

Chapter 8

Guide to the GTAP Data Base

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8.1 Overview

The GTAP data base is the global data base for the GTAP model of the world economy. It covers all the data included in the data package, except the time series trade data (described in chapter 7). It comprises four files: sets, parameters, main data, and energy volume data. All the files are header array files (a GEMPACK binary format) (Harrison and Pearson, 1998). In the GTAP model, data may be updated, that is, they typically depend on the state of the world, and change through a GTAP simulation. Parameters, on the other hand, are invariant within simulations.

The sets file enumerates the GTAP regions and commodities and other sets used in the model. The parameters file contains invariant behavioral parameters. The main data file is a representation of the state of the world economy in 1997. It represents the world economy as a system of flows of goods and services, measured as money values, in millions of 1997 U.S. dollars. These flows include both input-output flows within each region and bilateral international trade flows. Since most flows are measured at both tax-free and tax-paid prices, it also implicitly covers indirect taxation. On the other hand, it does not include price or quantity data, and does not include time series data. The energy volume data file contains data on energy purchases by firms and by households and bilateral trade of energy products.

8.2 GTAP Sets File

Table 8.1 shows the arrays in the sets file. The array H1 is a list of regions in the model. H2 lists ordinary goods and services or *traded commodities*, so called because they can be traded between regions. In this they contrast with the primary factors or *endowment commodities*, listed in array H6. The endowment commodities include land, unskilled labor, skilled labor, capital, and natural resources. One of these, capital, is specified in array H9 as the *capital endowment commodity* (this is for convenience in implementing the investment theory of the model).

The arrays H7 and H8 divide the endowment commodities into two groups. The *mobile* endowment commodities (H8) are perfectly mobile across industries within each region; the *sluggish* endowment commodities (H7) are imperfectly mobile or immobile. In the standard data base, skilled and unskilled labor and capital are classed as mobile, and land and natural resources as sluggish. This is suitable for long-run simulations. For short-run simulations, users may wish to move capital from H8 to H7, to treat it as sluggish rather than mobile.

The remaining arrays are provided for convenience in implementing the theoretical structure of the GTAP model. The *non-savings commodities*, array H3, comprise the endowment commodities, the traded commodities, and an investment good. The *demanded commodities*, H4, comprise endowment and traded commodities; the *produced commodities*, H5, comprise traded commodities and the investment good. Finally, array MARG lists the margin commodities.

Table 8.1 Arrays in the GTAP Sets File

Name	Dimension	Description
H1	r	Regions
H2	t	Traded commodities
H3	$s+m+t+1$	Non-saving commodities
H4	$s+m+t$	Demanded commodities
H5	$t+1$	Produced commodities
H6	$s+m$	Endowment commodities
H7	s	Sluggish endowment commodities
H8	m	Mobile endowment commodities
H9	1	Capital endowment commodity
MARG	g	Margin commodities

g number of margins commodities (sectors)

m number of primary factors perfectly mobile across industries

r number of regions

s number of primary factors not perfectly mobile across industries

t number of tradeable commodities (sectors)

Users of the GTAP model should note that the derived arrays H3, H4, and H5 are obsolete as of `gtap.tab` release 5.1 (they are now derived internally in the solution program). Also obsolete are the sluggish and mobile endowment commodity arrays H7 and H8; the sluggish/mobile distinction is now indicated with a parameter, SLUG (section 8.3).

8.2.1 GTAP Regions

In the standard data base, there are sixty-six (66) regions and fifty-seven (57) traded commodities. These are defined in the GTAP regional and sectoral classifications.

Table 8.2 shows the regional definitions used in version 5 of the data base. The 66 regions are defined as aggregates of 211 countries using the GTAP standard country list (section 8.2.2).

Table 8.2 Regions in the GTAP Data Base

	Code	Name	Member Countries	Code
1	AUS	Australia	Australia	AUS
2	NZL	New Zealand	New Zealand	NZL
3	CHN	China	China	CHN
4	HKG	Hong Kong	Hong Kong	HKG
5	JPN	Japan	Japan	JPN
6	KOR	Korea	Korea, Republic of	KOR
7	TWN	Taiwan	Taiwan	TWN
8	IDN	Indonesia	Indonesia	IDN
9	MYS	Malaysia	Malaysia	MYS
10	PHL	Philippines	Philippines	PHL
11	SGP	Singapore	Singapore	SGP
12	THA	Thailand	Thailand	THA
13	VNM	Vietnam	Vietnam	VNM
14	BGD	Bangladesh	Bangladesh	BGD
15	IND	India	India	IND
16	LKA	Sri Lanka	Sri Lanka	LKA
17	XSA	Rest of South Asia	Bhutan	BTN
			Maldives	MDV
			Nepal	NPL
			Pakistan	PAK
18	CAN	Canada	Canada	CAN
19	USA	United States of America	American Samoa	ASM
			Guam	GUM
			Northern Mariana Islands	MNP
			United States of America	USA
20	MEX	Mexico	Mexico	MEX

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Table 8.2 Regions in the GTAP Data Base (Continued)

	Code	Name	Member Countries	Code
21	XCM	Central America and the Caribbean	Anguila	AIA
			Antigua & Barbuda	ATG
			Aruba	ABW
			Bahamas	BHS
			Barbados	BRB
			Belize	BLZ
			Cayman Islands	CYM
			Costa Rica	CRI
			Cuba	CUB
			Dominica	DMA
			Dominican Republic	DOM
			El Salvador	SLV
			Grenada	GRD
			Guatemala	GTM
			Haiti	HTI
			Honduras	HND
			Jamaica	JAM
			Netherlands Antilles	ANT
			Nicaragua	NIC
			Panama	PAN
			Saint Kitts and Nevis	KNA
			Saint Lucia	LCA
			Saint Vincent and the Grenadines	VCT
			Trinidad and Tobago	TTO
			Virgin Islands, British	VGB
22	COL	Colombia	Colombia	COL
23	PER	Peru	Peru	PER
24	VEN	Venezuela	Venezuela	VEN
25	XAP	Rest of Andean Pact	Bolivia	BOL
			Ecuador	ECU
26	ARG	Argentina	Argentina	ARG
27	BRA	Brazil	Brazil	BRA
28	CHL	Chile	Chile	CHL
29	URY	Uruguay	Uruguay	URY
30	XSM	Rest of South America	Guyana	GUY
			Paraguay	PRY
			Suriname	SUR
31	AUT	Austria	Austria	AUT
32	BEL	Belgium	Belgium	BEL
33	DNK	Denmark	Denmark	DNK
34	FIN	Finland	Finland	FIN

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Table 8.2 Regions in the GTAP Data Base (Continued)

	Code	Name	Member Countries	Code
35	FRA	France	France French Guiana Martinique Reunion	FRA GUF MTQ REU
36	DEU	Germany	Germany	DEU
37	GBR	United Kingdom	United Kingdom	GBR
38	GRC	Greece	Greece	GRC
39	IRL	Ireland	Ireland	IRL
40	ITA	Italy	Italy	ITA
41	LUX	Luxembourg	Luxembourg	LUX
42	NLD	Netherlands	Netherlands	NLD
43	PRT	Portugal	Portugal	PRT
44	ESP	Spain	Spain	ESP
45	SWE	Sweden	Sweden	SWE
46	CHE	Switzerland	Switzerland	CHE
47	XEF	Rest of EFTA	Iceland Leichtenstein Norway	ISL LIE NOR
48	HUN	Hungary	Hungary	HUN
49	POL	Poland	Poland	POL
50	XCE	Rest of Central European Associates	Bulgaria Czech Republic Romania Slovakia Slovenia	BGR CZE ROM SVK SVN
51	XSU	Former Soviet Union	Armenia Azerbaijan Belarus Estonia Georgia Kazakhstan Kyrgyzstan Latvia Lithuania Moldova, Republic of Russian Federation Tajikistan Turkmenistan Ukraine Uzbekistan	ARM AZE BLR EST GEO KAZ KGZ LVA LTU MDA RUS TJK TKM UKR UZB
52	TUR	Turkey	Turkey	TUR

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Table 8.2 Regions in the GTAP Data Base (Continued)

	Code	Name	Member Countries	Code
53	XME	Rest of Middle East	Bahrain Iran, Islamic Republic of Iraq Israel Jordan Kuwait Lebanon Oman Qatar Saudi Arabia Syrian Arab Republic United Arab Emirates Yemen	BHR IRN IRQ ISR JOR KWT LBN OMN QAT SAU SYR ARE YEM
54	MAR	Morocco	Morocco	MAR
55	XNF	Rest of North Africa	Algeria Egypt Libyan Arab Jamahiriya Tunisia	DZA EGY LBY TUN
56	BWA	Botswana	Botswana	BWA
57	XSC	Rest of South African Customs Union	Lesotho Namibia South Africa Swaziland	LSO NAM ZAF SWZ
58	MWI	Malawi	Malawi	MWI
59	MOZ	Mozambique	Mozambique	MOZ
60	TZA	Tanzania	Tanzania, United Republic of	TZA
61	ZMB	Zambia	Zambia	ZMB
62	ZWE	Zimbabwe	Zimbabwe	ZWE
63	XSF	Other Southern Africa	Angola Mauritius	AGO MUS
64	UGA	Uganda	Uganda	UGA
65	XSS	Rest of Sub-Saharan Africa	Benin Burkina Faso Burundi Cameroon Cape Verde Central African Republic Chad Comoros Congo Cote d'Ivoire Djibouti Equatorial Guinea	BEN BFA BDI CMR CPV CAF TCD COM COG CIV DJI GNQ

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Table 8.2 Regions in the GTAP Data Base (Continued)

	Code	Name	Member Countries	Code
65	XSS	Rest of Sub-Saharan Africa (Contd)	Eritrea	ERI
			Ethiopia	ETH
			Gabon	GAB
			Gambia	GMB
			Ghana	GHA
			Guinea	GIN
			Guinea-Bissau	GNB
			Kenya	KEN
			Liberia	LBR
			Madagascar	MDG
			Mali	MLI
			Mauritania	MRT
			Mayotte	MYT
			Niger	NER
			Nigeria	NGA
			Rwanda	RWA
			Sao Tome and Principe	STP
			Senegal	SEN
			Seychelles	SYC
			Sierra Leone	SLE
			Somalia	SOM
			Sudan	SDN
			Togo	TGO
			Zaire	ZAR
66	XRW	Rest of World	Afghanistan	AFG
			Albania	ALB
			Andorra	AND
			Bermuda	BMU
			Bosnia and Herzegovina	BIH
			Brunei	BRN
			Cambodia	KHM
			Croatia	HRV
			Cyprus	CYP
			Faroe Islands	FRO
			Fiji	FJI
			French Polynesia	PYF
			Gibraltar	GIB
			Greenland	GRL
			Guadeloupe	GLP
			Kiribati	KIR
			Lao People's Democratic Republic	LAO
			Macau	MAC
			Macedonia, the former Yugoslav Republic of	MKD
			Malta	MLT
			Marshall Islands	MHL

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Table 8.2 Regions in the GTAP Data Base (Continued)

	Code	Name	Member Countries	Code
66	XRW	Rest of World (Contd)	Micronesia, Federated States of	FSM
			Monaco	MCO
			Mongolia	MNG
			Myanmar	MMR
			Nauru	NRU
			New Caledonia	NCL
			Korea, Democratic People's Republic of	PRK
			Papua New Guinea	PNG
			San Marino	SMR
			Solomon Islands	SLB
			Tonga	TON
			Tuvalu	TUV
			Vanuatu	VUT
			Western Samoa	WSM
			Yugoslavia	YUG

8.2.2 GTAP Standard Countries

A group comprised of 211 countries formed the set of standard countries in the construction of the GTAP 5 data base. The identification of a set of standard countries is key to achieving the goal of regional flexibility in the data base construction process. Regional flexibility is attained when new regions can readily be added to the data base by simply including the new region(s) in a list of regions and a mapping file used in the data construction process and supplying the additional country's input-output table.

To achieve regional flexibility, contributors of international data sets to GTAP are encouraged to provide the data on a country basis rather than on a GTAP region basis. This facilitates revision of the GTAP regional classification without having to go back to the data contributors for new, reclassified source data. The contributed data is then mapped or transformed to apply to the set of standard countries. A mapping between the standard set of countries and the set of GTAP regions is then used to aggregate the data (see table 8.2). The mapping file is revised when a new region is introduced in the GTAP data base.

The country composition of the set of standard countries for GTAP 5 is such that it omits no significant economies and it captures all significant information from the contributed international data sets. We obtain a GDP estimate for each standard country for use as a scaling factor in aggregating data sets.

8.2.3 GTAP Sectoral Classification (GSC2)

Tables 8.3 and 8.4 show the sectoral definitions used in version 5 of the data base. We define the GTAP agricultural and food processing sectors by reference to the Central Product Classification (CPC), as shown in table 8.3. The other GTAP sectors are defined by reference to the International Standard Industry Classification (ISIC), as shown in table 8.4. We use the ISIC for most sectors, because it is the reference point for sectoral classification in most I-O statistics. But for agriculture and food processing, the ISIC does not provide the detail we need, so we use instead the CPC. The CPC was developed by the Statistical Office of the United Nations to serve as a bridge between the ISIC and other sectoral classifications (UN 1990, 1991).

Table 8.3 GSC2 Sectors defined by Reference to the Provisional CPC

GSC2 Number	Code	CPC Code	Description
1	pdr	0113	Rice, not husked
		0114	Husked rice
2	wht	0111	Wheat and meslin
3	gro	0112	Maize (corn)
		0115	Barley
		0116	Rye, oats
		0119	Other cereals
4	v_f	012	Vegetables
		013	Fruit and nuts
5	osd	014	Oil seeds and oleaginous fruit
6	c_b	018	Plants used for sugar manufacturing
7	pfb	0192	Raw vegetable materials used in textiles
8	ocr	015	Live plants; cut flowers and flower buds; flower seeds and fruit seeds; vegetable seeds
		016	Beverage and spice crops
		017	Unmanufactured tobacco
		0191	Cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form of pellets; swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches and similar forage products, whether or not in the form of pellets
		0193	Plants and parts of plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes
		0194	Sugar beet seed and seeds of forage plants
		0199	Other raw vegetable materials
9	ctl	0211	Bovine cattle, sheep and goats, horses, asses, mules, and hinnies, live
		0299	Bovine semen

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Table 8.3 GSC2 Sectors defined by Reference to the Provisional CPC (Continued)

GSC2 Number	Code	CPC Code	Description
10	oap	0212	Swine, poultry and other animals, live
		0292	Eggs, in shell, fresh, preserved or cooked
		0293	Natural honey
		0294	Snails, live, fresh, chilled, frozen, dried, salted or in brine, except sea snails; frogs' legs, fresh, chilled or frozen
		0295	Edible products of animal origin n.e.c.
		0297	Hides, skins and furskins, raw
		0298	Insect waxes and spermaceti, whether or not refined or coloured
11	rmk	0291	Raw milk
12	wol	0296	Raw animal materials used in textile
13	for	03	Forestry, logging and related service activities
19	cmt	21111	Meat of bovine animals, fresh or chilled
		21112	Meat of bovine animals, frozen
		21115	Meat of sheep, fresh or chilled
		21116	Meat of sheep, frozen
		21117	Meat of goats, fresh, chilled or frozen
		21118	Meat of horses, asses, mules or hinnies, fresh, chilled or frozen
		21119	Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen
20	omt	2161	Fats of bovine animals, sheep, goats, pigs and poultry, raw or rendered; wool grease
		21113	Meat of swine, fresh or chilled
		21114	Meat of swine, frozen
		2112	Meat and edible offal, fresh, chilled or frozen, n.e.c.
		2113	Preserves and preparations of meat, meat offal or blood
		2114	Flours, meals and pellets of meat or meat offal, inedible; greaves
		2162	Animal oils and fats, crude and refined, except fats of bovine animals, sheep, goats, pigs and poultry
21	vol	2163	Soya-bean, ground-nut, olive, sunflower-seed, safflower, cotton-seed rape, colza and mustard oil, crude
		2164	Palm, coconut, palm kernel, babassu and linseed oil, crude
		2165	Soya-bean, ground-nut, olive, sunflower-seed, safflower, cotton-seed, rape, colza and mustard oil and their fractions, refined but not chemically modified; other oils obtained solely from olives and sesame oil, and their fractions, whether or not refined, but not chemically modified
		2166	Maize (corn) oil and its fractions, not chemically modified
		2167	Palm, coconut, palm kernel, babassu and linseed oil and their fractions, refined but not chemically modified; castor, tung and jojoba oil and fixed vegetable fats and oils (except maize oil) and their fractions n.e.c., whether or not refined, but not chemically modified

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Table 8.3 GSC2 Sectors defined by Reference to the Provisional CPC (Continued)

GSC2 Number	Code	CPC Code	Description
21	vol	2168	Margarine and similar preparations
		2169	Animal or vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined, but not further prepared
		217	Cotton linters
		218	Oil-cake and other solid residues resulting from the extraction of vegetable fats or oils; flours and meals of oil seeds or oleaginous fruits, except those of mustard; vegetable waxes, except triglycerides; degreas; residues resulting from the treatment of fatty substances or animal or vegetable waxes
22	mil	22	Dairy products
23	pcr	2316	Rice, semi- or wholly milled
24	sgr	235	Sugar
25	ofd	212	Prepared and preserved fish
		213	Prepared and preserved vegetables
		214	Fruit juices and vegetable juices
		215	Prepared and preserved fruit and nuts
		2311	Wheat or meslin flour
		2312	Cereal flours other than of wheat or meslin
		2313	Groats, meal and pellets of wheat
		2314	Cereal groats, meal and pellets n.e.c.
		2315	Other cereal grain products (including corn flakes)
		2317	Other vegetable flours and meals
		2318	Mixes and doughs for the preparation of bakers' wares
		232	Starches and starch products; sugars and sugar syrups n.e.c.
		233	Preparations used in animal feeding
		234	Bakery products
		236	Cocoa, chocolate and sugar confectionery
		237	Macaroni, noodles, couscous and similar farinaceous products
		239	Food products n.e.c.
26	b_t	24	Beverages
		25	Tobacco products

n.e.c. Not elsewhere classified

Table 8.4 GSC2 Sectors defined by Reference to the ISIC, Rev. 3

GSC2 Number	Code	ISIC3 Code	Description
14	fsh	015	Hunting, trapping and game propagation including related service activities
		05	Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
15	col	101	Mining and agglomeration of hard coal
		102	Mining and agglomeration of lignite
16	oil	111	Extraction of crude petroleum and natural gas (part)
		112	Service activities incidental to oil and gas extraction excluding surveying (part)
		103	Mining and agglomeration of peat
17	gas	111	Extraction of crude petroleum and natural gas (part)
		112	Service activities incidental to oil and gas extraction excluding surveying (part)
18	omn	12	Mining of uranium and thorium ores
		13	Mining of metal ores
		14	Other mining and quarrying
27	tex	17	Manufacture of textiles
		243	Manufacture of man-made fibres
28	wap	18	Manufacture of wearing apparel; dressing and dyeing of fur
29	lea	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
30	lum	20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
31	ppp	21	Manufacture of paper and paper products
		2211	Publishing of books, brochures, musical books and other publications
		2212	Publishing of newspapers, journals and periodicals
		2213	Publishing of recorded media
		2219	Other publishing (photos, engravings, postcards, timetables, forms, posters, art reproductions, etc.)
		222	Printing and service activities related to printing
		223	Reproduction of recorded media
32	p_c	231	Manufacture of coke oven products
		232	Manufacture of refined petroleum products
		233	Processing of nuclear fuel
33	crp	241	Manufacture of basic chemicals
		242	Manufacture of other chemical products
		25	Manufacture of rubber and plastics products
34	nmm	26	Manufacture of other non-metallic mineral products
35	i_s	271	Manufacture of basic iron and steel
		2731	Casting of iron and steel

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Table 8.4 GSC2 Sectors defined by Reference to the ISIC, Rev. 3 (Continued)

GSC2 Number	Code	ISIC3 Code	Description
36	nfm	272	Manufacture of basic precious and non-ferrous metals
		2732	Casting of non-ferrous metals
37	fmp	28	Manufacture of fabricated metal products, except machinery and equipment
38	mvh	34	Manufacture of motor vehicles, trailers and semi-trailers
39	otn	35	Manufacture of other transport equipment
40	e le	30	Manufacture of office, accounting and computing machinery
		32	Manufacture of radio, television and communication equipment and apparatus
41	ome	29	Manufacture of machinery and equipment n.e.c.
		31	Manufacture of electrical machinery and apparatus n.e.c.
		33	Manufacture of medical, precision and optical instruments, watches and clocks
42	omf	36	Manufacturing n.e.c.
		37	Recycling
43	ely	401	Production, collection and distribution of electricity
44	gdt	402	Manufacture of gas; distribution of gaseous fuels through mains
		403	Steam and hot water supply
45	wtr	41	Collection, purification and distribution of water
46	cns	45	Construction
47	trd	50	Sales, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
		51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
		521	Non-specialized retail trade in stores
		522	Retail sale of food, beverages and tobacco in specialized stores
		523	Other retail trade of new goods in specialized stores
		524	Retail sale of second-hand goods in stores
		525	Retail trade not in stores
		526	Repair of personal and household goods
		55	Hotels and restaurants
48	otp	60	Land transport; transport via pipelines
		63	Supporting and auxiliary transport activities; activities of travel agencies
49	wtp	61	Water transport
50	atp	62	Air transport
51	cmn	64	Post and telecommunications
52	ofi	65	Financial intermediation, except insurance and pension funding
		67	Activities auxiliary to financial intermediation
53	isr	66	Insurance and pension funding, except compulsory social security

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Table 8.4 GSC2 Sectors defined by Reference to the ISIC, Rev. 3 (Continued)

GSC2 Number	Code	ISIC3 Code	Description
54	obs	70	Real estate activities
		711	Renting of transport equipment
		712	Renting of other machinery and equipment
		713	Renting of personal and household goods n.e.c.
		72	Computer and related activities
		73	Research and development
		74	Other business activities
55	ros	92	Recreational, cultural and sporting activities
		93	Other service activities
		95	Private households with employed persons
56	osg	75	Public administration and defence; compulsory social security
		80	Education
		85	Health and social work
		90	Sewage and refuse disposal, sanitation and similar activities
		91	Activities of membership organizations n.e.c.
		99	Extra-territorial organizations and bodies
57	dwe	n.a.	n.a.

n.a. Not available

n.e.c. Not elsewhere classified

8.3 GTAP Parameters File

The parameters file contains invariant behavioral parameters and switch parameters, arranged in ten arrays, as listed in table 8.5. A detailed description of the parameters and their source data is available in chapter 20.

Table 8.5 Arrays in the GTAP Parameters File

Name	Dimension	Description
ESBD	t	elasticity of substitution between domestic product and imports
ESBM	t	elasticity of substitution between imports from different regions
ESBT	t	elasticity of substitution between composite intermediate inputs
ESBV	t	elasticity of substitution between primary factors in the production of value-added
ETRE	s	elasticity of transformation between industries for sluggish primary factor endowments
INCP	$t \times r$	expansion parameter in the CDE consumer demand system
RDLT	1	binary switch mechanism of allocating investment funds
RFLX	r	flexibility of expected net rate of return on capital stock with respect to investment
SLUG	e	sluggish-mobile switch parameter
SUBP	$t \times r$	substitution parameter in the CDE consumer demand system

e Number of factor endowments

r Number of regions

s Number of primary factors not perfectly mobile between industries

t Number of tradeable commodities (sectors)

8.4 GTAP Data File

The main data file consists of dollar values of flows of goods and services listed in table 8.6. It also includes arrays summarizing the value of revenue generated from protection measures and the subsidy expenditures related to support measures. These values are all in millions of 1997 U.S. dollars in the GTAP 5 data base.

The protection data is available in the GTAP data file both implicitly and explicitly. Implicitly, the rates of different protection instruments may be calculated from two matrices which refer to two different valuations of the same value flow. Table 8.7 shows the protection measures that may be calculated from the data base and the arrays associated with these measures. The import and export duties calculated from the data base are the comprehensive measures, *e.g.*, export duties cover all export distortions – ordinary export subsidies, export tax equivalents of ATC quotas, price undertakings and voluntary export restraints.

The protection data explicitly declared in the GTAP data file are the revenue values or expenditure values associated with the protection measures. The revenues/expenditures from the different types of import and export instruments are given in separate arrays. These explicit arrays are TFRV, XTRV, MFRV, ADRV, PURV, VRRV, OSEP, ISEP, and FBEP in table 8.6. Protection rates are also explicitly summarized in a tax rates file generated by the GTAPView program. More details about the GTAPView program and the tax summary file is given in chapter 10.

Table 8.6 Arrays in the GTAP Data File

Name	Dimension	Description
ADRV	$t \times r \times r$	anti-dumping duty
DPSM	r	sum of distribution parameters in the household demand system
EVFA	$e \times p \times r$	primary factor purchases, at agents' prices
EVOA	$e \times r$	primary factor sales, at agents' prices
FBEP	$e \times p \times r$	factor-based subsidies
ISEP	$t \times p \times r \times d$	intermediate input subsidies
MFRV	$t \times r \times r$	export subsidy equivalent of MFA quota premium
OSEP	$t \times r$	ordinary output subsidy
PURV	$t \times r \times r$	export subsidy equivalent of price undertakings
SAVE	r	net saving, by region
TFRV	$t \times r \times r$	ordinary import duty
TVOM	$t \times r$	sales of domestic product, at market prices
VDEP	r	capital depreciation
VDFA	$t \times p \times r$	domestic purchases, by firms, at agents' prices
VDFM	$t \times p \times r$	domestic purchases, by firms, at market prices
VDGA	$t \times r$	domestic purchases, by government, at agents' prices
VDGM	$t \times r$	domestic purchases, by government, at market prices
VDPA	$t \times r$	domestic purchases, by households, at agents' prices
VDPM	$t \times r$	domestic purchases, by households, at market prices
VFM	$e \times p \times r$	primary factor purchases, by households, at market prices
VIFA	$t \times p \times r$	import purchases, by firms, at agents' prices
VIFM	$t \times p \times r$	import purchases, by firms, at market prices
VIGA	$t \times r$	import purchases, by government, at agents' prices
VIGM	$t \times r$	import purchases, by government, at market prices
VIMS	$t \times r \times r$	imports, at market prices
VIPA	$t \times r$	import purchases, by households, at agents' prices
VIPM	$t \times r$	import purchases, by households, at market prices
VIWS	$t \times r \times r$	imports, at world prices
VKB	r	capital stock
VRRV	$t \times r \times r$	export subsidy equivalent of voluntary export restraints
VST	$t \times r$	margin exports
VTWR	$m \times t \times r \times r$	margins by margin commodity
VXMD	$t \times r \times r$	non-margin exports, at market prices
VXWD	$t \times r \times r$	non-margin exports, at world prices
XTRV	$t \times r \times r$	ordinary export subsidy

d number of trade directions (exports, imports)

e number of endowment commodities (primary factors)

m number of margin commodities (sectors)

p number of produced commodities

r number of regions

t number of tradeable commodities (sectors)

Table 8.7 Implicit Protection in the GTAP Data File

Protection Measures	Formula*	Description
Import Duties	VIMS / VIWS	power of import tax (comprehensive)
Export Duties	VXMD / VXWD	power of export tax (comprehensive)
Output Subsidies	VOA / VOM	power of output tax
Intermediate Input Subsidies		
Domestic Inputs	VDFA / VDFM	power of domestic intermediate input tax
Imported Inputs	VIFA / VIFM	power of imported intermediate input tax
Factor-Based Payments	EVFA / VFM	power of factor-based tax

* The difference between the two value flows gives value of revenue or subsidy expenditure.

8.5 GTAP Energy Volumes Data File

As shown in table 8.8, the energy volumes data file includes three arrays reporting the volume of energy purchases by firms and by households and also the volume of bilateral trade in energy products, in millions of tons of oil equivalents. Chapter 17 describes the construction of the energy data; chapter 19 documents some slight downstream adjustments.

Table 8.8 Arrays in the Energy Volumes Data File

Name	Dimension	Description
EGY	n	energy commodities
EVF	$n \times t \times r$	volume of input purchases by firms (Mtoe)
EVH	$n \times r$	volume of purchases by households (Mtoe)
EVT	$e \times r \times r$	volume of bilateral trade (Mtoe)

n Number of energy commodities (sectors)

r Number of regions

t Number of tradeable commodities (sectors)

e Number of energy commodities (sectors)

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