

PART 1.

EXPLANATORY NOTES ON THE TABLE

CHAPTER 1. OUTLINE OF THE TABLE

1.1 INTRODUCTION

The Asia-Pacific region has experienced remarkable economic growth over the last two decades. In the period of 1970-88, the GDP of Korea and Japan increased at annual average rates of 8.7 and 4.4 percent, respectively. At the same time, Korea's imports from Japan rose by 9.9 percent and Japan's imports from Korea increased by 14.1 percent, both annually. These facts suggest an underlying chain reaction of income effects whereby the growth of production and income in one country induces demands for imports which, in turn, stimulates production and income in the other country.

The 1985 Korea-Japan International Input-Output Table was constructed for the purpose of providing comprehensive data for a quantitative analysis of the structure of international economic interdependence. Moreover, the table will, together with both the 1970 and 1975 Japan-Korea International Input-Output Tables which were previously issued by the Bank of Korea (BOK) and the Institute of Developing Economies (IDE), provide substantial information for a multi-period comparison of the growth process. The project teams in both of the two institutions earnestly hope that the series of Korea-Japan International Input-Output Tables will find ready use in various related fields of study.

1.2 FORMAT OF THE TABLE

The Korea-Japan International Input-Output Table gives an account of all transactions within both Korea or Japan and also of trade between the two countries. In this table, as shown in Fig. 1.1, commodities (including services) and production activities are classified according to a uniform classification and grouped by nationality. The nationality of either a commodity or a production activity is defined by the location of the production process. Using this criterion, the activities of all of the establishments operating in Japan, for example, are recognized as Japanese domestic activities and all resulting products are accounted for as Japanese products, regardless of the nationality of the owner or employees of each establishment. In contrast, the nationality of consumers is defined by residential status, i.e., persons who reside in a country for longer than one year are considered to be domestic residents of that country, regardless of their actual nationality. Accordingly, Korean products consumed by the residents of Korea are accounted for as domestic consumption in Korea and those products consumed by non-residents, such as tourists, are treated as Korean exports.

The row codes, at the left of Fig. 1.1, classify commodities and production factors, while the column codes at the top classify the users of those commodities and factors. Therefore the table shows the distribution structure of each commodity when it is read row-wise. For example, among the Japanese products, the amounts represented by A^{JJ} and F^J are consumed in Japan, A^{JK} and F^{JK} in Korea, and L^J in the rest of the world (R.O.W.). Read column-wise, the table shows the inputs needed for the production of each commodity. For instance, Korean products requires Japanese, Korean and R.O.W. products as materials in the amounts of A^{JK} , A^{KK} and A^{WK} , respectively.

The total inputs (row XX 600) are equal to the total outputs (column XX600), sector by sector. Statistical discrepancies, including rounding errors generated in the compiling process, are recorded in the QX001 column.

Korean and Japanese products in this table are valued at producers' prices. International freight and insurance premiums incurred in the transactions between the two countries are recorded in the BF001 row. On the other hand, the R.O.W. products are valued at CIF, which are inclusive of these premiums. The DT001 row contains custom duties and import commodity taxes levied on the trade between Korea, Japan and the R.O.W.

All figures in the table are measured in units of one thousand U.S. dollars. The exchange rates used for conversion from the Japanese yen to the U.S. dollar and from the Korean won to the U.S. dollar are, respectively, 238.54 (¥/\$) and 870.02 (₩/\$) which are the averages of the respective monthly rates in 1985 as given in the International Financial Statistics of the IMF.

Fig. 1.1 Format of the 1985 Korea-Japan I-O Table

		INT. DEMAND			FINAL DEMAND					EXPORT TO R.O.W.			
		Japan	Korea		Japan	Korea		G	G	L LL	Q	X	X
		A AA	A AA	E	F FF	F FF	F	G	G	L LL	Q	X	X
		J JJ	K KK	T	J JJ	K KK	X	J	X	C WX	X	X	X
		0...29	0...29	9	0...09	0...09	9	9	9	0...09	0	0	6
		0 70	0 70	0	0 00	0 00	0	0	0	0 00	0	0	0
		1 40	1 40	0	1 50	1 50	0	0	0	1 10	1	0	0
INTERMEDIATE INPUTS	Japanese products	AJ001 : AJ274 AJ900	A ^{JJ}	A ^{JK}		F ^{JJ}	F ^{JK}					L ^J	
	Korean products	AK001 : AK274 AK900	A ^{KJ}	A ^{KK}		F ^{KJ}	F ^{KK}					L ^K	
	freight & Insurance	BF001											
	R.O.W. products	CW001 : CW274 CW900	A ^{WJ}	A ^{WK}		F ^{WJ}	F ^{WK}						
	tariff	DT001											
	total	ET900											
value added	VV001 : VV005 VV900	V ^J	V ^K										
total input	XX600												

1.3 SECTOR CLASSIFICATIONS

The basic classification of the 1985 Korea-Japan International Input-Output Table is composed of 274 intermediate, 5 final demand, and 5 value added sectors. Each sector corresponds to at least one sector in the national input-output tables for Korea and Japan.

In addition to the basic classification, two aggregated tables, one with 58 intermediate sectors and the other with 11 intermediate sectors, are presented here which correspond, respectively, to the 57 sector and 10 sector aggregated classifications of the 1975 Japan-Korea International Input-Output Table, with the exception of the Business Consumption sector.

A list of the sector classifications will be presented in Part 2.

Table 1.1 Number of Sectors

	Bilateral Table 1985	Korea Table 1985	Japan Table 1985	Bilateral Table 1975
1) Agriculture, Forestry and Fishery	28	37	34	35
2) Mining	8	14	10	17
3) Manufacturing	173	265	246	95
4) Electricity, Gas and Water Supply, and Construction	16	26	21	7
5) Service	46	57	91	10
6) Dummy Sector	3	3	6	3
Intermediate sector	274	402	408	167

1.4 SPECIAL TREATMENT

[1] Scrap and By-products

Some producers and consumers supply scrap and by-products to the markets. Special care has been taken in the recording of these secondary products in the table. In the actual recording process, there are four methods which can be employed; i.e., (1) the lump-sum method, (2) the transfer method, (3) the R. Stone method, and (4) the separation method. Fig. 1.2 shows how each of these methods treats scrap and by-products, assuming that the gas supply sector generates 10 units of coke as by-products, and that all of the values are absorbed in the steel manufacturing sector.

Fig. 1.2 Treatment of Scrap and By-products

(1) Lump-sum Method

	Gas supply	Coke	Steel	
Gas supply		10	.....
Coke			
Steel			
			

(2) Transfer Method

	Gas supply	Coke	Steel	
Gas supply	10	.....	.....
Coke		10	.....
Steel			
			

(3) R. Stone Method

	Gas supply	Coke	Steel	
Gas supply	.....		.....
Coke	-10	.....	10	.....
Steel	.....		.....
	

(4) Separation Method

	Gas supply	Coke	Steel	
Gas supply			⋮	
Coke	⋮	10	⋮	⋮
Steel			⋮	
			⋮	

In the lump-sum method, the coke produced in the gas supply sector is not distinguished from the main product (gas). As a result, the gross output of the gas supply sector includes the values for both gas and coke.

The transfer method records this case as if the coke sector inputs 10 units of gas to provide the steel manufacturing sector with 10 units of coke. Therefore, the amount of by-product is included in the gross outputs of both the gas supply and coke sectors.

The R. Stone method treats by-products as negative inputs of the sector in which they are generated. In this method, in contrast with the transfer method, the value of the by-product is not included in the gross output of any sector.

In the separation method, the coke is completely removed from the gas supply sector and recorded as a product of the coke sector. In actual practice, however, this method is seldom applied because the input structure is not easily divided into two different production activities.

As shown in Table 1.2, the Japanese table treats most scrap and by-products in the same manner as the Korean table. Therefore the 1985 Korea-Japan Input-Output Table has been compiled without any adjustment or conversion for the treatment of scraps and by-products.

Table 1.2 Treatment of scrap and by-products

Methods	Scrap & By-products	
	Korean Table	Japanese Table
(1) lump-sum method	Poultry droppings Paddy straw Fur and hide of livestock	Poultry droppings
(2) transfer method	Advertisements in publications and broadcasts	Advertisements in publications and broadcasts
(3) R. Stone method	All scrap Other by-products	All scrap Other by-products
(4) separation method	Gas generated in coke manufacturing	None

[2] Non-profit Organization Sectors

Gross outputs of the non-profit organization sectors such as Public Administration, Private Non-profit Institutions for Households (comprising religious groups, labor unions, and so forth), etc., are defined as the total current expenditures for their activities. The amounts for deficits in public organizations are recorded in the Government Consumption Expenditures column and those of private non-profit organizations are allotted in the column for Private Consumption Expenditures.

[3] Imputed Values

The gross outputs of the banking and insurance sectors are composed of (1) Imputed values for service charges and (2) other service charges. The former is given as the interest received by financial institutions over and above the interest paid to their depositors.

Imputed values for house rents of owner-occupied dwellings are estimated at market rents and included

in the gross output of the House Rent sector.

[4] Value Added Tax

The value added tax (VAT) is an indirect tax which is levied on the value added at each stage of the production of goods. It is collected by enterprises but is essentially borne by the final consumer of goods.

In Korea, enterprises are allowed to deduct the amount of VAT due on their purchases of intermediate inputs or capital goods from the amount of tax on their own products.

In order to value the commodity flows at purchasers' prices in the Korean national input-output tables, a system called "the net system" has been introduced, which includes the following:

- (1) Output is valued excluding VAT as invoiced by the producer;
- (2) Imports are valued excluding invoiced VAT on imports;
- (3) Intermediate inputs are valued excluding deductible VAT;
- (4) Final consumption is valued including VAT;
- (5) Gross capital formation is valued excluding deductible VAT;
- (6) Exports are valued excluding VAT.

In order to take VAT into account, the net system was applied in the 1985 Korea-Japan International Input-Output Table in the same way as in the Korean national input-output tables.

[5] Imports of Financial, Postal and Telecommunication Services

In the Bilateral Table, imports of banking, insurance, postal and telecommunication services are treated using a method similar to the transfer method explained in the beginning of this section. Fig. 1.3 shows how the Table treats an example where Japanese establishments in Sectors A and B, respectively, input 40 and 60 units of Korean banking services. In this case, the total amount of imports (100) is recorded in the column for the Japanese banking service sector, and the amounts purchased by Sectors A and B (40 and 60) are treated as Japanese domestic products.

Fig. 1.3 Treatment of Service Imports

		J A P A N		K O R E A	F. D.
		B a n k (A)	(B)	B a n k	
J A P A N	Bank	40	60		
K O R E A	Bank			100	
V. A.					

[6] Dummy Sectors

The 1985 Korea-Japan International Input-Output Table has three dummy sectors; i.e., (1) Office Supplies, (2) Business Consumption, and (3) Activities Not Classified Elsewhere. These sectors are introduced for the convenience of compilation although there are no such actual products in the economy. The Office Supplies sector records expenses for each establishment supplies such as notebooks, writing pads, stationery, etc. The Business Consumption Sector covers expenses on business travels, employee welfare expenditures, and other special business expenses. The sector for Activities Not Classified Elsewhere is mainly used, in the process of compiling national tables, to balance the row and column totals.

CHAPTER 2. METHOD OF COMPILATION

The 1985 Korea-Japan International Input-Output Table was compiled in the following stages:

- (1) Construction of the bilateral uniform input-output classification.
- (2) Conducting special surveys on imported commodities.
- (3) Compilation of import transaction tables by country of origin.
- (4) Re-examining the uniform classification with respect to the Foreign Trade Statistics.
- (5) Estimation of international freight and insurance premiums.
- (6) Conceptual adjustment of the national tables.
- (7) Compilation of export matrices.
- (8) Transformation of the national tables to the bilateral format.
- (9) Reconciliation and final check of the table.

Stage (1) and the special survey in Japan were undertaken in 1987. The survey in Korea and Stage (3) were carried out in 1988, Stages (4)-(8) were undertaken in 1989 and the final stage (8) was done in 1990. The details of the main process of compilation are shown in the following sections.

2.1 CONSTRUCTION OF THE BILATERAL UNIFORM INPUT-OUTPUT CLASSIFICATION

The largest possible number of sectors were set up for the bilateral uniform classification, first by examining the definitions of classifications for the 1985 Korean and Japanese national input-output tables. Then it was checked with respect to the Foreign Trade Statistics. The Korean values for exports to Japan and the Japanese values for imports from Korea, and vice versa, were compared for checking the reliability of the uniform classification. After some revision, 274 intermediate sectors were established as the basic classification of the 1985 Korea-Japan International Input-Output Table.

Two aggregated classifications were constructed, in 58 sectors and 11 sectors, for comparison with 1975 Japan-Korea International Table. Except for the Business Consumption sector which is not included in the classification of the 1975 Table, these aggregated classifications correspond to the 57 sector and 10 sector classifications of the 1975 Table, respectively.

2.2 SPECIAL SURVEYS ON IMPORTED COMMODITIES

The import matrix of the national input-output tables for Korea and Japan show the transaction of imported commodities regardless of the country of origin. On the other hand, the Foreign Trade Statistics show how much is imported from each country but provide no information on the users of these commodities. Therefore it was necessary to collect data on the origin of the imported inputs for each sector in order to construct the international trade slots of the Bilateral Table (A^{KJ} , A^{WJ} , A^{JK} , A^{WK} , F^{KJ} , F^{WJ} , F^{JK} , F^{WK} in Fig. 1.1).

To this purpose, a special survey was conducted in Japan by the Ministry of International Trade and Industry (MITI) in 1987. Data on the distribution structure of 1,700 commodities (classified by 7-digit CCCN code) selected out of a total of 5,237 commodities, by country of origin, were collected from various economic associations and trade establishments.

The survey in Korea was conducted by the Bank of Korea in 1988 to collect data on the country component of imported inputs, that is, each country's share of the total imports to the Korean establishment (BOK and IDE, [2]). This survey covered 20,340 billion won or 75 percent of the total Korean imports in 1985, and included a sample of 699 establishments out of a total of 6,925 establishments with import-licenses.

2.3 COMPILATION OF IMPORT TRANSACTION TABLES BY COUNTRY OF ORIGIN

Import transactions in the Bilateral Table were compiled from the import matrices of the national tables, the Foreign Trade Statistics, and the results of the special survey. The methods used in the compilation of the Korean and Japanese tables, however, were different due to variances in the availability of data from surveys.

As mentioned in the previous section, the results of the special survey in Japan identified the distribution

structure of 1,700 selected imported commodities from Korea. Using this information, the total imports from Korea, taken from the Foreign Trade Statistics of Japan, were allocated to the various user sectors. The imported commodities which were not covered by the survey were distributed in proportion to each column sector's consumption of those commodities, which was obtained from the import matrix of the Japanese national input-output table. The results of this process were tabulated in Fig. 1.4, commodity by commodity.

In Fig. 1.4, the total for each row should be equal to the total for the import of a commodity obtainable by country of origin from the Foreign Trade Statistics, while each column total should be equal to the sector's input of the imported commodity which is consistent with that of the national input-output table. The equality of the former was necessarily satisfied at the initial stage of the tabulation, but that of the latter could not be satisfied. The figures were recurrently modified until the discrepancies disappeared.

Fig. 1.4 Tabulation of the import transaction table by country of origin

	IO ₁	IO ₂	IO ₃	IO _n	total	c. t.
[CCCN1]							
Korea							
Rest of the world							
total							
control total							
[CCCN2]							
Korea							
Rest of the world							
total							
control total							
⋮							

The special survey in Korea provided information on which country produced the inputs for each Korean establishment. The shares for each country's products, derived from the results of the survey, were utilized for division of the import matrix of the national input-output table. The imports in the column sectors which were not covered by the survey were divided according to the component ratios of the total imports, which were obtained from the Korean Foreign Trade Statistics. The results of this process were also tabulated in the same form as for Japan. In the beginning, there were some discrepancies between the actual totals and the control totals, row-wise, which disappeared after the reconciliation process.

The import transaction tables for both countries compiled in the processes mentioned above do not include the so-called "invisible imports" (those imports transacted without visible transportation across a national border, such as jet fuels supplied in an airport abroad and the import of services). There was no country of origin data on this trade available in Japan, but for Korea, an estimation was possible using detailed data on the Balance of Payments compiled by BOK. After adjustments were made based on this information, we obtained the import transaction tables for Korea by country of origin including invisible imports. The data on Korean service exports to Japan were also derived from the same BOK data which expedited the estimate of Japanese service imports from Korea (except for the trade and freight transport services).

2.4 CONVERSION TO PRODUCERS' PRICES

The import transaction tables obtained in the previous section were all valued at CIF and in order to convert to producers' prices, it was necessary to subtract transportation costs and trade margins from the CIF import values. The process of conversion was composed of two steps; i.e., (1) subtraction of international freight and insurance premiums (conversion from CIF to FOB values) and (2) subtraction of domestic freight and trade margins in exporting countries (conversion from FOB to producers' values).

Because of the scarcity of detailed information on international freight and insurance premiums in both countries, the proportions in CIF values were estimated from the available data by roughly aggregating by commodity group and also by country of origin. For Japan, the estimation was done based mainly on the report of the Japan Maritime Research Institute [5] and other useful information including the results of interviews with experts. For Korea, the estimate was based on data given by the Korea Insurance Development Institute [6] and other unpublished statistics. This additional information made it possible to estimate the international freight and insurance premiums on the Korean and Japanese imports by multiplying the proportions by the CIF import values. These transportation costs were aggregated into a row vector and set up as the BF001 sector.

The second step was conducted by utilizing the trade and transportation margin rates on exports obtained from the national input-output tables of the counterpart countries. For example, the margins on the Japanese imports were estimated based on the Korean exports' margin rates, i.e., they were obtained by multiplying the margin rates by the FOB import values, and then transferred to the row for the trade and transportation sectors.

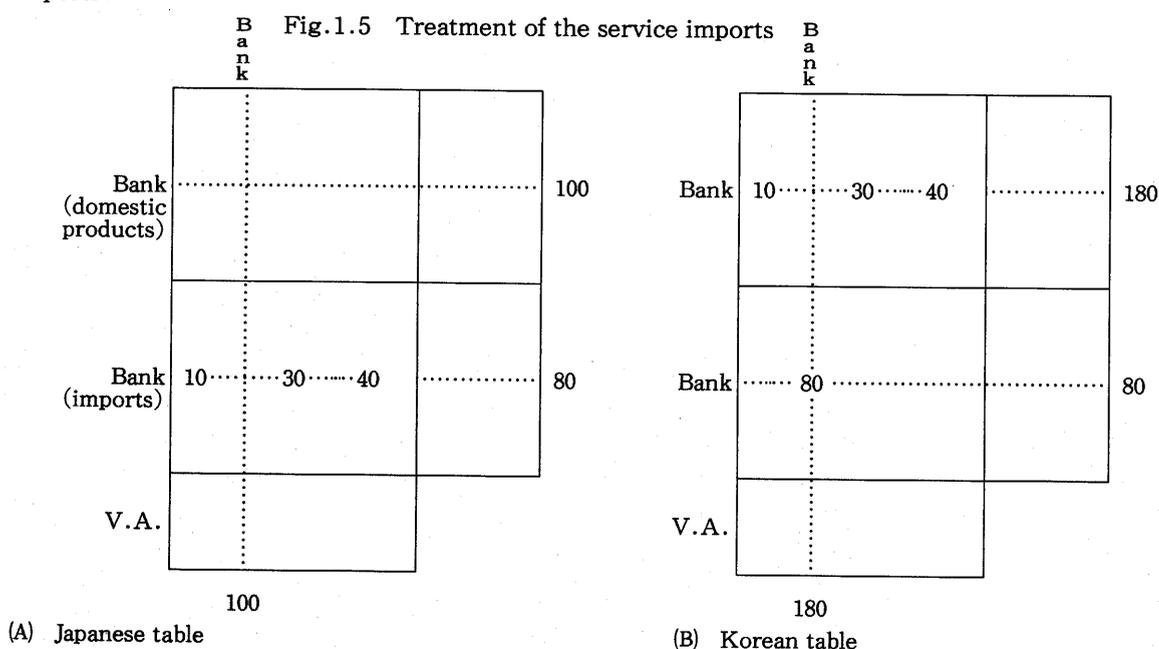
2.5 CONCEPTUAL ADJUSTMENT

(1) Imports of Banking, Insurance, Postal, and Telecommunication Services

Imports of the services noted above are treated differently in the Korean and Japanese national tables. The two panels in Fig. 5 show how these tables treat a case where imported banking services are purchased by three column sectors to the amount of 10, 30 and 40 units, respectively.

In the Japanese table (Panel A in Fig. 1.5), these values for banking services are recorded in the row for imported banking services, whereas the Korean table treats them as if they were produced by the domestic banking sector which imports 80 units of banking services from the counterpart country (Panel B).

In the 1985 Korea-Japan International Input-Output Table, as mentioned in Chapter 1, imports of the services mentioned above are treated in the same manner as in the Korean table. As a result of double accounting, the gross output of each of these Japanese service sectors in the Bilateral Table is bigger than the corresponding gross output in the national table by an amount equal to the value of the total imports.



[2] Internal Activities and Costs

In addition to their major activities, some establishments also bear internal costs for staff training, R & D activities, and transport costs of their products, materials and employees. In the Japanese table, the cost of these internal activities are separated from their major activities and recorded in the dummy sectors (7131-01, 7102-01, 8212-01, 8222-01). In the Korean table, on the contrary, these are all included in the major activities.

For the uniformity of recording, each dummy sector column in the Japanese table was allocated among the intermediate sectors in proportion to the figures in the dummy sector row (see Fig. 1.6).

Fig. 1.6 Treatment of the Cost of Internal Activities

		Dummy Sector					
Dummy Sector		18					
		6					
		12					
		⋮					
	10 — 20 — 30 —	⋮			---	60	
V.A.		24					
		⋮					
		60					

	3	6	9	0		18
	1	2	3	0		6
	2	4	6	0		12
	0 — 0 — 0 —	⋮			---	0
V.A.	4	8	12	0		
	⋮					
	10	20	30	0		

[3] Repair of General Machinery and Electric Machinery

In the Korean table, repair of machinery carried out by the manufacturer is included in the gross output of each manufacturing sector. In the Japanese table, however, this is recorded in the sectors for Repair of General Machinery (3032-10) and Repair of Electric Machinery (3432-10).

These two repair sectors in the table for Japan were distributed to the general machinery sectors and the electric machinery sectors, in the following manner:

i) Distribution of Columns

The figures in the repair sector columns were distributed in proportion to the gross output of each of the machinery sectors.

ii) Distribution of Rows

The rows for repairs were portioned out according to the column-wise ratios of the fixed capital formation matrix for Japan. However, this process generated some row-wise discrepancies in the manufacturing sectors between the control totals and the actual totals. The RAS method was applied for reconciliation of the table.

2.6 COMPILATION OF EXPORT MATRICES

The Bilateral Table shows, in matrix form, the Korean and Japanese exports of commodities by counterpart country (China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Taiwan, Thailand, USA, and the rest of the world). For Korea, this matrix was constructed by decomposing the export column of the national input-output table using Korean Foreign Trade Statistics and detailed data from the BOK Balance of Payments statement. For Japan, however, there was no detailed information available on "invisible exports." Therefore, estimates of service imports from Japan to Korea were substituted for service exports from Japan to Korea. All the exports to countries other than Korea were included in the column for Japan's exports to the rest of the world (LW001).

2.7 STATISTICAL DISCREPANCIES

The column-wise discrepancies in the Bilateral Table are caused solely by the rounding errors generated in the process of compilation. In principle, these errors were incorporated into the row for operating surplus (VV002). But some column sectors, such as public sectors, by definition, cannot have any value

but zero in operating surplus. In such a case, the discrepancy was merged into the value added sector with the largest value.

In contrast, there are four causes responsible for the row-wise discrepancies, i.e., (1) rounding errors, (2) discrepancies between the Foreign Trade Statistics for Korea and Japan, (3) differences in the code-converters (I-0 classification v.s. CCCN) used in the two countries, and (4) discrepancies between the export values shown in the national input-output table and the Foreign Trade Statistics of Japan. The export values for Japan in the Bilateral Table are based on data from the Foreign Trade Statistics which are not exactly equal to the values of ordinary exports in the national table for Japan. As a result, there are some discrepancies in the total output figures for Japanese products. All of the discrepancies listed above are recorded in the QX001 column.

In most of the sectors, the ratios of discrepancies to the gross outputs are below 1 percent, both row-wise and column-wise. But those sectors shown in Table 1.3 have row-wise discrepancies above 10 percent. The discrepancies in Sectors AK027, AK044, AK056, AK136, AK176 and AK184 arose from the third source noted above¹⁾, while those in Sectors AK041 and AK197 are from the second source (AK041 from the difference in the value of " provisionally preserved fruits" and AK197 from that of " aircraft"). The discrepancy in Sector AK084 is due to the fourth of these causes.

Table 1.3 Sectors with a discrepancy rate above 10 percent

Sector		Discrepancy
Code	Name	Rate (%)
(1) AK027	Sea-shore Culture	12.3
(2) AK041	Other Processed Farm Products	38.9
(3) AK044	Salted, Dried and Smoked Marine Products	28.4
(4) AK056	Other Food Preparations	11.1
(5) AK084	Other Wooden Products	12.9
(6) AK136	Other Non-metallic Mineral Products	12.4
(7) AK176	Other Electric Machinery and Equipment for Industry	11.5
(8) AK184	Applied Electronic Equipment	21.4
(9) AK197	Aircraft	11.1

2.8 SOURCES OF DATA

- [1] The Bank of Korea, *1985 Input-Output Tables*, Seoul: the Bank of Korea, 1988.
- [2] The Bank of Korea and Institute of Developing Economies, *Report for Special Survey on Imported Component of Input in Korea*, Tokyo: Institute of Developing Economies, 1989.
- [3] Customs Bureau, *Japan Exports & Imports, 1985*, Tokyo: Japan Tariff Association, 1986.
- [4] Government of Japan, *1985 Input-Output Tables*, Tokyo: Management and Coordination Agency, 1989.
- [5] Japan Maritime Research Institute, *Compilation of an Input-Output Table Focused on the International Freight Transport* (in Japanese), Tokyo: Japan Maritime Research Institute, 1988.
- [6] Korea Insurance Development Institute, *Marine Insurance Rating Manual* (in Korean), Seoul: Korea Insurance Development Institute, 1985.
- [7] Office of Customs Administration, *Statistical Yearbook of Foreign Trade, 1985*, Seoul: Office of Customs Administration, 1986.

1) The difference in the code-converter applied for the following commodities was the major sources of the discrepancies - sea weed (AK027), dried fish (AK044), ginseng products (AK056), marble stone products (AK136), inductors (AK176), microscopes and signals (AK184).