

11.D

Korea

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This chapter documents the procedure and considerations underlying the construction of the Korean input-output (I-O) table for version 6 of the Global Trade Analysis Project (GTAP) Data Base. The documentation is organized as follows. Section 11.D.1 provides a short description of the general characteristics of the Korean I-O table. Section 11.D.2 shows how the Korean I-O table is mapped to the GTAP concordance. Section 11.D.3 and 11.D.4 explain how negative values in the initial Korean I-O table were adjusted and how commodity taxes on imports were calculated, respectively. In the final section, information not available from the Korean I-O table are enumerated.

11.D.2 Data Source

The Korean I-O table used for version 6 of the GTAP Data Base was compiled by the Bank of Korea in Seoul (The Bank of Korea, 2003). The reference year of the Korean I-O table is 2000 and the units of accounts are million Korean won. The Korean I-O table is grouped commodity by commodity and includes 404 sectors, compared to 402 sectors in the Korean I-O table of 1995 used for version 5 of the GTAP Data Base. The new sectors introduced in the Korean I-O table of 2000 include sectors mainly related to computer and information technology such as semiconductor machinery (sector 244), flat-panel digital display equipment (sector 255), software development & supply (sector 364), computer related services (sector 365), and information supply services (sector 368).

Two different kinds of tables are available: a transactions table at producers' prices and a transactions table of imported goods and services. The transactions table of domestic goods and services was obtained by subtracting the second table (transaction table of imports) from the first table (transaction table of total uses). Before doing this, however, negative values in the tables were adjusted.

The matrix of final demand in the transactions table of domestic products and that of the transactions table of imports include private consumption expenditure, government consumption expenditure, gross private fixed capital formation, gross government fixed capital formation, change in stocks, and exports (of course, the transactions table of imports doesn't include a column of exports). Gross government fixed capital formation was added to gross private fixed capital formation to create a vector of investment usage of domestic products and a vector of investment usage of imports.

The matrix of value-added in the transactions table at producers' prices includes compensation of employees, operating surplus, depreciation of fixed capital, indirect taxes and (less) subsidies. Depreciation of fixed capital was added to operating surplus in order to obtain a vector of employment of capital. Subsidies were subtracted from indirect taxes to get a vector of net non-commodity indirect taxes.

11.D.2 Sectoral Concordance

Table 11.D.A1 in the appendix shows how the sectoral classification of the Korean I-O table is mapped to the GTAP sectoral classification (GSC2). Since the Korean I-O table is more disaggregated than the GTAP sectoral classification in all sectors except for three sectors (sector 6: sugar cane, sugar beet; sector 9: bovine cattle, sheep and goats, horses; sector 12: wool, silk-worm cocoons), it relatively easily fulfills the requirements of GSC2.

While there is neither domestic production of sugar cane and sugar beet, nor their imports in Korea, wool and silk-worm cocoons are included in sector 22 (other livestock breeding) of the 404 sectors of the Korean I-O table. Beef cattle are treated as a sector (sector 19) in the Korean I-O table, but sheep and goats, and horses are also included in the sector 22. Therefore, sector 22 of the Korean I-O table had to be split to be consistent with the GSC2.

The splits of sector 22 (other livestock breeding) of the Korean I-O table are shown in Table 11.D.1. The asterisk (*) signifies the Korean I-O table sector affected by the split.

Table 11.D.1 Splits of Sector 22 (Other Livestock Breeding) to be consistent with GSC2

GTAP (GSC2)	Korean I-O Table
09 Bovine cattle, sheep and goats, horses	19 Beef cattle 22* Other livestock breeding
10 Animal products nec	20 Swine 21 Poultry and eggs 22* Other livestock breeding
12 Wool, silk-worm cocoons	22* Other livestock breeding

The split of sector 22 of the Korean I-O table (the transactions table of domestic products and that of imports) was estimated on the basis of value of domestic output and imports of sheep and goats, horses, wool, silk-worm cocoons, and other livestock products (see table 11.D.2).

Table 11.D.2 Shares of Splits of Sector 22 (Other Livestock Breeding)

Components of Sector 22	Domestic Production		Imports	
	Value	Share (%)	Value	Share (%)
Sheep and goats	5,814	2.58	376	0.13
Horses	4,561	2.02	8,355	2.96
Wool	58	0.03	238,728	84.63
Silk-worm cocoons	14,336	6.35	445	0.16
Other livestock products	200,904	89.02	34,196	12.12
Total value of sector 22	225,673	100.00	282,100	100.00

11.D.3 Adjustment of Negative Values

In the initial Korean I-O table, there are negative values in the intermediate usage of domestic products, household consumption of domestic products, and investment usage of domestic products. These are mostly due to the scraps which are registered as negative values on the basis of the Stone's method and to the government subsidy for processed rice traded which is registered as negative values in the cells of trade and processed rice (sector 47, sector 23). In the Korean I-O table, this subsidy to support the income of farm household producing rice is not treated as a production subsidy registered as a negative value in the column of net non-commodity indirect taxes, but as a negative value in the cell of trade and processed rice in the matrix of intermediate usage of domestic products.

The negative values in intermediate usage of domestic products (in rows), household usage of domestic products, and investment usage of domestic products were all set to zero and sectoral balance was restored by adjusting "changes in stocks". The negative values in intermediate usage of domestic products (in columns) were also set to zero and sectoral balance was restored by adjusting "non-commodity indirect taxes."

11.D.4 Calculating Commodity Taxes on Imports

The initial Korean I-O table includes only a column vector reporting commodity taxes on total imports by commodity. This column vector was used as the column total to generate the following arrays:

- AI17: commodity tax on intermediate usage of imports, by commodity and industry
- AI19: commodity tax on household consumption of imports, by commodity
- AI21: commodity tax on investment usage of imports, by commodity
- AI23: commodity tax on government usage of imports, by commodity
- AI26: commodity tax on change in stocks of imports, by commodity.

This was done by first calculating the percentage shares of the base values corresponding to the above arrays to the value of total imports. Then the percentage shares were multiplied to the vector of commodity taxes on total imports.

11.D.5 Additional Remarks

Among the information cited in table 2 of GTAP Technical Paper No. 1, "Contributing Input-Output Tables to the GTAP Data Base", Release 4.2, January 2000, employment of land, by industry (AI15), commodity tax on intermediate usage of domestic products, by commodity and industry (AI16), commodity tax on household consumption of domestic products, by commodity (AI18), commodity tax on investment usage of domestic products, by commodity (AI20), commodity tax on government

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usage of domestic products, by commodity (AI22), commodity tax on exports, by commodity (AI24), and commodity tax on change in stocks of domestic products, by commodity (AI25) are not available in the initial Korean I-O table. The values for these arrays were all set to zero.

Reference

The Bank of Korea. 2003. Input-Output Tables of Korea 2000. Seoul.

Appendix

Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
01	pdr	Paddy rice	1	Unmilled rice
02	wht	Wheat	3	Wheat
03	gro	Cereal grains nec	2	Barley
			4	Miscellaneous cereals
04	v_f	Vegetables, fruit, nuts	5	Vegetables
			6	Fruits
			7	Pulses
05	osd	Oil seeds	9	Oleaginous crops
06	c b	Sugar cane, sugar beet		Non-existent
07	pfb	Plant-based fibers	12	Cotton and hemp
08	ocr	Crops nec	8	Potatoes
			10	Cultivated medicinal herbs
			11	Other edible crops
			13	Leaf tobacco
			14	Ornamental floriculture
			15	Natural rubber
			16	Seeds and seedlings
			17	Other inedible crops
09	ctl	Bovine cattle, sheep and goats, horses	19	Beef cattle
10	oap	Animal products nec	22*	Other livestock breeding
			20	Swine
			21	Poultry and eggs
			22*	Other livestock breeding
11	rmk	Raw milk	18	Dairy farming
12	wol	Wool, silk-worm cocoons	22*	Other livestock breeding
13	frs	Forestry	23	Forest planting and conservation
			24	Raw timber
			25	Edible forestry products
			26	Misc. forestry products
14	fsh	Fishing	27	Marine fishing
			28	Fresh water fishing
			29	Marine culture
			30	Fresh water culture
15	coa	Coal	31	Anthracite
			32	Bituminous coal
16	oil	Oil	33	Crude petroleum
17	gas	Gas	34	Natural gas
18	omn	Minerals nec	35	Iron ores
			36	Copper ores
			37	Lead and zinc ores
			38	Misc. nonferrous metal ores
			39	Sand and gravel
			40	Crushed and broken stone
			41	Other bulk stones
			42	Limestone

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
18	omn	Minerals nec (Contd)	43	Materials for ceramics
			44	Crude salt
			45	Misc. nonmetallic minerals
19	cmt	Bovine cattle, sheep, and goat, horse meat products	46	Slaughtering and meat processing
20	omt	Meat products nec	47	Poultry slaughtering and processing
			48	Prepared meat products
			71	Animal and marine fats and oils
21	vol	Vegetable oils and fats	72	Vegetable fats and oils and processed edible refined oil
22	mil	Dairy products	49	Milk
			50	Milk products
			51	Ice cream
23	pcr	Processed rice	57	Polished rice
24	sgr	Sugar	60	Raw sugar
			61	Refined sugar
25	ofd	Food products nec	52	Fish fillets and fish cake products
			53	Canned sea foods
			54	Frozen fish and sea foods
			55	Salted, dried and smoked sea foods
			56	Misc. Processed sea foods
			58	Polished barley
			59	Flour and cereal preparations
			62	Starches
			63	Glucose, glucose syrup and maltose
			64	Bakery products
			65	Confectionery products
			66	Noodles
			67	Refined salt
			68	Fermented seasonings
			69	Other seasoning
			70	Soy sauce and bean paste
			73	Canned or cured fruits and vegetables
			74	Coffee and tea
			75	Ginseng products
			76	Malt and yeast
			77	Bean curd
			78	Miscellaneous foodstuffs
			85	Prepared livestock feeds
26	b_ t	Beverages and tobacco products	79	Ethyl alcohol for beverages
			80	Distilled spirits (soju)
			81	Beer
			82	Other liquors
			83	Soft drinks
			84	Mineral water & manufactured ice
			86	Tobacco products
27	tex	Textiles	87	Silk yarn
			88	Woolen yarn
			89	Cotton yarn

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
27	tex	Textiles (Contd)	90	Hempen yarn
			91	Regenerated fiber yarn
			92	Synthetic fiber yarn
			93	Thread and other fiber yarns
			94	Silk fabrics
			95	Woolen fabrics
			96	Cotton fabrics
			97	Hempen fabrics
			98	Regenerated fiber fabrics
			99	Synthetic fiber fabrics
			100	Other fiber fabrics
			101	Knitted fabrics
			102	Fiber bleaching and dyeing
			109	Textile products
			110	Misc. Textile products
			111	Cordage, rope, and fishing nets
28	wap	Wearing apparel	103	Knitted wearing apparels
			104	Knitted clothing accessories
			105	Textile wearing apparels
			106	Other clothing accessories
			107	Leather wearing apparels
			108	Fur wearing apparels
29	lea	Leather products	112	Leather
			113	Fur
			114	Luggage and handbags
			115	Leather footwear
			116	Textile footwear and other shoes
			117	Other leather products
30	lum	Wood products	118	Lumber
			119	Plywood
			120	Reconstituted and densified wood
			121	Wooden products for construction
			122	Wooden containers
			123	Other wooden products
31	ppp	Paper products, publishing	124	Pulp
			125	Newsprint
			126	Printing paper
			127	Other raw paper and paperboard
			128	Corrugated paper and solid fiber boxes
			129	Paper containers
			130	Stationery paper and office paper
			131	Sanitary paper products
			132	Other paper products
			133	Newspapers
			134	Publishing
			135	Printing
			136	Publishing and reproduction of recorded media

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)		Korean I-O Table Sectoral Classification	
32	p_c Petroleum, coal products	137	Coal briquettes
		138	Coke and other coal products
		139	Naphtha
		140	Gasoline
		141	Jet oil
		142	Kerosene
		143	Light oil
		144	Heavy oil
		145	Liquefied petroleum gas
		146	Lubricants
		147	Misc. petroleum refinery products
33	crp Chemical, rubber, plastic products	148	Petrochemical basic products
		149	Petrochemical intermediate products
		150	Coal chemicals
		151	Other basic organic chemicals
		152	Industrial gases
		153	Basic inorganic chemicals
		154	Synthetic resins
		155	Synthetic rubber
		156	Regenerated cellulose fibers
		157	Synthetic fibers
		158	Nitrogen compounds
		159	Fertilizers
		160	Pesticides and other agricultural chemicals
		161	Medicaments
		162	Cosmetics and dentifrices
		163	Soap and detergents
		164	Dyes, pigments, and tanning materials
		165	Paints, varnishes, and allied products
		166	Printing ink
		167	Adhesives, gelatin, and sealants
		168	Explosives and fireworks products
		169	Recording media for electronic equipments
		170	Photographic chemical products
		171	Misc. Chemical products
		172	Primary plastic products
		173	Industrial plastic products
		174	Household articles of plastic material
		175	Tires and tubes
		176	Industrial rubber products
		177	Misc. rubber products
34	nmm Mineral products nec	178	Sheet glass and primary glass products
		179	Industrial glass products
		180	Household glass products and others
		181	Industrial pottery products
		182	Pottery, china, and earthenware for home use

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
34	nmm	Mineral products nec (Contd)	183	Clay refractories
			184	Clay products for construction
			185	Cement
			186	Ready mixed concrete
			187	Concrete blocks, bricks, and other concrete products
			188	Lime, gypsum, and plaster products
			189	Cut stone & stone products
			190	Asbestos and mineral wool products
			191	Abrasives
			192	Asphalts
			193	Misc. Nonmetallic mineral products
35	i_s	Ferrous metals	194	Pig iron
			195	Ferro alloys
			196	Steel ingots and semi-finished products
			197	Steel rods and bars
			198	Section steel
			199	Rails and wires
			200	Hot rolled steel plates and sheets
			201	Steel pipe and tubes, except foundry iron pipe and tubes
			202	Cold rolled steel sheet, strip, and bars
			203	Iron foundries and foundry iron pipe and tubes
			204	Forgings
			205	Coated steel plates
			206	Misc. primary iron and steel products
36	nfm	Metals nec	207	Copper ingots
			208	Aluminum ingots
			209	Lead and zinc ingots
			210	Gold and silver ingots
			211	Other nonferrous metal ingots
			212	Primary copper products
			213	Primary aluminum products
			214	Other nonferrous metal casting and forgings and primary nonferrous metals
37	fmp	Metal products	215	Metal products for construction
			216	Structural metal products
			217	Metal tanks and reservoirs
			218	Metal cans, barrels, and drums
			219	Hand tools
			220	Bolts, nuts, screws, rivets, and washers
			221	Fabricated wire products
			222	Fastening metal products
			223	Treatment and coating of metals
			224	Household metallic utensils
			225	Misc. Fabricated metal products

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
38	mvh	Motor vehicles and parts	281	Passenger automobiles
			282	Buses and vans
			283	Trucks
			284	Motor vehicles with special equipment
			285	Motor vehicle engines
			286	Motor vehicle chassis, bodies and parts
			287	Trailors and containers
39	otn	Transport equipment nec	288	Steel ships
			289	Other ships
			290	Ship repairing and ship parts
			291	Railroad vehicles and parts
			292	Aircraft and parts
			293	Motorcycles and parts
			294	Bicycles and parts and misc. transportation
40	ele	Electronic equipment	262	Television receiving sets
			263	Video cassette recorders and players
			264	Electric household audio equipment
			265	Other audio and visual equipment
			266	Wire telephone and telegraph equipment
			267	Radio and television broadcasting and wireless communication equipment
			268	Computer and peripheral equipment
			269	Office machines and devices
41	ome	Machinery and equipment nec	226	Engines and turbines
			227	Valves
			228	Bearing, gears, gearing and driving elements
			229	Conveyors and conveying equipment
			230	Air conditioning equipment and industrial refrigeration equipment
			231	Boiler
			232	Heating apparatus and cooking appliances
			233	Pumps and compressors
			234	Filtering or purifying machinery for liquid and gases
			235	Misc. machinery and equipment of general purpose
			236	Metal cutting type machine tools
			237	Metal forming machine tools
			238	Agricultural implements and machinery
			239	Construction and mining machinery
			240	Food processing machinery
			241	Textile machinery
			242	Metal molds and industrial patterns
			243	Printing machinery
			244	Semiconductor machinery
			245	Misc. machinery and equipment of special purpose

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
41	ome	Machinery and equipment nec (Contd)	246	Motors and generators
			247	Electric transformers
			248	Capacitors and rectifiers
			249	Electric transmission and distribution equipment
			250	Insulated wires and cables
			251	Batteries
			252	Electric lamps and electric lighting fixtures
			253	Misc. electric equipment and supplies
			254	Electron tubes
			255	Flat-panel digital display equipment
			256	Semiconductor devices
			257	Integrated circuits
			258	Electric resistors and storage batteries
			259	Electric coils, transformers and other inductors
			260	Printed circuit boards
			261	Misc. electronic components
			270	Household refrigerators and freezers
			271	Household laundry equipment
			272	Electric household fans
			273	Household electric cooking and heating equipment
			274	Other household electrical appliances
			275	Medical instruments and supplies
			276	Industrial automatic regulators
			277	Measuring and analytical instruments
			278	Cinematograph cameras and projectors
			279	Other photographic and optical instruments
			280	Watches and clocks
42	omf	Manufactures nec	295	Wood furniture
			296	Metal furniture
			297	Other furniture
			298	Toys and games
			299	Sporting and athletic goods
			300	Musical instruments
			301	Pens, pencils, and other artists' materials
			302	Jewelry and plated ware
			303	Models and decorations
			304	Misc. Manufactured products
43	ele	Electricity	305	Water power generation
			306	Thermal power generation
			307	Atomic power generation
			308	Self-power generation
44	gdt	Gas manufacture, distribution	309	Manufactured gas supply
45	wtr	Water	310	Steam and hot water supply
			311	Water supply
46	cns	Construction	312	Steel concrete residential building construction
			313	Wooden and other residential building construction

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
46	cns	Construction (Contd)	314	Steel concrete nonresidential building construction
			315	Wooden and other nonresidential building construction
			316	Building repairs
			317	Road construction
			318	Railroad construction
			319	Subway construction
			320	Breakwater, pier, and harbor construction
			321	Airport construction
			322	Dam, levee, and flood control project construction
			323	Water main line and drainage project construction
			324	Land clearing and reclamation, and irrigation project construction
			325	Land leveling and athletic field construction
			326	Electric power plant construction
			327	Communications line construction
			328	Misc. construction
47	trd	Trade	329	Wholesale trade
			330	Retail trade
			331	Eating and drinking places
			332	Hotels and other lodging places
48	otp	Transport nec	333	Railroad passenger transportation
			334	Railroad freight transportation
			335	Road passenger transportation
			336	Road freight transportation
			340	Services incidental to road transportation
			341	Services incidental to water transportation
			342	Airports, flying, fields and airport terminal services
			343	Cargo loading or unloading operations
			344	Warehousing and storage
			345	Other services incidental to transportation
49	wtp	Water transport	337	Coastal and inland water transportation
			338	Deep sea transportation
50	atp	Air transport	339	Air transportation
51	cmn	Communication	346	Postal services
			347	Telegraph and telephone
			348	Multimedia service with high Mbps bandwidth
			349	Value added communication
			350	Wireless broadcasting
			351	Cable broadcasting
52	ofi	Financial services nec	352	Central bank, bank depository institutions
			353	Non-bank depository intermediates
			354	Other financial intermediates
			357	Services auxiliary to finance and insurance
53	isr	Insurance	355	Life insurance
			356	Casualty insurance

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Table 11.D.A1 Mapping of the 404-Sector Korean I-O Table to the GTAP Sectoral Classification (Contd)

GTAP Sectoral Classification (GSC2)			Korean I-O Table Sectoral Classification	
54	obs	Business services nec	359	Real estate rental
			360	Real estate agents and managers
			361	Legal and accounting services
			362	Architecture and civil engineering services
			363	Other engineering services
			364	Software development and supply
			365	Computer related services
			366	Renting of machinery and goods
			367	Advertising services
			368	Research and news syndicates services
			369	Cleaning and disinfection services
			370	Agriculture and fishing services
			371	Misc. business services
55	ros	Recreational and other services	388	Culture services (public)
			389	Culture services (other)
			390	Motion picture production and distribution
			391	Theatrical producers, bands, and entertainers
			392	Sports organizations and sports facility operation
			393	Misc. amusement and recreation services
			394	Business associations and professional membership organizations
			395	Religious, political, labor, and other social organizations
			396	Motor repair services
			397	Other personal repair services
			398	Laundry and cleaning services
			399	Barber and beauty shops
			400	Domestic services
			401	Other personal services
			402	Office supplies
			403	Business consumption expenditures
			404	Nonclassifiable activities
56	osg	Public administration and defense, education and health	372	Public government
			373	Local government
			374	School education (public)
			375	School education (private, non-profit)
			376	School education (commercial)
			377	Research institutes (public)
			378	Research institutes (private, non-profit)
			379	Research institutes (commercial)
			380	Research and experiment in enterprise
			381	Medical and health services (public)
			382	Medical and health services (private, non-profit)
			383	Medical and health services (commercial)
			384	Social welfare services (public)
			385	Social welfare services (private, non-profit)
			386	Sanitary services (public)
			387	Sanitary services (commercial)
57	dwe	Dwellings	358	Owner-occupied dwellings (imputed rent)

* Requirements of the GTAP sectoral classification are not fulfilled.