

11.B

Australia

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The Australian input-output (I-O) table in the GTAP 6 Data Base was constructed from key input-output tables supplied by the Australian Bureau of Statistics (ABS) and some supporting tables estimated from other data sources. The data provided covers the Australian financial year ended 30 June 1997. The data were cleaned and transformed to meet GTAP's requirements and homogeneity assumptions were used to convert the data from 106 'multi-product' sectors to 'single-product' sectors. Finally, the data tables were reclassified and re-balanced to provide the matrices required by GTAP.

This paper describes the construction of the Australian input-output table for the GTAP 6 Data Base. The provision of the data for Australia was undertaken as part of the Productivity Commission's commitment as a member of the GTAP consortium.

In line with GTAP requirements, as outlined in Huff, McDougall, and Walmsley (2000), the data for Australia were provided in four matrices:

- the supply and use of the 57 GTAP products and three primary factors of production (land, labor and capital) *without* product taxes (GTAP matrix UF);
- the supply and use of the 57 GTAP products and three primary factors *with* product taxes (GTAP matrix UP);
- output of the 57 GTAP products (GTAP vector OP); and
- imports of the 57 GTAP products (GTAP vector MF).

Because data definitions and classifications of I-O information available to undertake the update do not match precisely with the requirements of GTAP, a 'building block' approach has been adopted. Under this approach, available information was first adjusted or reclassified according to GTAP requirements. When this processing was complete, the individual building blocks so derived were assembled according to the structure of the GTAP Data Base as defined by the tables UF, UP, OP and MF.

Section 11.B.1 describes the key data sources used, while section 11.B.2 outlines the processing of source data into a form corresponding to GTAP requirements. Section 11.B.3 describes how these data were brought together into the GTAP format. Section 11.B.4 notes key conceptual differences and sensitivities between this version and the Australian I-O table in the GTAP 5 Data Base. Section 11.B.5 notes key diagnostics tests applied to the data base before its distribution.

11.B.1 Source Data

The primary data sources used to construct the Australian I-O table for GTAP were electronic versions of the 1996-97 I-O tables made available by the Australian Bureau of Statistics for the Australian financial year ended 30 June 1997.¹ The ABS tables contain detailed data on the supply and use of 106 products in Australia and the associated product tax payments (see appendix table 11.B.1 for a list of tables of supply, use and derived tables provided in electronic format for the 106-sector Australian I-O product classification).

Two versions of the 1996-97 I-O tables were made available by the ABS. The versions differed with respect to the treatment of transport margin activities.² The first version recorded such margin service flows differently depending on whether the buyer or seller was invoiced for the cost of transportation and goods traded. This treatment accorded with the recommended treatment of transport margins set out in the System of National Accounts, 1993 edition (Commission of European Communities *et al.* 1993). The second version recorded transport margin service flows on a common basis — as a cost to the buyer regardless of who was actually invoiced for the transport service (whether the buyer or seller). This treatment of transport services accorded with the treatment set out in the 1968 edition of the System of National Accounts (UN 1968) and the treatment applied in the Australian I-O tables for the financial year 1993-94 — the reference year for the Australian tables submitted for GTAP 5 Data Base.

The recording of transport margin service flows on an SNA68 basis has significant advantages for economic analysis using I-O tables (Aspen 2001 and Gretton, Bobbin and Horridge 2004). The GTAP center indicated a preference for the data base to be prepared on an SNA68 basis³ (McDougall, R., GTAP, Purdue University, pers. comm., 9 September 2003). Consequently, the primary data sources used to construct the Australian I-O table for the GTAP 6 Data Base was the electronic version of key I-O tables compiled by the ABS according to SNA68.⁴

A third potential data source was also considered — the 1996-97 MONASH model data base (Horridge 2002). However, this source was derived from the ABS I-O tables that included the SNA93 treatment of transport margin services. Thus, while the MONASH data base provided

¹ABS (2000) describes the concepts, sources and methods used in compiling the Australian input-output tables.

²The ABS defines margin activities to be the difference between the price received by producers (basic prices) and the price paid by the purchaser of a good or service (purchasers' prices). Margin activities fall into two broad groups — mark-ups and taxes. Mark-ups primarily increase the value of goods without otherwise transforming them and include wholesale and retail trade margins and transport margins. Tax margins are taxes or subsidies levied on products and include sales taxes, excise taxes, customs duties (tariffs) and, since July 2000, the goods and services tax.

³McDougall, R., GTAP, Purdue University, pers. Comm., 9 September 2003.

⁴The SNA68 *Use table* supplied by the ABS also included some revisions. In 60 of the 106 IOPC commodities, mainly in the mining and manufacturing sectors, SNA68 *Total supply* (col. T6) was lower than published under SNA93. Most revisions were modest (less than 2 per cent). As a result, *Total intermediate usage* (row T1) was only 0.7 per cent lower. *Australian production* (row T2) and *Total usage* (row T3) were, respectively, also 0.5 per cent and 0.4 per cent lower. *Gross domestic product* and *Gross value added* were unchanged.

operational advantages for the compilation of the GTAP Data Base, it suffered from the same limitations as the ABS tables on which it was based, and accordingly was not used in the current exercise.

Some secondary data sources referenced in this document were used to fill gaps in the primary source data. These gaps arose either because the ABS restricted the release of certain statistics to preserve confidentiality or because some of the supporting tables needed to construct the I-O table for the GTAP Data Base were not provided by the ABS on an SNA68 basis.⁵ Any missing SNA68 supporting tables required, such as the duty and commodity tax tables, were estimated from data in the SNA68 tables supplemented with data from the corresponding SNA93 tables.

11.B.2 Processing of the Source Data

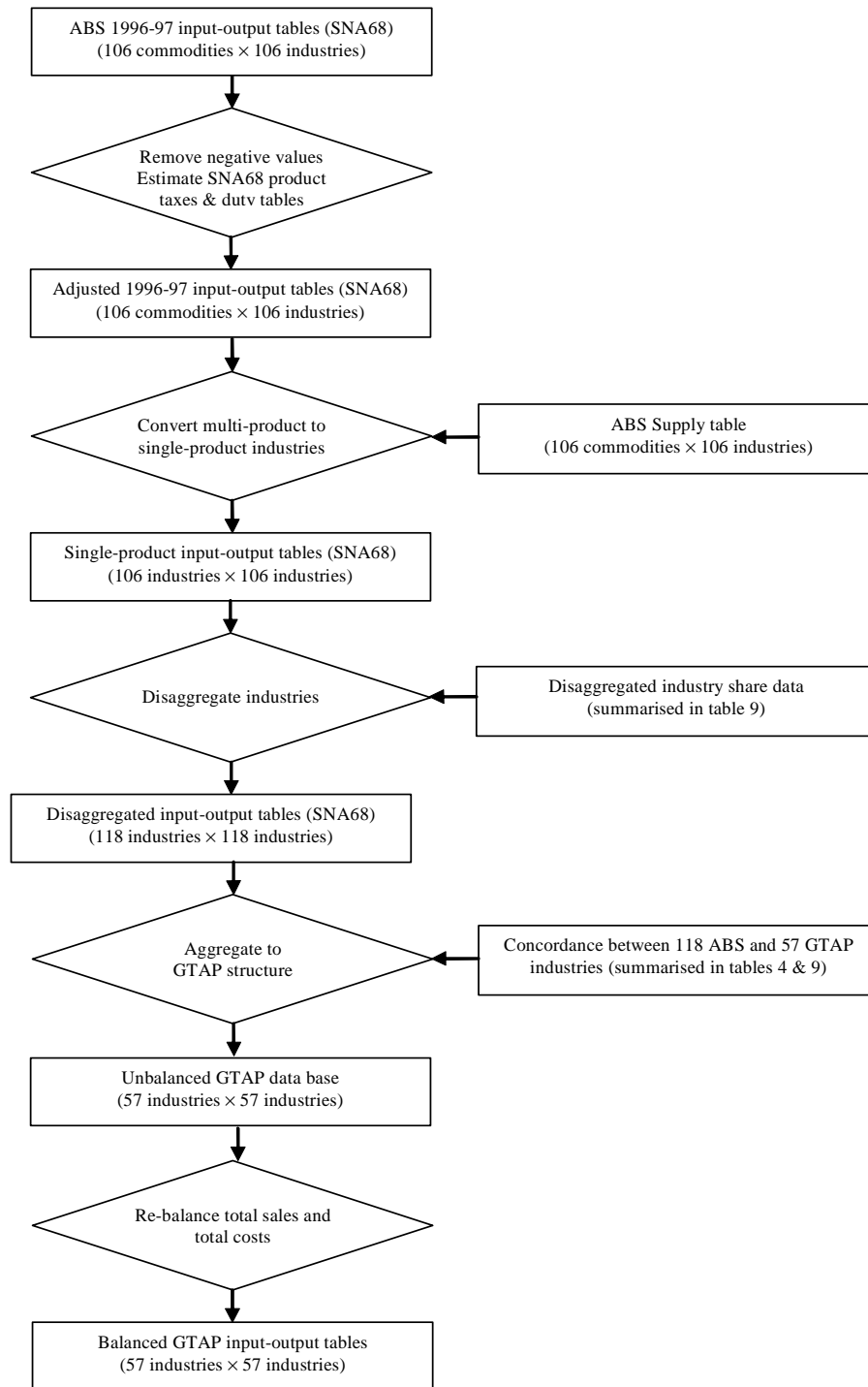
The ABS data, although similar to the format of the GTAP data requirements, did not fully satisfy all aspects of the GTAP requirements as set out in Huff, McDougall and Walmsley (2000). The main adjustments applied to the ABS data were:

- removal of negative value flows
- reconciliation of basic price and producer price flows
- recoding of imports, from the generic ABS category of complementary imports to disaggregated GTAP products
- removal of ‘re-exports’ from imports and exports
- re-classification of the ABS primary factor inputs to GTAP input categories
- aggregation of the ABS investment categories to the single GTAP investment category
- treatment of other taxes less subsidies on production
- transformation of industries from a multi-product to a single-product structure
- re-classification of flows classified by ABS industry categories to GTAP categories
- final balancing of the data base.

The process for creating the Australian I-O tables for the GTAP 6 Data Base is illustrated in figure 11.B.1. Details of each process are outlined below.

⁵To preserve confidentiality, the ABS restricts the release of statistics where the disclosure of the statistics would enable the identification of data supplied by individuals or firms.

Figure 11.B.1 Process for Creating the Australian I-O Table for the GTAP 6 Data Base



11.B.2.1 Removal of Negative Value Flows

Negative value flows were found to exist for definitional and data reasons. The main reason for the negative value flows was the recording of imports on a 'net basis' in the ABS I-O tables. Under this convention, the net value of imports of transportable goods was reported as the value of goods imported *less* the cost of any Australian transport services incurred in bringing those goods to Australia. To balance the supply and use of relevant flows, the cost of any Australian transport services were deducted from industry and final users' consumption of relevant transport services. Consequentially, usage of imports of water transport and air transport was set to zero for 88 industries and exports of water transport and air transport services were increased by identical amounts (see table 11.B.1).

In a similar vein, the reported negative of A\$135.7 million for household consumption of imported water transport was increased to +A\$25.7 million on the basis of benchmark information provided in the 1993-94 input-output tables (ABS 1997).⁶ Household consumption of domestically produced water transport was reduced by A\$161.4 million to offset the adjustment to imports and maintain aggregate household consumption at its initial level. Exports of water transport services were increased to balance supply and use.

Table 11.B.1 Intermediate Use of Imported Water transport and Air Transport

Measure	Units	Water Transport (6301)	Air Transport (6401)
Negative elements	No. of cells	83	5
Total value of negative imports	A\$ million	-50.0	-129.8
Total value of imports	A\$ million	686.8	1497.3
Negatives' share	Per cent	7.3	8.7

Source: ABS 2001a (Input-Output Tables, Australia, 1996-97, Cat. no. 5209.0, SNA68 unpublished).

Table 11.B.2 Negative Cells in the ABS Domestic Use Table^a (A\$ million, 1996-97, Basic Prices)

Commodity	Using Industry	Value
2806 Electronic equipment	106 Poultry	-0.0005
104 Dairy cattle	2106 Bakery products	-0.00004
104 Dairy cattle	2108 Other food products	-0.00002
104 Dairy cattle	5701 Accommodation, cafes & restaurants	-0.00118
7702 Other property services	7801 Scientific research etc	-0.13875
104 Dairy cattle	8201 Defense	-0.00001
2805 Scientific equipment	9501 Personal services	-0.16554
Total		-0.30604

^a Derived by subtracting SNA68 Imports table (ABS IO table 3) from the SNA68 Use table (ABS IO table 2). Source: ABS 2001a (Input-Output Tables, Australia, 1996-97, Cat. no. 5209.0, SNA68 unpublished).

⁶ Household final consumption of imported *water transport* in 1996-97 was set to 4 per cent of total intermediate usage, the same share as in the 1993-94 input-output tables (ABS 1997).

Negative value flows also occurred when the estimated use of imports exceeded total use of a product. This statistical relationship implied that input of domestic production by certain users was negative (table 11.B.2). These negatives were removed by increasing intermediate usage of domestically produced products to zero and total use by the same amount. To maintain the balance between total costs and sales, imports and exports of these commodities were reduced by 50 per cent of the original negative value.

11.B.2.2 Reconciling Basic Price and Producer Price Flows

GTAP requires that data on usage of products be reported at basic prices (matrix UF) and at producers' prices (matrix UP) with the difference between the two matrices being taxes on products. The ABS provided data at basic prices together with a matrix of the impost on users of aggregate taxes on products (ABS I-O table 33) and matrices on the components:

- sales tax by commodity and category of use (ABS I-O table 34)
- import duty by commodity and category of use (ABS I-O table 35)
- other taxes on products by commodity and category of use (ABS I-O table 36), and
- (less) subsidies on products by commodity and category of use (ABS I-O table 37).

In principle, the table at producers' prices required by GTAP could have been obtained by simple aggregation of the basic price flows and taxes on these flows. However, revised variants of the relevant tax tables were not available at basic prices with the SNA68 treatment of transport margins service flows (see ABS I-O table 2). Therefore, to complete the dataset, estimates of product taxes had to be imputed. This was done by imputing the *ad valorem* duty, tax or subsidy rate implied by the basic price and product tax tables with the SNA93 treatment of transport services. This *ad valorem* rate was then applied to the revised use or imports tables at basic prices, as appropriate, to derive revised product tax tables showing (net) product taxes and imports duty. Finally, the results so derived for each industry were scaled to ensure that total product taxes paid by each industry matched comparable totals provided by the relevant benchmark ABS data (ie row P3 in the in the Use table — ABS I-O table 2 (SNA68)).

11.B.2.3 Recoding of Complementary Imports

The use and imports tables supplied by the ABS (ABS I-O tables 2 and 3, respectively) distinguished between imports of goods produced in Australia (*Competing imports*, row P6) and those that are not (*Complementary imports*, row P5). Complementary imports in 1996-97 mostly comprised motor cycles (A\$250.8 million) and natural rubber (A\$78.8 million) (ABS 2001a, p. 92). Competing imports accounted for 99.7 per cent of Australian imports in 1996-97. The GTAP Data Base assigns all imports to specified industry of origin products and makes no provision for complementary

imports defined from the perspective of an individual country. In order to conform to GTAP accounting conventions, *Complementary imports* were allocated to each industry's use of competing imports.

11.B.2.4 Removal of Re-exports

The imports table supplied by the ABS (ABS I-O table 3) included information on 're-exports' — goods temporarily brought into Australia that are subsequently exported (row 9909). Re-exports accounted for 2 per cent of Australian imports in 1996-97. As re-exports are not included in the GTAP Data Base, re-export flows were identified and subtracted from total exports and imports. Handling and distribution services provided by Australian firms and associated with re-exports were retained and classified as an export of a transport or distribution service in accordance with the convention adopted in source data tables provided by the ABS.

11.B.2.5 Reclassification of Primary Factors of Production

The use table supplied by the ABS (ABS I-O table 2) provided data on the inputs of two primary factors of production — *Compensation of employees* (row P1) and *Gross operating surplus & mixed income* (row P2) — by each industry. These categories overlap with the three primary input categories — land, labor and capital — specified in the GTAP Data Base. To complete the I-O table for GTAP, the ABS categories were reclassified to GTAP categories using the primary factor shares adopted in the MONASH model data base (appendix table 11.B.A4). Horridge (2002) describes the derivation of the primary factor shares from the underlying published input-output tables.

11.B.2.6 Aggregation of Investment

The ABS provided data on commodity sales to each category of final demand — final consumption expenditure disaggregated to private and government; gross fixed capital formation disaggregated to private, public enterprises and general government; changes in inventories; and exports (table 11.B.3). The categorisation is similar to that applied in GTAP, with the exception that the ABS categories of *Gross fixed capital formation — Private* (column Q3 of ABS I-O tables 2 and 3); *Gross fixed capital formation — Public enterprises* (column Q4); and *Gross fixed capital formation — General Government* (column Q5) provide a more detailed breakdown than required for GTAP. To complete the I-O table for GTAP, these categories were aggregated to form the GTAP final demand category *Investment*.

Table 11.B.3 Final Demand Concordance

Column	ABS Category	GTAP Category
Q1	Final consumption expenditure — Households	Private household consumption
Q2	Final consumption expenditure — Government	Government consumption
Q3	Gross fixed capital formation — Private	Investment
Q4	Gross fixed capital formation — Public enterprises	
Q5	Gross fixed capital formation — General Government	
Q6	Change in inventories	Change in stocks
Q7	Exports	Exports

11.B.2.7 Treatment of Other Taxes Less Subsidies on Production

The ABS definition of total sectoral usage (row T2 in ABS I-O table 2) includes ‘other taxes less subsidies on production’ whereas the GTAP definition of total usage does not (matrices UF and UP). The estimated total value of these taxes less subsidies was A\$22 650 million in 1996-96.⁷

11.B.2.8 Converting Multi-product Industries to Single-product Industries

The basic input-output tables provided by the ABS are ‘multi-product’ in nature — that is, each industry produces commodities characteristic of that industry and can also produce commodities characteristic of other industries (e.g. the ABS *Dairy products* industry primarily produced *Dairy products* but also produced some *Meat and meat products*). The GTAP model (and hence its data base) on the other hand is ‘single product’ in nature — that is, each ‘industry’ is defined as producing only one ‘commodity’ and each ‘commodity’ is produced by only one ‘industry’. The multi-product ABS input-output tables were converted to single-product, or symmetric, tables by applying the industry technology assumption, whereby all products produced by an industry were assumed to be produced with the same input-output structure. It also was assumed that an industry supplied each user of products it produced in proportion to its market share for that product. Market share information needed for the application of these assumptions was derived from the supply table provided by the ABS (ABS I-O table 1). The application of these assumptions enables the commodity-by-industry tables supplied by the ABS to be converted to ‘industry-by-industry’ tables.

⁷ The ABS defines ‘other taxes on production’ as ‘all taxes that enterprises incur as a result of engaging in production, except taxes on products’ and includes: payroll taxes; recurrent taxes on land, buildings or other structures; some business and professional licences; stamp duties; taxes on pollution; and taxes on international transactions. Likewise, the ABS defines ‘other subsidies on production’ as ‘all subsidies, except subsidies on products, which resident enterprises may receive as a consequence of engaging in production’ and includes employment subsidies (ABS 2000, Australian National Accounts: Concepts, Sources and Methods, Cat. no 5216.0).

11.B.2.9 Mapping ABS Products to GTAP Counterparts

The Australian I-O tables have 106 sectors (these are listed in appendix table 11.B.A2) compared to the 57 in the GTAP 6 Data Base. To complete the I-O on a 57 sector basis, a concordance was established between the two classifications (appendix table 11.B.A3) and used to map the I-O data from the 106 ABS sectors to the 57 GTAP sectors. The concordance shows that 93 ABS sectors can be linked directly to one of the GTAP sectors without adjustment. However, it also shows that 13 ABS sectors were linked to more than one GTAP sector.⁸ For example, the ABS sector Grains is linked to the GTAP sectors Paddy rice, Wheat, Oil-seeds and Cereal grains.

The process for mapping information on the use of sector outputs (rows) and sector inputs (columns) (and associated product taxes) involved, for each relevant ABS sector, a decomposition of the relevant rows and columns into building block categories that could be linked directly or re-aggregated to a GTAP sector. Inputs to production and sector outputs were estimated for each building block sector by reference to detailed sector-specific information contained in the MONASH model data base. Where such information was not available (ie where the sectors in MONASH did not correspond to the sectors needed to compile the I-O table for GTAP), the ABS input and output structures were apportioned according to ABS output shares (appendix table 11.B.A5).

11.B.2.10 Balancing the Data Base

Once all adjustments were completed, the I-O table for GTAP was balanced to ensure that total sales aligned with total costs for each sector and that the income and expenditure components of GDP aligned with estimates published by the ABS taking into account any adjustments associated with meeting GTAP's requirements.

11.B.3 I-O Table Supplied to GTAP

The above steps provided a series of 'building block' tables that met GTAP classification and data requirements, but did not conform to the data base structure outlined in Huff, McDougall and Walmsley (2000). Assembly of the final tables involved:

- for the matrix UF, merging the domestic usage of domestic production, imported supplies and primary inputs by sector and category of final demand, evaluated at basic prices into a single array.
- for the matrix UP, aggregating estimated product taxes (net) by sector and category of use with estimates of usage at basic prices (matrix UF) to provide estimates of usage of domestic production and imported supplies at producer prices.
- for the vector OP, transferring estimated output by sector from the building block tables to a single array. The value of output is estimated at basic prices and, as such, is inclusive of all domestically produced and imported inputs, and product taxes on those

⁸ The data used are too detailed to present here in full and are available from the authors on request.

inputs (matrix UP) plus other taxes and subsidies on production (such as payroll and land taxes) (not included in matrix UF or UP).

- for the vector MF, transferring the total value of imports by sector (single product industry basis) from the building block tables to a single array.

11.B.4 Comparability with Previous Australian I-O Tables

The starting point for the Australian I-O table in the GTAP 5 Data Base was the MONASH model data base for the reference year 1993-94. That data base was benchmarked to ABS input-output tables for that year; however, it had the advantage of commodity and industry disaggregations needed to provide information according to the GTAP sectoral classification. The starting point for the Australian I-O table in the GTAP 6 Data Base was a special version of the input-output tables compiled by the ABS on request from the Productivity Commission. This version differed from the published tables for 1996-97 with respect to the treatment of transport margin services (as outlined above). Although this treatment is aligned to the treatment of transport services in the 1993-94 MONASH data base (and supporting input-output tables), the treatment has not been carried forward to the most recent MONASH data base, at this stage. More generally, the GTAP 6 Australian I-O table has been compiled according to the statistical standards promulgated in the SNA93, whereas the GTAP 5 Australian I-O table provided by Matoris, Travis and Welsh (2002) was based on data compiled according to the statistical standards promulgated in the SNA68. Details of the changes to the Australian national accounts and supporting output tables associated with the new standards are provided in ABS (1997).

11.B.5 Diagnostics

The Australian I-O table for the GTAP Data Base was checked to ensure that

- there were no negative values (other than where appropriate)
- the pre- and post disaggregation value of costs and sales balanced
- total sales equaled total costs in total and by sector
- the values for GDP, GDP(I) and GDP(E) were correct
- the components of GDP(I) and GDP(E) were correct, and
- the GTAP entropy input-output cost shares appeared correct.⁹

⁹ The entropy input-output cost shares measure the difference in cost shares for each industry in the Australian I-O table compared to a representative GTAP I-O table and highlight any unusual cost shares (Walmsley and McDougall, 2001).

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Appendix

Table 11.B.A1 1996-97 Input-Output Data Available Electronically

Grouping	Table	Description	
Basic tables	1†	Supply table — supply by product group by industry and imports	
	2†*	Use table — input by industry and final use category and supply by product group	
	3†*	Imports table — input by industry and final use category and supply by product group	
	4	Reconciliation of flows at basic prices and at purchasers' prices by product	
Industry by industry tables (basic prices, recording intra-industry flows) ^a			
107 Industries		Direct allocation of competing imports	
	5	Flow matrix	
	6	Direct requirements coefficients from Table 5	
	7	Total requirements coefficients from Table 6	
		Indirect allocation of competing imports	
	8	Flow matrix	
	9	Direct requirements coefficients from Table 8	
	10	Total requirements coefficients from Table 9	
	Primary input tables	17	Primary input content (total requirements) per \$100 of final use by industry
		18	Primary input content by industry of each category of final use
Other tables	19	Specialisation and coverage ratios by industry	
	20	Employment by industry	
	21	Composition of supply of product groups containing margin products	
	22	Output multipliers, direct allocation of competing imports	
	Margin matrices ^b	23	Wholesale trade (4501, part)
		24	Retail trade (5101, part)
		25	Restaurants, hotels and clubs (5701, part)
26		Road transport (6101, part)	
27		Rail transport (6201, part)	
28		Pipeline transport (6201, part)	
29		Water transport (6301, part)	
30		Air transport (6401, part)	
31		Port handling (6601, part)	
32		Marine insurance (7401, part)	
33†		Taxes on products (net)	
34	Sales tax		
35†	Duty		
36	Other taxes on products		
37	Subsidies on products		

* Also supplied by the ABS on an SNA68 basis.

† used in constructing the I-O table for GTAP.

^a Similar tables are available at the 35 industry level (ABS IO tables 11 to 16).

^b Supply of margin by product group to which the margin applies and input of margin by industry and final use category.

Source: ABS 2001a (Input-Output Tables, Australia, 1996-97, Cat. no. 5209.0, p. 93).

Table 11.B.A2 ABS Input-Output Product Classification, 1996-97

No.	IOPC	Description	No.	IOPC	Description
1	101	Sheep	41	2502	Basic chemicals
2	102	Grains	42	2503	Paints
3	103	Beef cattle	43	2504	Pharmaceuticals
4	104	Dairy cattle	44	2505	Soap & detergents
5	105	Pigs	45	2506	Cosmetics & toiletries
6	106	Poultry	46	2507	Other chemical products
7	107	Other agriculture	47	2508	Rubber products
8	200	Services to agriculture	48	2509	Plastic products
9	300	Forestry & logging	49	2601	Glass & glass products
10	400	Commerical fishing	50	2701	Iron & steel
11	1100	Coal, oil & gas	51	2702	Basic non-ferrous metals
12	1301	Iron ores	52	2703	Structural metal products
13	1302	Non-ferrous metal ores	53	2704	Sheet metal products
14	1400	Other mining	54	2705	Fabricated metal products
15	1500	Services to mining	55	2801	Motor vehicles & parts etc
16	2101	Meat & meat products	56	2802	Ships & boats
17	2102	Dairy products	57	2803	Railway equipment
18	2103	Fruit & vegetable products	58	2804	Aircraft
19	2104	Oils & fats	59	2805	Scientific etc equipment
20	2105	Flour & cereal foods	60	2806	Electronic equipment
21	2106	Bakery products	61	2807	Household appliances
22	2107	Confectionery	62	2808	Other electrical equipment
23	2108	Other food products	63	2809	Agricultural, mining etc machinery
24	2109	Soft drinks, cordials & syrups	64	2810	Other machinery & equipment
25	2110	Beer & malt	65	2901	Prefabricated buildings
26	2111	Wine & spirits	66	2902	Furniture
27	2112	Tobacco products	67	2903	Other manufacturing
28	2201	Textile fibres, yarns etc	68	3601	Electricity supply
29	2202	Textile products	69	3602	Gas supply
30	2203	Knitting mill products	70	3701	Water, sewerage & drainage
31	2204	Clothing	71	4101	Residential building
32	2205	Footwear	72	4102	Other construction
33	2206	Leather & leather products	73	4501	Wholesale trade
34	2301	Sawmill products	74	5101	Retail trade
35	2302	Other wood products	75	5401	Mechanical repairs
36	2303	Pulp, paper & paperboard	76	5402	Other repairs
37	2304	Paper containers & products	77	5701	Accommodation, cafes & restaurants
38	2401	Printing & services to printing	78	6101	Road transport
39	2402	Publishing, recorded media etc	79	6201	Rail transport ^b
40	2501	Petroleum & coal products	80	6301	Water transport

Continued

Table 11.B.A2 ABS Input-Output Product Classification, 1996-97 (Contd)

No.	IOPC	Description	No.	IOPC	Description
81	6401	Air transport	94	8201	Defense
82	6601	Services to transport ^d	95	8401	Education
83	7101	Communication services	96	8601	Health services
84	7301	Banking	97	8701	Community services
85	7302	Non-bank finance	98	9101	Motion picture, radio, etc
86	7401	Insurance	99	2602	Ceramic products
87	7501	Services to finance etc	100	2603	Cement, lime & concrete slurry
88	7701	Ownership of dwellings	101	2604	Plaster & other concrete products
89	7702	Other property services	102	2605	Other non-metallic mineral products
90	7801	Scientific research etc	103	9201	Libraries, museums & the arts
91	7802	Legal, accounting etc services	104	9301	Sport, gambling etc
92	7803	Other business services	105	9501	Personal services
93	8101	Government administration	106	9601	Other services

^aServices to agriculture, hunting & trapping.

^bRail, pipeline * other transport.

^cAir & space transport.

^dServices to transport, storage.

Source: ABS 2001a (Input-Output Tables, Australia, 1996-97, Cat. No. 5209.0).

Table 11.B.A3 Concordance Between ABS and GTAP Products

IOPC	ABS Product	GTAP Product	
101	Sheep	Bovine cattle, sheep & goats, horses	9
		Wool, silk-worm cocoons	12
102	Grains	Paddy rice	1
		Wheat	2
		Cereal grains nec	3
		Oil-seeds	5
103	Beef cattle	Bovine cattle, sheep & goats, horses	9
104	Dairy cattle	Bovine cattle, sheep & goats, horses	9
		Raw milk	11
105	Pigs	Animal products nec	10
106	Poultry	Animal products nec	10
107	Other agriculture	Vegetables, fruit, nuts	4
		Sugar cane, sugar beet	6
		Plant-based fibers	7
		Crops nec	8
		Bovine cattle, sheep & goats, horses	9
		Animal products nec	10
		Forestry	13
200	Services to agriculture	Paddy rice	1
		Wheat	2
		Cereal grains nec	3
		Vegetables, fruit, nuts	4
		Oil-seeds	5
		Sugar cane, sugar beet	6
		Plant-based fibers	7
		Crops nec	8
		Bovine cattle sheep & goats, horses	9
		Animal products nec	10
		Raw milk	11
		Wool, silk-worm cocoons	12
300	Forestry & logging	Forestry	13
400	Commercial fishing	Fishing	14
1100	Coal, oil & gas	Coal	15
		Oil	16
		Gas	17
1301	Iron ores	Minerals nec	18
1302	Non-ferrous metal ores	Minerals nec	18
1400	Other mining	Minerals nec	18
1500	Services to mining	Oil	16
		Minerals nec	18
2101	Meat & meat products	Animal products nec	10
		Bovine cattle, sheep & goat, horse meat products	19
		Meat products nec	20
2102	Dairy products	Dairy products	22

Continued

Table 11.B.A3 Concordance Between ABS and GTAP Products (Contd)

IOPC	ABS Product	GTAP Product	
2103	Fruit & vegetable products	Food products nec	25
2104	Oils & fats	Vegetable oils & fats	21
2106	Bakery products	Food products nec	25
2107	Confectionery	Food products nec	25
2108	Other food products	Sugar	24
		Food products nec	25
2109	Soft drinks, cordials & syrups	Beverages & tobacco products	26
2110	Beer & malt	Beverages & tobacco products	26
2111	Wine & spirits	Beverages & tobacco products	26
2112	Tobacco products	Beverages & tobacco products	26
2201	Textile fibres, yarns etc	Textiles	27
2202	Textile products	Textiles	27
2203	Knitting mill products	Textiles	27
		Wearing apparel	28
2204	Clothing	Wearing apparel	28
2205	Footwear	Leather products	29
2206	Leather & leather products	Leather products	29
2301	Sawmill products	Wood products	30
2302	Other wood products	Wood products	30
2303	Pulp, paper & paperboard	Paper products, publishing	31
2304	Paper containers & products	Paper products, publishing	31
2401	Printing & services to printing	Paper products, publishing	31
2402	Publishing, recorded media etc	Paper products, publishing	31
2501	Petroleum & coal products	Petroleum, coal products	32
2502	Basic chemicals	Chemical, rubber, plastic products	33
2503	Paints	Chemical, rubber, plastic products	33
2504	Pharmaceuticals	Chemical, rubber, plastic products	33
2505	Soap & detergents	Chemical, rubber, plastic products	33
2506	Cosmetics & toiletries	Chemical, rubber, plastic products	33
2507	Other chemical products	Chemical, rubber, plastic products	33
2508	Rubber products	Chemical, rubber, plastic products	33
2509	Plastic products	Chemical, rubber, plastic products	33
2601	Glass & glass products	Mineral products nec	34
2602	Ceramic products	Mineral products nec	34
2603	Cement, lime & concrete slurry	Mineral products nec	34
2604	Plaster & other concrete products	Mineral products nec	34
2605	Other non-metallic mineral products	Mineral products nec	34
2701	Iron & steel	Ferrous metals	35
2702	Basic non-ferrous metals	Metals nec	36
2703	Structural metal products	Metal products	37
2704	Sheet metal products	Metal products	37
2705	Fabricated metal products	Metal products	37
2801	Motor vehicles & parts etc	Motor vehicles & parts	38
2802	Ships & boats	Transport equipment nec	39

Continued

Table 11.B.A3 Concordance Between ABS and GTAP Products (Contd)

IOPC	ABS Product	GTAP Product	
2803	Railway equipment	Transport equipment nec	39
2804	Aircraft	Transport equipment nec	39
2805	Scientific etc equipment	Machinery & equipment nec	41
2806	Electronic equipment	Electronic equipment	40
2807	Household appliances	Machinery & equipment nec	41
2808	Other electrical equipment	Machinery & equipment nec	41
2809	Agricultural, mining etc machinery	Machinery & equipment nec	41
2810	Other machinery & equipment	Machinery & equipment nec	41
2901	Prefabricated buildings	Manufactures nec	42
2902	Furniture	Manufactures nec	42
2903	Other manufacturing	Manufactures nec	42
3601	Electricity supply	Electricity	43
3602	Gas supply	Gas manufacture, distribution	44
3701	Water, sewerage & drainage	Water	45
4101	Residential building	Construction	46
4102	Other construction	Construction	46
4501	Wholesale trade	Trade	47
5101	Retail trade	Trade	47
5401	Mechanical repairs	Trade	47
5402	Other repairs	Trade	47
5701	Accommodation, cafes & restaurants	Trade	47
6101	Road transport	Transport nec	48
6201	Rail transport	Transport nec	48
6301	Water transport	Water transport	49
6401	Air transport	Air transport	50
6601	Services to transport	Transport nec	48
		Water transport	49
		Air transport	50
7101	Communication services	Communication	51
7301	Banking	Financial services nec	52
7302	Non-bank finance	Financial services nec	52
7401	Insurance	Insurance	53
7501	Services to finance etc	Financial services nec	52
		Insurance	53
7701	Ownership of dwellings	Dwellings	57
7702	Other property services	Business services nec	54
7801	Scientific research etc	Business services nec	54
7802	Legal, accounting etc services	Business services nec	54
7803	Other business services	Business services nec	54
8101	Government administration	Public administration & defense, education, health	56
8201	Defence	Public administration & defense, education, health	56
8401	Education	Public administration & defense, education, health	56
8601	Health services	Public administration & defense, education, health	56
8701	Community services	Public administration & defense, education, health	56

Continued

Table 11.B.A3 Concordance Between ABS and GTAP Products (Contd)

IOPC	ABS Product	GTAP Product	
9101	Motion picture, radio etc	Recreational & other services	55
9201	Libraries, museums & the arts	Recreational & other services	55
9301	Sport, gambling etc	Recreational & other services	55
9501	Personal services	Recreational & other services	55
9601	Other services	Public administration & defense, education, health	56

Source: Estimates based on Huff, McDougall and Walmsley, (2000) and ABS (1995) (Central Product Classification).

Table 11.B.A4 Primary Factor Shares^a (Per cent)

No.	IOPC	ABS Industry	Land	Labor	Capital ^b
1	101	Sheep	39.7	39.5	20.8
2	102	Grains	41.5	36.0	22.5
3	103	Beef cattle	37.6	42.5	19.9
4	104	Dairy cattle	36.9	49.5	13.6
5	105	Pigs	32.3	55.4	12.3
6	106	Poultry	0.0	47.0	53.0
7	107	Other agriculture	31.4	49.7	18.8
8	200	Services to agriculture	0.0	85.4	14.6
9	300	Forestry & logging	0.0	81.6	18.4
10	400	Commercial fishing	0.0	67.5	32.5
11	1100	Coal, oil & gas	0.0	22.3	77.7
12	1301	Iron ores	0.0	24.7	75.3
13	1302	Non-ferrous metal ores	0.0	29.0	71.0
14	1400	Other mining	0.0	21.4	78.6
15	1500	Services to mining	0.0	53.5	46.5
16	2101	Meat & meat products	0.0	82.4	17.6
17	2102	Dairy products	0.0	45.9	54.1
18	2103	Fruit & vegetable products	0.0	48.1	51.9
19	2104	Oils & fats	0.0	54.6	45.4
20	2105	Flour & cereal foods	0.0	38.2	61.8
21	2106	Bakery products	0.0	66.0	34.0
22	2107	Confectionery	0.0	65.0	35.0
23	2108	Other food products	0.0	57.6	42.4
24	2109	Soft drinks, cordials & syrups	0.0	50.2	49.8
25	2110	Beer & malt	0.0	21.6	78.4
26	2111	Wine & spirits	0.0	26.9	73.1
27	2112	Tobacco products	0.0	25.1	74.9
28	2201	Textile fibres, yarns etc	0.0	71.7	28.3
29	2202	Textile products	0.0	71.9	28.1
30	2203	Knitting mill products	0.0	74.1	25.9
31	2204	Clothing	0.0	81.0	19.0
32	2205	Footwear	0.0	84.5	15.5
33	2206	Leather & leather products	0.0	88.9	11.1
34	2301	Sawmill products	0.0	48.0	52.0
35	2302	Other wood products	0.0	66.7	33.3
36	2303	Pulp, paper & paperboard	0.0	44.3	55.7
37	2304	Paper containers & products	0.0	55.3	44.7
38	2401	Printing & services to printing	0.0	62.3	37.7
39	2402	Publishing, recorded media etc	0.0	54.0	46.0
40	2501	Petroleum & coal products	0.0	23.7	76.3
41	2502	Basic chemicals	0.0	48.3	51.0
42	2503	Paints	0.0	44.0	56.0
43	2504	Pharmaceuticals	0.0	48.8	51.2
44	2505	Soap & detergents	0.0	54.9	45.1
45	2506	Cosmetics & toiletries	0.0	68.4	31.6
46	2507	Other chemical products	0.0	50.7	49.3
47	2508	Rubber products	0.0	62.0	38.0
48	2509	Plastic products	0.0	57.5	42.5
49	2601	Glass & glass products	0.0	62.0	38.0

Continued

Table 11.B.A4 Primary Factor Shares^a (Per cent) (Contd)

No.	IOPC	ABS Industry	Land	Labor	Capital ^b
50	2602	Ceramic products	0.0	53.3	46.7
51	2603	Cement, lime & concrete slurry	0.0	42.6	57.4
52	2604	Plaster & other concrete products	0.0	51.1	48.9
53	2605	Other non-metallic mineral products	0.0	59.1	40.9
54	2701	Iron & steel	0.0	55.6	44.4
55	2702	Basic non-ferrous metals	0.0	42.5	57.5
56	2703	Structural metal products	0.0	69.0	31.0
57	2704	Sheet metal products	0.0	65.3	34.7
58	2705	Fabricated metal products	0.0	71.4	28.6
59	2801	Motor vehicles & parts etc	0.0	49.7	50.3
60	2802	Ships & boats	0.0	66.6	33.4
61	2803	Railway equipment	0.0	79.5	20.5
62	2804	Aircraft	0.0	80.1	19.9
63	2805	Scientific etc equipment	0.0	68.9	31.1
64	2806	Electronic equipment	0.0	55.8	44.2
65	2807	Household appliances	0.0	72.8	27.2
66	2808	Other electrical equipment	0.0	70.1	29.9
67	2809	Agricultural, mining etc machinery	0.0	80.4	19.6
68	2810	Other machinery & equipment	0.0	73.6	26.4
69	2901	Prefabricated buildings	0.0	43.1	56.9
70	2902	Furniture	0.0	73.8	26.2
71	2903	Other manufacturing	0.0	58.6	41.4
72	3601	Electricity supply	0.0	26.5	73.5
73	3602	Gas supply	0.0	36.0	64.0
74	3701	Water, sewerage & drainage	0.0	23.7	76.3
75	4101	Residential building	0.0	65.7	34.3
76	4102	Other construction	0.0	86.7	13.3
77	4501	Wholesale trade	0.0	75.5	24.5
78	5101	Retail trade	0.0	92.6	7.4
79	5401	Mechanical repairs	0.0	70.3	29.7
80	5402	Other repairs	0.0	58.9	41.1
81	5701	Accommodation, cafes & restaurants	0.0	63.7	36.3
82	6101	Road transport	0.0	71.8	28.2
83	6201	Rail transport	0.0	79.1	20.9
84	6301	Water transport	0.0	44.6	55.4
85	6401	Air transport	0.0	71.8	28.2
86	6601	Services to transport	0.0	43.6	56.4
87	7101	Communication services	0.0	45.5	54.5
88	7301	Banking	0.0	61.4	38.6
89	7302	Non-bank finance	0.0	47.3	52.7
90	7401	Insurance	0.0	78.7	21.3
91	7501	Services to finance etc	0.0	31.3	68.7
92	7701	Ownership of dwellings	0.0	0.0	100.0
93	7702	Other property services	0.0	72.4	27.6
94	7801	Scientific research etc	0.0	71.4	28.6
95	7802	Legal, accounting etc services	0.0	72.7	27.3
96	7803	Other business services	0.0	72.7	27.3
97	8101	Government administration	0.0	85.9	14.1
98	8201	Defence	0.0	90.3	9.7

Continued

Table 11.B.A4 Primary Factor Shares^a (Per cent) (Contd)

No.	IOPC	ABS Industry	Land	Labor	Capital ^b
99	8401	Education	0.0	88.5	11.5
100	8601	Health services	0.0	89.7	10.3
101	8701	Community services	0.0	87.3	12.7
102	9101	Motion picture, radio etc	0.0	54.6	45.4
103	9201	Libraries, museums & the arts	0.0	75.6	24.4
104	9301	Sport, gambling etc	0.0	46.5	53.5
105	9501	Personal services	0.0	49.8	50.2
106	9601	Other services	0.0	84.8	15.2

^a Primary factor shares implicit in the 1996-97 MONASH model data base excluding complementary imports. The shares were applied to the total value of Compensation of employees (P1) and Gross operating surplus & mixed income (P2) to map to the GTAP primary factors: land, labour and capital.

^b Capital and Other costs.

Source: Estimates based on ABS 2001a (Input-Output Tables, Australia, 1996-97, SNA68 unpublished), Horridge 2002 and the 1996-97 MONASH model data base (107 commodities × 107 industries).

Table 11.B.A5 Mapping of ABS Sectors to more than one GTAP Sector

IOPC ABS Sector (4 digit)	ABS Code	ABS Sector (8 digit)	GTAP Sector	Data Source Used
101	1240010	Sheep & lambs	9	Bovine cattle, sheep & goats, horses
	1240020	Wool	12	Wool, silk-worm cocoons
102	1210010	Wheat	2	Wheat
	1210040	Rice in the husk	1	Paddy rice
	1210060	Oilseeds	5	Oil-seeds
	0102 (nec)	Grains nec ^a	3	Cereal grains nec
104	1300010	Whole milk	11	Raw milk
	130015	Dairy cattle	9	Bovine cattle, sheep & goats, horses
107	1520010	Horse studs	9	Bovine cattle, sheep & goats, horses
		Deer farming		
	1590010	Honey & beeswax	10	Animal products nec
		Live animals nec		
	1610010	Sugar cane for planting	6	Sugar cane, sugar beet
		Sugar cane for crushing		
	1620010	Cotton ^b	7	Plant-based fibers
	1690020	Tobacco	8	Crops nec
		Hops		
		Grass, lucerne & clover seed		
		Hay, cereal grasses & fodder		
	1690066	Agriculture nec	10	Animal products nec
	1698300	Natural rubber	13	Forestry
200	0107 (nec)	Other agriculture nec ^a	4	Vegetables, fruit, nuts
	2110010	Ginned cotton	7	Plant-based fibres
	2110020	Cotton seed		
	2120010	Sheep shearing services	12	Wool, silk-worm cocoons
	2200010	Skins	10	Animal products nec
	0200 (nec)	Services to agriculture nec ^a	1	Paddy rice
				Total supply shares (ABS 2001b)

Continued

Table 11.B.A5 Mapping of ABS Sectors to more than one GTAP Sector (Contd)

IOPC ABS Sector (4 digit)	ABS Code	ABS Sector (8 digit)	GTAP Sector	Data Source Used
200	0200 (nec)	Services to agriculture nec (Contd)	2 Wheat 3 Cereal grains nec 4 Vegetables, fruit, nuts 5 Oil-seeds 6 Sugar cane, sugar beet 8 Crops nec 9 Bovine cattle, sheep & goats, horses 10 Animal products nec 11 Raw milk 12 Wool, silk-worm cocoons 15 Coal	MONASH 1996-97 data base (144 commodities x 144 industries)
1100	Coal, oil & gas	Black coal Brown coal Crude oil Liquefied natural gas Natural gas Liquefied petroleum gases Other income	16 Oil 17 Gas 15 Coal 16 Oil 17 Gas 16 Oil	Total supply shares (ABS 2001b)
1500	Services to mining	Petroleum exploration (own account) Petroleum exploration services nec		
2101	Meat & meat products	1500 (nec) 21110011 Fresh meat 21110070 Meat for human consumption	18 Minerals nec 19 Bovine cattle, sheep & goat, horse meat products	Total supply shares (ABS 2001b)

Continued

Table 11.B.A5 Mapping of ABS Sectors to more than one GTAP Sector (Contd)

IOPC ABS Sector (4 digit)	ABS Code	ABS Sector (8 digit)	GTAP Sector	Data Source Used
2101 Meat & meat products (Contd)	21120010	Poultry ^c		
	21110060	Raw hides	10 Animal products nec	
	2101 (nec)	Meat & meat products nec ^a	20 Meat products nec	MONASH 1996-97 data base (144 commodities x 144 industries)
2105 Flour & cereal foods	21520041	Milled rice	23 Processed rice	Total imports shares (ABS 2001b)
	21520042	Husked rice		
	21520043	Hulled rice		
	2152044	Rice bran		
	2105 (nec)	Flour & cereal foods nec ^a	25 Food products nec	MONASH 1967-97 data base (144 commodities X 144 industries)
2108 Other food products	21710010	Raw sugar	24 Sugar	
	2171021	Refined sugar		
	2171022	Golden syrup		
	2171031	Icing sugar & molasses		
	21710032	Sugar nec		
	2108 (nec)	Other food products nec ^a	25 Food products nec	
2203 Knitting mill products	22310010	Hosiery	28 Wearing apparel	Total supply shares (ABS 2001b)
	22320010	Pullovers & jumpers		
	2203 (nec)	Knitting mill products nec ^a	27 Textiles	
6601 Services to transport	66110010	Parking services	48 Transport nec	Total supply shares (ABS 2001b)
	66190010	Services to road transport nec		
	66420010	Rail freight forwarding		
	66200010	Margin - services to water transport	49 Water transport	
	66200020	Non-margin - stevedoring & port handling services		
66200030	Services to water transport nec			

Continued

Table 11.B.A5 Mapping of ABS Sectors to more than one GTAP Sector (Contd)

IOPC ABS Sector (4 digit)	ABS Code	ABS Sector (8 digit)	GTAP Sector	Data Source Used
6601 Services to transport (Contd)	66300010	Services to air transport	50 Air transport	
	6601 (nec)	Services to transport nec ^a	48 Transport nec	
			49 Water transport	
			50 Air transport	
7501 Services to finance etc	75200010	Services to insurance	53 Insurance`	Total supply shares
	7501 (nec)	Services to finance nec ^a	52 Finance services nec	(ABS.2001b)

^a Includes ABS 8-digit items within the 4-digit product group not specified separately above.

^b Excludes ginned cotton.

^c Poultry included as part of Bovine cattle, sheep & goat, horse meat products on the basis of Hufif, McDougall and Walmsley (2000, p. 17).

Sources: Estimates based on MONASH model data bases (various) and ABS 2001b (Input-Output Tables, Product Details, 1996-97, Cat. no. 5215.0).