



Contributing Input-Output

Tables to the GTAP Data Base

Karen HUFF

Robert MCDUGALL

Terrie WALMSLEY

GTAP Technical Paper No. 1

Release 4.2

January 2000

HUFF is an assistant professor in the Department of Agricultural Economics and Business at the University of Guelph, Canada. MCDUGALL is Deputy Director, and WALMSLEY a post-doctoral research fellow, at the Center for Global Trade Analysis, Department of Agricultural Economic, Purdue University, USA.

GTAP stands for the Global Trade Analysis Project which is administered by the Center for Global Trade Analysis, Purdue University, West Lafayette, IN 47907-1145 USA. For more information about GTAP, please refer to our Worldwide Web site at <http://www.agecon.purdue.edu/gtap/>, or send a request to conner@agecon.purdue.edu.

Contributing Input-Output Tables to the

GTAP Data Base

**by Karen HUFF,
Robert MCDUGALL,
and
Terrie WALMSLEY**

GTAP Technical Paper No. 1

Abstract

This document is written for those who wish to contribute to the GTAP data base, whether by providing an input-output table for a country not separately represented in the data base, or by updating the table for a region that is already represented. It provides specifications and advice on the structure of the table, sectoral classification, treatment of imports, and other key points. It also describes what we at the Center for Global Trade Analysis do once we receive your table.

This version has been revised for use by contributors to release 6 of the GTAP data base. In particular, all concordances are to the revised GTAP sectoral classification developed for release 6. Further assistance to contributors is also available from the web site:

<http://www.gtap.agecon.purdue.edu/databases/contribute/>

Table of Contents

1	History of this document	1
2	Commodity by commodity, commodity by industry, and industry by industry tables . . .	2
3	Organization of the data	2
4	Mapping to GTAP sectoral classification	4
5	Treatment of imports	6
6	Checking accounting identities and non-negativity	7
7	What we do when we receive your table	7
8	Parting remarks	9
A	GTAP sectoral classification, revision 2	13
B	Relationship between pre- and post-commodity-tax matrices	25
C	Documentation	26
	References	28

Tables

1	Arrays for Single-Region Input-Output Tables: Unified Format	3
2	Arrays for Single-Region Input-Output Tables: Original Format	4
A1	GSC2 sectors	9
A2	Mandatory splits classification: sectors	11
A3	Mandatory splits classification: concordance to GSC2	12
A4	GSC2 sectors defined by reference to the CPC	14
A5	GSC2 sectors defined by reference to the ISIC, Rev. 3	17
A6	Matrix of pre-commodity-tax usage values (UF).	25
A7	Matrix of post-commodity-tax usage values (UP).	25

Contributing Input-Output Tables to the GTAP Data Base

This document is written for those who wish to contribute to the GTAP data base, whether by providing an input-output table for a country not separately represented in the data base, or by providing a new table to update a region already represented. Instructions are given on how to organize the structure of the table, sectoral classification, treatment of imports, and other key points.

The guidelines are designed to make it as easy as possible to prepare a GTAP input-output (IO) table from your IO data, while providing us with the best possible information and data to update and improve the GTAP data base.

Appendix A to this paper contains a list of the 57 GTAP sectors. The sectors in your contributed table should appear in the same order, or as close possible. It is essential that you follow this numeric convention when organizing your table. The 3-character strings located next to the commodity numbers are used in the GTAP model to refer to each particular commodity group. You may find this brief naming convention convenient for labeling your data.

The IO data may be provided in one of the following forms: as a spreadsheet file or for those of you with GEMPACK, a header array file (as described in section 3).

1 History of this document

This is the fourth edition of this document. It applies to contributions to version 5 of the GTAP data base; the third edition applied to version 4, the second to version 3. The main changes from the fourth version are:

- the GTAP sectoral classification revision 1 (50 sector) is replaced by revision 2 (57 sector),
- the requirement that contributed tables strictly match the target sectoral classification is relaxed, to a requirement that contributed tables match at least an aggregation of the target classification,
- the introduction of a new unified format for contributing tables,
- further details regarding how to remove negative capital earnings,
- an additional appendix outlining what is required for the documentation of the regional IO table, this documentation is intended to form part of the documentation for the entire GTAP data base.

The main changes made in the third edition over the second edition are as follows:

- the target sectoral classification is the revised GTAP sectoral classification developed for version 4 of the data base,
- the requirement that contributed tables strictly match the target sectoral classification is relaxed in the area of agriculture and food processing,
- an appendix, giving an example of the concordance information required from contributors, is dropped, as no example is yet available for the revised sectoral classification.

The main changes made in the second edition over the first are as follows:

- the structure of the GTAP IO tables is defined not in a figure but in a table,
- a section is added, “Commodity by commodity, commodity by industry, and industry by industry tables”, explaining the relationship or lack of relationship between our terminology and input-output accounting terminology,
- a new procedure is provided for constructing import data, for the case where the input-output table contains only an import row,
- a table is added showing the ISIC-GTAP concordance previously published on the ftp site.

2 Commodity by commodity, commodity by industry, and industry by industry tables

Some of you will be aware of the distinctions between commodity by commodity, commodity by industry, and industry by industry tables. Those who are, are liable to be misled by some of the terminology in table 1 and elsewhere in this document.

In table 1 and elsewhere, we often speak of data ordered “by industry”, or “by commodity and industry”. This suggests to some, that the single-region input-output tables are commodity by industry tables. In fact, our preference is for commodity by commodity tables.

In this document, “by industry” should be understood as shorthand for “by current production sector”; where current production sectors correspond to commodities, so that current production sector i represents production of commodity i .

Our terminology (inherited from the Australian Industry Commission’s SALTER Project) reflects usage in CGE modeling rather than input-output accounting.

3 *Organization of the data*

Data can be contributed in one of two formats. The first is a new unified format (table 1) introduced for version 5 of the GTAP data base. The second is the original format (table 2) used previously for versions 3 and 4 of the GTAP data base.

Table 1 illustrates how the data should be organized using the new unified format. In this format all data are contained in four arrays. The first array in table 1 is UF. It refers to a $(2g+3) \times (g+5)$ matrix of pre-commodity-tax usage values, where g is the number of sectors. The rows of the matrix refer to inputs into production, including domestic commodities, imported commodities, land, labor and capital. The columns refer to uses of commodities, including intermediate usage, private household consumption, government consumption, investment, changes in stocks and exports. Table A6 in appendix B describes the relationship between UF and the arrays outlined in the original format below.

Table 1 Arrays for Single-Region Input-Output Tables: Unified Format

	Dimensions	Description
UF	$2g+3, g+5$	Usage of input i in use u , commodity tax excluded
UP	$2g+3, g+5$	Usage of input i by use u , commodity tax inclusive
OP	g	Output of sector i , non-commodity indirect tax included
MF	g	Imports of commodity i , import duties excluded
SSET	g	Sector names
SMAP	gg	Map from standard GTAP sectors

g Number of sectors in your table
 gg Number of sectors in GTAP standard sectoral classification

The second array in Table 1 is UP. This array refers to a $(2g+3) \times (g+5)$ matrix of post-commodity-tax usage values, where g is again the number of sectors. This array is similar to the first in that each row of the matrix refers to an input into production and each column to a use. UF, however, refers to the pre-commodity-tax values, while UP is to the post-commodity-tax values. Table A7 in appendix B outlines the relationship between UP and the arrays used in the original format, outlined below.

This is followed by two arrays, OP and MF. OP refers to a vector of outputs, non-commodity indirect tax inclusive, with dimension g . Each row in the vector refers to a domestic sector. For each domestic sector this vector (OP) is equal to the sum across inputs of the post-commodity-tax usage values (UP) plus non-commodity indirect taxes (AI12). MF refers to a vector of imports, import duties excluded, with dimension g . In this case each row refers to an imported commodity. For each imported commodity this vector (MF) is equal to the sum across uses of the pre-commodity-tax usage values (UFP) less import duties (AI27).

Finally, there are two string arrays, SSET and SMAP. These define your sectoral classification, and the map between it and the standard GTAP sectoral classification. These are necessary because we now accept tables that do not separate out all standard GTAP sectors. These string arrays are required under both formats.

The original method for organizing data is outlined in Table 2. The first entry in the table is AI01. It refers to the $g \times g$ matrix of intermediate usage of domestic goods, where g denotes the number of sectors in the GTAP sectoral classification (currently 57). The rows of the matrix refer to commodities and the columns refer to sectors. Therefore, looking across the first row of your array of domestic intermediates, each entry represents a specific sector's demand for paddy rice in the production of intermediates. The next entry in the table refers to the $g \times g$ matrix of sectoral demand for imported intermediates (AI02). Note that in the case of imports values are inclusive of import duties.

The intermediate use matrices are followed by vectors of final demands for both domestic and imported goods for investment use (AI03 and AI04), private household consumption (AI05 and AI06), and government consumption (AI07 and AI08). The next two vectors (AI09 and AI10) represent changes in stocks of domestic and imported goods, respectively. Note that changes in stocks should not be combined with investment, but reported as a separate vector. The next vector (AI11) represents exports. Note that there is only one export vector for domestically produced goods (there should be no re-exports of imported goods).

The next vector (AI12) should contain non-commodity indirect taxes, by industry. The next three vectors represent the value added for your economy in terms of labor (AI13), capital (AI14) and agricultural land (AI15). In the GTAP model, land use is restricted to the first twelve commodities (agricultural goods). The remaining arrays through AI27 contain commodity taxes as outlined in Table 2.

Most likely not all of the arrays presented will be available from your IO table. For example, there may be no information on commodity taxes. In this case fill the array with zeroes and note the lack of data. Another common limitation is the absence of payments to land, in which case this should be noted as well. Finally, it is not uncommon for the import information to be available only in aggregate form. For example, sectoral import demand may not be allocated to specific commodities. In these cases, we ask that you provide the most detailed information available (it is worth searching for unpublished tables underpinning the published one). More details on the treatment of imports are given below.

Table 2 Arrays for Single-Region Input-Output Tables: Original Format

	Dimension	Description
AI01	g×g	Intermediate usage of domestic products, by commodity and industry
AI02	g×g	Intermediate usage of imports, by commodity and industry
AI03	g	Investment usage of domestic products, by commodity
AI04	g	Investment usage of imports, by commodity
AI05	g	Household consumption of domestic products, by commodity
AI06	g	Household consumption of imports, by commodity
AI07	g	Government consumption of domestic products, by commodity
AI08	g	Government consumption of imports, by commodity
AI09	g	Change in stocks of domestic products, by commodity
AI10	g	Change in stocks of imports, by commodity
AI11	g	Exports, by commodity
AI12	g	Non-commodity indirect taxes, net, by industry
AI13	g	Employment of labor, by industry
AI14	g	Employment of capital, by industry
AI15	g	Employment of land, by industry
AI16	g×g	Commodity tax on intermediate usage of domestic products, by commodity and industry
AI17	g×g	Commodity tax on intermediate usage of imports, by commodity and industry
AI18	g	Commodity tax on household consumption of domestic products, by commodity
AI19	g	Commodity tax on household consumption of imports, by commodity
AI20	g	Commodity tax on investment usage of domestic products, by commodity
AI21	g	Commodity tax on investment usage of imports, by commodity
AI22	g	Commodity tax on government usage of domestic products, by commodity
AI23	g	Commodity tax on government usage of imports, by commodity
AI24	g	Commodity tax on exports, by commodity
AI25	g	Commodity tax on change in stocks of domestic products, by commodity
AI26	g	Commodity tax on change in stocks of imports, by commodity
AI27	g	Import duty, by commodity
SSET	g	Sector names
SMAP	gg	Map from standard GTAP sectors

g Number of sectors in your table

gg Number of sectors in GTAP standard sectoral classification

Source: CALDER et al. (1993).

4 *Mapping to GTAP sectoral classification*

One of the main tasks in preparing a GTAP IO table is mapping the data to the GTAP sectoral classification (GSC). To do that, you need to construct a concordance between the sectoral classification used in your source data and the GSC. And for that in turn you need precise definitions of the GTAP sectors.

For version 5 of the data base, we have prepared a revised GSC, the *GSC, revision 2 (GSC2)*. This was done in response to requests for greater detail in services. The new sectoral classification has seven additional sectors, all in services. It has 57 sectors in total. They may be found listed in table A1 in appendix A.

From previous experience, we expect that some potential contributors will find it difficult to provide full sectoral detail in agriculture and food processing. In anticipation of such difficulties, we are obtaining supplementary data for these areas, to be incorporated into a new multi-region agricultural data set. This will enable us to relax the requirements for sectoral classification in the IO tables.

For version 5 of the data base, contributed tables should use the GSC2, or an aggregation thereof, subject to the following conditions:

- the classification is an aggregation of the GSC2,
- the classification is a disaggregation of the mandatory splits classification described below,
- the classification distinguishes at least 30 sectors.

The mandatory splits require the separation of agriculture and food processing, and energy, from other sectors. These splits support our disaggregation procedure, allowing us to use special data sources for disaggregating agriculture and food processing and for disaggregating energy. At present we use a special data source for the agricultural disaggregation; in the future, we may wish to do likewise for energy. Table A2 lists the mandatory splits, and table A3 defines them in terms of GTAP sectors.

While we accept aggregated sectoral classifications, we encourage you to provide as much sectoral detail as your source data support. This will lead to a higher data quality than relying entirely on the our disaggregation procedures, which rely partly on using other region's data as proxies, and partly on an agricultural input-output data set that has data sourcing difficulties of its own. But where your source input-output data are not sufficiently disaggregated to support the GSC2, you have the option of letting us do the disaggregation.

Note also that we reserve the right to reject any contributed table at our own discretion, and that the degree of disaggregation is one factor we take into account in deciding whether to accept or reject the table.

Whatever sectoral classification you plan to use, whether the full GSC2 or some aggregation of it, you will need to construct a concordance from the source classification to your target classification. If the target classification is some aggregation of the GSC2, you should also construct a concordance from the GSC2 to your target classification, to show how your agricultural and food processing sectors correspond to the GSC2 sectors.

In constructing the concordance you need definitions of the GSC2 sectors. These are provided in appendix A. The definitions are in two parts, one for agriculture and food processing and the other for all other sectors. In agriculture and food processing, table A4 defines each sector by reference to the provisional Central Product Classification (UN 1992). For all other sectors, table A5 provides definitions by reference to the third revision of the International Standard Industry Classification (UN 1990).

In addition, we have made a number of electronic concordances (ISIC to GSC, HS to GSC, CCCN to HS, CCCN to GSC, and SITC to GSC) available through the GTAP `ftp` and web sites. The address for the web site is <http://www.agecon.purdue.edu/gtap/>. At the time of writing, these concordances have not yet not been revised from GSC to GSC2.

In addition to the file containing the arrays of IO information in GTAP format, we also ask you to supply the concordance from the sectoral classification used in your source data to the sectoral classification used in your contributed table. This may be in any convenient format. If the contributed table uses an aggregation of the GSC2, we also ask you to supply the concordance from the GSC2 to the classification used in your contributed table. We ask that you present this as part of the IO table data structure described in section 3 above.

5 Treatment of imports

As foreshadowed above, this section discusses the various treatments of imports in IO tables and strategies for you to follow under each scenario follows. If your IO table consists of a total use matrix and an imports matrix, then just subtract the imports from total use to derive the domestic use matrix and then proceed in the usual way. This is the best scenario for the reporting of imports.

Another possible scenario for the treatment of imports in your IO table would be a column vector reporting total imports by commodity. In this instance, we ask that you create an imports matrix by pro-rating the totals across uses by applying the structure implied by the total use matrix. For each row of the total use matrix, compute the percentage of the row total allocated to each sector. Then fill in the import matrix by multiplying each commodity total by the appropriate percentage for each sector. Finally, subtract the new imports matrix from the total use matrix to obtain the domestic use matrix. Under either this or the previous scenario, be sure to document the steps you followed to create the imports matrix.

For best results, apply this procedure before changing from your original sectoral classification to the GTAP classification.

The final scenario for the treatment of imports would be a row vector reporting total import costs by sector, but not by commodity. If this is how imports are treated in your IO table, you need further information to prepare satisfactory import arrays. Specifically, you need data for imports by commodity. You also have a larger task than under the previous scenarios. The following paragraphs describe one way of performing this task.

Taking data on import usage by commodity, adjust it so that is consistent with your input-output data on import usage by use category. That is, make sure that the two import data sets give the same value for total imports. To achieve this, rescale the “import usage by commodity” data.

Using these rescaled data, calculate import shares for domestic usage of each commodity (i.e. usage excluding exports). Apply these import shares to your input-output data for commodity usage by commodity and use category, to obtain initial estimates for import usage by commodity and use category.

Using the RAS procedure, adjust these initial estimates to impose consistency with both the “imports by commodity” and the “imports by use category” data. To apply this procedure, first rescale each column of your initial estimates, to make it consistent with the “imports by use category” data. Then rescale each row, to make it consistent with the “imports by commodity” data. Continue rescaling columns and rows alternately, until you converge on a data set that satisfies both the “imports by use category” and the “imports by commodity” constraints simultaneously.

For best results, apply this procedure before changing from your original sectoral classification to the GTAP sectoral classification.

6 Checking accounting identities and non-negativity

It is essential that you verify that some basic accounting relationships hold for your aggregated table before sending it to us. First check the sectoral balance condition — total sales must equal total costs for each sector. Total sales by commodity equal the sum of intermediate sales, and sales to the final demand categories (investment, private households, government, stocks and exports) or the sum across uses of UF. Total costs by sector equal the sum of purchases of domestic and imported intermediates, value added and industry taxes or OP.

Also check that the pre-tax values of all flows are non-negative. If this is not the case, then some adjustment will be required. Finally, if pre-tax values are strictly positive, post-tax values should also be strictly positive.

7 What we do when we receive your table

This section explains what we do when we receive your table. For the most part it describes our procedures as they had developed up to and including the preparation of the GTAP 3 data base. We will not necessarily follow this procedure in future cases; we will vary it as circumstances or experience suggest. For the time being however we expect it will provide some worthwhile guidance.

When we get your table, we will check it for structure, sectoral classification, sign, and balance. Depending on the outcome, we may return the table for further work, modify it ourselves, or use it unaltered.

In evolving the procedure described below we have followed a couple of principles about the division of work. Decisions requiring local knowledge and processes requiring local data are best undertaken by you, not us. And for best results, data construction processes involving sector-specific information should be performed before not after sectoral aggregation. Since you do the sectoral aggregation, those processes also should be performed by you not us. Examples of such processes may be found in the section “Treatment of imports”.

Structure

We check that your table contains the information needed for the GTAP single-region IO table structure (described in table 1).

If your table lacks data for changes in stocks or for commodity taxes, we set these at zero. If you have not separated agricultural land from capital, we do so, using shares from an external study or from a “representative table”. If the table lacks a duty vector, we supply one, using your data for import usage, and tariff rates from our protection data base. If it contains other deviations from the table 1 structure, we return it for further work.

The “representative table” referred to above is a weighted sum of tables for primary GTAP regions (not including composite regions). The weights are such as to ensure that each region is represented in proportion to its GDP. To construct the representative table we use tables on hand from the last version of the data base.

Sectoral classification

We briefly review your sectoral concordance. If we find apparent errors, we return the table and ask you to correct them.

We check that you have completed the sectoral transformation: that is, that the data are in the GTAP sectoral classification, and not some approximation to it. In the past, some contributors have sent in tables where a few sectoral splits remain to be done: for example, they may not have separated rice from wheat, or oil from gas. For version 4, if there are splits remaining to be made in agriculture and

food processing, we make them ourselves using the food and agriculture data set. If there are splits remaining to be made in other areas, we return the table for further work.

Sign

We check that the sign conditions are met. The sign conditions are:

- all pre-tax commodity usage values (except changes in stocks) are non-negative,
- where pre-tax commodity usage values are strictly positive, post-tax values are also strictly positive, and
- all factor usage values are non-negative.

If the sign conditions are violated, but the violations are very small, we modify the table ourselves. We set the offending cell to zero, restoring sectoral balance if necessary by adjusting “changes in stocks”. If the violations are not small, we usually return the table for further work.

Special cases may arise with negative values for capital usage. Negative values here may be statistically valid, reflecting operating losses in some industries in the data reference year. Nevertheless we need to eliminate them before incorporating the table into the GTAP data base. Ideally capital earnings should reflect the earnings needed to earn a normal return on the capital employed in the industry. To eliminate these negatives, first determine whether the operating losses are a usual occurrence, which can persist because of some explicit or implicit subsidy, or whether they are unusual. If they are usual, adjust capital earnings upwards to reflect a reasonable positive return on capital, and adjust non-commodity indirect taxes downwards to maintain sectoral balance. If operating losses are not usual, but reflect unusually adverse conditions in the data reference year, do not adjust non-commodity-taxes but restore sectoral balance by some other means, such as an upward adjustment in “changes in stocks”. The usual level of capital earnings can be estimated using the ratio of capital earnings to all other costs from previous years. All of these adjustments are best made before converting from the original to the GTAP sectoral classification.

Balance

We check that the table satisfies the sectoral balance condition, that in each sector total sales are equal to total costs. If the balance condition is not satisfied, but the imbalances are very small, we modify the table ourselves, making adjustments to “changes in stocks” so as to achieve balance. If the imbalances are not small, we return the table for further work.

Discretionary decision

We reserve the right to accept or reject any table at our discretion whether or not it meets the formal requirements described above. In exercising our discretion, we take into account factors including:

- the importance of the region to GTAP users,
- the likelihood that IO data will be forthcoming for future GTAP releases, and
- the level of sectoral detail in the contributed table.

8 *Parting remarks*

We would be very grateful if each contributor to the GTAP data base could also write a short report outlining the data sources and any problems encountered when creating the regional IO table. Appendix C provides a brief summary of what should be included in this report. As stated above, we will include the report in the documentation of the GTAP data base.

Good luck and thank you for your interest in, and support of GTAP. By the way, we offer a free aggregation of the pre-release GTAP data base, and the complete final release, to anyone contributing significantly to the data base!

Appendix A: GTAP Sectoral Classification, Revision 2

Table A1 GSC2 sectors

Number	Code	Description
1	pdr	Paddy rice
2	wht	Wheat
3	gro	Cereal grains nec
4	v_f	Vegetables, fruit, nuts
5	osd	Oil seeds
6	c_b	Sugar cane, sugar beet
7	pfb	Plant-based fibers
8	ocr	Crops nec
9	ctl	Bovine cattle, sheep and goats, horses
10	oap	Animal products nec
11	rmk	Raw milk
12	wol	Wool, silk-worm cocoons
13	for	Forestry
14	fsh	Fishing
15	col	Coal
16	oil	Oil
17	gas	Gas
18	omn	Minerals nec
19	cmt	Bovine cattle, sheep and goat, horse meat products
20	omt	Meat products nec
21	vol	Vegetable oils and fats
22	mil	Dairy products
23	pcr	Processed rice
24	sgr	Sugar
25	ofd	Food products nec
26	b_t	Beverages and tobacco products
27	tex	Textiles
28	wap	Wearing apparel
29	lea	Leather products
30	lum	Wood products

(contd)

Table A1 GSC2 sectors (continued)

Number	Code	Description
31	ppp	Paper products, publishing
32	p_c	Petroleum, coal products
33	crp	Chemical, rubber, plastic products
34	nmm	Mineral products nec
35	i_s	Ferrous metals
36	nfm	Metals nec
37	fmp	Metal products
38	mvh	Motor vehicles and parts
39	otn	Transport equipment nec
40	ele	Electronic equipment
41	ome	Machinery and equipment nec
42	omf	Manufactures nec
43	ely	Electricity
44	gdt	Gas manufacture, distribution
45	wtr	Water
46	cns	Construction
47	trd	Trade
48	otp	Transport nec
49	wtp	Water transport
50	atp	Air transport
51	cmn	Communication
52	ofi	Financial services nec
53	isr	Insurance
54	obs	Business services nec
55	ros	Recreational and other services
56	osg	Public administration and defense, education, health
57	dwe	Dwellings

Table A2 Mandatory splits classification: sectors

Number	Code	Description
1	afp	Agriculture and food processing
2	eng	Energy
3	oth	Goods and services nec

Table A3 Mandatory splits classification: concordance to GSC2

MSC		GSC2				
Number	Code	Number	Code	Description		
1	afp	1	pdr	Paddy rice		
		2	wht	Wheat		
		3	gro	Cereal grains nec		
		4	v_f	Vegetables, fruits, nuts		
		5	osd	Oilseeds		
		6	c_b	Sugar cane, sugar beet		
		7	pfb	Plant-based fibers		
		8	ocr	Crops nec		
		9	ctl	Bovine cattle, sheep and goats, horses		
		10	oap	Animal products nec		
		11	rmk	Raw milk		
		12	wol	Wool, silk-worm cocoons		
		19	cmt	Bovine cattle, sheep and goat, horse meat products		
		20	omt	Meat products nec		
		21	vol	Vegetable oils and fats		
		22	mil	Dairy products		
		23	pcr	Processed rice		
		24	sgr	Sugar		
		25	ofd	Food products nec		
		26	b_t	Beverages and tobacco products		
		2	eng	15	col	Coal
				16	oil	Oil
				17	gas	Gas
				32	p_c	Petroleum, coal products
				43	ely	Electricity
				44	gdt	Gas manufacture, distribution
3	oth			13	for	Forestry
		14	fsh	Fishing		
		18	omn	Minerals nec		
		27	tex	Textiles		
		28	wap	Wearing apparel		
		29	lea	Leather products		
		30	lum	Wood products		
		31	ppp	Paper products, publishing		
		33	crp	Chemical, rubber, plastic products		

Table A3 Mandatory splits classification: concordance to GSC2 (cont'd)

MSC		GSC2		
Number	Code	Number	Code	Description
		34	nmm	Mineral products nec
		35	i_s	Ferrous metals
		36	nfm	Metals nec
		37	fmp	Metal products
		38	mvh	Motor vehicles and parts
		39	otn	Transport equipment nec
		40	ele	Electronic equipment
		41	ome	Machinery and equipment nec
		42	omf	Manufactures nec
		45	wtr	Water
		46	cns	Construction
		47	trd	Trade
		48	otp	Transport nec
		49	wtp	Water transport
		50	atp	Air transport
		51	cmn	Communication
		52	ofi	Financial services nec
		53	isr	Insurance
		54	obs	Business services nec
		55	ros	Recreational and other services
		56	osg	Public administration and defense, education, health
		57	dwe	Dwellings

Table A4GSC2 sectors defined by reference to the CPC

GSC2		CPC	
Number	Code	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
9	ctl	0211	Bovine cattle, sheep and goats, horses, asses, mules, and hinnies, live
		0299	Bovine semen
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

Table A4GSC2 sectors defined by reference to the CPC
(continued)

GSC2		CPC	
Number	Code	Code	Description
		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
		2161	Fats of bovine animals, sheep, goats, pigs and poultry, raw or rendered; wool grease
20	omt	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

Table A4GSC2 sectors defined by reference to the CPC
(continued)

GSC2		CPC	
Number	Code	Code	Description
		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
		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

Table A4GSC2 sectors defined by reference to the CPC
(continued)

GSC2		CPC	
Number	Code	Code	Description
		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 A5GSC2 sectors defined by reference to the ISIC, Rev. 3

GSC2		ISIC3	
Number	Code	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
		103	Mining and agglomeration of peat
16	oil	111	Extraction of crude petroleum and natural gas (part)
		112	Service activities incidental to oil and gas extraction excluding surveying (part)
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
		22	Publishing, printing and reproduction of record media
32	p_c	231	Manufacture of coke oven products
		232	Manufacture of refined petroleum products
		233	Processing of nuclear fuel

Table A5GSC2 sectors defined by reference to the ISIC, Rev. 3
(continued)

GSC		ISIC	
Number	Code	Code	Description
33	crp	241	Manufacture of basic chemicals
		242	Manufacture of other chemical products
		25	Manufacture of rubber and plastics products
34	nmn	26	Manufacture of other non-metallic mineral products
35	i_s	271	Manufacture of basic iron and steel
		2731	Casting of iron and steel
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	ele	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

Table A5GSC2 sectors defined by reference to the ISIC, Rev. 3
(continued)

GSC		ISIC	
Number	Code	Code	Description
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
54	obs	K	Real estate, renting and 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 defense; 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

Table A5GSC2 sectors defined by reference to the ISIC, Rev. 3
(continued)

GSC		ISIC	
Number	Code	Code	Description
57	dwe	n.a.	n.a.

n.a. not available

n.e.c. not elsewhere classified

Appendix B: Relationship between Pre- and Post-Commodity-tax Usage values Matricies

The following tables depict the relationship between the pre-commodity-tax usage values matrix (UF) and the post-commodity-tax usage values matrix (UP) from the unified format with those arrays described in the original format.

Table A6: Matrix of pre-commodity-tax usage values (UF).

	SECT	Investment	Consumption	Government	Change in Stocks	Exports
DSECT	AI01	AI03	AI05	AI07	AI09	AI11
MSECT	AI02	AI04	AI06	AI08	AI10	0
Labor	AI13	0	0	0	0	0
Capital	AI14	0	0	0	0	0
Land	AI15	0	0	0	0	0

The first column are the inputs into production including domestic commodities (DSECT), imported commodities (MSECT), labor, land and capital. The first row represent the uses of these commodities, as intermediate inputs (SECT), investment, consumption, government, changes in stocks and export.

Table A7: Matrix of post-commodity-tax usage values (UP).

	SECT	Investment	Consumption	Governemnt	Change in Stocks	Exports
DSECT	AI01+ AI16	AI03 + AI20	AI05 + AI18	AI07 + AI22	AI09 + AI25	AI11+ AI24
MSECT	AI02 + AI17	AI04 + AI21	AI06 + AI19	AI08 + AI23	AI10 + AI26	0
Labor	AI13	0	0	0	0	0
Capital	AI14	0	0	0	0	0
Land	AI15	0	0	0	0	0

Appendix C: Documentation

The main objective of the documentation is to inform users about where the data in the supplied table come from and where data had to be made up. Describing the procedure followed is not the main objective, though it will need to be done to some extent to achieve the main objective. Below is a list of suggested topics (* marks the more ambitious topics).

- 1 Reference information for the source table.
- 2* If possible a review the different options available for the source table.
- 3 A description of the source table. This description should include the following:
 - a) The reference year for the source table.
 - b) The units of the source table.
 - c) Whether the source data was industry by industry, industry by commodity or commodity by commodity.
 - d) The valuation of the source table. That is, whether the source data was in basic or purchaser prices.
 - e) The structure of the source table, with emphasis on where it is inconsistent with GTAP. This would include details on the treatment of imports, indirect taxes, sales by final buyers and the ownership of dwellings. In addition, details relating to the classification of primary factors and final demands in the source data, including a mapping to the GTAP factors and final demands.
 - f) The sectoral classification of the source data and a mapping between it and the GTAP sectors
 - g) A description of any applied constraints such as non-negativity or sectoral balance conditions.
 - h)* If possible an examination of the quality and any salient features of economic content of the source data.
- 2 A description of how inconsistencies between source table and GTAP were dealt with. This description would also include a list of:

- a) any additional data sources used to handle these inconsistencies; and
 - b) the assumptions made to create any additional data.
- 5 List any deviations between the supplied table and those required for the GTAP data base. Differences may appear between:
- a) the structure;
 - b) the sectoral classifications;
 - c) the sign constraints; and
 - d) the sectoral balance conditions between the two data bases.
- 6* Other important points which could be discussed include:
- a) the salient features of economic content of the supplied table;
 - b) an outline of the strengths and weaknesses of supplied table; and
 - c) any data lost as a result of moving between the source data and supplied table.

References

CALDER W., MCDUGALL R. and STRZELECKI A. 1993. *Procedures for later stage processing of single region input-output data for Salter*, Salter Working Paper No. 18, Canberra: Industry Commission.

UNITED NATIONS. 1990. *International Standard Industrial Classification of All Economic Activities, Third Revision*, Statistical Papers, Series M No. 4, Rev. 3, Sales No. E.91.XVII.7. New York: United Nations Publishing Division.

UNITED NATIONS. 1998. *Central Product Classification*, Statistical Papers, Series M No. 77, Ver 1.0, Sales No. E.98.XVII.5. New York: United Nations Publishing Division.