputs 1	1,125	2,405	1,056	612	1,284	4,100	1,467	651		
Compensation of Employees 1	719	2,370	875	326						
Other value added ～ 2	(Operating Surplus, etc.) 607	1,579	617	317						
Total of Value Added 1	1,326	3,949	1,492	643						
Total Commodity Output 1	2,451	6,354	2,548	1,255						

<Abbreviation>
C^P: Private Consumption Expenditure
J : Net Increase in Inventory
O : Other Domestic Final Demand
Ex: Export to the Rest of the World (ROW)
Adj: Adjustment Item between export of exporting country and import of importing country in the table
ROW: The Rest of the World
CT : Control Totals (output)

< Note >

1: EC denotes the United Kingdom, France, Germany (excluding the former East Germany).
2: Asia denotes Indonesia, Malaysia, Singapore, the Philippines, Thailand, China, Taiwan, and Korea.
3: ▒ Shadow parts show domestic transaction matrix of domestically produced goods and services.
4: As to "Value added" and "Final demand", if an original I-O table showed the detailed items of them, they are shown as "Reference items" in the table. EC has non-deductible VAT in intersection between "Other value added" (Value added) and "Other domestic final demand" (Final demand).

Figure 1: The Format of the 1985 Japan-US-EC-Asia Input-Output Tables (24-sector)

2. area coverage: four countries/regions,

   (a) Japan,

   (b) the United States,

   (c) EC (integrating three EC countries: the United Kingdom, France, and Germany while excluding the former East Germany), and

   (d) Asia (integrating eight countries/regions: Indonesia, Malaysia, Singapore, the Philippines, Thailand, China, Taiwan, and Korea).

3. commodity (row)-by-commodity (column) table,

4. non-competitive import type,

5. evaluation at producer's price
   (excluding import matrix from the rest of the world: c.i.f. basis),

6. sector size: 38 × 38-sector per country/region,
   24 × 24-sector per country/region (aggregated sector classification),
   (i.e. the table is a square matrix with the size of
   "38 × 4" × "38 × 4" (=152 × 152) and "24 × 4" × "24 × 4" (=96 × 96)),

7. showing "imported services transaction" in "import matrix from the rest of the world (ROW)" with no country breakdown due to limitation of data,

8. showing "international freight charge and insurance cost" and "customs and import tax on imported goods" as row vectors, respectively, due to limitation of data,

9. adjusting diagonal cell putting into zero at the level of 38-sector
   (Control Totals (the output of commodity) are less than CT of the original I-O table.),

10. expressing in dollars by using the annual average exchange rate for 1985.

2.2. Major compilation procedures of the table

Major compilation procedures of the table are as follows:

1. construction of the common sector classification,

2. adjustment of each original country's input-output table,

3. estimation of the trade sectors and breaking down into destination country/region,

4. balancing adjustment of each modified country I-O table and integration of country tables into an international I-O table

The following sections provide more detailed explanation of the compilation procedures.

2.2.1. Construction of a common sector classification

Nowadays, many countries have their own input-output (I-O) tables. However, there are large differences among these I-O tables with regard to I-O sector classification and sector size, as I-O tables are usually compiled reflecting the industrial structure and viewpoints of the respective countries. In order to facilitate international comparison, it is necessary to have common I-O sector classification for an international input-output table.

Ultimately, the common I-O sector classification we prepare for the 1985 Japan-US-EC-Asia I-O table consists of 38-sector tables and 24-sector tables. As for the bilateral input-output tables, they are 165-sector, 47-sector, and 26-sector, respectively, for Japan-US, 93-sector, 43-sector, and 24-sector, respectively, for Japan-U.K., 86-sector, 43-sector, and 24-sector, respectively, for Japan-France, 55-sector, 43-sector, and 24-sector, respectively, for Japan-Germany (excluding the former East Germany). The followings are the compilation procedures.

The compilation of the common I-O sector classification begins by comparing and examining the most detailed I-O table of each country. The 1985 I-O tables of each country we used are 408 sectors for Japan, 544 sectors for the United States, 102 sectors for the United Kingdom, 98 sectors for France, and 58 sectors for Germany (excluding the former East Germany). The concepts and definitions of each sector, and the range of commodities included in each sector are checked. Basically, each common I-O sector is established by aggregating similar original I-O sectors of the countries concerned into a common I-O sector. As to unmatch original I-O sectors, they are put into a common I-O sector by the name of "Other X" sector at approximate level of each similar category such as "Other transportation equipment" sector, or "Other manufactured goods" sector.

As for the bilateral international I-O tables, it is possible to obtain common I-O sectors by recombining and adjusting the Japan's I-O table to adapt the I-O sector classification of its trading partners. Moreover, we checked the trade data between export data (f.o.b.) of the exporting country and import data (c.i.f.) of the importing country on the basis of each tentative common I-O sector. If there is a common I-O sector which has a large discrepancy on trade data due to the mismatch of the trade code versus the I-O code between Japan's I-O table and the partner's I-O table, we adjust this by referring to Japan's I-O data which are available at more disaggregated levels, thus enabling us to reclassify the I-O classification with unmatched trade code with other I-O classification in which matching trade code is available. For instance, "Copy machines" is included in the broader classification "Office machines" in Japan's I-O code classification, whereas "Copy machines" is aggregated under "Optical instruments" in the US I-O code classification. As Japan's I-O code classification consists of more detailed breakdown as compared to the US I-O code classification, we reclassify the output of "Copy machines" under another Japan's I-O code classification, namely "Other photographic instruments", so that we can match this category with "Optical instruments" in the US I-O code classification. As it is extremely difficult to create a completely coordinated international common I-O sector classification, we have to set the common I-O sectors by mainly aggregating sectors concerned as detailed as possible only for those sectors that are "nearly coordinated".

In the case of multilateral international I-O table, it is difficult to adjust the Japan's I-O table to adapt simultaneously against the I-O sector classification of plural countries. Therefore, we set up the common I-O classification for the 1985 Japan-US-EC-Asia I-O table by aggregating widely original I-O sectors, and a result, we obtain the 38-sector and 24-sector (aggregated sector) classifications.

2.2.2. Adjustment of each country's input-output table

In order to facilitate international comparison, it is necessary to standardize the table format of an international I-O table in addition to common I-O sector classification. Original I-O tables

of each country have their own peculiar sectors such as dummy sectors. We modified original I-O tables to standardize them within feasible limits. The followings are the major sectors that we modified.

With regard to dummy sectors such as "Office supplies for business use" sector and self-activity sectors such as "self-transport" (in-house transport activity for passenger/freight), their row/column vectors are removed from the I-O table by redistributing their values to the respective sectors in the endogenous part of the original I-O table. After this adjustment, the I-O table shows the input of each column sector including a column vector of goods and services for the activities of dummy/self-activity sectors.

With regard to "General government" sectors (central and local), their input vectors in the endogenous sector are transferred into "Government purchase" sector in final demand sector in order to conform to the I-O table format of the United States and the United Kingdom. However, as to the value added vectors (column), they remained the same as in each original I-O table.

2.2.3. Estimation of the trade matrices

After standardizing table format with common I-O sector, it is necessary to estimate the trade matrices of goods and services in each country's I-O table in order to compile an international I-O table. The modified individual country's I-O table (competitive import type) is divided into a transaction matrix for domestically produced goods and services and a import matrix by using trade coefficients.

The calculation formula and denotations are as follows:

Trade coefficients : $m_i = M_i/(\sum AX + F^d)_i$

M_i : imports of the i-th goods/services

$\sum(AX)_i$: intermediate demand of the i-th goods/services

F_i^d : domestic final demand of the i-th goods/services
(= excluding export from final demand)

Domestic self-sufficiency coefficients : $d_i = 1 - m_i$

Then, the import matrix of a country's I-O table is further divided into 13 countries/regions matrices, that is, imports from Japan, US, U.K., France, Germany (excluding the former East Germany), Indonesia, Malaysia, Singapore, the Philippines, Thailand, China, Taiwan, Korea, and the Rest of the world (ROW), by using trade coefficients by country. They are calculated for each I-O row sector by using import trade statistics of the importing country.

The calculation formula and denotations are as follows:

Trade coefficients by country : $m_i^{rs} = M_i^{rs}/(\sum AX + F^d)_i$
(apply to a country having no import matrix)

Trade coefficients by country : $m_i^{rs} = M_i^{rs}/(\sum A^m X + F^m)_i$
(apply to a country having an import matrix)

r : a supplying country (exporting country)

s : a demanding country (importing country)

$\sum(A^m X)_i$: intermediate demand of the i-th imported goods/services

F_i^m : domestic final demand of the i-th imported goods/services

However, as to services transaction, they could not be showed by country matrices due to the limitation on services transaction data. The inputs of domestically produced services are listed in a section corresponding to the matrix on the domestically produced goods and services. With regard to the inputs of imported services, they are included in a section corresponding to the import matrix from the rest of the world (ROW).

As for the Japanese imports, we adjusted the Japanese import matrices (by country) by using the results of a special survey on the demand structure of imported goods (CCCN 7-digit code basis; answered about 1700 out of 5200 CCCN code commodities). Japanese exports are adjusted in import matrix of Japan's trading partner country by using the name of demand sector which obtained from a special survey on the demand structure of exports of Japan (CCCN 7-digit code basis; answered about 1300 out of 3900 CCCN code commodities), and the distribution ratio of each row I-O vector of the partner country's import matrix from Japan which is estimated by using trade coefficients of imported goods from Japan.

With regard to international freight and insurance cost, they are estimated in matrix form by using information from the US trade statistics and the Japan Maritime Research Institute. Then the matrix of international freight and insurance cost is deducted from the import matrices (c.i.f. basis). Basically, the ratio of the international freight and insurance cost to the c.i.f. basis import value is calculated at the level of 38-common sector by using the above-mentioned data source. As to the ratio among U.K., France and Germany, they are treated zero due to limitation of data. Then they are multiplied by import matrices (by country with c.i.f. basis) in order to get matrices (by country) of the international freight and insurance cost on imported goods. Although the data are estimated in matrix form, they are shown only as a row vector in the international I-O table because of limitation in the data source.

Customs duties and import tax on imported goods are also shown as a row vector under the import matrix from the Rest of the World in the table. The reason is that we could not estimate the data in a matrix form for some countries' I-O tables. This is because some I-O tables show only a row vector of "customs duties", and some I-O tables have no data about it. If we could get the data by a column vector, it is possible to estimate the data in a matrix form using procedure similar to the trade coefficient method.

2.2.4. Balancing each modified country's I-O table and integration of each table into an international I-O table

After estimating 13 import matrices per each country/region, there will be discrepancies in each cell between the summary table of 13 import matrices (including a import matrix from ROW) and the original import matrix of that country. They should be balanced to be coincident with the original import matrix. The cumulative errors of cells are balanced by using a kind of Lagrange method (by computer processing).

As a result of the above process, each country's I-O table has a transaction matrix of domestically produced goods and services and 13 countries/regions import matrices. These matrices in a counry's I-O table are integrated into four countries/regions matrices, namely Japan, US, EC (U.K., France, and Germany excluding the former East Germany) and Asia. Then, each country/region I-O table (Japan, US, EC, and Asia) was integrated into an international I-O table, that is, the 1985 Japan-US-EC-Asia I-O table (we call it the World I-O table for convenience).

Finally, we create a new sector by the name of "Adjustment item" in the final demand sector of the World I-O table in order to balance the table. It is treated as if it is a kind of "export" column vector in a broad concept by regarding it as transporting goods from exporting country to importing country for the goods in that column. Since we use the data of trade matrix based on the import matrix of importing country side for estimation, it is necessary to balance horizontally in the World table in order to adjust the discrepancy between exporting country's I-O data and importing country's I-O data.

After completing the table, the figures in the diagonal cells are deducted from the cell and the CT (Control Totals = production output values) at the level of the most detailed common sector classification, that is 38-sector. The reason is as follows. In order to facilitate international comparison, we thought that it is necessary to remove the difference due to different data sources. Usually, manufacturing census data shows shipment of the commodity excluding consumption for own use in the establishment. On the other hand, statistics on commodity output include it. For example, if the output of "iron and steel" is estimated by using manufacturing census data, it does not include the output of "pig iron" which are consumed in production of "crude steel" in the same establishment, but only the output for shipment to outside. The production value of the census data is estimated by the formula "Production value = Shipment value + Net increase in inventory". However, if it is estimated by using statistics on commodity output, the output value is greater than the one by census data because of the inclusion of the output for own consumption in the same establishment. For this reason, it is necessary to remove the difference due to data source for estimation of output in I-O account in order to be able to compare internationally.

3. Analysis of International Economic Dependency Based on the Table

By utilizing the 1985 Japan-US-EC-Asia I-O table, it is possible to analyze quantitatively the relations of interdependence among the countries/regions concerned, in a way similar to the ordinary input-output analysis method. For example, by linking "Leontief inverse matrix coefficients" to "domestic final demand" of a country/region concerned, we can estimate the output increase in each sector/country induced by one unit of final domestic demand in each sector/country. This section introduces some results of analysis on relations of interdependence among countries/regions concerned based on the table.

3.1. Relations of interdependence among Japan, the United States, EC (U.K., France, and Germany) and Asia

3.1.1. Dependence of a country/region to domestic final demand of other countries/regions concerned

Figure 2 shows output inducement distribution ratio of a country/region by domestic final demand of other countries/regions concerned. EC (integrating the United Kingdom, France and Germany excluding the former East Germany) and Asia have a high degree of dependence in production owing to domestic final demand of other countries/regions concerned. As for EC, it should be noted that the imports of EC from ROW (the rest of the world) are relatively large, due to the fact that the other nine EC countries are classified in ROW.

As for Asia, it is highly dependent on the United States in particular, and Japan is also highly dependent on the United States.

On the other hand, production in the United States has particularly low dependence on domestic final demand of Japan, EC and Asia. Even when induced output by export to ROW is included, US's dependence of production to demand of foreign countries/regions is the lowest among the four countries/regions. In other words, US's production is highly dependent on its own domestic final demand.

The major sectors of each country/region concerned which has large output inducement ratio by the domestic final demand of other countries/regions concerned are shown in Table 1. EC has 6 sectors out of 24 sectors in which inducement output is more than 10% by the demand of other countries/regions concerned, Asia has 12 sectors, and Japan has 11 sectors. On the other hand, the US has only one sector which the output inducement effect from other countries/regions is above 10%, or 5 sectors which similar ratio is above 5%.

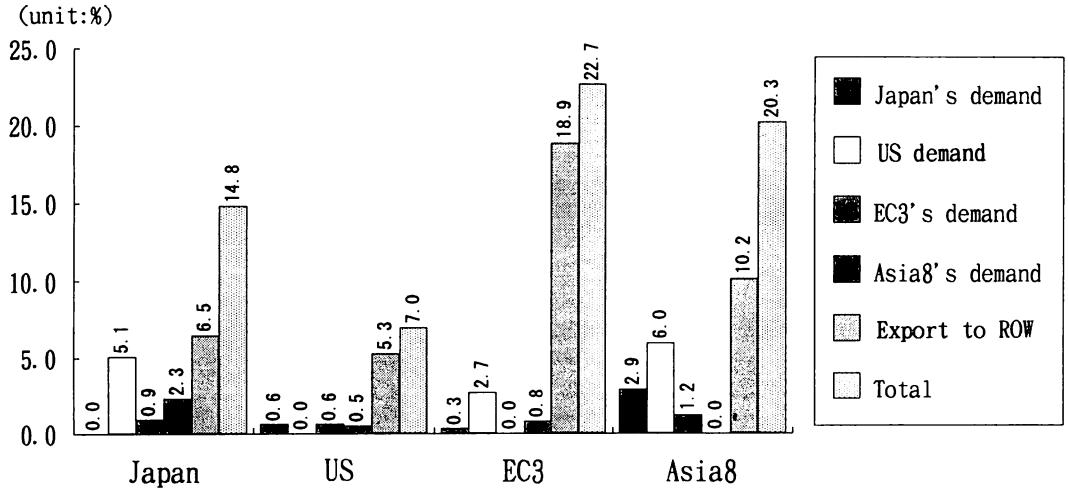


Figure 2: Production Inducement Dependence of the Countries/Regions Concerned

Table 1: Output Inducement Distribution Ratio by Domestic Final Demand of Other Countries/Regions Concerned (24-sector of the 1985 Japan-US-EC-Asia I-O Table)

(1) EC's Output Inducement Distribution Ratio by the Other Three Countries'/Regions' Domestic Final Demand (more than 10% Inducement Output Distribution Ratio)

Ranking	Sector Name of EC	By Domestic Final Demand of				Reference	
		Japan	US	Asia	Total	R.O.W.	EC
1st	Precision machinery	1.4%	14.9%	2.3%	18.7%	(24.7%)	(56.7%)
2nd	Nonferrous metals	3.4%	7.7%	2.8%	13.9%	(49.8%)	(36.4%)
3rd	Other transport machinery	0.3%	8.9%	3.8%	13.0%	(39.0%)	(48.0%)
4th	Ordinary machinery	0.8%	8.5%	3.2%	12.5%	(36.3%)	(51.1%)
5th	Iron & steel, and products	0.4%	7.9%	2.7%	11.0%	(48.7%)	(40.3%)
6th	Automobiles	0.6%	9.4%	0.4%	10.4%	(32.8%)	(56.8%)

(2) Asian Output Inducement Distribution Ratio by the Other Three Countries'/Regions' Domestic Final Demand (more than 10% Inducement Output Distribution Ratio)

Ranking	Sector Name of Asia	By Domestic Final Demand of				Reference	
		Japan	US	EC	Total	R.O.W.	Asia
1st	Electric machinery	2.0%	26.2%	4.5%	32.7%	(11.0%)	(56.4%)
2nd	Mining	20.7%	10.8%	1.0%	32.5%	(18.6%)	(48.9%)
3rd	Textiles	3.9%	15.7%	3.1%	22.7%	(17.7%)	(59.6%)
4th	Nonferrous metals	6.0%	13.2%	3.2%	22.4%	(16.3%)	(61.3%)
5th	Precision machinery	3.2%	15.3%	2.3%	20.8%	(15.2%)	(64.0%)
6th	Other manufactured goods	2.3%	15.2%	2.5%	20.0%	(17.4%)	(62.6%)
7th	Pulp, paper, wood products	3.3%	11.4%	2.6%	17.2%	(10.5%)	(72.3%)
8th	Metal products	1.5%	10.7%	1.3%	13.6%	(15.2%)	(71.2%)
9th	Oil products	6.2%	5.9%	0.9%	13.1%	(22.0%)	(65.0%)
10th	Chemicals	3.2%	7.3%	1.7%	12.1%	(13.3%)	(74.6%)
11th	Iron & steel,and products	2.6%	7.9%	0.9%	11.4%	(10.9%)	(77.6%)
12th	Commerce	3.5%	6.4%	1.2%	11.2%	(11.7%)	(77.1%)

(3) Japanese Output Inducement Distribution Ratio by the Other Three Countries'/Regions' Domestic Final Demand (more than 10% Inducement Output Distribution Ratio)

Ranking	Sector Name of Japan	Domestic Final Demand of				Reference	
		US	EC	Asia	Total	R.O.W.	Japan
1st	Automobiles	30.1%	3.3%	4.6%	37.9%	(19.6%)	(42.5%)
2nd	Precision machinery	21.5%	5.3%	6.8%	33.6%	(10.3%)	(56.1%)
3rd	Nonferrous metals	16.2%	2.9%	8.6%	27.7%	(14.4%)	(57.9%)
4th	Electric machinery	17.1%	4.2%	5.3%	26.5%	(13.6%)	(59.9%)
5th	Iron & steel, and products	12.0%	1.3%	12.4%	25.7%	(17.2%)	(57.1%)
6th	Ordinary machinery	8.8%	1.5%	8.2%	18.5%	(8.9%)	(72.6%)
7th	Mining	7.6%	1.3%	7.2%	16.1%	(8.5%)	(75.5%)
8th	Metal products	8.5%	1.3%	3.8%	13.6%	(6.9%)	(79.5%)
9th	Chemicals	6.1%	1.9%	5.6%	13.6%	(11.0%)	(75.4%)
10th	Other transport machinery	6.9%	0.7%	5.9%	13.5%	(37.0%)	(49.5%)
11th	Other manufactured goods	7.5%	1.5%	2.7%	11.6%	(8.2%)	(80.1%)

(4) US's Output Inducement Distribution Ratio by the Other Three Countries'/Regions' Domestic Final Demand (more than 5% Inducement Output Distribution Ratio)

Ranking	Sector Name of US	Domestic Final Demand of				Reference	
		US	EC	Asia	Total	R.O.W.	Japan
1st	Nonferrous metals	5.1%	3.2%	2.5%	10.8%	(11.3%)	(77.9%)
2nd	Electric machinery	1.3%	3.7%	1.7%	6.6%	(11.5%)	(81.9%)
3rd	Agriculture, forestry, fishery	3.3%	1.2%	1.8%	6.3%	(9.4%)	(84.3%)
4th	Other transport machinery	1.9%	2.3%	1.5%	5.6%	(18.2%)	(76.2%)
5th	Chemicals	1.7%	1.9%	1.8%	5.4%	(12.1%)	(82.5%)

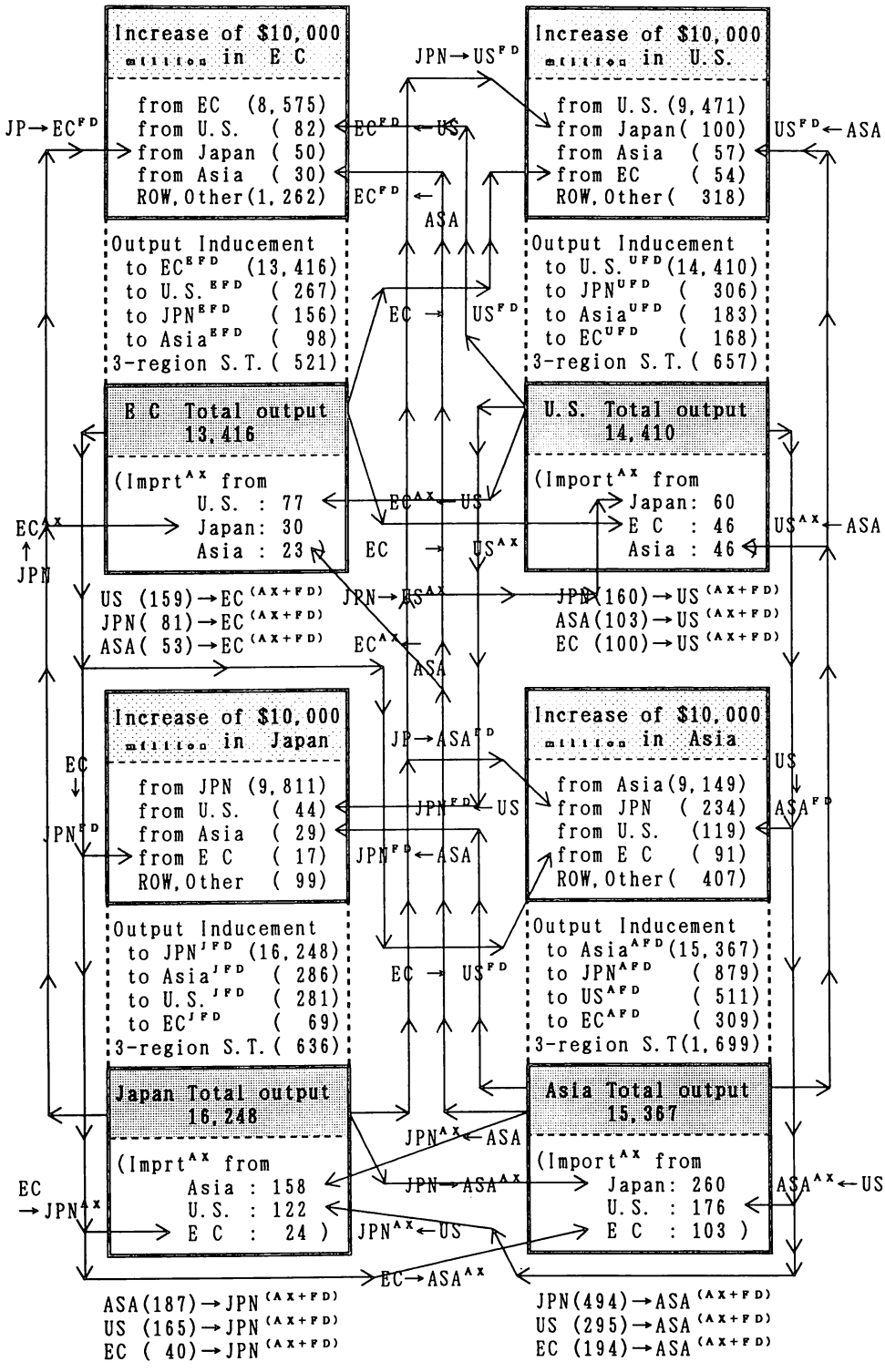


Figure 3: Effect of a $10,000 Million Increase in the Domestic Final Demand of Each Country/Region Concerned (Unit: $ million)

Table 2: Induced Output of Each Country/Region by a $10 billions Increase in the Domestic Final Demand of the Countries/Regions Concerned (Unit: $ million)

Domestic Final Demand of a Country /Region	Increase in Domestic Final Demand ($ million)	Induced Output of Each Country/Region by the Demand of Country/Region Concerned				
		Japan ($ million)	US ($ million)	EC ($ million)	Asia ($ million)	Total of 4 Regions ($ million)
Japan	10000	16248	281	69	286	16883
US	10000	306	14410	168	183	15066
EC	10000	156	267	13416	98	13936
Asia	10000	879	511	309	15367	17067
Total Induced Output of the Head Column Country/Region		17589	15469	13961	15934	62952

Table 3: Induced Import of Intermediated Inputs by the Output of the Producing Country/Region (Unit: $ million)

Input from r-country ↓	Induced Import by the Output of Individual Country/Region Concerned			
	Japan's Output 16248	US's Output 14410	EC's Output 13416	Asia's Output 15367
from Japan	-	60	30	260
from US	122	-	77	176
from EC	24	46	-	103
from Asia	158	46	23	-
Subtotal	304	152	130	539
Insurance & Freight	40	10	7	62
from R.O.W.	513	279	953	586
Customs	28	11	27	101
(Insurance & Freight + Customs)	68	20	34	162
Input Total	884	451	1117	1288

Table 4: Purchase of Goods from r-Country/Region by a $10 billions Increase in Domestic Final Demand of Each Country/Region (Unit: $ million)

Composition of $10 Billion Domestic Final Demand of Country/Region Concerned	Composition of Domestic Final Demand of Individual Country/Region			
	Japan	US	EC	Asia
	10000	10000	10000	10000
from Japan	9811	100	50	234
from US	44	9471	82	119
from EC	17	54	8575	91
from Asia	29	57	30	9149
Subtotal	9900	9683	8738	9593
Insurance & Freight	8	11	8	34
from R.O.W.	81	283	583	253
Customs	11	23	20	120
(Ins. & Fre. + Cus.)	19	34	28	154
Non-deductible VAT, etc.			650	
Total	10000	10000	10000	10000

Table 5: Total Imports of Intermediate Inputs Induced by a $10 Billions Increase in Domestic Final Demand of Each Country/Region (Unit: $ million)

Input from r-country	Induced Import by a $10 Billions Increase in Domestic Final Demand of Individual Country/Region Concerned			
	Japan's $10 bil.	US's $10 bil.	EC's $10 bil.	Asia's $10 bil.
(induced output)→	16248	14410	13416	15367
from Japan	-	160	81	494
from US	165	-	159	295
from EC	40	100	-	194
from Asia	187	103	53	-
Subtotal	393	363	293	983

Table 6: Induced Import by the Output of the Producing Country/Region (Unit: $ million)

Input from r-country ↓	Induced Import by the Output of Individual Country/Region Concerned			
	Japan's Output	US's Output	EC's Output	Asia's Output
	17589	15469	13961	15934
from Japan	-	65	31	270
from US	132	-	80	183
from EC	26	49	-	106
from Asia	172	49	24	-
Subtotal	329	163	136	559
Insurance & Freight	43	10	8	64
from R.O.W.	555	299	992	608
Customs	30	12	28	104
(Insurance & Freight + Customs)	73	22	36	168
Input Total	957	484	1163	1335

Table 7: Total Import Induced by a $10 Billions Domestic Final Demand of Each Country/Region (Unit: $ million)

Input from r-country	Induced Import by the $10 Billions Increase of Domestic Final Demand of Individual Country/Region Concerned			
	Japan's $10 bil.	US's $10 bil.	EC's $10 bil.	Asia's $10 bil.
(induced output)→	17589	15469	13961	15934
from Japan	-	164	82	504
from US	175	-	162	302
from EC	42	103	-	198
from Asia	200	107	54	-
Subtotal	418	374	299	1003

Table 8: The Top Three Sectors in a Country/Region Concerned which Production would be Induced by a $10 billions Increase in Domestic Final Demand of the Other Three Countries/Regions Concerned

(Unit: million dollars)

Top three sectors whose output would be induced by domestic final demand of Country/region concerned	Country/region whose domestic final demand would be increased $10,000 millions			
	Increase of $10,000 millions in Japan's domestic final demand	Increase of $10,000 millions in U.S.'s domestic final demand	Increase of $10,000 millions in EC's domestic final demand	Increase of $10,000 millions in Asia's domestic final demand
To Japanese sectors	All : 16,248	All : 306	All : 156	All : 879
1st sector	Services: 482	Electric machinery: 53	Electric machinery:36	Ordinary machinery : 108
2nd sector	Construc-tion : 181	Automobile:51	Services: 16	Electric machinery : 103
3rd sector	Commerce: 174	Services : 31	Automobile : 16	Iron and steel : 97
To U.S.'s sector	All : 281	All : 14,410	All : 267	All : 511
1st sector	Agriculture, forestry, fishery : 36	Services: 457	Electric machinery : 55	Electric machinery : 54
2nd sector	Services : 28	Commerce: 169	Commerce: 28	Commerce: 54
3rd sector	Commerce: 28	Construc-tion : 117	Services: 27	Services: 51
To EC's sector	All : 69	All : 168	All: 13,416	All : 309
1st sector	Chemicals: 11	Automobile:20	Services:382	Services: 66
2nd sector	Services : 7	Ordinary machinery: 18	Commerce:144	Ordinary machinery:42
3rd sector	Ordinary machinery: 5	Service : 17	Government activity:132	Chemicals:28
To Asian sector	All : 286	All : 183	All : 98	All: 15,367
1st sector	Mining : 73	Electric machinery: 28	Textiles: 14	Agriculture, forestry, fishery: 230
2nd sector	Agriculture, forestry, fishery : 40	Textiles : 26	Electric machinery:14	Services:218
3rd sector	Commerce: 25	Other manu-factured goods : 22	Agriculture, forestry, fishery : 11	Construc-tion :174
Total of 4 Countries/Rs.	16,883	15,066	13,936	17,067

Note 1: ⁘ Shadow parts denote inducement of output to domestic sectors.

3.1.2. Effect of a $10 billion increase in the domestic final demand of each country/region concerned

If we assumed that the component ratio of each country's domestic final demand is constant, we can calculate the effect of a $10 billion increase in the domestic final demand of each country/region concerned (see Figure 3, Table 2–7). In the case where domestic final demand is increased by $10 billion in Japan, the United States, EC and Asia, respectively, Asia has the largest impact on production and other country's export increase effect of the other three countries/regions concerned.

The details are as follows.

1. Effect of a $10 billions increase in Asian domestic final demand

   A "$10 billions" increase in Asian domestic final demand is expended directly to buy $9,149 millions of Asian goods, $234 millions of imported goods from Japan, $119 millions of imported goods from US, and $91 millions of imported goods from EC (see Table 4, Figure 3).

   Their total repercussion effects on production by Asian demand on goods of four countries/regions concerned are $15,367 millions for Asia, $879 millions for Japan, $511 millions for US, and $309 millions for EC. The total effects on production on four countries/regions concerned is $17,067 millions. Asia exerts the largest production increase effect on the other three countries/regions concerned (see horizontally Table 2, Figure 3). The top three sectors with the largest induced output are shown in Table 8. "Agriculture, forestry, fishery" sector is the sector most stimulated by demand increase in Asia.

   Asia needs imports of intermediate inputs to produce the $15,367 millions of output inducement. The required imports is calculated to be $260 millions from Japan, $176 millions from US, and $103 millions from EC, respectively (see Table 3). In other words, Asia has the largest impact on export increase effect of the other three countries/regions concerned due to Asian intermediate demand. In addition, as a part of the "$10 billion" increase in Asian domestic final demand is expended to buy imported goods, Asian required imports is $494 millions from Japan, $295 millions from US, and $194 millions from EC, respectively (see Table 5).

   In the case of a $10 billions demand increasing simultaneously in four countries/regions concerned, Asian induced output increase is $15,934 millions. That is, in addition to $15,367 millions due to its own demand ($10 billions), there are $286 millions, $183 millions and $98 millions of induced output in Japan, US and EC, respectively, by a $10 billions increase in domestic final demand in Japan, US and EC respectively (see vertically Table 2). The required import by country/region for the output of $15,934 millions is shown in Table 6, and the total import (intermediate import + domestic final demand import) by country/region concerned is shown in Table 7.

2. Effect of a $10 billions increase in Japanese domestic final demand

   A "$10 billions" increase in Japanese domestic final demand is expended to buy $9,811 millions of Japanese goods, $44 millions of US's goods, $29 millions of Asian goods, and $17 millions of EC goods (see Table 4, Figure 3).

   Their total repercussion effects on production by the Japanese demand for the goods of four countries/regions concerned are $16,248 millions for Japan, $286 millions for Asia, $281 millions for the US, and $69 millions for EC. The total effects on production in four countries/regions concerned is $16,883 millions (see horizontally Table 2, Figure 3). Although Japan exerts large increase effect on production, its total receive impact from the other 3 countries/regions' respective $10 billions demand increase is greater than its total

impact on the other 3 countries/regions. The top three sectors with the largest induced output are shown in Table 8. "Services" sector is the sector most stimulated by demand increase in Japan. With regard to other country's/region's sectors, it stimulates the output of raw materials producing sector such as "Mining" sector of Asia, "Agriculture, forestry, fishery" sector of US, and "Chemicals" sector of EC.

Japan needs imports of intermediate input to produce the $16,248 millions of output inducement. The required import is calculated to be $158 millions from Asia, $122 millions from the US, and $24 millions from EC, respectively (see Table 3). Japan has large impact on export increase effect of the other three countries/regions concerned due to Japanese intermediate demand (Asia: $539mil., Japan: $304 mil., US: $152 mil., EC: $130 mil.). In addition, part of the $10 billions increase in Japanese domestic final demand is expended to buy imported goods mentioned-above. Consequently, Japanese required imports is $187 millions from Asia, $165 millions from the US, and $40 millions from EC, respectively (see Table 5).

In the case of a $10 billions demand increasing simultaneously in four countries/regions concerned, Japanese induced output increase is $17,589 millions. That is, in addition to the $16,248 millions induced by its own demand ($10 billions), there are $879 millions output induced by Asian $10 billions demand, $306 millions by US, and $156 million by EC (see vertically Table 2). The required import by country/region for the output of $17,589 millions is shown in Table 6, and the total import (intermediate import + domestic final demand import) by country/region concerned is shown in Table 7.

3. Effect of a $10 billions increase in US's domestic final demand

A "$10 billions" increase in the US's domestic final demand is expended to buy $9,471 millions of US goods, $100 millions of Japanese goods, $57 millions of Asian goods, and $54 millions of EC's goods (see Table 4, Figure 3).

Their total repercussion effects on production by the US's demand on the goods of four countries/regions concerned are $14,410 millions for the US, $306 millions for Japan, $183 millions for Asia, and $168 millions for EC. The total effects on production in four countries/regions concerned is $15,066 millions (see horizontally Table 2, Figure 3). In the case of the United States, its total receive impact from the other three countries/regions' respective $10 billions demand increase is also greater than the total impact on the other 3 countries/regions. The top three sectors with the largest induced output are shown in Table 8. "Services" sector is the most stimulated sector in US. With regard to other country's/region's sectors, it stimulates the output of consumption goods producing sector such as electric machinery sector of Japan and Asia, automobile sector of Japan and EC, and textiles sector of Asia, etc.

The United States needs imports of intermediate input to produce the $14,410 millions of output inducement. The required import is calculated to be $60 millions from Japan, and $46 millions from Asia and EC, respectively (see Table 3). In addition, part of the $10 billions increase in US's domestic final demand is expended to buy imported goods mentioned-above. Consequently, US's required imports is $160 millions from Japan, $103 millions from Asia, and $100 millions from EC, respectively (see Table 5).

In the case of a $10 billions demand increasing simultaneously in four countries/regions concerned, US's induced output increase is $15,469 millions. That is, in addition to the $14,410 millions induced by its own demand ($10 billions), there are $511 millions output induced by Asian $10 billions demand, $281 millions by Japan, and $267 million by EC (see vertically Table 2). The required imports by country/region for the output of $15,469 millions is shown in Table 6, and the total import (intermediate import + domestic final demand import) by country/region concerned is shown in Table 7.

4. Effect of a $10 billions increase in EC's domestic final demand

A "$10 billions" increase in EC's domestic final demand is expended to buy $8,575 millions of EC's goods, $82 millions of US goods, $50 millions of Japanese goods, and $30 millions of Asian goods (see Table 4, Figure 3).

Their total repercussion effects on production by the EC's demand on the goods of four countries/regions concerned are $13,416 millions for EC, $267 millions for US, $156 millions for Japan, and $98 millions for Asia. The total effects on production in the four countries/regions concerned is $13,936 millions (see horizontally Table 2, Figure 3). EC has almost the same impact between its total receive impact from the other three countries/regions' respective $10 billions demand increase and the total impact on the other 3 countries/ regions. The top three sectors with the largest induced output are shown in Table 8. "Services" sector is the most stimulated sector in EC. With regard to other country's/region's sectors, it stimulates the output of electric machinery sector of three countries/ regions, and the textiles sector of Asia.

EC needs imports of intermediate input to produce the $13,416 millions of output inducement. The required import is calculated to be $77 millions from US, $33 millions from Japan, and $23 millions from Asia, respectively (see Table 3). In addition, part of the $10 billions increase in EC's domestic final demand is expended to buy imported goods mentioned above. Consequently, EC's required imports is $159 millions from US, $81 millions from Japan, and $53 millions from Asia (see Table 5).

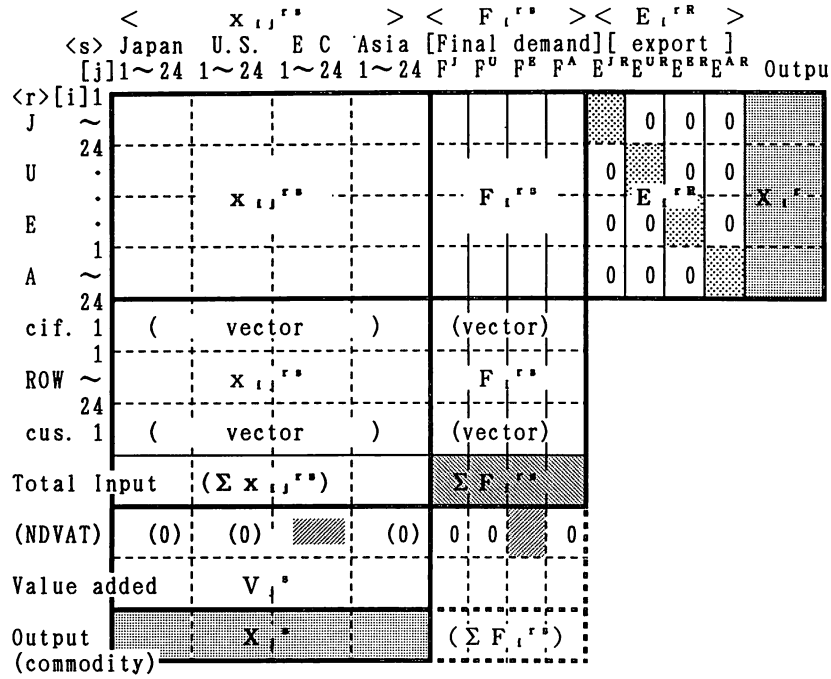
In the case of a $10 billions demand increasing simultaneously in four countries/regions concerned, EC's induced output increase is $13,961 millions. That is, in addition to the $13,416 millions induced by its own demand ($10 billions), there are $309 millions of output induced by Asian $10 billions demand, $168 millions by US, and $69 million by Japan (see vertically Table 2). The required imports by country/region for the output of $13,961 millions is shown in Table 6, and the total import (intermediate import + domestic final demand import) by country/region concerned is shown in Table 7.

4. Future Prospects of the 1990 International I-O Table

MITI intends to compile the international input-output tables for 1990 using similar method. That is, bilateral international I-O tables for Japan-US, Japan-U.K., Japan-France, Japan-Germany, and a multilateral I-O table for Japan-US-EC-Asia. As for the 1990 Japan-US input-output table, the preliminary version is scheduled to complete in May 1995. We will use the 1990 US I-O table prepared by INFORUM (Interindustry Forcasting at the University of Maryland in US) which is based on the 1982 US benchmark I-O table. Although we still have a lot of problems to be solved for the 1990 international I-O table, we will try to compile the international I-O tables for 1990, and to supply them as a kind of public goods.

Appendix

1. The Structure of the 1985 Japan-US-EC-Asia Input-Output Table



[Denotation]

x_{ij}^{rs}	:	i-sector input value from r-country/region in j-sector of s-country/region
c.i.f.	:	A vector denotes the cost of international freight & insurance
ROW	:	the Rest of the World
cus.	:	A vector denotes the cost of customs & tax on imported goods
Total input	:	It includes "c.i.f." cost and "customs duties" cost.
NDVAT	:	Non-deductible Value added tax vector
v_j^s	:	Value added of j-sector in s-country/region
X_j^s	:	Output value (commodity) of j-sector in s-country/region
F_i^{rs}	:	i-sector input value from r-country/region in s-country/region
E_i^{rR}	:	i-sector export value from r-country/region to the Rest of the World
X_i^r	:	Output value (commodity) of i-sector in r-country/region
F^s	:	Domestic final demand in s-country/region (s moves over four countries/regions)
E^{rR}	:	Export value from r-country/region to the Rest of the World (r moves over four countries/regions)
r	:	A supplying country (r moves over four countries/regions)
s	:	A demanding country (s moves over four countries/regions)
i	:	The i-th supplying sector (commodity) ($1 \leq i \leq n$)
j	:	The j-th demanding sector (commodity) ($1 \leq j \leq n$)
n	:	The number of sectors
J	:	Japan
U	:	The United states
E	:	EC (the United Kingdom, France, and Germany excluding East Germany)
A	:	Asia (Indonesia, Malaysia, Singapore, the Philippines, Thailand, China, Taiwan, and Korea)
R	:	The Rest of the World

2. Input Coefficient Matrix

$$A = (a_{ij}^{rs}) \quad (= x_{ij}^{rs} / X_j^s) = \begin{bmatrix} A^{JJ} & A^{JU} & A^{JE} & A^{JA} \\ A^{UJ} & A^{UU} & A^{UE} & A^{UA} \\ A^{EJ} & A^{EU} & A^{EE} & A^{EA} \\ A^{AJ} & A^{AU} & A^{AE} & A^{AA} \end{bmatrix} \text{(endogenous variables)}$$

$$\begin{bmatrix} A_{clf}^{J} & A_{clf}^{U} & A_{clf}^{E} & A_{clf}^{A} \\ A^{RJ} & A^{RU} & A^{RE} & A^{RA} \\ A_{cus}^{J} & A_{cus}^{U} & A_{cus}^{E} & A_{cus}^{A} \end{bmatrix} \text{(exogenous variables)}$$

$$\begin{bmatrix} v_j^J & v_j^U & v_j^E & v_j^A \end{bmatrix} \text{(exogenous variables)}$$

[Denotation]

A	:	Input coefficient matrix consisting of 4 countries/regions concerned
a_{ij}^{rs}	:	i-sector input coefficient from r-country/region in j-sector of s-country/region
x_{ij}^{rs}	:	i-sector input value from r-country/region in j-sector of s-country/region
X_j^s	:	Output value of j-sector in s-country/region
v_j^s	:	Value added coefficient of j-sector in s-country/region
r	:	A supplying country (r moves over four countries/regions)
s	:	A demanding country (s moves over four countries/regions)
i	:	The i-th supplying sector (commodity) ($1 \leq i \leq n$)
j	:	The j-th demanding sector (commodity) ($1 \leq j \leq n$)
n	:	The number of sectors
J	:	Japan
U	:	The United states
E	:	EC (the United Kingdom, France, and Germany excluding East Germany)
A	:	Asia (Indonesia, Malaysia, Singapore, the Philippines, Thailand, China, Taiwan, and Korea)
R	:	The Rest of the World

3. Inverse Coefficient Matrix

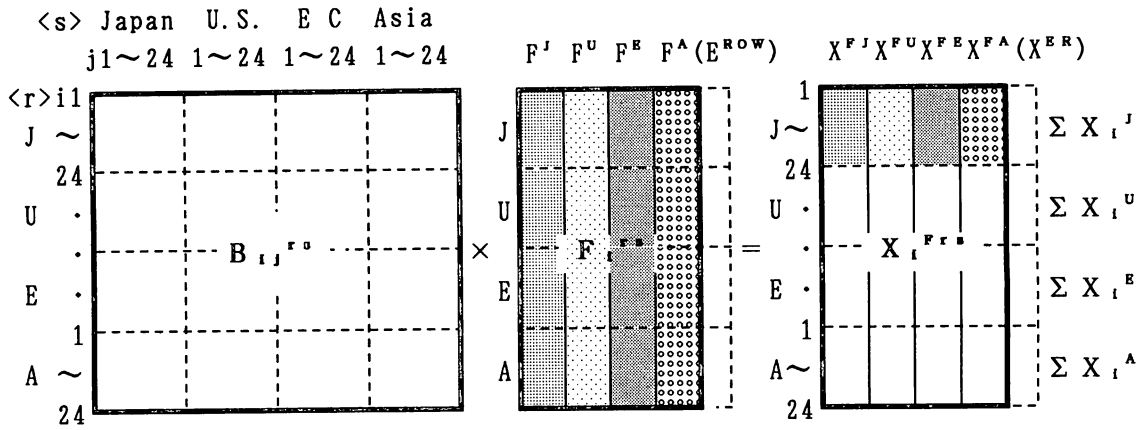
$$B = (b_{ij}^{rs}) = (I - A_{ij}^{rs})^{-1} = \begin{bmatrix} B^{JJ} & B^{JU} & B^{JE} & B^{JA} \\ B^{UJ} & B^{UU} & B^{UE} & B^{UA} \\ B^{EJ} & B^{EU} & B^{EE} & B^{EA} \\ B^{AJ} & B^{AU} & B^{AE} & B^{AA} \end{bmatrix}$$

4. Induced Output by Domestic Final Demand of Each Country/Region

$$X_i^{Frs} = B_{ij}^{rs} \times F_i^{rs}$$

$$< B_{ij}^{rs} > \times < F_i^{rs} > = < X_i^{Frs} >$$

<Induced Output>



[Denotation]

X_i^{Frs}	:	Induced output value of i-sector in r-country/region by domestic final demand of s-country/region to the goods from r-country/region to s-country/region
X^{Fs}	:	Induced output value by domestic final demand of s-country/region
(X^{ER})	:	Induced output value by export to the rest of the world
B_{ij}^{rs}	:	Inverse coefficient Matrix consisting of 4 countries/regions concerned
F^s	:	Domestic final demand of s-country/region
F_i^{rs}	:	Domestic final demand of s-country/region to the i-sector from r-country/region to s-country/region
(E^{ROW})	:	Export to the Rest of the World (ROW) from r-country/region
r	:	A supplying country/region (r moves over four countris/regions)
s	:	A demanding country/region (s moves over four countris/regions)
i	:	The i-th sector (commodity) in left hand column of the table ($1 \leq i \leq n$)
j	:	The j-th sector (commodity) in head column of the table ($1 \leq j \leq n$)

5. Contribution Ratios of Domestic Final Demand by Country/Region to the Output of Each Country/Region Concerned

$$R_i^{Frs} = (\hat{X}_i^r)^{-1} \times (B_{ij}^{rs} \times F_i^{rs})$$

<Induced output by country's domestic final demand>

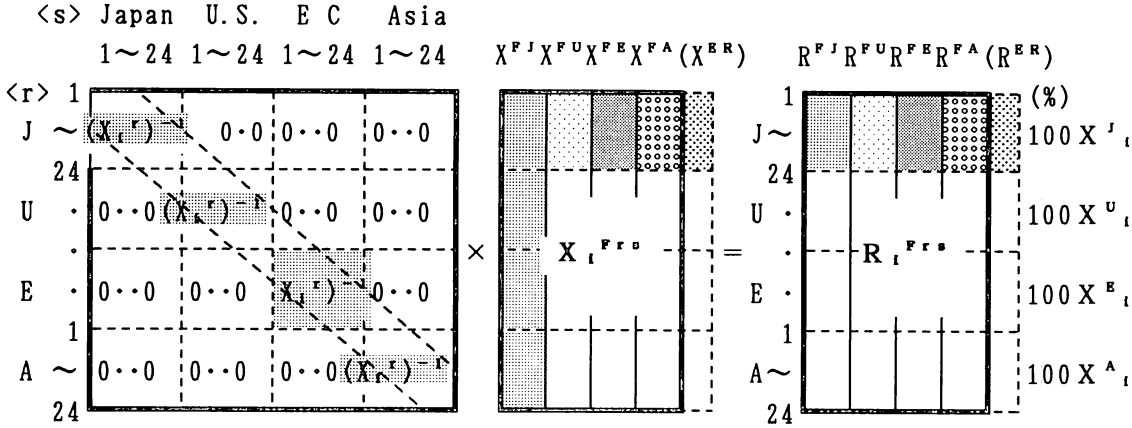
$$= (\hat{X}_i^r)^{-1} \times (X_i^{Frs})$$

$< (\hat{X}_i^r)^{-1} >$ $< X_i^{Frs} >$ $< R_i^{Frs} >$

< Diagonal matrix consisting of inverse of total output of i-th sector>

<Induced output by final demand>

<Contribution ratios of the induced output by final demand >



[Denotation]

R_i^{Frs}	:	Contribution Ratios of domestic final demand by country/region to the induced output of i-th sector in r-country/region
$\hat{}$	:	Diagonal matrix
X_i^r	:	Output value of the i-th sector in r-country/region
B_{ij}^{rs}	:	Inverse coefficient matrix consisting of 4 countries/regions concerned
F_i^{rs}	:	Domestic final demand of s-country/region to the i-sector from r-country/region
X_i^{Frs}	:	Induced output value of the i-th sector in r-country/region by domestic final demand of s-country/region to the goods from r-country/region to s-country/region

6. Induced Output Coefficient (Total Requirements) by a Unit of Domestic Final Demand of Each Country/Region Concerned

$$C_i^{Fs} = (B_{ij}^{rs} \times F_i^{rs}) \times (i\hat{F}_i^{s})^{-1}$$

<Induced output> <Column total of the final demand in s-country/region>

$$= (X_i^{Frs}) \times (i\hat{F}_i^{s})^{-1}$$

[Denotation]

C_i^{Fs}	:	Induced output coefficient (total requirements) to the i-th sector by a unit of domestic final demand of s-country/region
B_{ij}^{rs}	:	Inverse coefficients matrix consisting of 4 countries/regions concerned
F_i^{rs}	:	Domestic final demand of s-country/region to the i-th sector from r-country/region to s-country/region
i	:	A unit row vector consisting of all 1
$\hat{}$	:	Diagonal matrix
F_i^s	:	Domestic final demand of s-country/region to the i-th sector
r	:	A supplying country (r moves four countris/regions)
s	:	A demanding country (s moves four countris/regions and ROW)
i	:	The i-th supplying sector (commodity) of country r ($1 \leq i \leq n$)
j	:	The j-th sector (commodity) in head column of the table ($1 \leq j \leq n$)

[Calculation step]

(1) Structure of the domestic final demand of s-country/region are described in chart 1. EC's column total of domestic final demand includes non-deductible VAT (value added tax).

(2) The row vector consisting of column totals of these country's/ region's domestic final demand are made diagonal matrix consisting of the inverse. (Chart 2.)

(3) Induced output coefficients (total requirements) to i-th sector by a unit of domestic final demand of each country/region concerned are calculated by multiplying "induced output matrix by each country/region final demand" by "diagonal matrix of the inverse consisting of column totals of these countries'/regions' domestic final demand".

Chart 1.
Structure of the domestic final demand of *s*-country/region

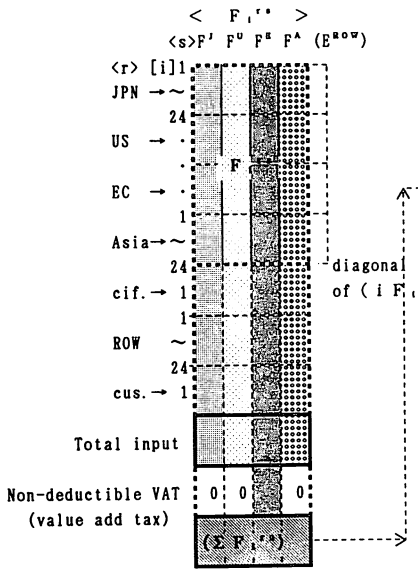
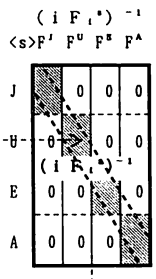


Chart 2.
Diagonal matrix consisting of the inverse of column totals of the *s*-country/region's domestical final demand



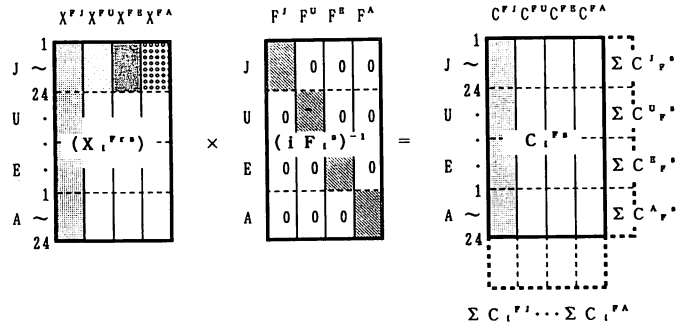
(Chart 3.)

Chart 3.
Induced output coefficient (total requirements) to the *i*-th sector by a unit of domestic final demand of each country/region concerned

< X_i^{rs} >
< Induced output by domestic final demand of each country/region >

< $(i \times \hat{F}_i^s)^{-1}$ >
< Diagonal matrix consisting of the inverse of the column totals of each country's/region's domestic final demand>

< C_i^{rs} >
<Induced output coefficient to the i-th sector by a unit of the domestic final demand of s-country/region >

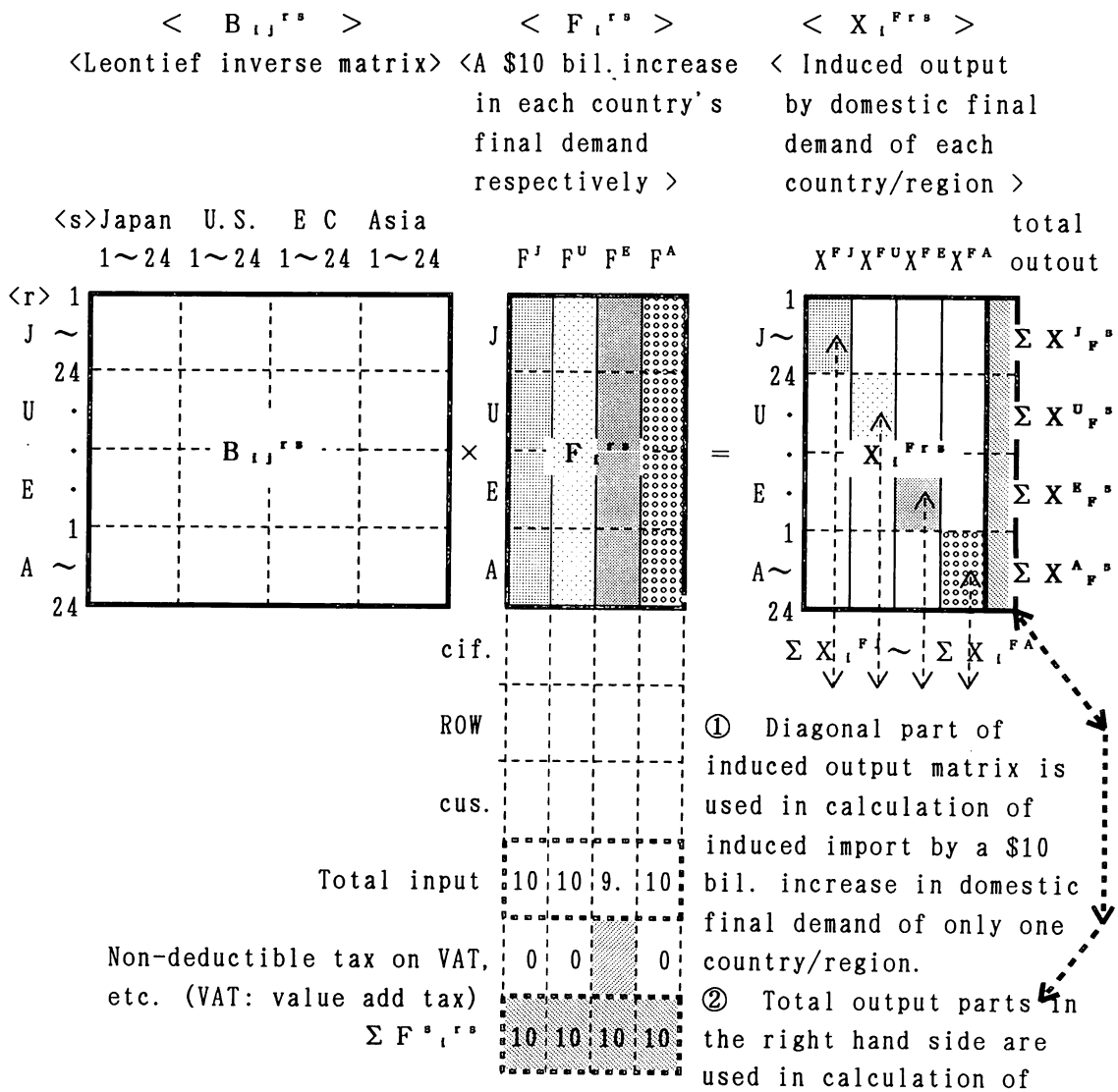


7. Induced Import by a $10 Billion Increase in Domestic Final Demand in Each Country/Region Respectively

[Calculation step]

(1) Calculation of the total induced output to the i-th sector of r-country/region by a $10 billion increase in domestic final demand in s-country/region respectively

$$X_i^{Frs} = B_{ij}^{rs} \times F_i^{rs}$$



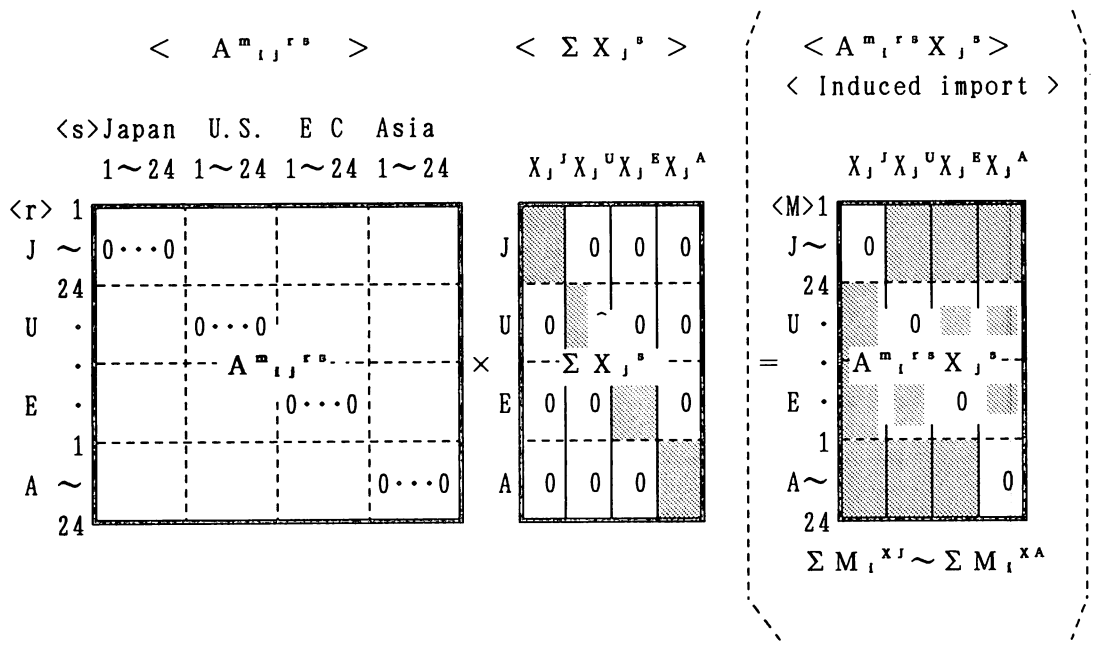
[Denotation]

B_{ij}^{rs}	:	Inverse coefficient matrix consisting of 4 countries/regions concerned
F_i^{rs}	:	\$10 billion increase of domestic final demand of a demanding country/region
X_i^{Frs}	:	Induced output of the i-th sector of r-country/region by domestic final demand of s-country/region concerned
$\sum X^r F^s$	:	Sum of the induced output to the i-th sector of r-country/region by domestic final demand of s-country/region

(2) Calculation of induced import which is to be input for the induced output by \$10 billion increase of domestic final demand in each country/region respectively, and of direct import for the \$10 billion increase of domestic final demand of that coutry/region.

$$M_i^{rs} = A^m{}_{ij}^{rs} \times \sum \hat{X}_j^s + F^m{}_i^{rs}$$

(Total import) (import for intermediate demand) (direct import for domestic final demand)



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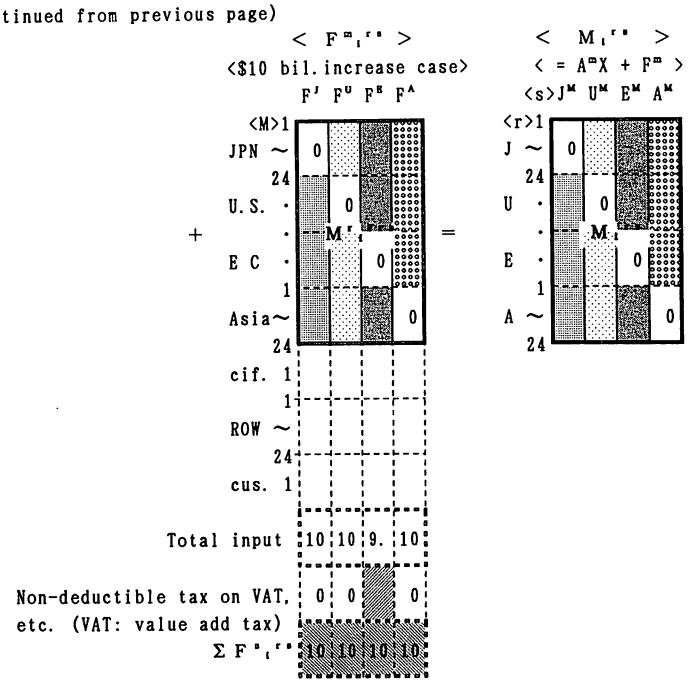

[Denotation]

M_i^{rs} : Total import value consisting of induced imports of intermediate inputs to the output which is induced by a \$10 billions increase in final demand in each country/region respectively and directly purchased import induced by a \$10 billions increase in domestic final demand of that country/region.

A_{ij}^{mrs} : Import input coefficients matrix which is obtained from A_{ij}^{rs} matrix by putting into zero at the part of A_{ij}^{rr}

$\sum X_j^s$: Diagonal matrix consisting of the induced output value of the j-th sector in s-country/region by a \$10 billions increase in final demand in each country/region respectively

$A_i^{mrs}X_j^s$: Induced imports of the i-th sector for intermediate input to the induced output of the j-th sector in s-country/region by a \$10 billions increase in final demad in each country/region respectively

F_i^{mrs} : Directly purchased import by a \$10 billions increase in domestic final demand of that country/region

X_j^s : Output value of the j-th sector in s-country/region

References

[1] Ministry of International Trade and Industry (1993 Aug.), "The 1985 Japan-U.S.-EC-Asia Input-Output Table", Japan, International Trade and Industry Statistics Association.

[2] Hirochika OTA (1994), "Background and Compilation of 1985 Japan-U.S.-EC-Asia International Input-Output Table" (in Japanese), *Innovation & I-O technique*, Vol.5, No.1, pp.12-18, Pan Pacific Association of Input-Output Studies.

[3] Institute of Developing Economies (1992 Sep.), "Asian International Input-Output Table 1985", Japan, Institute of Developing Economies.

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2. If a table or a figure is not typed in the TeX or LaTeX format, its caption, source and note should be saved in other file.
3. Every sentence should start on a new line by ending the previous sentence using the 'Enter'(CR) key.
4. A double spaced empty line should be left between paragraphs.

```
\documentstyle[twoside]{article}

% Page Layout
\topmargin = 0.0cm
\headsep   = 20pt
\footheight = 0.0cm
\footskip = 0.0cm
\oddsidemargin = 0.0cm \evensidemargin = 0.0cm
\textheight = 21.5cm \textwidth = 14.6cm

% Title, Thanks and Author(s)
\title{Title\thanks{...}}
\author{By\\ Author1$^{*}$ and Author2$^{**}$}
\begin{document}
\maketitle

% Abstract
\begin{abstract}
This is an abstract.
.....................
End of abstract.
\end{abstract}

% Table
\begin{table}
\caption{This is a table.}
\label{table1}
\begin{center}
\small
\begin{tabular}{...}
......
\end{tabular}
\end{center}
```

```
\footnotesize
Source:
Note:
\normalsize
\end{table}

%   Diagram (e.g. width and height = 140mm x 200mm)
\begin{figure}
\label{table1}
\begin{center}
\setlength{\unitlength}{1.00mm} %
\begin{picture}(140,200)(0,0)
\end{picture}
\end{center}
\footnotesize
Source:
Note:
\normalsize
\caption{This is a 140mm*200mm figure.}
\label{fig1}
\end{figure}

%   Equation with a reference label
\begin{equation}
X=(I-A)^{-1}F
\label{IOtable}
\end{equation}

%  References to Talbe, Diagaram, Equation and Bibliography.
Equation (\ref{IOtable}) is ...
Figure \ref{fig1} is ...
Table \ref{table1} is ...
See Author\cite{Label}, for example.

%  Bibliography
\begin{thebibliography}{99}
\bibitem{Label}Author, Name(1993), ``Title of a paper,'' {\it Journal},
Vol.#, No.#, pp.###--###.
\bibitem{WL}Leontief, W.W.(1951), {\it The Structure of the American
Economy, 1919--1939: An Empirical Application of Equilibrium Analysis},
Oxford Univ. Press.
\end{thebibliography}
\end{document}
```

SUBMISSION GUIDE

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The first page should include: Title, Author(s) name, and Abstract (not more than 100 words). Affiliation appears in the foot note* of the first page of the text, with a superscript* to the author's name.

Appendix, if any, should appear at the end of the paper, before the references.

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