
D Database modifications

In this appendix, the processes involved in updating the base year of the database, disaggregating the motor vehicle and parts industry, and incorporating ACIS in the model are described.

D.1 Updating the base year

The database was updated from 2001-02 to 2005-06 in four steps, to suit the MMRF model (figure D.1).

1. The 2001-02 ABS national input–output table for 109 industries was converted to a 172-sector database to be consistent with a simple general equilibrium (GE) model of the Australian economy (ORANI). This produced a national database with a structure that is broadly consistent with that of the regional database used in the MMRF model.
2. Industry value-added and trade flows were updated to 2005-06 using ABS national accounts and trade data.
3. The updated national database was disaggregated to 59 statistical-divisions, to form what is known as TERM. This was done using:
 - 2006 Census data on employment by industry, to define the size of the 172 industries in each statistical division
 - population size, to estimate household consumption per statistical division
 - ABS 2002 Household Expenditure Survey data on regional consumption levels
 - trade data from 49 ports to estimate international trade flows in and out of each statistical division.
4. The number of regions and industries in the TERM database was then aggregated to the State/Territory level to generate the eight-region MMRF database, with 58 industries (further details are found in Horridge et al. (2005)).

The resultant concordance of input–output and MMRF industries is shown in table D.1.

Figure D.1 **Stages in updating an MMRF database to 2005-06**

Stage	Regions	Industries
ABS 2001	1	109
↓		manufacturing, agriculture and service industries disaggregated
ORANI G	1	172
↓		no change
2005-2006	1	172
↓	statistical division	mining and services aggregated
TERM	59	144
↓	State and Territories	sectors aggregated
MMRF	8	58

Data source: Glyn Wittwer, Centre of Policy Studies, Monash University, pers. comm., 8 May 2008.

Table D.1 Concordance — 2001-02 ABS national input-output and MMRF industries

<i>Input-Output</i>	<i>Description</i>	<i>MMRF industry</i>
0101	Sheep	Sheep cattle
0102	Grains	Grains
0103	Beef cattle	Sheep cattle
0104	Dairy cattle	Dairy
0105	Pigs	Other animals
0106	Poultry	Other animals
0107	Other agriculture	Other agriculture
0200	Services to agriculture, hunting and trapping	Fishing and services to agriculture
0300	Forestry and logging	Forestry
0400	Commercial fishing	Fishing and services to agriculture
1101	Coal	Coal
1201	Oil and gas	Oil, gas
1301	Iron ores	Iron ore
1302	Non-ferrous metal ores	Non iron ore
1400	Other mining	Other mining
1500	Services to mining	Other mining
2101	Meat and meat products	Meat products
2102	Dairy products	Other food
2103	Fruit and vegetable products	Other food
2104	Oils and fats	Other food
2105	Flour mill products and cereal foods	Other food
2106	Bakery products	Other food
2107	Confectionery	Other food
2108	Other food products	Other food
2109	Soft drinks, cordials and syrups	Other food
2110	Beer and malt	Other food
2113	Wine, spirits and tobacco products	Other food
2201	Textile fibres, yarns and woven fabrics	Textile, clothing and footwear
2202	Textile products	Textile, clothing and footwear
2203	Knitting mill products	Textile, clothing and footwear
2204	Clothing	Textile, clothing and footwear
2205	Footwear	Textile, clothing and footwear
2206	Leather and leather products	Textile, clothing and footwear
2301	Sawmill products	Wood products
2302	Other wood products	Wood products
2303	Pulp, paper and paperboard	Paper products
2304	Paper containers and products	Paper products
2401	Printing and services to printing	Printing
2402	Publishing, recorded media, etc.	Printing
2501	Petroleum and coal products	Gasoline, diesel, LPG, air fuel, other fuel
2502	Basic chemicals	Chemicals
2503	Paints	Chemicals

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Table D.1 (continued)

<i>Input-Output</i>	<i>Description</i>	<i>MMRF industry</i>
2504	Medicinal and pharmaceutical products, pesticides	Chemicals
2505	Soap and detergents	Chemicals
2506	Cosmetics and toiletry preparations	Chemicals
2507	Other chemical products	Chemicals
2508	Rubber products	Rubber and plastic
2509	Plastic products	Rubber and plastic
2601	Glass and glass products	Non-metallic minerals
2602	Ceramic products	Non-metallic minerals
2603	Cement, lime and concrete slurry	Cement
2604	Plaster and other concrete products	Non-metallic minerals
2605	Other non-metallic mineral products	Non-metallic minerals
2701	Iron and steel	Steel
2702	Basic non-ferrous metal and products	Alumina, aluminium, other metals
2703	Structural metal products	Metal products
2704	Sheet metal products	Metal products
2705	Fabricated metal products	Metal products
2801	Motor vehicles and parts, other transport equipment	Motor vehicles and parts
2802	Ships and boats	Other manufacturing
2803	Railway equipment	Other manufacturing
2804	Aircraft	Other manufacturing
2805	Photographic and scientific equipment	Other manufacturing
2806	Electronic equipment	Other manufacturing
2807	Household appliances	Other manufacturing
2808	Other electrical equipment	Other manufacturing
2809	Agricultural, mining, etc. machinery	Other manufacturing
2810	Other machinery and equipment	Other manufacturing
2901	Prefabricated buildings	Other manufacturing
2902	Furniture	Other manufacturing
2903	Other manufacturing	Other manufacturing
3601	Electricity supply	
3602	Gas supply	Gas supply
3701	Water supply, sewerage and drainage services	Water supply
4101	Residential building	Construction
4102	Other construction	Construction
4201	Construction trade services	Construction
4501	Wholesale trade	Trade
4502	Wholesale mechanical repairs	Trade
4503	Other wholesale repairs	Trade
5101	Retail trade	Trade
5102	Retail mechanical repairs	Trade
5103	Other retail repairs	Trade
5701	Accommodation, cafes and restaurants	Accommodation hotels
6101	Road transport	Road transport

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Table D.1 (continued)

<i>Input–Output</i>	<i>Description</i>	<i>MMRF industry</i>
6201	Rail, pipeline and other transport	Road freight
6301	Water transport	Water transport
6401	Air and space transport	Air transport
6401	Air and space transport	Air transport
6601	Services to transport, storage	Water transport
7101	Communication services	Communication
7301	Banking	Financial services
7302	Non-bank finance	Financial services
7401	Insurance	Financial services
7501	Services to finance, investment and insurance	Financial services
7701	Ownership of dwellings	Dwelling
7702	Other property services	Business services
7801	Scientific research, technical and computer services	Business services
7802	Legal, accounting, marketing and business management services	Business services
7803	Other business services	Business services
8101	Government administration	Public services
8201	Defence	Public services
8401	Education	Public services
8601	Health services	Public services
8701	Community services	Public services
9101	Motion picture, radio and television services	Other services
9201	Libraries, museums and the arts	Other services
9301	Sport, gambling and recreational services	Other services
9501	Personal services	Other services
9601	Other services	Other services

Source: MMRF database.

D.2 Disaggregating the automotive industry

The ABS categorises all industries into Input–Output Industry Groups (IOIGs) which can be linked (via the IOIG-ANZSIC (Australian and New Zealand Standard Industrial Classification) concordance) to a corresponding list of the products primarily produced by these industries, referred to as Input–Output Product Classification (IOPC) codes. These IOPCs form the basis for disaggregating the motor vehicle and parts industry in the MMRF database. ABS release 5215.0.55.001 (ABS 2006) provides detailed input-output information on the allocation of the supply of all IOPCs across all industry and final users in the economy.

The first step in the disaggregation was to examine the tariff rate imposed on each

IOPC relevant to the motor vehicle and parts industry. This was done via a concordance between the IOPCs, and the Harmonized System (HS) codes used by the Australian Customs Service in assigning tariffs to commodities. The car assembly and car components industry was defined to be all commodities that are subject to the 10 per cent Most-Favoured Nation (MFN) automotive tariff rate. All those commodities not subject to a 10 per cent tariff were defined as ‘other’.

Because the IOPC-HS concordance links a single IOPC to several HS commodities, in some cases a number of different tariff rates were connected to a single IOPC. In these cases, additional trade volume data were used to discern whether most of a commodity’s trade was subject to a 10 per cent tariff. If this was the case, the commodity was defined to be part of the car assembly and car component sector.

Car assembly and car components were then separated from each other, with ‘car assembly’ taken to be represented by the IOPC 28110010 (‘Finished motor vehicles with less than 10 persons capacity’), and the remainder defined as ‘components’. Table D.2 sets out the resulting disaggregation of motor vehicle and parts-related IOPCs into ‘assembly’, ‘components’ and ‘other’, and their concordance with HS commodities.

This sectoral split was then used to disaggregate demand in the MMRF database by intermediate industry users and final users (represented by the rows in the MMRF input–output tables) into the demand for ‘others’ and for ‘car assembly and components’. Except for trade variables, this was done using the national shares of supply of the relevant groups of IOPCs to each user from the ABS input–output product details, applied uniformly across all jurisdictions.¹ Having specified shares for each component of the row in the MMRF database, the total sales split was then calculated as the weighted average share across all users.

¹ For export and import shares, trade data by jurisdiction and commodity, at a HS 6-digit level, were obtained from the ABS (unpublished data), and concoded with IOPCs. For other elements in the row for which no ABS shares were available, for example. inventories, the national total supply shares were used.

Table D.2 **Concordance — IOPC–HS^a**

Sector^b	IOPCs	IOPC description	HS6 codes
Cars	28110010	Finished motor vehicles with less than 10 persons capacity	870321, 870322, 870323, 870324, 870331, 870332, 870333, 870390
Components	28110071	Cranks, crank & cam shafts, gears and flywheels	848310, 848320, 848330, 848340, 848350, 848390
	28130012	Motor vehicle and truck air conditioners	841520
	28130014	Motor vehicle or motor cycle wiring harnesses	854430
	28130015	Motor vehicle starting, heaters, demisters, windscreen wipers; lighting/signalling equipment	851110, 851120, 851130, 851140, 851150, 851180, 851190, 851220, 851230, 851240, 851290
	28190010	Motor vehicle transmission assemblies (excl associated with the manufacture of complete vehicles/engines)	870829, 870840, 870850, 870860, 870880, 870891, 870892, 870893, 870894, 870895, 870899
	28190021	Cylinder blocks, pistons, connecting rods, valves (excl associated with the manufacture of complete vehicles/engines)	840991, 840999, 870829, 870840, 870850, 870880, 870891, 870892, 870894, 870895, 870899
	28190022	Fuel, lubricating or cooling medium pumps (excl associated with the manufacture of complete vehicles or engines)	841330, 870829, 870840, 870850, 870880, 870891, 870892, 870894, 870895, 870899
	28190023	Cranks, cam shafts, gears and flywheels (excl associated with the manufacture of complete vehicles/engines)	848310, 848320, 848330, 848340, 848350, 848360, 848390, 870829, 870840, 870850, 870880, 870891, 870892, 870894, 870895, 870899
	28190024	Motor vehicle, tractor and truck gaskets (excl associated with the manufacture of complete vehicles or engines)	848410, 848490
	28190025	Motor vehicle parts and equipment nec (excl associated with motor vehicle manufacturing)	840991, 840999, 848420, 870810, 870821, 870829, 870830, 870831, 870839, 870840, 870850, 870870, 870880, 870891, 870892, 870894, 870895, 870899
	28190026	Motor vehicle body panels	870829
	28299998	Unassembled motor vehicles nec	na
	Others	28110020	Finished motor vehicles with 10 or more person capacity
28110030		Finished trucks, truck type vehicles, utilities and panel vans	870421, 870422, 870423, 870431, 870432, 870490, 870510, 870520, 870530, 870540, 870590
28110060		Engines nec, for motor vehicles or tractors	840731, 840732, 840733, 840734, 840790, 840820
28110072		Motor vehicle, tractor and truck gaskets (associated with the manufacture of complete vehicles or engines)	848410, 848490
28110073		Motor vehicle, tractor & cycle parts nec (associated with the manufacture of complete vehicles & engines)	848420, 870810, 870821, 870899

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Table D.2 (continued)

<i>Sector^b</i>	<i>IOPCs</i>	<i>IOPC description</i>	<i>HS6 codes</i>
Others	28119010	Second hand motor vehicles	870321, 870322, 870323, 870324, 870331, 870332, 870333, 870390, 870431
	28120011	Motor vehicle and truck bodies (coachwork)	870710, 870790
	28120031	Agricultural self loading and unloading semi-trailers (incl tippers)	871620
	28120032	Other semi-trailers for the transport of goods & materials (incl tankers, vans, transporters, stock crates & jinkers)	870432, 871620, 871631, 871639
	28120041	Trailers for the transport of goods and materials (incl box trailers, boat trailers and horse floats)	871631, 871639
	28120042	Other trailers & semi-trailers nec (excl for the transport of goods & materials, & domestic type camper trailers)	871640
	28120050	Body panels for trucks and buses	870829
	28120060	Parts nec, for motor vehicle trailers and semi-trailers	871690
	28130013	Motor vehicle apparatus for making, breaking, protecting & making connections to/in electrical circuits (excl wiring)	853610, 853620, 853630
	28130016	Motor vehicle, tractor and motor cycle filament lamps and sealed beam lamps	853910, 853922, 853929
	28130017	Motor vehicle & tractor gauges, revolution & production counters, speed indicators, thermostats & similar instruments	902519, 902610, 902620, 902680, 902910, 902920, 903033, 903039, 903210, 903281, 903289
	28290010	Transport equipment, parts and accessories nec	870310, 871200, 871310, 871390, 871411, 871419, 871420, 871491, 871492, 871493, 871494, 871495, 871496, 871499, 871500, 871680
	28298000	Motor scooters and motor cycles	871110, 871120, 871130, 871140, 871150, 871190
	28291810	Royalties income and licence fees (2811-2819, 2829)	na
	28291900	Repairing and servicing (2811-2819, 2829)	na
	28291920	Other income (2811-2819, 2829)	na
	28291950	Increase in stocks - work-in-progress (2811-2819, 2829)	na

^a IOPC refers to Input–Output Product Classification codes. HS refers to the Harmonised System of product classification, presented here at the 6-digit-level of disaggregation. ^b These refer to the sectors as defined by the Commission for the purposes of disaggregating the MMRF database. **nec** not elsewhere classified. **na** not applicable.

To disaggregate the industry cost data (the columns of the MMRF database):

- the shares of total sales were imposed on total production costs (because total costs must equal total sales for the database to be balanced)
- capital and labour cost shares were estimated from ABS data on each industry's

value-added and wage costs in each jurisdiction (ABS 2005a-f, unpublished data).

- value-added was subtracted from total production costs for each industry in each jurisdiction, to obtain cost shares for the remaining inputs. As was suggested by the workshop referees (appendix B), the calculated cost structures were then compared to ABS data to check how well these corresponded (ABS 2005a-f, unpublished data).

The same procedure for splitting the rows and columns of the database was used to separate ‘car assembly’ from ‘car components’. This stage also involved:

- imposing a value of zero on the costs and sales of car assembly in all jurisdictions except Victoria and South Australia, as shown in Table 3.2
- setting the share of car assembly and components for both Victoria and South Australia equal to that calculated from ABS data on state production shares (ABS 2005b, ABS 2005d).

Four checks were performed to ensure the database was structurally sound before the modelling was undertaken.

- A basic accounting requirement is that total sales (the sum of the row elements) is equal to total production (the sum of the column elements).
 - These figures for each sector were compared to ensure total sales equalled total costs.
- The diagonal element in intermediate demand — which refers to the respective value of cars and of components used in the production of cars and of components — was examined.
 - As expected, the value of cars used in components was zero, with the value of components used in cars being the highest value.
- The tariff rates implicit in the tariff revenue matrix conformed to the trade-weighted average tariff rates which have been adjusted to take into account the impact of ACIS import duty credits on tariff revenue collected.
- The results of the disaggregation of the MMRF database were also compared with the 2001-02 ABS input–output product details (ABS 2006) as well as more recent data (2005-06) on production (ABS 2007).

D.3 Incorporating ACIS

The process for allocating ACIS capped and uncapped credits across jurisdictions and for incorporating these in the database is described below.

Allocating capped credits

In this study, it has been assumed that the total capped credits for Stage 2 are spread evenly across its five years — that is, \$400 million in credits are distributed annually. The allocation has been undertaken in the following way.

- Consistent with the modulation process outlined in chapter 2, and because car assembly only occurs in Victoria and South Australia, the 55 per cent allocated to vehicle assemblers has been split across these two States, based on the estimates of total costs derived from the MMRF database.
- The remaining 45 per cent of capped funding was split according to each jurisdiction's share of component production costs.

This process is consistent with the idea that the majority of capped ACIS funding is allocated according to production values. This process produces an average rate of subsidy for each sector, without recognising any disparities that might exist among firms within the sector.

Allocating uncapped credits

Given the total estimated ACIS funding of \$537 million (chapter 2), after accounting for the \$400 million in capped credits, \$137 million in uncapped credits remain. These credits were allocated between Victoria and South Australia according to the estimates of production costs derived from the MMRF database.

The estimated shares of capped and uncapped ACIS funding allocated to car assembly and component manufacturing are consistent with the actual average distribution between 2005 and 2007, as reported by AusIndustry (table D.3).

Table D.3 **Share of total ACIS funding by sector**

	<i>PC Distribution^a</i>		<i>AusIndustry^b</i>	
	<i>Uncapped</i>	<i>Capped</i>	<i>Total</i>	<i>Total</i>
	%	%	%	%
Car assembly	25	41	67	62
Components	0	34	33	36

^a Although tool producers and service providers are entitled to receive ACIS, the proportion they are allocated is very small. Therefore, for modelling purposes, their allocation was assumed to be zero. Also, due to the nature of the MMRF industry split between cars and components, several component producers which are currently captured in 'others' have had their ACIS entitlements allocated to 'components' in the modelling.

^b This is the average split across car assembly and component manufacturers over the three years from 2005 to 2007. The shares do not sum to 100, as they exclude the proportion allocated to tool producers and service providers.

Sources: AusIndustry (unpublished data); Commission estimates.

How ACIS was included in the database

ACIS-inclusive tariff rates (chapter 3) were used to derive the implicit import duties that should have been paid by the car assembly and components sectors under the normal tariff system. Since neither sector imports cars as intermediate inputs, the imputed import duties are paid exclusively on imported car parts.

- The uncapped ACIS value (\$137 million) for the car assembly industry was modelled as a negative federal indirect tax on imports, and allocated according to the regional cost of car production. These subsidies are used to offset directly the import duties paid by the car industries in Victoria and South Australia.
- Capped ACIS funding was treated as a production subsidy (allocated across jurisdictions as outlined above), and included in the database as negative federal taxes on Other Cost Tickets (OCTS).

As the federal tax (OTXF) is included in OCTS in the database, the values of OCTS for car assembly and components industries had to be adjusted to maintain the original total cost values for the industries.

The total imputed import duties that should have been paid by the car assembly and components sectors are estimated to be \$240 million, compared with actual industry receipts of \$537 million. The surplus was assumed to have been sold by the industries to other importers of cars and components for capital investment (BAS2) and for final consumption (BAS3). Therefore, the corresponding import values in BAS2 and BAS3 needed to be adjusted to reflect the purchases of \$297 million of ACIS credits from the assembly and components sectors.