

Australia

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1. Introduction

The GTAP 6 I-O table for Australia was constructed from key input-output tables supplied by the Australian Bureau of Statistics and some supporting tables estimated from other data sources. The I-O table covers the Australian financial year ended 30 June 1997 and records margin activities such as transport as part of the supplying industry. The data were cleaned and transformed to meet GTAP's requirements. This mainly involved employing the homogeneity assumption to convert from 106 'multi-product' to 'single-product' industries and then mapping the data into 57 GTAP industries. The resulting I-O table was balanced using RAS procedures. Although the primary data sources and methodology used are different, the GTAP 6 Data Base is conceptually similar to the previous data base.

This paper describes the construction of the version 6 Australian I-O table for the Global Trade Analysis Project (GTAP) Model. Providing the Australian I-O table for this model is part of the Productivity Commission's commitment as a member of the GTAP Consortium.

In line with GTAP requirements, the output data supplied consisted of the four matrices:

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

These matrices were constructed using a 'building blocks' approach. Detailed data on the supply and use of local and imported products and on the associated product taxes and import duties involved were first derived or estimated from available data. The matrices were then assembled from these building blocks.

2. Source Data

The primary data sources used to construct the Australian I-O table were electronic versions of the 1996-97 input-output (IO) tables made available by the Australian Bureau of Statistics for the Australian financial year ended 30 June 1997.¹ The tables contain detailed data on the supply and use of 106 products in Australia and the associated product tax payments (table 1 in the annex at the end of this paper). The tables also contain data on the use of two primary factors of

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

production — *Compensation of employees* and *Gross operating surplus & mixed income* — by industry.²

Two versions of the 1996-97 input-output tables were made available by the ABS. The versions differed with respect to the treatment of transport margin activities.³ The first version recorded such margin service flows differently depending on whether the buyer or seller was invoiced for the transported good. 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 margins service flows on a common basis, as an impost on the good bought by the buyer regardless of who was actually invoiced for the transport service. 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 input-output tables for the financial year 1993-94 — the reference year for the Australian tables submitted for version 5 of the GTAP Data Base.

The recording of transport margin service flows on a SNA68 basis has significant advantages for economic analysis using input-output tables (Aspen 2001 and Gretton, Bobbin and Horridge 2004).

The GTAP secretariat indicated a preference for the data base to be prepared on an SNA68 basis (McDougall, R., GTAP, Purdue, pers. comm., 9 September 2003).

Consequently, the primary data sources used to construct the Australian component of the GTAP 6 Data Base were the electronic versions of key input-output tables compiled by the ABS according to SNA68 — the *Total use table* (I-O table 2) and the *Imports table* (I-O table 3).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 input-output tables that included the SNA93 treatment of transport margin services. Thus, while the Monash data base provided operational advantages for the compilation of the GTAP Data Base, it suffered from the

² *Compensation of employees* is the total remuneration of employees, whether in cash or in kind, and is akin to labour income in GTAP. *Gross operating surplus & mixed income* is the surplus accruing to owners from the processes of production and is akin to income from capital and land in GTAP. Mixed income also includes the gross operating surplus for unincorporated enterprises and returns for the proprietors' own labour (akin to wages and salaries).

³ The 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 margin are taxes or subsidies levied on products and include sales taxes, excise taxes, customs duties (tariffs) and, since July 200, the goods and services tax.

⁴ The SNA68 *Use table* supplied by the ABS also contained 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.

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 client confidentiality or because some of the supporting tables needed to construct the GTAP data base were not provided 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 supplied supplemented with data from the corresponding SNA93 tables.⁶

3. Processing of the Source Data

The format of the ABS data, although similar to the format of the GTAP data requirements, did not fully match those requirements (Huff, McDougall and Walmsley 2000).

The main adjustments needed to map from the ABS format to GTAP were:

- removal of negative values;
- estimation of missing data vectors and flows;
- treatment of complementary imports;
- treatment of re-exports;
- treatment of primary factors;
- treatment of final demands;
- converting multi-product industries to single-product industries;
- mapping ABS products to their GTAP counterparts; and
- balancing the data base.

The process for creating the GTAP 6 Data Base for Australia is illustrated in figure 1. Details of each process are outlined below.

3.1 Removal of Negative Values

Negative value flows were found to exist in the ABS tables for these reasons:

- some negative flows of minor value for imports of *Water transport* and *Air transport* remained as an artefact of ABS compilation procedures (summarised in table 3). These flows were set to zero and exports of these commodities were reduced by an offsetting amount to maintain the balance between their supply and use.
- some estimates of the use of domestically produced products, derived by deducting imports from total use, were found to be negative because the value of imports was slightly higher than total use (table 4). These negatives were removed by increasing domestic intermediate usage to zero and total use by the entries' value. To maintain total sales, imports and exports of these commodities were both reduced by 50 per cent of the original negative value.

⁵ To 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.

⁶ Table 2 in the annex lists all of the input-output tables available electronically.

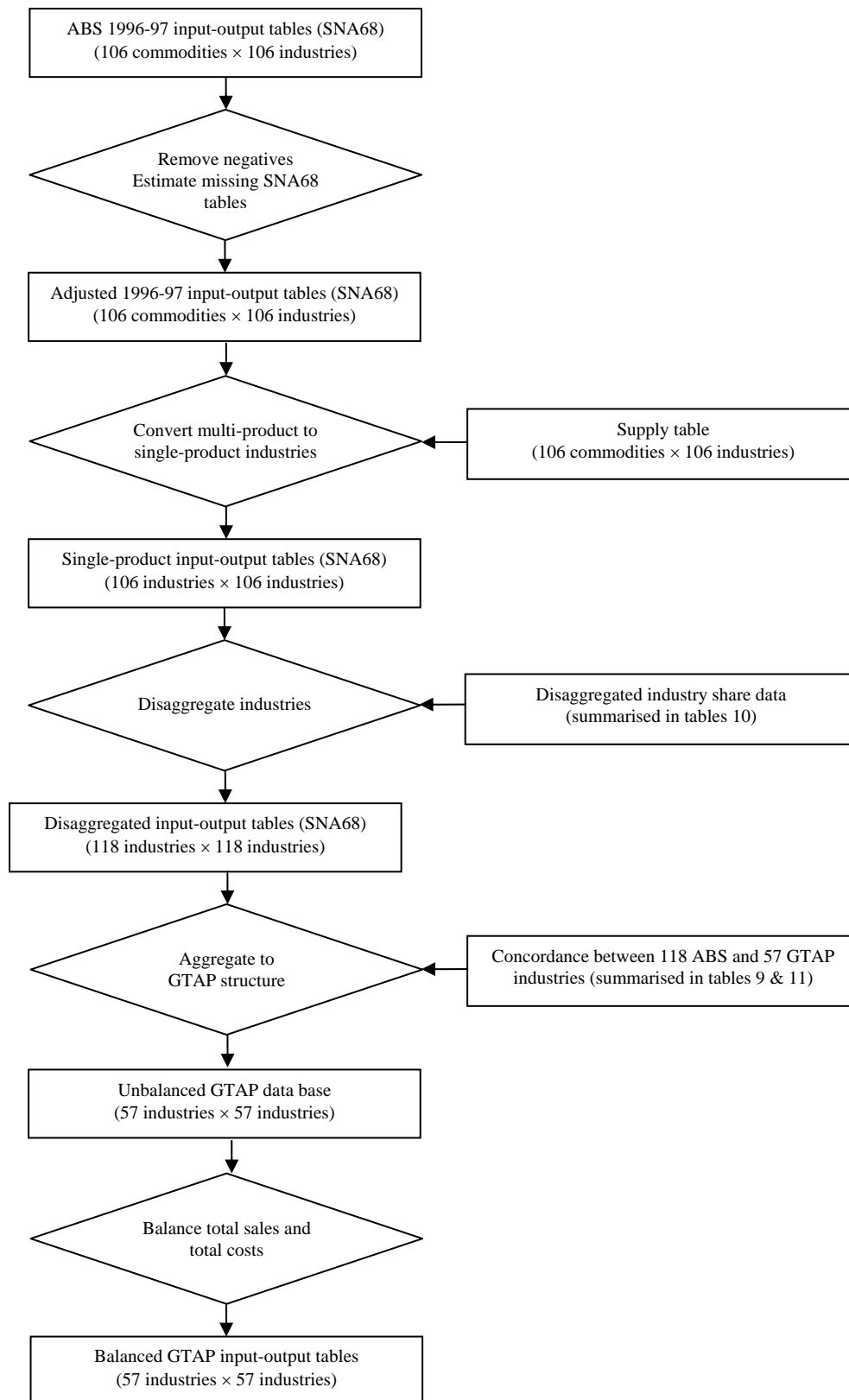
- one estimate of the use of imported water transport services was found to be negative reflecting the ‘net’ treatment of transport services in the *Imports table* (I-O table 3) because the ABS recorded the *net* value of imports — the value of goods imported *less* the value of exports of transport services.⁷ This practice meant that household final consumption expenditure on imported *Water transport* was -A\$135.7 million. This negative was removed by setting private final consumption of imported *Water transport* to +A\$25.7 million on the basis of information provided in the 1993-94 input-output tables (ABS 1997).⁸ To hold household consumption of *Water transport* fixed, domestic consumption of *Water transport* was reduced by A\$161.4 million.⁹

⁷ Alternatively, imports of goods could be recorded in the *Imports table* (I-O tables 3) and the freight component could be recorded as an export of the relevant transport service (eg water transport) in the *Use table* (I-O table 2) and in the relevant margin table (eg I-O table 29).

⁸ 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).

⁹ An adjustment to exports could not be made as this ‘net’ value could not be split up into the export and import components.

Figure 1. Process for creating the GTAP 6 Australian I-O table



3.2 *Estimation of Missing Data Vectors and Flows*

One of the GTAP matrices is valued at purchasers' prices (matrix UP). In addition to data on basic prices (matrix UF), this requires product taxes to be known for the use of domestic and imported commodities.

In principle, this table could have been obtained from the ABS tables supplied together with the *Taxes on products (net) table* (I-O table 33). The information could also be obtained from the underlying ABS tables:

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

However, revised variants of these tables were not provided with the tables including the revised (SNA68) treatment of transport margins service flows. To complete the data set an implied 'ad valorem' duty, tax or subsidy rate with respect to basic price flows was estimated from tables with the initial (SNA93) treatment of transport services. This ad valorem rate was applied to the revised usage tables and imports table, as appropriate, to derive revised tables showing imports duty and all other (net) product taxes. Finally, the results so derived for each industry, for each product tax category, were applied to ensure that industry tables matched comparable values provided by the ABS.

As a result, SNA68 tables were estimated for:

- duty on imports by commodity and using sector;
- commodity taxes on products (net); and
- taxes on products (net).¹⁰

The *Duty table* was estimated by:

- estimating the SNA93 average rates of import duty by dividing the SNA93 *Duty table* by the SNA93 *Imports table*; and
- applying these average rates of import duty to the SNA68 *Imports table*.¹¹

¹⁰ The prefix SNA68 or SNA93 is used to identify the source of the underlying data used to derive that table. The label SNA93 refers to data compiled on an SNA93 basis and sourced or derived from the electronic files underlying the published input-output tables (ABS 2001a). The label SNA68 refers to data compiled on an SNA68 basis and sourced or derived from the electronic SNA68 files supplied by the ABS.

¹¹ The previous input-output tables report that custom duties on commodities for which an excise tax is levied on local product are treated as commodity taxes (ABS 1997, para. 27, p. 5). This would lead to a small over-reporting of commodities taxes and underreporting of duty. Based on estimates derived from the differences between the calculated average rates of duty and those estimated by the Commission as part of its annual assistance measures, \$46 million of commodity tax revenue was re-classified as duty to overcome this underreporting.

Similarly, the *Commodity taxes on products table* covering the net effect of sales tax, taxes on products and subsidies on products was estimated by:

- calculating SNA93 *Commodity taxes on products table* by subtracting the SNA93 *Duty table* from the SNA93 *Taxes on products table*;
- estimating the SNA93 average commodity tax rates on local and imported products by dividing the SNA93 *Commodity taxes on products table* by the SNA93 *Total use table*; and
- applying these average commodity tax rates to the SNA68 *Domestic use table* and *Imports table* (giving *commodity taxes on domestic use* and *commodity taxes on imports*, respectively).¹²

Total product taxes on imports is the duty of *duty* and *commodity taxes on imports*.

The *Taxes on products table* was calculated as the sum of duty and commodity taxes on products. RAS procedures were applied to the *Commodity taxes on products table* to ensure that the column totals in the *Taxes on products table* matched the SNA68 *Taxes less subsidies on products* supplied by the ABS (row P3 in the in the *Total use table*).

3.3 Treatment of Complementary Imports

The use and imports table supplied by the ABS 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 in the imports and total use tables and the totals were increased accordingly.

This treatment of complementary imports affected the building blocks used for all of the matrices supplied to GTAP.

3.4 Treatment of Re-exports

The imports table supplied by the ABS contained 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.

¹² In a few isolated cases, the resulting commodity tax estimates for that industry were adjusted to ensure that activity at producer prices remained unchanged.

As re-exports are not permitted in the GTAP Data Base, re-exports were subtracted from total exports of that commodity and from total imports of that commodity. Handling and distribution costs associated with re-exports are included in the data base as they form part of Australian economic activity.

3.5 Treatment of Primary Factors of Production

The total use table supplied by the ABS provided data on the use of two primary factors of production by each industry — *Compensation of employees* (row P1) and *Gross operating surplus & mixed income* (row P2). These categories overlap with the primary input categories specified for land, labour and capital in the GTAP Data Base.

To complete the GTAP Data Base, the ABS categories were mapped to GTAP categories using a decomposition applied in the benchmarking of the Monash model data base to the ABS input-output tables for 1996-97 (table 5). Horridge (2002) describes the derivation of the primary factor returns from the published input-output tables that underlie the shares used.

This treatment of primary factors of production affected the ‘building blocks’ used for all of the matrices supplied to GTAP except for the imports matrix (matrix MF).

3.6 Treatment of Final Demands

The ABS provided data on commodity sales to each category of final demand — household consumption; government consumption; gross fixed capital formation disaggregated to private, public enterprises and general government; changes in inventories; and exports (table 6).

The categorisation is similar to that applied in GTAP, with the exception that the ABS categories of *Gross fixed capital formation — Private* (column Q3); *Gross fixed capital formation — Public enterprises* (column Q4); and *Gross fixed capital formation — General Government* (column Q5). To complete the GTAP data base, these categories were aggregated to form the GTAP final demand category *Investment*.

This treatment of final demands affected the ‘building blocks’ used for the GTAP supply and use matrices with and without product taxes (matrices UP and UF, respectively).

3.7 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 produce commodities characteristic of that industry and can also produce commodities characteristic of other industries (eg the *Dairy products* industry primarily produced *Dairy products* but also had some output of *Meat and meat products*).

Because the GTAP Model (and hence its data base) 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 had to be converted to a single-product, or symmetric, data base. This was achieved by applying the industry technology assumption whereby all products produced by an industry are 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. Production or market share information needed for the application of these assumptions was provided by the ABS.

The application of these assumptions enables the commodity by industry tables supplied by the ABS to be converted to ‘industry by industry’, or symmetric, tables.

This treatment of ‘multi-product’ industries affected the ‘building blocks’ for all of the matrices supplied to GTAP.

3.8 Mapping ABS Products to their GTAP Counterparts

The Australian input-output tables have 106 products compared to the 57 in the GTAP 6 Data Base, these are listed in tables 1 and 7, respectively.

Table 8 lists the concordance used to map each ABS product to its GTAP counterparts.

The concordance shows that 93 ABS products can be linked directly to one of GTAP products without adjustment. However, 13 ABS products were linked to more than one GTAP product.¹³ For example, the ABS product *Grains* is linked to the GTAP products *Paddy rice*, *Wheat*, *Oil-seeds* and *Cereal grains*. The adjustment involved either splitting ABS products into components corresponding to GTAP products (disaggregating) or as part of a proportional allocation process (mapping).

Two techniques were used to map the 13 ABS products linked to more than one GTAP product.

The first technique used involved disaggregating the sales and production data supplied by the ABS for 8 of the 13 products into components corresponding to GTAP products (table 10). For example, the ABS product *Sheep* was split into two components, *Wool* and *Sheepmeat*, which, respectively, corresponded to the GTAP products *Wool*, *silk-worm cocoons* and *Bovine cattle, sheep & goats, horses*.

Some of the 1996-97 data bases for Monash model contain product structures more closely aligned to the GTAP classification than that used by the ABS in the input-output tables.¹⁴ The Monash model data bases contained detailed sales information for many of the components

¹³ The data used is too detailed to present here in full and is available from the authors on request.

¹⁴ The Monash model has a number of data bases loosely based on the 1996-97 ABS input-output tables. The main differences between these data bases relate to their sectoral classification, both in terms of the number and type of sectors, and whether they contain ‘multi-product’ or ‘single-product’ industries.

need to map the ABS products to GTAP. For example, the 115 × 113 Monash data base contained a breakdown of sales for *Wool* and *Sheepmeat* to each industry and category of final demand (household consumption, government consumption, investment, changes in inventories and exports).

For most of the 8 ABS products disaggregated, their sales in the ABS input-output tables (ie the rows) were split between the components according to their share of the group's sales in the corresponding Monash data base used.¹⁵ That is, exports of the *Sheep* (the 'group') were split 89.7 per cent to *Wool* and 10.3 per cent *Sheepmeat* (the 'components') according to their share of 'wool' exports in the Monash data base used (ie the sum of wool and Sheepmeat exports). Each component's share of group sales is different for each industry and category of final demand.

A similar process was then used to disaggregate each industry in the ABS input-output tables (ie the columns).

In the absence of detailed product-specific sales information, the sales and costs of the remaining ABS products (*Services to agriculture* and *Flour & cereal foods*) were disaggregated into their components using a constant share based on their share of total sales of the ABS product being disaggregated.

The second technique used involved mapping a constant proportion of all sales and costs of 9 of the ABS products (including 4 created as a result of the disaggregation process) to the relevant GTAP products (table 10). This approach presupposes that the sales and cost structure of each component takes on the same pattern as the group containing it. The proportions used to map each of the components were their share of total sales of the relevant group (tables 12 to 22).¹⁶

Care was taken to ensure that the values in the cross-over cells for each commodity and industry split agreed with the mix of inputs used in Australian production and that the resulting total supply shares and values corresponded to the published totals (tables 12 to 22).

This mapping of ABS products affected the 'building blocks' for all of the matrices supplied to GTAP.

3.9 Balancing the I-O Table

Once all adjustments were completed, the GTAP data files were checked to ensure that:

- (a) total industry sales equalled total costs for each industry; and
- (b) the level and components of GDP agreed with estimates published by the ABS.

¹⁵ Two 1996-97 Monash model data bases were used to disaggregate the ABS products, one with 144 commodities and 144 industries and another with 115 commodities and 113 industries.

¹⁶ The share of imports was also used for imports of *Processed rice*.

Where there were differences between total sales and total costs for an industry, payments to the three primary factors of production were scaled equally to ensure that total costs matched total sales for that industry.

4. *I-O Table Supplied to GTAP*

The data supplied to GTAP met the requirements set out in Huff, McDougall and Walmsley (2000). It contained four matrices in header array file format (table 23).

The *supply and use matrix without product taxes* (matrix UF) details the use of each GTAP product from local and imported sources and primary factors by each GTAP product and category of final demand. This matrix was constructed using three building blocks. The first building block consisted of data on the use of domestic production and came from the single-product SNA68 *Domestic use table*. The second building block consisted on the use of imports and came from the single-product SNA68 *Imports table*. The third building block consisted of data on the use of primary factors and came from the SNA68 *Domestic use table*. The resulting matrix is expressed in basic prices.

The *supply and use matrix with product taxes* (matrix UP) was constructed by adding two single building blocks to the *supply and use matrix without product taxes* (matrix UF). The building block for domestic use came from the single-product SNA68 *Commodity taxes on domestic use table*, while the building block for imports came from the single-product SNA68 *Total product taxes on imports table*. By definition, there are no product taxes on the three primary factors of production. The resulting matrix is expressed in producer prices.

The *Value of output* (matrix OP) was the value of *Australian production* (row T2) in the single-product SNA68 *Total use table*. The resulting matrix is expressed in market prices as it includes *Taxes less subsidies on products* (row P3), which is part of the GTAP matrix UP, and *Other taxes less subsidies on production* (row P4).¹⁷

The *Value of imports cif* (matrix MF) was the single-product variant of the *Imports table*. The resulting matrix is expressed in basic prices.

5. *Comparability with Previous GTAP Data Bases*

The starting point for the GTAP version 5 of the Australian I-O table was the Monash model data base for the reference year 1993-94. That table was based on 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.

¹⁷ *Other taxes less subsidies on production* (row P4) consist of all taxes that enterprises incur as a result of engaging in production other than taxes on products and include payroll taxes, taxes on land and local government rates.

The starting point for 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 Data Base provided has been compiled according to the statistical standards promulgated in the SNA93, whereas the version 5 data base provided by Mastoris, 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).

6. *Diagnostics*

The Australian I-O table was checked to ensure that:

- (a) there were no negative values (other than where appropriate);
- (b) the pre- and post disaggregation value of costs and sales balanced;
- (c) total sales equalled total costs;
- (d) the values for GDP, GDP(I) and GDP(E) were correct;
- (e) that the components of GDP(I) and GDP(E) were correct; and the GTAP entropy input-output cost shares appeared correct.¹⁸

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¹⁸ The entropy input-output cost shares used measure the difference in cost shares for each industry in the Australian I-O table compared to a representative GTAP Data Base and highlight any unusual cost shares (Walmsley and McDougall 2001).

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Annex

Table 1. ABS input-output product classification, 1996-97

| <i>No.</i> | <i>IOPC</i> | <i>Description</i> | <i>No.</i> | <i>IOPC</i> | <i>Description</i> |
|------------|-------------|--------------------------------------|------------|-------------|-------------------------------------|
| 1 | 0101 | Sheep | 39 | 2402 | Publishing, recorded media etc |
| 2 | 0102 | Grains | 40 | 2501 | Petroleum & coal products |
| 3 | 0103 | Beef cattle | 41 | 2502 | Basic chemicals |
| 4 | 0104 | Dairy cattle | 42 | 2503 | Paints |
| 5 | 0105 | Pigs | 43 | 2504 | Pharmaceuticals |
| 6 | 0106 | Poultry | 44 | 2505 | Soap & detergents |
| 7 | 0107 | Other agriculture | 45 | 2506 | Cosmetics & toiletries |
| 8 | 0200 | Services to agriculture ^a | 46 | 2507 | Other chemical products |
| 9 | 0300 | Forestry & logging | 47 | 2508 | Rubber products |
| 10 | 0400 | Commercial fishing | 48 | 2509 | Plastic products |
| 11 | 1100 | Coal, oil & gas | 49 | 2601 | Glass & glass products |
| 12 | 1301 | Iron ores | 50 | 2602 | Ceramic products |
| 13 | 1302 | Non-ferrous metal ores | 51 | 2603 | Cement, lime & concrete slurry |
| 14 | 1400 | Other mining | 52 | 2604 | Plaster & other concrete products |
| 15 | 1500 | Services to mining | 53 | 2605 | Other non-metallic mineral products |
| 16 | 2101 | Meat & meat products | 54 | 2701 | Iron & steel |
| 17 | 2102 | Dairy products | 55 | 2702 | Basic non-ferrous metals |
| 18 | 2103 | Fruit & vegetable products | 56 | 2703 | Structural metal products |
| 19 | 2104 | Oils & fats | 57 | 2704 | Sheet metal products |
| 20 | 2105 | Flour & cereal foods | 58 | 2705 | Fabricated metal products |
| 21 | 2106 | Bakery products | 59 | 2801 | Motor vehicles & parts etc |
| 22 | 2107 | Confectionery | 60 | 2802 | Ships & boats |
| 23 | 2108 | Other food products | 61 | 2803 | Railway equipment |
| 24 | 2109 | Soft drinks, cordials & syrups | 62 | 2804 | Aircraft |
| 25 | 2110 | Beer & malt | 63 | 2805 | Scientific etc equipment |
| 26 | 2111 | Wine & spirits | 64 | 2806 | Electronic equipment |
| 27 | 2112 | Tobacco products | 65 | 2807 | Household appliances |
| 28 | 2201 | Textile fibres, yarns etc | 66 | 2808 | Other electrical equipment |
| 29 | 2202 | Textile products | 67 | 2809 | Agricultural, mining etc machinery |
| 30 | 2203 | Knitting mill products | 68 | 2810 | Other machinery & equipment |
| 31 | 2204 | Clothing | 69 | 2901 | Prefabricated buildings |
| 32 | 2205 | Footwear | 70 | 2902 | Furniture |
| 33 | 2206 | Leather & leather products | 71 | 2903 | Other manufacturing |
| 34 | 2301 | Sawmill products | 72 | 3601 | Electricity supply |
| 35 | 2302 | Other wood products | 73 | 3602 | Gas supply |
| 36 | 2303 | Pulp, paper & paperboard | 74 | 3701 | Water, sewerage & drainage |
| 37 | 2304 | Paper containers & products | 75 | 4101 | Residential building |
| 38 | 2401 | Printing & services to printing | 76 | 4102 | Other construction |

| <i>No.</i> | <i>IOPC</i> | <i>Description</i> | <i>No.</i> | <i>IOPC</i> | <i>Description</i> |
|------------|-------------|---|------------|-------------|--------------------------------|
| 77 | 4501 | Wholesale trade | 92 | 7701 | Ownership of dwellings |
| 78 | 5101 | Retail trade | 93 | 7702 | Other property services |
| 79 | 5401 | Mechanical repairs | 94 | 7801 | Scientific research etc |
| 80 | 5402 | Other repairs | 95 | 7802 | Legal, accounting etc services |
| 81 | 5701 | Accommodation, cafes & restaurants | 96 | 7803 | Other business services |
| 82 | 6101 | Road transport | 97 | 8101 | Government administration |
| 83 | 6201 | Rail transport ^{b} | 98 | 8201 | Defence |
| 84 | 6301 | Water transport | 99 | 8401 | Education |
| 85 | 6401 | Air transport ^{c} | 100 | 8601 | Health services |
| 86 | 6601 | Services to transport ^{d} | 101 | 8701 | Community services |
| 87 | 7101 | Communication services | 102 | 9101 | Motion picture, radio etc |
| 88 | 7301 | Banking | 103 | 9201 | Libraries, museums & the arts |
| 89 | 7302 | Non-bank finance | 104 | 9301 | Sport, gambling etc |
| 90 | 7401 | Insurance | 105 | 9501 | Personal services |
| 91 | 7501 | Services to finance etc | 106 | 9601 | Other services |

^{**a**} Services to agriculture, hunting & trapping. ^{**b**} Rail, pipeline & other transport. ^{**c**} Air & space transport. ^{**d**} Services to transport, storage.

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

Table 2. Summary of the input-output data available electronically 1996-97

| <i>Grouping</i> | <i>Table</i> | <i>Description</i> | |
|---|-----------------------------|---|--|
| Basic tables | 1† | Supply table — supply by product group by industry and imports | |
| | 2† | Use table ^a — 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 group | |
| Industry by industry tables (basic prices, recording intra-industry flows)^b | | | |
| 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 (total requirements) 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^c | 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 | |

† used in constructing the GTAP data base. ^a Referred to as the *Total use table* in this paper to differentiate it from domestic use. ^b Similar tables are available at the 35 industry level (IO tables 11 to 16). ^c 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 3. Intermediate use of imported Water transport and Air transport

| <i>Measure</i> | <i>Units</i> | <i>Water transport (6301)</i> | <i>Air transport (6401)</i> |
|---------------------------------|--------------|-----------------------------------|---------------------------------|
| 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 4. Negative cells in the SNA68 Domestic use table^a A\$ million, 1996-97, Basic prices

| <i>Commodity</i> | <i>Using industry</i> | <i>Value</i> |
|------------------------------|---|-----------------|
| 2806 Electronic equipment | 0106 Poultry | -0.00050 |
| 0104 Dairy cattle | 2106 Bakery products | -0.00004 |
| 0104 Dairy cattle | 2108 Other food products | -0.00002 |
| 0104 Dairy cattle | 5701 Accommodation, cafes & restaurants | -0.00118 |
| 7702 Other property services | 7801 Scientific research etc | -0.13875 |
| 0104 Dairy cattle | 8201 Defence | -0.00001 |
| 2805 Scientific equipment | 9501 Personal services | -0.16554 |
| Total | | -0.30604 |

^a Derived by subtracting SNA68 Imports table (IO table 3) from the SNA68 Use table (IO table 2).

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

Table 5. Primary factor shares^a Per cent

| <i>No.</i> | <i>IOPC</i> | <i>ABS industry</i> | <i>Land</i> | <i>Labour</i> | <i>Capital^b</i> |
|------------|-------------|---------------------------------|-------------|---------------|----------------------------|
| 1 | 0101 | Sheep | 39.7 | 39.5 | 20.8 |
| 2 | 0102 | Grains | 41.5 | 36.0 | 22.5 |
| 3 | 0103 | Beef cattle | 37.6 | 42.5 | 19.9 |
| 4 | 0104 | Dairy cattle | 36.9 | 49.5 | 13.6 |
| 5 | 0105 | Pigs | 32.3 | 55.4 | 12.3 |
| 6 | 0106 | Poultry | 0.0 | 47.0 | 53.0 |
| 7 | 0107 | Other agriculture | 31.4 | 49.7 | 18.8 |
| 8 | 0200 | Services to agriculture | 0.0 | 85.4 | 14.6 |
| 9 | 0300 | Forestry & logging | 0.0 | 81.6 | 18.4 |
| 10 | 0400 | 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 | 51.7 |

| <i>No.</i> | <i>IOPC</i> | <i>ABS industry</i> | <i>Land</i> | <i>Labour</i> | <i>Capital^b</i> |
|------------|-------------|-------------------------------------|-------------|---------------|----------------------------|
| 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 |
| 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 |

| <i>No.</i> | <i>IOPC</i> | <i>ABS industry</i> | <i>Land</i> | <i>Labour</i> | <i>Capital^b</i> |
|------------|-------------|--------------------------------|-------------|---------------|----------------------------|
| 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 |
| 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. 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 6. Final demand concordance

| <i>Column</i> | <i>ABS category</i> | <i>GTAP category</i> |
|---------------|--|-------------------------------|
| 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 |

Table 7. GTAP sectoral classification (GSC2)

| <i>No.</i> | <i>Code</i> | <i>Description</i> | <i>No.</i> | <i>Code</i> | <i>Description</i> |
|------------|-------------|--|------------|-------------|---|
| 1 | pdr | Paddy rice | 30 | lum | Wood products |
| 2 | wht | Wheat | 31 | ppp | Paper products, publishing |
| 3 | gro | Cereal grains nec | 32 | p_c | Petroleum, coal products |
| 4 | v_f | Vegetables, fruit, nuts | 33 | crp | Chemical, rubber, plastic products |
| 5 | osd | Oil-seeds | 34 | nmm | Mineral products nec |
| 6 | c_b | Sugar cane, sugar beet | 35 | i_s | Ferrous metals |
| 7 | pfb | Plant-based fibers | 36 | nfm | Metals nec |
| 8 | ocr | Crops nec | 37 | fmp | Metal products |
| 9 | ctl | Bovine cattle, sheep & goats, horses | 38 | mvh | Motor vehicles & parts |
| 10 | oap | Animal products nec | 39 | otn | Transport equipment nec |
| 11 | rmk | Raw milk | 40 | ele | Electronic equipment |
| 12 | wol | Wool, silk-worm cocoons | 41 | ome | Machinery & equipment nec |
| 13 | for | Forestry | 42 | omf | Manufactures nec |
| 14 | fsh | Fishing | 43 | ely | Electricity |
| 15 | col | Coal | 44 | gdt | Gas manufacture, distribution |
| 16 | Oil | Oil | 45 | wtr | Water |
| 17 | gas | Gas | 46 | cns | Construction |
| 18 | omn | Minerals nec | 47 | trd | Trade |
| 19 | cmt | Bovine cattle, sheep & goat, horse meat products | 48 | otp | Transport nec |
| 20 | omt | Meat products nec | 49 | wtp | Water transport |
| 21 | Vol | Vegetable oils & fats | 50 | atp | Air transport |
| 22 | Mil | Dairy products | 51 | cmn | Communication |
| 23 | Pcr | Processed rice | 52 | ofi | Financial services nec |
| 24 | Sgr | Sugar ^a | 53 | isr | Insurance |
| 25 | Ofd | Food products nec | 54 | obs | Business services nec |
| 26 | b_t | Beverages & tobacco products | 55 | ros | Recreational & other services |
| 27 | Tex | Textiles | 56 | osg | Public administration & Defense, education, health services |
| 28 | wap | Wearing apparel | 57 | dwe | Dwellings |
| 29 | Lea | Leather products | | | |

^a Refined sugar.

Source: Huff, McDougall and Walmsley 2000, pp. 12–3.

Table 8. Concordance between ABS and GTAP products

| <i>IOPC</i> | <i>ABS product</i> | <i>GTAP product</i> | <i>GTAP no.</i> |
|-------------|-------------------------|--|-----------------|
| 0101 | Sheep | Bovine cattle, sheep & goats, horses | 9 |
| | | Wool, silk-worm cocoons | 12 |
| 0102 | Grains | Paddy rice | 1 |
| | | Wheat | 2 |
| | | Cereal grains nec | 3 |
| 0103 | Beef cattle | Bovine cattle, sheep & goats, horses | 9 |
| 0104 | Dairy cattle | Bovine cattle, sheep & goats, horses | 9 |
| | | Raw milk | 11 |
| 0105 | Pigs | Animal products nec | 10 |
| 0106 | Poultry | Animal products nec | 10 |
| 0107 | 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 |
| 0200 | 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 |
| 0300 | Forestry & logging | Forestry | 13 |
| 0400 | 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 | Bovine cattle, sheep & goat, horse meat products | 19 |

| <i>IOPC</i> | <i>ABS product</i> | <i>GTAP product</i> | <i>GTAP no.</i> |
|-------------|-----------------------------------|------------------------------------|-----------------|
| | | Meat products nec | 20 |
| | | Animal products nec | 10 |
| 2102 | Dairy products | Dairy products | 22 |
| 2103 | Fruit & vegetable products | Food products nec | 25 |
| 2104 | Oils & fats | Vegetable oils & fats | 21 |
| 2105 | Flour & cereal foods | Processed rice | 23 |
| | | Food products nec | 25 |
| 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 |

| <i>IOPC</i> | <i>ABS product</i> | <i>GTAP product</i> | <i>GTAP no.</i> |
|-------------|-------------------------------------|-------------------------------|-----------------|
| 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 |
| 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 |

| <i>IOPC</i> | <i>ABS product</i> | <i>GTAP product</i> | <i>GTAP no.</i> |
|-------------|--------------------------------|--|-----------------|
| | | 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 |
| 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 9. Disaggregation of ABS products

| <i>IOPC</i> | <i>ABS product</i> | <i>Disaggregated product</i> | <i>Data source used</i> |
|-------------|-------------------------|--|---|
| 0101 | Sheep | Wool Sheepmeat | Monash 115 × 113 |
| 0102 | Grains | Wheat Rice Other cereal grains | Monash 144 × 144 |
| 0107 | Other agriculture | Vegetables, fruit, nuts Sugar cane Other agriculture nec Cotton | Monash 144 × 144 |
| 0200 | Services to agriculture | Cotton ginning Agricultural services | Total supply share ^a (ABS 2001b) |
| 1100 | Coal; oil & gas | Coal Oil Gas | Monash 144 × 144 |
| 2101 | Meat & meat products | Beef products Other meat products | Monash 144 × 144 |
| 2105 | Flour & cereal foods | Processed rice Flour & cereal foods | Total supply share & Total imports share ^a (ABS 2001b) |
| 2108 | Other food products | Refined sugar Food products nec | Monash 144 × 144 |

^a Fixed shares were used for each component, except for the cross-over cells, where it was assumed that each industry only used its own component. That is, for the intersection of the commodity and row being split, usage in the resulting cells only occurred on the diagonal.

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

Table 10. ABS products mapped to more than one GTAP product ^a

| <i>IOPC</i> | <i>ABS product</i> | <i>Components mapped</i> | <i>No.</i> | <i>GTAP product</i> |
|-----------------------------|-------------------------|--------------------------------------|------------|--|
| 0102 (part) ^b | Other cereal grains | Oil-seeds | 5 | Oil-seeds |
| | | Cereal grains nec | 3 | Cereal grains nec |
| 0104 | Dairy cattle | Dairy cattle | 9 | Bovine cattle, sheep & goats, horses |
| | | Raw milk | 11 | Raw milk |
| 0107 (part) ^b | Other agriculture nec | Horse studs & deer farming | 9 | Bovine cattle, sheep & goats, horses |
| | | Animal products nec | 10 | Animal products nec |
| | | Forestry | 13 | Forestry |
| 0200 (part) ^b | Agricultural services | Services to rice | 1 | Paddy rice |
| | | Services to wheat | 2 | Wheat |
| | | Services to cereal grains nec | 3 | Cereal grains nec |
| | | Services to vegetables, fruit, nuts | 4 | Vegetables, fruit, nuts |
| | | Services to oil-seeds | 5 | Oil-seeds |
| | | Services to sugar cane | 6 | Sugar cane, sugar beet |
| | | Services to crops nec | 8 | Crops nec |
| | | Services to livestock | 9 | Bovine cattle sheep & goats, horses |
| | | Services to animal products nec | 10 | Animal products nec |
| | | Services to raw milk | 11 | Raw milk |
| | | Services to wool | 12 | Wool, silk-worm cocoons |
| Services to sheepmeat | 9 | Bovine cattle, sheep & goats, horses | | |
| 1500 | Services to mining | Services to oil | 16 | Oil |
| | | Services to mining nec | 18 | Mining nec |
| 2101 (part) ^b | Beef products | Beef products | 19 | Bovine cattle, sheep & goat, horse meat products |
| | | Animal products nec | 10 | Animal products nec |
| 2203 | Knitting mill products | Textiles | 27 | Textiles |
| | | Knitting mill products | 28 | Wearing apparel |
| 6601 | Services to transport | Services to transport nec | 48 | Transport nec |
| | | Services to water transport | 49 | Water transport |
| | | Services to air transport | 50 | Air transport |
| 7501 | Services to finance etc | Services to Insurance | 53 | Insurance |
| | | Services to finance nec | 52 | Finance services nec |

^a Each disaggregated product was mapped into its GTAP counterparts using their share of Total supply of the ABS product. ^b Output of the disaggregation process (table 10).

Source: Estimates based on ABS 2001b (*Input-Output Tables, Product Details, 1996-97, Cat. no. 5215.0*).

Table 11. Mapping of ABS input: Other cereal grains A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------------------|----------------------------|-------------------|------------------------------|--------------------------|---------------------|
| | Other cereal grains | | 2 381.9 | 41.0 | 2 422.9 |
| 01210060 | Oilseeds | Oil-seeds | 289.3 | 40.2 | 329.5 |
| 0102 (nec) ^a | Cereal grains nec | Cereal grains nec | 2 092.6 | 0.8 | 2 093.4 |

^a Barley (01210020); Oats (01210030); Sorghum (01210050); Legumes (01210073) and Cereal grains nec (01210080).

Source: ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 12. Mapping of ABS input: Dairy cattle A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------|---------------------|--------------------------------------|------------------------------|--------------------------|---------------------|
| 0104 | Dairy cattle | | 3 032.0 | 0.0 | 3 032.0 |
| 01300010 | Whole milk | Raw milk | 2 811.0 | 0.0 | 2 811.0 |
| 01300015 | Dairy cattle | Bovine cattle, sheep & goats, horses | 221.0 | 0.0 | 221.0 |

Source: ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 13. Mapping of ABS c input: Other agriculture nec A\$ million, 1996-97, Basic prices, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------|------------------------------|--------------------------------------|------------------------------|--------------------------|---------------------|
| | Other agriculture nec | | 764.5 | 354.1 | 1 118.6 |
| 01520010 | Horse studs | Bovine cattle, sheep & goats, horses | 428.1 | 97.1 | 525.2 |
| 01530010 | Deer farming | | | | |
| 01590011 | Honey & beeswax | Animal products nec | 336.4 | 178.2 | 514.6 |
| 01590020 | Live animals nec | | | | |
| 01690066 | Agriculture nec | | | | |
| 01698300 | Natural rubber | Forestry | 0.0 | 78.8 | 78.8 |

Source: ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 14. Mapping of ABS input: Agricultural services A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian productio n</i> | <i>Competin g imports</i> | <i>Total supply</i> |
|-------------------------|------------------------------|--------------------------------------|---------------------------------------|-------------------------------|-------------------------|
| | Agricultural services | | 1 564.5 | 10.5 | 1 574.9 |
| 0200 (nec) ^a | Services to agriculture nec | Paddy rice | 10.6 | 0.1 | 10.7 |
| 0200 (nec) ^a | Services to agriculture nec | Wheat | 180.1 | 1.2 | 181.3 |
| 0200 (nec) ^a | Services to agriculture nec | Cereal grains nec | 86.4 | 0.6 | 87 |
| 0200 (nec) ^a | Services to agriculture nec | Vegetables, fruit, nuts | 192.2 | 1.3 | 193.5 |
| 0200 (nec) ^a | Services to agriculture nec | Oil-seeds | 13.6 | 0.1 | 13.7 |
| 0200 (nec) ^a | Services to agriculture nec | Sugar cane, sugar beet | 48.5 | 0.3 | 48.8 |
| 0200 (nec) ^a | Services to agriculture nec | Crops nec | 64.6 | 0.4 | 65 |
| 0200 (nec) ^a | Services to agriculture nec | Bovine cattle, sheep & goats, horses | 210.8 | 1.4 | 212.2 |
| 02200010 | Skins | Animal products nec | 264.2 | 1.8 | 266 |
| 0200 (nec) ^a | Services to agriculture nec | | | | |
| 0200 (nec) ^a | Services to agriculture nec | Raw milk | 125.2 | 0.8 | 126 |
| 02120010 | Sheep shearing services | Wool, silk-worm cocoons | 368.1 | 2.5 | 370.6 |
| 0200 (nec) ^a | Services to agriculture nec | | | | |

^a Aerial agricultural services (02130010), Services to agriculture nec (02190010) and General government consumption of fixed capital (02201980). Pro-rated to GTAP commodities based on their total supply share.

Source: Estimates based on ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0) and ABS 1994 (*Input-Output Tables, Product Details, 1989-90*, Cat. no. 5215.0).

Table 15. Mapping of ABS input: Services to mining A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------------------|-------------------------------------|-------------------|------------------------------|--------------------------|---------------------|
| 1500 | Services to mining | | 5 080.0 | 74.0 | 5 154.0 |
| 15110010 | Petroleum exploration (own account) | Oil | 873.1 | 32.0 | 905.1 |
| 15120010 | Petroleum exploration services nec | | | | |
| 1500 (nec) ^a | Services to mining nec | Minerals nec | 4 206.9 | 42.0 | 4 248.9 |

^a Mining exploration (own account) (15130010); Mining exploration services nec (15140010); Mining services nec (15200010); and General government consumption of fixed capital (15201980).

Source: Estimates based on ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0) and ABS 1997 (*Input-Output Tables, Product Details, 1993-94*, Cat. no. 5215.0).

Table 16. Mapping of ABS input: Beef products A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------|----------------------------|--|------------------------------|--------------------------|---------------------|
| | Beef products | | 8 211.3 | 98.4 | 8 309.6 |
| 21110011 | Fresh meat | Bovine cattle, sheep & goat, horse meat products | 7 710.3 | 98.4 | 7 808.6 |
| 21110070 | Meat for human consumption | | | | |
| 21120010 | Poultry ^a | | | | |
| 21110060 | Raw hides | Animal products nec | 501.0 | 0.0 | 501.0 |

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

Source: ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 17. Mapping of ABS input: Knitting mill products A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------------------|-------------------------------|-------------------|------------------------------|--------------------------|---------------------|
| 2203 | Knitting mill products | | 994.9 | 430.8 | 1 425.7 |
| 2203 (nec) ^a | Knitting mill products nec | Textiles | 523.6 | 150.7 | 674.4 |
| 22310010 | Hosiery | Wearing apparel | 471.3 | 280.1 | 751.3 |
| 22320010 | Pullovers & jumpers | | | | |

^a Knitted or crocheted tufted textile fabrics (22390011); Knitted or crocheted pile fabrics (22390012); Knitted or crocheted fabric nec (22390020); Curtains (22390030); Knitted articles nec (22390050); and Other income (22391920).

Source: ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 18. Mapping of ABS input: Services to transport A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------------------|---|-------------------|------------------------------|--------------------------|---------------------|
| 6601 | Services to transport | | 18 614.8 | 418.9 | 19 033.7 |
| 66110010 | Parking services | Transport nec | 9 825.9 | 0.0 | 9 303.0 |
| 66190010 | Services to road transport nec | | | | |
| 66420010 | Rail freight forwarding | | | | |
| 6601 (nec) ^a | Services to transport nec | | | | |
| 66200010 | Margin - services to water transport | Water transport | 3 593.0 | 246.3 | 3 858.3 |
| 66200020 | Non-margin – stevedoring & port handling services | | | | |
| 66200030 | Services to water transport nec | | | | |
| 6601 (nec) ^a | Services to transport nec | | | | |
| 66300010 | Services to air transport | Air transport | 5 195.9 | 172.6 | 5 872.3 |
| 6601 (nec) ^a | Services to transport nec | | | | |

^a Travel & tourist agency services (66140010); Forwarding agency services (66430010); Customs agency services (66440010) storage (6700010) and General government consumption of fixed capital (67111980).

Source: Estimates based on ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 19. Mapping of ABS input: Services to finance A\$ million, 1996-97, Basic prices

| <i>IOPC</i> | <i>ABS input</i> | <i>GTAP input</i> | <i>Australian production</i> | <i>Competing imports</i> | <i>Total supply</i> |
|-------------------------|----------------------------|------------------------|------------------------------|--------------------------|---------------------|
| 7501 | Services to finance | | 9 517.0 | 80.7 | 9 597.7 |
| 75200010 | Services to insurance | Insurance | 3 114.0 | 0.0 | 3 114.0 |
| 7501 (nec) ^a | Services to finance nec | Financial services nec | 6 403 | 80.7 | 6 483.7 |

^a Security broking and dealing services (75100010) and Services to finance and investment nec (75100020).

Source: ABS 2001b (*Input-Output Tables, Product Details, 1996-97*, Cat. no. 5215.0).

Table 20. Summary of data supplied to GTAP for version 6 of the Australian I-O table^a A\$ million, 1996-97

| <i>GTAP matrix</i> | <i>Description</i> | <i>Interpretation</i> | <i>Valuation</i> | <i>Dimensions</i> | <i>Source</i> |
|--------------------|--------------------------------------|---|------------------|-------------------|--|
| UF | Use table (without product taxes) | Value of the use of input i by output u | Basic prices | 117×62 | <i>Domestic inputs</i> (57× 62): Single-product SNA68 Domestic use table <i>Imported inputs</i> (57× 62): Single-product SNA68 Imports table <i>Primary factors of production</i> (3× 62): Single-product SNA68 Domestic use table |
| UP | Use table (with product taxes) | Value of the use of input i by output u | Producer prices | 117×62 | <i>Domestic inputs</i> (57× 62): Matrix UF plus Single-product SNA68 Commodity taxes on domestic use table <i>Imported inputs</i> (57× 62): Matrix UF plus Single-product SNA68 Total product taxes on imports table <i>Primary factor of productions</i> (3× 62): Matrix UF (product taxes on primary factors of production are zero by definition) |
| OP | Output table | Value of production by output u | Market prices | 57×1 | <i>Domestic inputs</i> : Australian production (row T2) in Single-product SNA68 Total use table |
| MF | Imports table (without duty) | Value of imports of input i | Basic prices | 57×1 | <i>Imported inputs</i> : Single-product SNA68 Imports table |