



Contributing Input-Output

Tables to the GTAP Data Base

Karen HUFF

Robert MCDUGALL

Terrie WALMSLEY

Angel AGUIAR

GTAP Technical Paper No. 1

Release 5

January 2022

AGUIAR is the corresponding author (aaguiar@purdue.edu) and economist 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 <https://www.gtap.agecon.purdue.edu/>, or send a request to contactgtap@purdue.edu.

Contributing Input-Output Tables to the

GTAP Data Base

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

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 11 of the GTAP data base. In particular, all concordances are to the revised GTAP sectoral classification developed for release 11. 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.....	6
5	Treatment of imports	7
6	Checking accounting identities and non-negativity.....	8
7	What we do when we receive your table.....	9
8	Parting remarks.....	11
A	GTAP sectoral classification, revision 3	12
B	Relationship between pre- and post-commodity-tax matrices.....	23
C	Documentation	24
	References	26

Tables

1	Arrays for Single-Region Input-Output Tables: Unified Format	3
2	Arrays for Single-Region Input-Output Tables: Original Format	5
A1	GSC3 sectors	12
A2	Mandatory splits classification: sectors.....	14
A3	Mandatory splits classification: concordance to GSC3.....	15
A4	GSC3 sectors defined by reference to the CPC.....	17
A5	GSC3 sectors defined by reference to the ISIC, Rev.4	20
A6	Matrix of pre-commodity-tax usage values (UF).....	23
A7	Matrix of post-commodity-tax usage values (UP)	23

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 65 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 fifth edition of this document. It applies to contributions to version 11 of the GTAP data base; the fourth edition applied to versions 5 to 9, 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 2 (57 sector) is replaced by revision 3 (65 sector)

The main changes made in 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 65). 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	$g \times g$	Intermediate usage of domestic products, by commodity and industry
AI02	$g \times g$	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	$g \times g$	Commodity tax on intermediate usage of domestic products, by commodity and industry
AI17	$g \times g$	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 10 onwards of the data base, we have prepared a revised GSC, the *GSC, revision 3* (GSC3). This was done in response to requests for greater detail in services. The new sectoral classification has eight additional sectors, it has 65 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.

Contributed tables should use the GSC3, or an aggregation thereof, subject to the following conditions:

- the classification is an aggregation of the GSC3,
- 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 GSC3, 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 GSC3 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 GSC3, you should also construct a concordance from the GSC3 to your target classification, to show how your agricultural and food processing sectors correspond to the GSC3 sectors.

In constructing the concordance you need definitions of the GSC3 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 version 2.1 (UN 2015). For all other sectors, table A5 provides definitions by reference to the fourth revision of the International Standard Industry Classification (UN 2008).

In addition, we have made a number of electronic concordances (ISIC to GSC3, HS to GSC3, CPC to GSC3) available through the GTAP web site. The address for the web site is <http://www.agecon.purdue.edu/gtap/>.

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 GSC3, we also ask you to supply the concordance from the GSC3 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. 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. 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 3

Table A1 GSC3 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	pfib	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	frs	Forestry
14	fsh	Fishing
15	coa	Coal
16	oil	Oil
17	gas	Gas
18	oxt	Other extraction (formerly 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

(cont'd)

Table A1 GSC3 sectors (cont'd)

Number	Code	Description
31	ppp	Paper products, publishing
32	p_c	Petroleum, coal products
33	chm	Chemical products (formerly part of crp)
34	bph	Basic pharmaceutical products (formerly part of crp)
35	rpp	Rubber, plastic products (formerly part of crp)
36	nmm	Mineral products nec
37	i_s	Ferrous metals
38	nfm	Metals nec
39	fmp	Metal products
40	ele	Computer, electronic and optical products
41	eeq	Electrical equipment
42	ome	Machinery and equipment nec
43	mvh	Motor vehicles and parts
44	otn	Transport equipment nec
45	omf	Manufactures nec
46	ely	Electricity
47	gdt	Gas manufacture, distribution
48	wtr	Water
49	cns	Construction
50	trd	Trade
51	afs	Accommodation, Food and service activities
52	otp	Transport nec
53	wtp	Water transport
54	atp	Air transport
55	whs	Warehousing and support activities
56	cmn	Communication
57	ofi	Financial services nec
58	Ins	Insurance
59	rsa	Real estate activities
60	obs	Business services nec
61	ros	Recreational and other services
62	osg	Public administration and defense, education, health
63	edu	Education
64	hht	Health
65	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 GSC3

MSC		GSC3				
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	coa	Coal
				16	oil	Oil
				17	gas	Gas
				32	p_c	Petroleum, coal products
				46	ely	Electricity
				47	gdt	Gas manufacture, distribution
3	oth			13	frs	Forestry
		14	fsh	Fishing		
		18	oxt	Other Extraction		
		27	tex	Textiles		
		28	wap	Wearing apparel		
		29	lea	Leather products		
		30	lum	Wood products		
		31	ppp	Paper products, publishing		
		33	chm	Chemical products		

(cont'd)

Table A3 Mandatory splits classification: concordance to GSC3 (cont'd)

MSC		GSC3		
Number	Code	Number	Code	Description
3	oth	34	bph	Basic pharmaceutical products
		35	rpp	Rubber and plastic products
		36	mmm	Mineral products nec
		37	i_s	Ferrous metals
		38	nfm	Metals nec
		39	fmp	Metal products
		40	ele	Computer, electronic and optical products
		41	eeq	Electrical equipment
		42	ome	Machinery and equipment nec
		43	mvh	Motor vehicles and parts
		44	otn	Transport equipment nec
		45	omf	Manufactures nec
		48	wtr	Water
		49	cns	Construction
		50	trd	Trade
		51	afs	Accommodation, Food and service activities
		52	otp	Transport nec
		53	wtp	Water transport
		54	atp	Air transport
		55	whs	Warehousing and support activities
		56	cmn	Communication
		57	ofi	Financial services nec
		58	ins	Insurance (formerly isr)
		59	rsa	Real estate activities
		60	obs	Business services nec
		61	ros	Recreational and other services
		62	osg	Public Administration and defense
		63	edu	Education
		64	hht	Human health and social work activities
		65	dwe	Dwellings

Table A4GSC3 sectors defined by reference to the CPC

GSC3		CPC			
Number	Code	Code	Description		
1	pdr	0113	Rice		
2	wht	0111	Wheat		
3	gro	0112	Maize (corn)		
		0114	Sorghum		
		0115	Barley		
		0116	Rye		
		0117	Oats		
		0118	Milletts		
		0119	Other cereals		
4	v_f	012	Vegetables		
		013	Fruit and nuts		
		015	Edible roots and tubers with high starch or inulin content		
		017	Pulses (dried leguminous vegetables)		
5	osd	014	Oil seeds and oleaginous fruit		
6	c_b	018	Sugar crops		
7	pfb	0192	Fibre crops		
8	ocr	016	Stimulant, spice and aromatic crops		
		0191	Forage products		
		0193	Plants and parts of plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes		
		0194	Beet seeds (excluding sugar beet seeds) and seeds of forage plants		
		0195	Natural rubber in primary forms or in plates, sheets or strip		
		0196	Living plants; cut flowers and flower buds; flower seeds		
		0197	Unmanufactured tobacco		
		0199	Other raw vegetable materials nec		
		9	ctl	0211	Bovine animals, live
				0212	Other ruminants
0213	Horses and other equines				
02411	Bovine semen				
10	oap	0214	Swine / pigs		
		0215	Poultry		
		0219	Other live animals		
		023	Eggs of hens or other birds in shell, fresh		
		02419	Semen, n.e.c		
		0291	Natural honey		
		0292	Snails, fresh, chilled, frozen, dried, salted or in brine, except sea snails		
0293	Edible products of animal origin n.e.c.				

(cont'd)

Table A4GSC3 sectors defined by reference to the CPC (cont'd)

GSC3		CPC			
Number	Code	Code	Description		
10	oap	0295	Hides, skins and furskins, raw		
		0296	Insect waxes and spermaceti, whether or not refined or coloured		
11	rmk	022	Raw milk		
12	wol	0294	Raw animal materials used in textiles		
13	frs	03	Forestry and logging products		
19	cmt	21111	Meat of cattle, fresh or chilled		
		21112	Meat of buffalo, fresh or chilled		
		21115	Meat of sheep, fresh or chilled		
		21116	Meat of goat, fresh or chilled		
		21117	Meat of camels and camelids, fresh or chilled		
		21118	Meat of horses and other equines, fresh or chilled		
		21119	Other meat of mammals, fresh or chilled		
		2113	Meat of mammals, frozen		
		2115	Edible offal of mammals, fresh, chilled or frozen		
		20	omt	21113	Meat of pigs, fresh or chilled
				21114	Meat of rabbits and hares, fresh or chilled
				2112	Meat of poultry, fresh or chilled
				2114	Meat of poultry, frozen
2116	Edible offal of poultry, fresh, chilled or frozen				
2117	Other meat and edible offal, fresh, chilled or frozen				
2118	Preserves and preparations of meat, meat offal or blood				
2119	Flours, meals and pellets of meat or meat offal, inedible; greaves				
21	vol	215	Animal fats		
		216	Vegetable oils		
		217	Margarine and similar preparations		
		218	Cotton linters		
		219	Oil-cake and other 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, or husked		

(cont'd)

Table A4GSC3 sectors defined by reference to the CPC (cont'd)

GSC3		CPC	
Number	Code	Code	Description
24	sgr	235	Sugar and molasses
25	ofd	212	Prepared and preserved fish, crustaceans, molluscs and other aquatic invertebrates
		213	Prepared and preserved vegetables, pulses and potatoes
		214	Prepared and preserved fruits and nuts
		2311	Wheat and meslin flour
		2312	Other cereal flours
		2313	Groats, meal and pellets of wheat and other cereals
		2314	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; lucerne (alfalfa) meal and pellets
		234	Bakery products
		26	b_t
237	Macaroni, noodles, couscous and similar farinaceous products		
239	Food products n.e.c.		
24	Beverages		
25	Tobacco products		

n.e.c. not elsewhere classified

Table A5GSC3 sectors defined by reference to the ISIC, Rev. 4

GSC3	ISIC4		
Number	Code	Code	Description
14	fsh	03	Fishing and aquaculture
		017	Hunting, trapping and related service activities
15	coa	05	Mining of coal and lignite
16	oil	061	Extraction of crude petroleum
		091(part)	Support activities for petroleum and natural gas extraction (petroleum part)
17	gas	062	Extraction of natural gas
		091(part)	Support activities for petroleum and natural gas extraction (natural gas part)
18	oxt	07	Mining of metal ores
		08	Other mining and quarrying
		099	Support activities for other mining and quarrying
27	tex	13	Manufacture of textiles
28	wap	14	Manufacture of wearing apparel
29	lea	15	Manufacture of leather and related products
30	lum	16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
31	ppp	17	Manufacture of paper and paper products
		18	Printing and reproduction of record media
33	chm	20	Manufacture of chemicals and chemical products
34	bph	21	Manufacture of pharmaceuticals, medicinal chemical and botanical products
35	rpp	22	Manufacture of rubber and plastics products
36	nmm	23	Manufacture of other non-metallic mineral products
37	i_s	241	Manufacture of basic iron and steel
		2431	Casting of iron and steel
38	nfm	242	Manufacture of basic precious and other non-ferrous metals
		2432	Casting of non-ferrous metals
39	fmp	25	Manufacture of fabricated metal products, except machinery and equipment
40	ele	26	Manufacture of computer, electronic and optical products
41	eeq	27	Manufacture of electrical equipment
42	ome	28	Manufacture of machinery and equipment n.e.c.
43	mvh	29	Manufacture of motor vehicles, trailers and semi-trailers

Table A5GSC3 sectors defined by reference to the ISIC, Rev. 4
(cont'd)

GSC3		ISIC4	
Number	Code	Code	Description
44	otn	30	Manufacture of other transport equipment
45	omf	31	Manufacture of furniture
		32	Other manufacturing
		33	Repair and installation of machinery and equipment
46	ely	351	Production, collection and distribution of electricity
		353	Steam and hot water supply
47	gdt	352	Manufacture of gas; distribution of gaseous fuels through mains
48	wtr	36	Collection, purification and distribution of water, water collection, treatment and supply
		37	Sewerage
		38	Waste collection, treatment and disposal activities; materials recovery
		39	Remediation activities and other waste management services
49	cns	41	Construction of buildings
		42	Civil engineering
		43	Specialized construction activities
50	trd	45	Wholesale and retail trade and repair of motor vehicles and motorcycles
		46	Wholesale trade, except of motor vehicles and motorcycles
		47	Retail trade, except of motor vehicles and motorcycles
51	afs	55	Accommodation
		56	Food and beverage service activities
52	otp	49	Land transport and transport via pipelines
53	wtp	50	Water transport
54	atp	51	Air transport
55	whs	52	Warehousing and support activities for transportation
56	cmn	53	Postal and courier activities
		58	Publishing activities
		59	Motion picture, video and television programme production, sound recording and music publishing activities
		60	Programming and broadcasting activities
		61	Telecommunications

(cont'd)

Table A5GSC3 sectors defined by reference to the ISIC, Rev. 4
(cont'd)

GSC3		ISIC4	
Number	Code	Code	Description
56	cmn	62	Computer programming, consultancy and related activities
		63	Information service activities
57	ofi	64	Financial service activities, except insurance and pension funding
		661	Activities auxiliary to financial service activities, except insurance and pension funding
		663	Fund management activities
58	ins	65	Insurance, reinsurance and pension funding, except compulsory social security
		662	Activities auxiliary to insurance and pension funding
59	rsa	68	Real estate activities
60	obs	M, N	Professional, scientific and technical activities and Administrative and support service activities
61	ros	R, S, T	Arts, entertainment and recreation; Other service activities; Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
62	osg	84	Public administration and defence; compulsory social security
		99	Activities of extraterritorial organizations and bodies
63	edu	85	Education
64	hht	Q	Human health and social work activities
65	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 Matrices

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	Government	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. 2008. *International Standard Industrial Classification of All Economic Activities, Third Revision*, Statistical Papers, Series M No. 4, Rev. 4, Sales No. E.08.XVII.25. New York: United Nations Publishing Division. Available from:

https://unstats.un.org/unsd/publication/seriesm/seriesm_4rev4e.pdf

UNITED NATIONS. 2015. *Central Product Classification*, Statistical Papers, Series M No. 77, Ver 2.1. New York: United Nations Publishing Division. Available from:
<https://unstats.un.org/unsd/classifications/unsdclassifications/cpcv21.pdf>