# B Model database

This appendix outlines how the MMRF-Auto14 database used for this inquiry was produced and provides key information about the input–output structure of the automotive manufacturing industry. It covers:

* the generation of the initial MMRF database that formed the starting point for the database used in this inquiry (section B.1)
* the disaggregation of the motor vehicles and parts manufacturing industry into constituent industries covering the manufacture of passenger motor vehicles, the manufacture of trucks, buses, trailers, caravans and other specialist vehicles, and the manufacture of automotive components (section B.2)
* the uprating of the disaggregated database from a reference year of 2005‑06 to 2012‑13 (section B.3)
* the structure of the automotive manufacturing industries in the inquiry database (section B.4)
* the inclusion of data needed to assess the sub-state regional impacts of the closure of passenger motor vehicle manufacturing plants (section B.5).

It should be noted that comprehensive input–output tables are not available for the current period. Work for this inquiry has sought to fill this gap from a range of sources including input–output tables for 2005-06 and 2009-10, population census information for 2006 and 2011, other data from the Australian Bureau of Statistics (ABS), and information provided by the Department of Industry and other participants to the inquiry.

## B.1 Creating the initial model database

The database used for this inquiry was created from the standard MMRF model database, which aligns with the 2005‑06 ABS *Input-Output Tables*. The standard database is compiled in three broad steps to suit model data and classification requirements (figure B.1).

Figure B.1 Stages in creating the initial MMRF database used for this inquiry

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | **Stage** | **Regions** | **Industries** | | **ABS 2005-06 Input-Output Tables** | 1 | 109 | |  | Australia | Agriculture, mining, manufacturing and service industries disaggregated | | **ORANI‑G** | 1 | 183 | |  | Sub-state local government areas | Agriculture, mining, manufacturing and service industries aggregated | | **TERM** | 205 | 183 | |  | State and Territories | Sectors aggregated | |  | 8 | 64 | |  |  | Database ‘hammered’ to align as best as possible to control targets | | **MMRF** | 8 | 64 | |

*Source*: CoPS (forthcoming).

In the first step, the 2005-06 ABS national input–output tables for 109 industries were converted to a 183-sector database to be consistent with another general equilibrium (GE) model of the Australian economy (ORANI‑G). This produced a national database with a structure that is broadly consistent with that of the regional database used in the MMRF model.

Second, the national database was disaggregated to 205 sub-state regions, to form what is known as the TERM database. This was done using:

* 2006 ABS *Census of Population and Housing* data on employment by industry, to define regional production of the 183 industries at the local government area level
* ABS 2003‑04 *Household Expenditure Survey* data to estimate household consumption per statistical division
* trade data from 49 ports to estimate international trade flows in and out of each statistical division.[[1]](#footnote-1)

Interregional trade flows were then estimated within the constraints provided by the basic data using a gravity modelling approach.

Third, 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 64 industries (table B.1).

Table B.1 Concordance between industries in the initial MMRF database and the 2005‑06 ABS input‑output industry groups

|  |  |  |  |
| --- | --- | --- | --- |
| No. | MMRF industry | IOIG | Input–output industry group |
| 1 | Livestock | 0101 | Sheep |
|  |  | 0103 | Beef cattle |
| 2 | Crops | 0102 | Grains |
| 3 | Dairy cattle | 0104 | Dairy cattle |
| 4 | Other agriculture | 0105 | Pigs |
|  |  | 0106 | Poultry |
|  |  | 0107 | Other agriculture |
|  |  | 0200 | Services to agriculture, hunting and trapping |
| 5 | Forestry and logging | 0300 | Forestry and logging |
| 6 | Fishing | 0400 | Commercial fishing |
| 7 | Coal mining | 1101 | Coal |
| 8 | Oil mining | 1201 | Oil and gas (part) |
| 9 | Gas mining | 1201 | Oil and gas (part) |
| 10 | Iron ore mining | 1301 | Iron ores |
| 11 | Other metal ore mining | 1302 | Non-ferrous metal ores |
| 12 | Other mining | 1400 | Other mining |
|  |  | 1500 | Services to mining |
| 13 | Meat products | 2101 | Meat and meat products |
| 14 | Dairy products | 2102 | Dairy products |
| 15 | Other food beverages and tobacco | 2103 | Fruit and vegetable products |
|  |  | 2104 | Oils and fats |
|  |  | 2105 | Flour mill products and cereal foods |
|  |  | 2106 | Bakery products |
|  |  | 2107 | Confectionery |
|  |  | 2108 | Other food products |
|  |  | 2109 | Soft drinks, cordials and syrups |
|  |  | 2110 | Beer and malt |
|  |  | 2113 | Wine, spirits and tobacco products |
| 16 | Textiles, clothing and footwear | 2201 | Textile fibres, yarns and woven fabrics |
|  |  | 2202 | Textile products |
|  |  | 2203 | Knitting mill products |
|  |  | 2204 | Clothing |
|  |  | 2205 | Footwear |
|  |  | 2206 | Leather and leather products |

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Table B.1 (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| No. | MMRF industry | IOIG | Input–output industry group |
| 17 | Wood and wood products | 2301 | Sawmill products |
|  |  | 2302 | Other wood products |
| 18 | Paper and paper products | 2303 | Pulp, paper and paperboard |
|  |  | 2304 | Paper containers and products |
| 19 | Printing, publishing and | 2401 | Printing and services to printing |
|  | recorded media | 2402 | Publishing, recorded media and publishing |
| 20 | Petrol | 2501 | Petroleum and coal products (part) |
| 21 | Other petroleum and coal products | 2501 | Petroleum and coal products (part) |
| 22 | Chemical products | 2502 | Basic chemicals |
|  |  | 2503 | Paints |
|  |  | 2504 | Medicinal and pharmaceutical products; pesticides |
|  |  | 2505 | Soap and other detergents |
|  |  | 2506 | Cosmetics and toiletry preparations |
|  |  | 2507 | Other chemical products |
| 23 | Rubber and plastic products | 2508 | Rubber products |
|  |  | 2509 | Plastic products |
| 24 | Other non-metallic minerals | 2601 | Glass and glass products |
|  | products | 2602 | Ceramic products |
|  |  | 2604 | Plaster and other concrete products |
|  |  | 2605 | Other non-metallic mineral products |
| 25 | Cement and lime | 2603 | Cement, lime and concrete slurry |
| 26 | Iron and steel | 2701 | Iron and steel |
| 27 | Alumina | 2702 | Basic non-ferrous metal and products (part) |
| 28 | Aluminium | 2702 | Basic non-ferrous metal and products (part) |
| 29 | Other non-ferrous metals | 2702 | Basic non-ferrous metal and products (part) |
| 30 | Metal products | 2703 | Structural metal products |
|  |  | 2704 | Sheet metal products |
|  |  | 2705 | Fabricated metal products |
| **31** | **Motor vehicles and parts** | **2801** | **Motor vehicles and parts; other transport equipment** |
| 32 | Other equipment | 2802 | Ships and boats |
|  |  | 2803 | Railway equipment |
|  |  | 2804 | Aircraft |
|  |  | 2805 | Photographic and scientific equipment |
|  |  | 2806 | Electronic equipment |
|  |  | 2807 | Household appliances |
|  |  | 2808 | Other electrical equipment |
| 33 | Other manufacturing | 2809 | Agricultural, mining and construction machinery |
|  |  | 2810 | Other machinery and equipment |
|  |  | 2901 | Prefabricated buildings |
|  |  | 2902 | Furniture |
|  |  | 2903 | Other manufacturing |

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Table B.1 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | MMRF industry | | IOIG | Input–output industry group | |
| 34 | Electricity generation – coal | | 3601 | Electricity supply (part) | |
| 35 | Electricity generation – gas | | 3601 | Electricity supply (part) | |
| 36 | Electricity generation – oil | | 3601 | Electricity supply (part) | |
| 37 | Electricity generation – hydro | | 3601 | Electricity supply (part) | |
| 38 | Electricity generation – other | | 3601 | Electricity supply (part) | |
| 39 | Electricity supply | | 3601 | Electricity supply (part) | |
| 40 | Gas supply | | 3602 | Gas supply | |
| 41 | Water and sewage services | | 3701 | Water supply; sewerage and drainage services | |
| 42 | Residential construction | | 4101 | Residential building | |
| 43 | Non-residential construction | | 4102 | Other construction | |
|  |  | | 4201 | Construction trade services | |
| 44 | Wholesale trade | | 4501 | Wholesale trade | |
|  |  | | 4502 | Wholesale mechanical repairs | |
|  |  | | 4503 | Other wholesale repairs | |
| 45 | Retail trade | | 5101 | Retail trade | |
| 46 | Mechanical repairs | | 5102 | Retail mechanical repairs | |
|  |  | | 5103 | Other retail repairs | |
| 47 | Hotels, cafes and restaurants | | 5701 | Accommodation, cafes and restaurants | |
| 48 | Road freight transport | | 6101 | Road transport (part) | |
| 49 | Road passenger transport | | 6101 | Road transport (part) | |
| 50 | Rail freight transport | 6201 | | Rail, pipeline and other transport (part) |
| 51 | Rail passenger transport | 6201 | | Rail, pipeline and other transport (part) |
| 52 | Pipeline and other transport | 6201 | | Rail, pipeline and other transport (part) |
| 53 | Water transport | 6301 | | Water transport |
| 54 | Air transport | 6401 | | Air and space transport |
| 55 | Services to transport | 6601 | | Services to transport, storage |
| 56 | Communication services | 7101 | | Communication services |
| 57 | Financial services | 7301 | | Banking |
|  |  | 7302 | | Non-bank finance |
|  |  | 7401 | | Insurance |
|  |  | 7501 | | Services to finance, investment and insurance |
| 58 | Ownership of dwellings | 7701 | | Ownership of dwellings |
| 59 | Business services | 7702 | | Other property services |
|  |  | 7801 | | Scientific research, technical and computer services |
|  |  | 7802 | | Legal, accounting, marketing and business management services |
|  |  | 7803 | | Other business services |

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Table B.1 (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| No. | MMRF industry | IOIG | Input–output industry group |
| 60 | Government administration | 8101 | Government administration |
|  | and defence | 8201 | Defence |
| 61 | Education | 8401 | Education |
| 62 | Health services | 8601 | Health services |
| 63 | Community services | 8701 | Community services |
|  |  | 9101 | Motion picture, radio and television services |
|  |  | 9201 | Libraries, museums and the arts |
|  |  | 9301 | Sport, gambling and recreational services |
| 64 | Other services | 9501 | Personal services |
|  |  | 9601 | Other services |

*Source*: CoPS (forthcoming).

## B.2 Disaggregating the motor vehicles and parts manufacturing industry

The initial MMRF database used for this inquiry contains a single industry covering all motor vehicle, parts and other automotive production in Australia. This reflects the industry and commodity structure used by the ABS in its *Input-Output Tables* (ABS 2009a, 2009b), which provides the detailed structure of the Australian economy on which the initial (standard) model database is based.[[2]](#footnote-2)

The single motor vehicles and parts industry was disaggregated for the purposes of this inquiry into three industries using more detailed ABS product information (ABS 2009b) and information provided in the course of the inquiry:

* *passenger motor vehicle manufacturing*, which consists of finished motor vehicles with less than 10 persons capacity and second hand motor vehicles[[3]](#footnote-3)
* *automotive components manufacturing*, which consists of automotive electrical component manufacturing and other vehicle parts manufacturing (ANZSIC 1993 classes 2813 and 2819), and covers the manufacture of components such as panels, gaskets, cranks, cam shafts, gears, flywheels, fuel pumps, transmission systems, instrumentation, seatbelts, lights, windscreen wipers and air conditioners (supplied to passenger motor vehicle producers, the automotive aftermarket or exported)
* a residual *other automotive manufacturing*, which includes, among other things, the manufacture of trucks, buses, trailers, caravans and other specialist vehicles.[[4]](#footnote-4)

The full mapping used between the relevant ABS input-output product codes (IOPCs) (that underpin the input-output product groups (IOPGs) in the ABS *Input-Output Tables*) and the automotive industries in the disaggregation are listed in table B.2.[[5]](#footnote-5)

The definition of ‘automotive components manufacturing’ used above (which also reflects the ABS ANZSIC 1993 and 2006 definitions, table B.3) is narrower than the supply chain boundaries commonly thought of within the industry, as it does not include many manufactured inputs used in producing vehicles that do not form part of the product group ‘Motor vehicles and parts; other transport equipment’ (IOPG 2801) in the 2005‑06 *Input-Output Tables*. Other inputs in the automotive supply chain include: chemicals, paints, plastics and plastic products, tyres, rubber and glass products, textile products and the production of metals and metal products that form parts of different ABS manufacturing industries. For example, windscreens and other vehicle windows form part of the ABSproduct group ‘glass and glass products’ (IOPG 2601). Throughout this appendix, the full range of manufactured products used in the manufacture of passenger motor vehicles are referred to as ‘*manufactured inputs*’, of which ‘automotive components manufacturing’ that forms part of the ABS ‘motor vehicle and motor vehicle part manufacturing’ industry (ANZSIC 2006 group 231) is a component.

The value of total use of manufactured inputs by the automotive industry is just over double the value of use of automotive components manufacturing as classified by the ABS.[[6]](#footnote-6)

Table B.2 Concordance between the disaggregated automotive industries and the detailed 2005‑06 ABS input‑output products

|  |  |  |  |
| --- | --- | --- | --- |
| Industrya | IOPCb | IOPC description | |
| **Passenger motor vehicles manufacturing** | 28110010 | Finished motor vehicles with less than 10 persons capacity |
| 28119010 | Second hand motor vehicles |
| **Automotive components manufacturing** | 28130011 | Vehicle electric motors of an output not exceeding 37.5W; other DC motors and DC generators |
| 28130012 | Motor vehicle and truck air conditioners |
| 28130013 | Motor vehicle apparatus for making, breaking, protecting & making connections to/in electrical circuits (excl wiring) |
| 28130014 | Motor vehicle or motor cycle wiring harnesses |
| 28130015 | Motor vehicle, tractor or motor cycle starting, heaters, demisters, windscreen wipers; lighting/signalling equipment |
| 28130016 | Motor vehicle, tractor and motor cycle filament lamps and sealed beam lamps |
| 28130017 | Motor vehicle & tractor gauges, revolution & production counters, speed indicators, thermostats & similar instruments |
| 28190010 | Motor vehicle transmission assemblies (excl associated with the manufacture of complete vehicles/engines) |
| 28190021 | Cylinder blocks, pistons, connecting rods, valves (excl associated with the manufacture of complete vehicles/engines) |
| 28190022 | Fuel, lubricating or cooling medium pumps (excl associated with the manufacture of complete vehicles or engines) |
| 28190023 | Cranks, cam shafts, gears and flywheels (excl associated with the manufacture of complete vehicles/engines) |
| 28190024 | Motor vehicle, tractor and truck gaskets (excl associated with the manufacture of complete vehicles or engines) |
| 28190025 | Motor vehicle parts and equipment nec (excl associated with motor vehicle manufacturing) |
| 28190026 | Motor vehicle body panels |
| **Other automotive manufacturing** | 28110020 | Finished motor vehicles with 10 or more person capacity |
| 28110030 | Finished trucks, truck type vehicles, utilities and panel vans |
| 28110040 | Unassembled motor vehicles nec |
| 28110050 | Chassis with engines for motor vehicles |
| 28110060 | Engines nec, for motor vehicles or tractors |
| 28110071 | Cranks, crank & cam shafts, gears and flywheels (associated with the manufacture of complete vehicles or engines) |
| 28110072 | Motor vehicle, tractor and truck gaskets (associated with the manufacture of complete vehicles or engines) |
| 28110073 | Motor vehicle, tractor & cycle parts nec (associated with the manufacture of complete vehicles & engines) |
| 28120011 | Motor vehicle and truck bodies (coachwork) |
| 28120020 | Caravans, camper trailers and similar vehicles |
| 28120031 | Agricultural self-loading and unloading semi-trailers (incl tippers) |

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Table B.2 (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| Industrya | IOPCb | | IOPC description |
|  | 28120032 | Other semi-trailers for the transport of goods & materials (incl tankers, vans, transporters, stock crates & jinkers) | | |
| 28120041 | | Trailers for the transport of goods and materials (incl box trailers, boat trailers and horse floats) | |
| 28120042 | | Other trailers & semi-trailers nec (excl for the transport of goods & materials, & domestic type camper trailers) | |
| 28120050 | | Body panels for trucks and buses | |
| 28120060 | | Parts nec, for motor vehicle trailers and semi-trailers | |
| 28290010 | | Transport equipment, parts and accessories nec | |
| 28291810 | | Royalties income and licence fees (2811-2819, 2829) | |
| 28291900 | | Repairing and servicing (2811-2819, 2829) | |
| 28291920 | | Other income (2811-2819, 2829) | |
| 28291950 | | Increase in stocks - work-in-progress (2811-2819, 2829) | |
| 28298000 | | Motor scooters and motor cycles | |

**na** Not applicable. **nec** not elsewhere classified. **a** Industries and products as defined by the Commission for the purposes of disaggregating the MMRF database. **b** IOPC refers to Input–Output Product Classification code.

The disaggregation of the motor vehicles and parts industry used detailed input-output information from the Commission’s 2008 modelling of the *Economy-Wide Effects of Future Automotive Assistance* (PC 2008) as the starting point for the current disaggregation. This earlier information was updated, where possible, using a combination of available input-output data (ABS 2009a, 2009b), industry data (DoI 2013), ABS *Census of Population and Housing* data and other information provided by participants to this inquiry about aspects of the structure of the industry. The procedure used to disaggregate the ‘motor vehicles and parts’ industry in the initial MMRF database is outlined in box B.1.

|  |
| --- |
| Box B.1 Disaggregating the motor vehicles and parts industry |
| The database generated by the Centre of Policy Studies (CoPS) for the Commission’s 2008 modelling of the *Effects of Future Automotive Assistance* provided the starting point for disaggregating the ‘motor vehicles and parts’ industry in MMRF (PC 2008). First, for each variable requiring disaggregation, shares were derived from the 2008 database. The shares were calculated as the value for each disaggregated automotive industry divided by the sum of the values of the three new automotive industries.  Next, these shares were applied to the initial MMRF database used for the current inquiry. That is, the shares were multiplied by the corresponding aggregate motor vehicles and parts value to generate values for each new automotive industry.  Adjustments were then made to the database to reflect more recent data and to satisfy the technical requirements of the model, as set out below.   * Sales totals for the disaggregated motor vehicles and parts industries were adjusted to align with control targets based on the ABS input-output product details in annex table B1.1. Aggregate sales by domestic producers were based on sales of the products manufactured by the three disaggregated industries distributed in the proportions 0.51, 0.26 and 0.23. Import sales of the products produced by the three industries were distributed across industries in the proportions 0.59, 0.19 and 0.22. * Sales for the new automotive industries were allocated across intermediate use, exports and household final consumption to broadly align with sales shares reported in the source input-output tables listed in annex table B1.2. * State sales of components and other manufactured goods to the passenger motor vehicle manufacturing industry were calibrated to data on purchases of manufactured inputs by passenger motor vehicle producers based on data from submissions (FCAI, sub. 30; GM Holden, sub. 58; Government of South Australia, sub. 68; WiSER, sub. 8). The derived sales shares are discussed below. * The ‘value added in production’ shares for the Australian automotive industries were aligned as closely as possible with values implied by the 2005-06 ABS *Input-Output Tables* (table B1.3). The distribution of value added and sales across jurisdictions was based on the 2008 study (table B1.4). Employment was distributed across states by reference to employment shares by industry from the ABS 2006 *Census of Population and Housing* (table B1.5). * To satisfy the technical modelling requirement of zero profits for each industry, costs were adjusted to match sales. This was done by scaling costs from all sources (primary factors and intermediate inputs) for passenger motor vehicle, component and other automotive manufacturing industries, leaving their cost shares (the share of each input in total costs) constant.   The resulting disaggregated database was then checked for structural soundness. |
|  |
|  |

Table B.3 Mapping of ABS motor vehicle and motor vehicle part manufacturing industry data to MMRF industrya

|  |  |  |
| --- | --- | --- |
| ANZSIC 1993 industry | Broadly equivalent ANZSIC 2006 industry | Disaggregated MMRF industry |
| 2811 Motor vehicle manufacturing | 2311 Motor vehicle manufacturing | Passenger motor vehicle manufacture (part)b  Other automotive manufacturing (part)b |
| 2812 Motor vehicle body and trailer manufacturing | 2312 Motor vehicle body and trailer manufacturing | Other automotive manufacturing |
| 2813 Automotive electrical component manufacturing | 2313 Automotive electrical component manufacturing | Automotive components manufacturing |
| 2819 Other motor vehicle parts manufacturing | 2319 Other motor vehicle parts manufacturing | Automotive components manufacturing |

a Used to map ABS data for ANZSIC 2006 group ‘Motor vehicle and motor vehicle part manufacturing’ (ANZSIC 2006 group 231) to MMRF industry. b The products that make up ‘passenger motor vehicle manufacturing’ accounted for 82 per cent of domestic ‘Motor vehicle manufacturing’ (ANZSIC 2006 class 2311) in 2005‑06, with other automotive manufacturing accounting for the remaining 18 per cent*.*

## B.3 Uprating the database from 2005-06 to 2012-13

The disaggregated 2005‑06 MMRF database was uprated to 2012‑13 to reflect the relative and absolute decline in Australian passenger motor vehicle manufacturing that has occurred since 2005-06 (box B.2). The industry trends used to uprate the 2005‑06 database are set out in table B.4. Given the paucity of data available on aspects of the automotive components manufacturing and other automotive manufacturing industries, the modelling scenario gives greater weight to tracking changes in the passenger motor vehicle manufacturing industry over this period than to the remaining automotive industries.

|  |
| --- |
| Box B.2 Recent trends in Australian automotive manufacturing |
| The Australian motor vehicle manufacturing industry has been getting smaller in recent years relative to other activities as well as in absolute terms, as measured by output and employment.  The number of sales of passenger motor vehicles and sports utility vehicles (SUVs) in Australia (imported and domestically manufactured) grew at just over 2 per cent per year in the six years from 2006. Behind this trend, the number of SUV sales have increased by 10 per cent, while sales of sedans have declined by 1 per cent per year. The largest decline in sale numbers has been in the large vehicle segment of the market (including imports as well as Holden Commodores assembled in Elizabeth, Ford Falcons assembled in Broadmeadows and Toyota Aurions assembled in Altona), which declined by 12 per cent per year.  Overall, the volume of Australian production of passenger motor vehicles and SUVs declined at 6 per cent per year over the same six year period (2006 to 2012) — falling from 330 000 units to 220 000 units. A relatively large decline in Australian production volumes occurred in 2009, coinciding with a 20 per cent appreciation of the Australian dollar relative to the US dollar. The volume of Australian vehicle exports also declined at a similar rate to Australian production.  *Flow-on implications for the use of Australian-produced manufactured inputs*  The decline in passenger motor vehicle production has translated into a decline in the demand for manufactured inputs to passenger motor vehicle manufacturing. Department of Industry data indicate that the value of Australian-sourced manufactured inputs used by passenger motor vehicle producers in Australia decreased by more than 10 per cent per year from 2006 to 2012 (falling from $4.65 billion to $2.34 billion in nominal terms).[[7]](#footnote-7)  Department of Industry data also indicate that the nominal value of exports of manufactured automotive inputs (that is, ‘components’ broadly defined) declined by 2 per cent per year.  With respect to the automotive components manufacturing industry as defined by the ABS, data from the ABS *Australian Industry* publication indicate that the nominal value of total sales and employment for the industry fell by around 5 per cent per year between 2005‑06 and 2011‑12. |
| (Continued next page) |
|  |
|  |

|  |
| --- |
| Box B.2 (continued) |
| The more rapid rate of decline in the use of Australian manufactured inputs in passenger motor vehicle production (from the Department of Industry data) compared with total automotive component production (from the ABS data) indicates that the importance of passenger motor vehicle producers as users of components manufactured in Australia has been decreasing. In 2005-06, using these two data sources and a range of plausible assumptions to address the discrepancy between automotive components manufacturing and manufactured inputs more broadly, it is estimated that between 25 per cent and 38 per cent of automotive components produced in Australia would have been used in passenger motor vehicle manufacturing in Australia (discussed in the annex B2). Comparable estimates for 2012-13 are in the range 17 to 25 per cent — representing a decline of about 5 per cent per year.  Such a trend would be consistent with information provided to this inquiry by the Australian Automotive Aftermarket Association (sub. 54), which noted that the aftermarket segment has shown strong year-on-year growth. |
| *Sources*: Commission estimates based on DoI (2012, 2013); ABS (2013, *Australian Industry*, 2011-12, Cat. no. 8155.0, Data cube 81550DO003\_2011\_12). |
|  |
|  |

Table B.4 Automotive industry-specific changes applied in the uprating of industry flows, annual average, 2005‑06 to 2012‑13

Per cent per year

|  |  |  |  |
| --- | --- | --- | --- |
| Industry | Measure targeted | Estimate based on | Value |
| Passenger motor vehicle manufacturing | Australian production of cars (real) | *Key Automotive Statistics 2012* (DoI 2013) | -7.7 |
|  | Passenger motor vehicle exports (real) | *Key Automotive Statistics 2012* (DoI 2013) | -8.3 |
|  | Employment (persons)**a** | Estimates based on *Key Automotive Statistics* (DoI 2013) | -7.5b |
| Automotive components manufacturing | Gross output (real) | Estimates based on *Australian Industry* (ABS 2013a) | -5.0c |
|  | Employment (persons)**a** | Estimates based on *Australian Industry* (ABS 2013a) | -4.5c |
| Other automotive manufacturing | Employment (persons)**a** | Estimates based on *Australian Industry* (ABS 2013a) | -2.4b |

**a** Employment in 2005-06 and 2012-13 shown in tables B1.5 and B.9, respectively. **b** State-specific shocks applied as part of the uprating based on the average annual percentage change between tables B.9 and B1.5. c Modelled as a 0.5 per cent decline in labour productivity.

*Sources*: Commission estimates based on DoI (2013); ABS (2013a).

Other activities were uprated according to changes in population, terms of trade and labour productivity (PC 2012b). Australia’s terms of trade increased during much of the period 2005-06 to 2012-13, reaching a peak in 2011-12 (ABS 2013d).

The resulting national output and employment shares by sector broadly align with the sectoral distribution of activity reported in the Australian National Accounts (figure B.2). The passenger motor vehicle industry in Australia is estimated to account for about 0.1 per cent of aggregate economic activity in 2012-13, while the automotive component manufacturing industry (as defined by the ABS) is estimated to account for just under 0.2 per cent.

The uprated 2012‑13 database was also checked against the latest year for which ABS *Input-Output Tables* are available (2009‑10) (ABS 2013b, 2013c). The resulting database was found to be broadly comparable with the available information for that year.

The dynamic modelling assumes production and employment in the passenger motor vehicle industry remains fixed from 2012‑13 to 2016‑17.

## B.4 Structure of the automotive manufacturing industry in the inquiry database

### Sourcing of intermediate inputs

Inputs sourced from Australian manufactured goods and Australian service suppliers are estimated to account for about 80 per cent of inputs to passenger motor vehicle manufacturing in the 2012‑13 database (table B.5). The share is slightly higher for inputs to the manufacture of automotive components at just over 80 per cent.

Table B.5 Source of intermediate inputs used by the motor vehicles and parts industry in the MMRF database, estimated 2012-13 basisa

Per cent

|  |  |  |
| --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive componentsb |
| Domestically produced | 79.0 | 82.2 |
| Imported | 21.0 | 17.8 |
| **Total** | **100.0** | **100.0** |

**a** Estimated at basic prices. Under this convention, domestic supplies are valued on an ex-factory or service establishment basis, while imports are valued at the border inclusive of international insurance costs and freight costs (that is, on a cif basis). b Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819).

*Source*: Commission estimates.

Figure B.2 Comparison of actual and projected distribution of production and employment by broad industry sector, Australia, 2012‑13

Per cent

|  |  |
| --- | --- |
| **Production (gross value added)** | |
| ABS National Accounts | Model projection |
|  |  |
| **Employment (persons)** | |
| ABS Labour Force Survey | Model projection |
|  |  |

*Sources*: ABS (2013, *Australian System of National Accounts*, 2012-13, Cat. no. 5204.0); ABS (*Labour Force, Australia, Detailed, Quarterly*, Feb 2014, Cat. no. 6291.0.55.003); Commission estimates.

### Composition of domestically sourced intermediate inputs

Domestically sourced manufactures are estimated to account for over half of all domestically sourced intermediate inputs (goods and services combined) to the Victorian and South Australian passenger motor vehicle industry in the 2012‑13 database. Products classified as automotive components manufacturing account for over half of manufactured inputs, while the remainder relate to a range of other manufactures including glass, rubber, plastic, chemical and metal products (table B.6).

A large proportion of components and other manufactured inputs to passenger motor vehicle manufacturing in Victoria and South Australia are estimated to be sourced from within those states. Based on inquiry information about the use of Australian-produced manufactured inputs by passenger motor vehicle producers and industry activity levels, it is estimated in the 2012-13 database that manufactured inputs sourced from Victorian-based suppliers make up about 49 per cent of intermediate inputs to Victorian passenger motor vehicle manufacturing (that is, 29.9 per cent plus 19.1 per cent in table B.6), while manufactured inputs sourced from South Australian-based suppliers are estimated to make up about 31 per cent (that is, 21.0 per cent plus 10.5 per cent) of intermediate inputs to South Australian passenger motor vehicle manufacturing. Manufactured inputs from:

* Victorian-based suppliers make up just over 12 per cent (8.2 per cent plus 4.1 per cent) of intermediate inputs to passenger motor vehicle manufacturing in South Australia.
* South Australian-based suppliers make up just over 6 per cent (0.9 per cent plus 5.2 per cent) of intermediate inputs to passenger motor vehicle manufacturing in Victoria.

Table B.6 Source of domestically produced intermediate inputs to the domestic passenger motor vehicle manufacturing industries in the MMRF database, estimated 2012-13 basisa

Per cent

|  |  |  |
| --- | --- | --- |
|  | Victoria | South Australia |
| **Manufactured inputs** | **58.2** | **50.6** |
| *of which:* |  |  |
| Automotive components manufacturing b | 31.2 | 30.1 |
| *Sourced from:* |  |  |
| Victoria | 29.9 | 8.2 |
| South Australia | 0.9 | 21.0 |
| Other manufactured inputs | 27.0 | 20.5 |
| *Sourced from:* |  |  |
| Victoria | 19.1 | 4.1 |
| South Australia | 5.2 | 10.5 |
| **Transport, services and other inputs** | **41.8** | **49.4** |
| **Total** | **100.0** | **100.0** |

**a** Estimated at basic prices. Under this convention, manufactured goods are valued on an ex-factory basis, while services are inclusive of transport and distribution costs. b Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819).

*Source*: Commission estimates.

### Disposition of output

About 60 per cent of domestically produced passenger motor vehicles are estimated to have been sold to Australian households in the 2012‑13 database, with the balance used in investment (by businesses and governments) or exported (table B.7). In line with available input-output data, only minimal use of domestically produced passenger motor vehicles is estimated as an intermediate input to production in the 2012‑13 database.

With regard to automotive components manufacturing, over one-fifth of its output is used in passenger motor vehicle manufacturing in the 2012‑13 database (box B.3).

Table B.7 Use of domestically produced motor vehicles and parts in the MMRF database, estimated 2012-13 basisa

Per cent

|  |  |  |
| --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive components  manufacturingb |
| Use by industries | 0.1 | 78.8 |
| *of which:* |  |  |
| Passenger motor vehicle manufacturing | .. | 20.7c |
| Automotive component manufacturing | .. | 2.5 |
| Other automotive manufacturing | .. | 4.0 |
| Other industries | 0.1 | 51.6 |
| Sales to investment and otherd | 24.2 | 4.7 |
| Sales to households final consumption | 57.4 | 12.0 |
| Export sales | 18.3 | 4.6 |
| **Total sales** | **100.0** | **100.0** |

**..** No Change. a Estimated at basic prices. Under this convention, manufactured goods are valued on an ex-factory basis, while services are inclusive of transport and distribution costs. b Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819). c See box B.3. d Including sales to government final consumption and change in inventories.

*Source*: Commission estimates.

|  |
| --- |
| Box B.3 Estimating the use of automotive components in passenger motor vehicle manufacturing |
| The share of production of automotive components covered by the ABS ANZSIC classes 2813 and 2819 that is used by the passenger motor vehicle manufacturing industry in 2012‑13 is sensitive to the scale of operation of vehicle manufacturing and the level of component production in Australia.  Although dated, the natural year to benchmark these estimates to is 2005-06, the benchmark year for the model database. For that year, it is estimated that about 35 per cent of domestically produced components were used in the manufacture of passenger motor vehicles. This estimate is based on the database disaggregation process described in box B.1. In particular, state sales of components to the passenger motor vehicle manufacturing industry were calibrated to data on purchases of manufactured inputs by passenger motor vehicle producers, based on data from submissions. These data were more recent, so the 2005-06 database was calibrated to a higher level of sales proportional to the larger size of the domestic passenger motor vehicle industry in 2005-06.  Applying a 5 per cent annual decline in the share of automotive components produced in Australia that is used by the passenger motor vehicle manufacturing industry (box B.2) to the estimated share in the 2005-06 database (35 per cent) suggests that just under 24 per cent of Australian produced components would have been used in the manufacture of passenger motor vehicles in 2012-13 (compared with 21 per cent in the database).  Another point of comparison is the use of all manufactured inputs. In the 2012-13 database (at basic or ex-factory prices, re-expressed in 2012-13 dollars), $1829 million of goods manufactured in Victoria are estimated to be used in passenger motor vehicle manufacturing ($1640 million in Victoria and $189 million in South Australia). Passenger motor vehicle producers are also estimated to use $542 million of goods manufactured in South Australia ($196 million in Victoria and $345 million in South Australia). Allowing for the difference between prices paid by the motor vehicle producers and basic prices, these data are within 10 per cent of targets based on data on purchases of manufactured inputs by passenger motor vehicle producers (FCAI, sub. 30; GM Holden, sub. 58; Government of South Australia, sub. 68; WiSER, sub. 8).  Two other sources of information — the ABS 2009-10 *Input–Output Tables* and the Department of Industry’s Key Automotive Statistics publication — also provide indicative information on the current share of automotive components manufacturing used in passenger motor vehicle manufacturing. These sources suggest that between 17 per cent and 32 per cent of automotive components were used in passenger motor vehicle manufacturing in 2012-13. The methods used to estimate these ranges are described in the annex B2.  The estimates derived in the annex B2 may differ from those provided by other sources because those provided in the annex are based on the use of automotive components as defined in ABS classifications.   * Suppliers of the aftermarket are included in the estimates (in contrast, they can be excluded in some estimates that relate only to tier 1 or supply-chain firms). * Suppliers of other manufactured goods such as windscreens, steel and paint are not included. |
|  |

### Supply and use of automotive components by jurisdiction

Component producers in Victoria and South Australia are relatively more reliant on sales to industry in general, and domestic passenger motor vehicle manufacturing in particular, than producers in other states (table B.8). Component producers in other jurisdictions generally sell proportionately more of their output to households (for example, sale of aftermarket parts directly to households) and to exports than do Victorian and South Australian producers.

Automotive component producers are also estimated to have substantial sales to other industries, with the single most important using industry across jurisdictions being mechanical repairs. The high usage shares in non-passenger motor vehicle manufacturing industries are broadly consistent with the 2005‑06 and 2009‑10 ABS *Input-Output Tables*.

Table B.8 Use of domestically produced automotive components in the MMRF database, estimated 2012-13 basisa

Per cent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Components produced in: | | | |
| Victoria | South Australia | Other regions | All regions |
| Sales to production | 86.2 | 89.0 | 61.9 | 78.8 |
| *of which:* |  |  |  |  |
| Passenger motor vehicle manufacturing | 32.4 | 24.3 | 1.0 | 20.7 |
| *of which:* |  |  |  |  |
| In Victoria | 29.4 | 2.7 | 0.5 | 15.3 |
| In South Australia | 2.9 | 21.6 | 0.4 | 5.4 |
| Other automotive manufacturing | 4.5 | 2.1 | 4.3 | 4.0 |
| Mechanical repairs | 21.6 | 26.6 | 25.4 | 23.7 |
| Other industries | 27.7 | 36.0 | 31.2 | 30.3 |
| Sales to investment and otherb | 0.6 | 6.3 | 10.1 | 4.7 |
| Sales to household final consumption | 8.9 | 0.9 | 22.5 | 12.0 |
| Export sales | 4.3 | 3.8 | 5.5 | 4.6 |
| **Total sales** | **100.0** | **100.0** | **100.0** | **100.0** |

a Estimated at basic prices. Under this convention, manufactured goods are valued on an ex-factory basis, while services are inclusive of transport and distribution costs. b Including sales to government final consumption and change in inventories.

*Source*: Commission estimates.

### Employment

Actual employment in the Australian automotive manufacturing industry is estimated to have declined from 2005‑06 to 2012‑13 at almost 5 per cent per year, with the largest decline being for passenger motor vehicle manufacturing (8 per cent per year) and smallest for other automotive manufacturing (2 per cent per year) (based on tables B.9 and B1.5). The decline in passenger motor vehicle manufacturing employment has been larger in South Australia (12 per cent per year) than in Victoria (5 per cent per year) and is reflected in the uprated database.

Employment in the uprated database for 2012-13 (table B.9) is generally consistent with the latest available data from a range of sources (table B.10). Employment in automotive component manufacturing is smaller than that in the Federation of Automotive Products Manufacturers (FAPM) submission (sub. 69) owing to the narrower focus of the automotive components manufacturing industry in the uprated database (confined to automotive components manufacturing as classified by the ABS, which excludes other manufactured inputs such as windscreens, steel and paint).

Table B.9 Motor vehicles and parts industry employment in the MMRF database, estimated 2012‑13 basisa

Persons

|  |  |  |  |
| --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive  componentsa | Other automotive |
| Victoria | 9 127 | 9 351 | 6 421 |
| South Australia | 2 223 | 2 962 | 1 002 |
| New South Wales | .. | 2 492 | 4 242 |
| Queensland | .. | 2 185 | 5 128 |
| Western Australia | .. | 797 | 1 943 |
| Tasmania | .. | 93 | 274 |
| Northern Territory | .. | 29 | 94 |
| Australian Capital Territory | .. | 14 | 39 |
| **Australia** | **11 350** | **17 923** | **19 145** |

**..** No change. a Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819).

*Sources*: Commission estimates based on: Ford (sub. 65); Holden (sub. 58); Toyota (sub. 31); ABS (*Australian Industry, 2011-12*, Cat. no. 8155.0); ABS (*Census of Population and Housing*, 2006).

Table B.10 Employment estimates for the Australian motor vehicles and parts manufacturing industry

Latest available data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | Year | Passenger motor vehicles | Automotive components | Other automotive | Motor vehicles  and parts |
| ABS, *Labour Force Survey* | 2013 |  |  |  | 44 000a |
| ABS, *Australian Industry* | 2011-12 | 17 274b | 18 774 | 14 680 | 50 728 |
| ABS, *Census of Population and Housing* | 2011 | 14 481c | 16 169 | 18 353 | 49 003 |
| Ford, Holden and Toyota submissions | 2013 | 11 350 |  |  |  |
| Department of Industry, *Key Automotive Statistics* | 2012 | 11 053 |  |  |  |
| FAPM submission | 2013 |  | 34 000d |  |  |

a Based on quarterly employment, averaged to the November quarter of 2013, for ANZSIC 2006 Group 231 (Motor vehicle and motor vehicle part manufacturing). b Includes non-passenger motor vehicle manufacturing, in particular truck and bus manufacturing. c Excludes employment reported in regions other than Melbourne, Barwon and Adelaide in order to minimise the inclusion of non-passenger motor vehicle manufacturing. d Includes employment outside the automotive manufacturing industry as defined by the ABS. For example, motor vehicle windscreen suppliers are classified by the ABS as glass and glass product manufacturing, and steel and paint inputs are classified into other parts of manufacturing.

*Sources*: ABS (*Labour Force, Australia, Detailed, Quarterly*, November 2013, Cat. no. 6291.0.55.003); ABS (*Australian Industry*, 2011-12, Cat. no. 8155.0); ABS (*Census of Population and Housing*, 2011); DoI (2013); Ford (sub. 65); Holden (sub. 58); Toyota (sub. 31); FAPM (sub. 69).

## B.5 Sub-state regions

State and regional economies have greater (or lesser) dependence on particular industries than the economy as a whole. For the purposes of projecting the regional impacts associated with the closure of the major Australian passenger motor vehicle manufacturing plants and the consequent contraction of their Australian-based suppliers, the Monash Regional Equation System (MRES) was added to the MMRF model to disaggregate state employment changes to sub-state regions. It does so using a ‘tops-down’ approach which pro-rates state employment changes to sub-state regions based on their initial *share* of state employment in each industry in the current simulation year. The 58 sub-state regions in MRES are based on the ABS *Australian Standard Geographic Classification* and are analogous to the ‘statistical divisions’ used by the ABS (table B.11).[[8]](#footnote-8)

Passenger motor vehicle manufacturing is concentrated in the Melbourne, Adelaide and Barwon (covering Geelong) statistical divisions in the 2012‑13 database (table B.12). These regions, respectively, account for roughly 70, 20 and 10 per cent of national employment in this industry (based on the 2011 ABS *Census of Population and Housing*).

Automotive component manufacturing (as defined) in the 2012‑13 database is more widely dispersed than passenger motor vehicle manufacturing, but, nonetheless, is concentrated in capital city statistical divisions in most mainland States (Melbourne, Adelaide, Sydney, Brisbane and Perth). There is also some component manufacturing employment in other regions, such as the Central Highlands (covering Ballarat) and Barwon in Victoria, the Darling Downs (covering Toowoomba) in Queensland and Hunter (covering Newcastle) in New South Wales (table B.12).

The shares in the model were calibrated to the regional employment shares in table B.12. Total employment in each industry was calibrated to the levels in table B.9.

Table B.11 Sub-state regions in the MMRF regional equation system

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | MRES Region | ABS SD | Main centre | Other selected urban centres |
| 1 | Sydney | 105 | Sydney | Campbelltown, Gosford, Katoomba, Parramatta, Sutherland |
| 2 | Hunter | 110 | Newcastle | Cessnock, Maitland, Muswellbrook, Nelson Bay, Singleton |
| 3 | Illawarra | 115 | Wollongong | Kiama, Mittagong, Moss Vale, Shellharbour, Shoalhaven |
| 4 | Richmond-Tweed | 120 | Lismore | Ballina, Byron Bay, Casino, Tweed Heads |
| 5 | Mid-North Coast | 125 | Coffs Harbour | Grafton, Kempsey, Port Macquarie, Taree |
| 6 | Northern | 130 | Tamworth | Armidale, Glen Innes, Gunnedah, Inverell, Moree, Tenterfield |
| 7 | North Western | 135 | Dubbo | Bourke, Cobar, Coonabarabran, Gilgandra, Mudgee, Walgett |
| 8 | Central West | 140 | Orange | Bathurst, Blayney, Cowra, Forbes, Lithgow, Oberon, Parkes |
| 9 | South Eastern | 145 | Queanbeyan | Bega, Bombala, Cooma, Crookwell, Goulburn, Yass, Young |
| 10 | Murrumbidgee | 150 | Wagga Wagga | Cootamundra, Griffith, Gundagai, Hay, Narrandera, Tumut |
| 11 | Murray | 155 | Albury | Balranald, Deniliquin, Holbrook, Tumbarumba, Wentworth |
| 12 | Far West | 160 | Broken Hill | Tibooburra, Wilcannia |
| 13 | Melbourne | 205 | Melbourne | Altona, Dandenong, Lilydale, Mornington Peninsula, Sunbury |
| 14 | Barwon | 210 | Geelong | Anglesea, Apollo Bay, Colac, Lorne, Queenscliff, Torquay, Winchelsea |
| 15 | Western District | 215 | Warrnambool | Camperdown, Hamilton, Port Fairy, Portland |
| 16 | Central Highlands | 220 | Ballarat | Ararat, Avoca, Bacchus Marsh, Creswick, Daylesford |
| 17 | Wimmera | 225 | Horsham | Dimboola, Halls, Gap, Nhill, St Arnaud, Stawell |
| 18 | Mallee | 230 | Mildura | Donald, Kerang, Ouyen, Swan Hill |
| 19 | Loddon | 235 | Bendigo | Castlemaine, Heathcote, Kyneton, Maryborough, Wedderburn |
| 20 | Goulburn | 240 | Shepparton | Benalla, Cobram, Echuca, Kyabram, Rochester, Yarrawonga |
| 21 | Ovens-Murray | 245 | Wodonga | Beechworth, Bright, Mount Beauty, Rutherglen, Wangaratta |
| 22 | East Gippsland | 250 | Sale | Bairnsdale, Lakes Entrance, Mallacoota, Omeo, Orbost |
| 23 | Gippsland | 255 | Traralgon | Moe, Morwell, Yallourn, Wonthaggi |

(continued next page)

Table B.11 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | MRES Region | ABS SD | | Main centre | Other selected urban centres |
| 24 | Brisbane | | 305 | Brisbane | Beenleigh, Caboolture, Ipswich, Logan, Mount Gravatt, Redcliffe |
| 25 | Gold Coast | | 307 | Gold Coast | Burleigh Heads, Coolangatta, Robina, Southport, Surfers Paradise |
| 26 | Sunshine Coast | | 309 | Noosa | Buderim, Caloundra, Coolum, Maroochydore, Maleny |
| 27 | West Moreton | | 312 | Beaudesert | Boonah, Gatton, Nambour |
| 28 | Wide Bay-Burnett | | 315 | Hervey Bay | Bundaberg, Gympie, Maryborough, Mundubbera |
| 29 | Darling Downs | | 320 | Toowoomba | Dalby, Goondiwindi, Stanthorpe, Warwick |
| 30 | South West | | 325 | Charleville | Quilpie, Roma, St George |
| 31 | Fitzroy | | 330 | Rockhampton | Emerald, Gladstone, Yeppoon |
| 32 | Central West | | 335 | Longreach | Barcaldine, Blackall, Winton |
| 33 | Mackay | | 340 | Mackay | Clermont, Proserpine |
| 34 | Northern | | 345 | Townsville | Ayr, Bowen, Charters Towers, Ingham |
| 35 | Far North | | 350 | Cairns | Atherton, Cooktown, Innisfail, Mareeba, Mosman, Weipa |
| 36 | North West | | 355 | Mount Isa | Cloncurry, Hughenden, Normanton |
| 37 | Adelaide | | 405 | Adelaide | Elizabeth, Gawler, Glenelg, Henley, Marion, Salisbury |
| 38 | Outer Adelaide | | 410 | Mount Barker | Barossa Valley, Kangaroo Island, Onkaparinga, Victor Harbor |
| 39 | Yorke & Lower North | | 415 | Yorketown | Bute, Riverton, Wallaroo |
| 40 | Murray Lands | | 420 | Renmark | Murray Bridge, Pinnaroo |
| 41 | South East | | 425 | Mount Gambier | Bordertown, Kingston, Naracoorte |
| 42 | Eyre | | 430 | Port Lincoln | Ceduna |
| 43 | Northern | | 435 | Whyalla | Coober Pedy, Port Augusta, Port Pirie, Woomera |
| 44 | Perth | | 505 | Perth | Armadale, Fremantle, Joondalup, Kwinana, Rockingham, Wanneroo |
| 45 | South West | | 510 | Bunbury | Busselton, Collie, Mandurah, Manjimup, Margaret River, Pemberton |
| 46 | Great Southern | | 515 | Albany | Denmark, Katanning |
| 47 | Wheatbelt | | 520, 525 | Northam | Merredin, Moora, Narrogin |
| 48 | Goldfields-Esperance | | 530 | Kalgoorlie | Boulder, Coolgardie, Esperance |
| 49 | Mid West | | 535(p) | Geraldton | Meekatharra, Mount Magnet |
| 50 | Gascoyne | | 535(p) | Carnarvon | Exmouth |
| 51 | Pilbara | | 540 | Port Hedland | Karratha, Newman, Tom Price |
| 52 | Kimberley | | 545 | Broome | Derby, Kununurra, Wyndham |
| 53 | Greater Hobart | | 605 | Hobart | Clarence, Glenorchy, Sorell |
| 54 | Southern | | 610 | Geeveston | Bicheno, Huonville, Triabunna |
| 55 | Northern | | 615 | Launceston | Deloraine, Georgetown, St Helens |
| 56 | Mersey-Lyell | | 620 | Devonport | Burnie, Queenstown, Smithton, Ulverstone, Zeehan |
| 57 | Northern Territory | | 7 | Darwin | Alice Springs, Katherine, Nhulunbuy, Tennant Creek |
| 58 | Australian Capital Territory | | 8 | Canberra |  |

a The regions in Western Australia are based on those used by the Western Australian Government with the remainder based on ABS statistical divisions.

*Source*: Based on ABS (*Australian Standard Geographic Classification (ASGC)*, Cat. no. 1216.0).

Table B.12 Passenger motor vehicle manufacturing and automotive components manufacturing employment, by state and selected MMRF region, based on 2011 Census data

Per cent

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | | |  | Automotive components manufacturing | | |
| State and sub-state region | Share of total for industry | Share of state for industry | Share of sub-state regiona |  | Share of total for industry | Share of state for industry | Share of sub-state regiona |
| **New South Wales** | **0** | **0** | **0.00** |  | **14** | **100** | **0.08** |
| Sydney | 0 | 0 | 0.00 |  | 9 | 68 | 0.08 |
| Hunter | 0 | 0 | 0.00 |  | 1 | 7 | 0.06 |
| Murray | 0 | 0 | 0.00 |  | 1 | 6 | 0.29 |
| All other regions | 0 | 0 | 0.00 |  | 3 | 19 | 0.06 |
| **Victoria** | **80** | **100** | **0.50** |  | **52** | **100** | **0.36** |
| Melbourne | 72 | 89 | 0.59 |  | 45 | 87 | 0.42 |
| Barwon | 9 | 11 | 1.09 |  | 2 | 4 | 0.30 |
| Central Highlands | 0 | 0 | 0.00 |  | 2 | 5 | 0.61 |
| Loddon | 0 | 0 | 0.00 |  | 1 | 1 | 0.15 |
| All other regions | 0 | 0 | 0.00 |  | 2 | 3 | 0.08 |
| **Queensland** | **0** | **0** | **0.00** |  | **12** | **100** | **0.11** |
| Brisbane | 0 | 0 | 0.00 |  | 7 | 57 | 0.12 |
| Darling Downs | 0 | 0 | 0.00 |  | 1 | 11 | 0.23 |
| Gold Coast | 0 | 0 | 0.00 |  | 1 | 10 | 0.09 |
| Mackay | 0 | 0 | 0.00 |  | 1 | 5 | 0.14 |
| All other regions | 0 | 0 | 0.00 |  | 2 | 17 | 0.06 |
| **South Australia** | **20** | **100** | **0.42** |  | **17** | **100** | **0.39** |
| Adelaide | 20 | 100 | 0.56 |  | 16 | 96 | 0.51 |
| All other regions | 0 | 0 | 0.00 |  | 1 | 4 | 0.06 |
| **Western Australia** | **0** | **0** | **0.00** |  | **4** | **100** | **0.07** |
| Perth | 0 | 0 | 0.00 |  | 4 | 88 | 0.08 |
| All other regions | 0 | 0 | 0.00 |  | 1 | 12 | 0.03 |
| **Tasmania** | **0** | **0** | **0.00** |  | **1** | **100** | **0.04** |
| **Northern Territory** | **0** | **0** | **0.00** |  | **0** | **100** | **0.03** |
| **Australian Capital Territory** | **0** | **0** | **0.00** |  | **0** | **100** | **0.01** |
| *Capital cities* | *91* | *na* | *na* |  | *82* | *na* | *na* |

a Indicative sub-state employment shares based on the level of regional employment as reported in the 2011 Census. The sub-state impacts reported in chapter 2 are based on the employment shares in the MMRF‑Auto14 database.

*Source*: Commission estimates based on ABS (*Census of Population and Housing*, 2011, source file generated using TableBuilder Pro on 31 January 2014).

## Annex B1 Reference year database tables

Table B1.1 Motor vehicles and parts industry sales in the MMRF database, estimated 2005‑06 basisa,b

$ million (2005-06 dollars)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive components manufacturingc | Other automotive manufacturing |
| Sales of domestic supplies | 12 429 | 6 375 | 5 711 |
| Sales of imported supplies | 14 385 | 4 593 | 5 311 |
| **Total sales** | **26 814** | **10 968** | **11 021** |

a Components may not add to totals due to rounding. b Excluding re-exports. c Based on the ABS ANZSIC 2006 classes: automotive electrical component manufacturing (class 2313); and other motor vehicle parts manufacturing (class 2319).

*Sources*: Commission estimates based on: ABS (*Australian National Accounts: Input-Output Tables — Electronic Publication*, 2005‑06, Cat. no. 5209.0.55.001); ABS (*Australian National Accounts: Input-Output Tables (Product Details)*, 2005‑06, Cat. no. 5215.0.55.001).

Table B1.2 Use of domestically produced motor vehicles and parts in the MMRF database, estimated 2005‑06 basisa

Per cent

|  |  |  |  |
| --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive components  manufacturingb | Other automotive manufacturing |
| Sales to production | .. | 82.6 | 33.9 |
| *of which:* |  |  |  |
| Passenger motor vehicle manufacturing | .. | 35.4 | 0 |
| Automotive components manufacturing | .. | 2.1 | 1.0 |
| Other industries | .. | 45.0 | 32.8 |
| Sales to investment and otherc | 23.8 | 3.6 | 40.4 |
| Sales to household final consumption | 56.7 | 3.7 | 14.8 |
| Export sales | 19.4 | 10.1 | 11.0 |
| **Total sales** | **100.0** | **100.0** | **100.0** |

a Components may not add to totals due to rounding. b Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (ANZSIC 2006 class 2813); and other motor vehicle parts manufacturing (ANZSIC 2006 class 2819). c Including sales to government final consumption and change in inventories.

*Sources*: Commission estimates based on: ABS (*Australian National Accounts: Input-Output Tables — Electronic Publication*, 2005‑06, Cat. no. 5209.0.55.001); ABS (*Australian National Accounts: Input-Output Tables (Product Details)*, 2005‑06, Cat. no. 5215.0.55.001).

Table B1.3 Motor vehicles and parts industry costs in the MMRF database, estimated 2005‑06 basis

$ million (2005-06 dollars)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive componentsa | Other automotive |
| Total intermediate use | 10 262 | 4 162 | 3 989 |
| Compensation of employees | 1 384 | 1 418 | 1 148 |
| Gross operating surplus & mixed income | 958 | 858 | 477 |
| Taxes less subsidies on products | 116 | 29 | 27 |
| Other taxes less subsidies on production | -291 | -91 | 70 |
| Australian production | 12 429 | 6 375 | 5 711 |
| Competing imports | 13 557 | 4 356 | 5 204 |
| Total uses | 25 985 | 10 731 | 10 914 |
| **Gross value added**b | **2 051** | **2 184** | **1 694** |

a Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819). b Sum of compensation of employees, gross operating surplus & mixed income and other taxes less subsidies on production.

*Sources*: Commission estimates based on: ABS (*Australian National Accounts: Input-Output Tables — Electronic Publication*, 2005‑06, Cat. no. 5209.0.55.001); ABS (*Australian National Accounts: Input-Output Tables (Product Details)*, 2005‑06, Cat. no. 5215.0.55.001); ABS (*Australian Industry, 2011-12*, Cat. no. 8155.0).

Table B1.4 Regional share of gross value added by the automotive industry in the MMRF database, estimated 2005‑06 basisa

Per cent

|  |  |  |  |
| --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive componentsa | Other automotive |
| Victoria | 69.8 | 64.6 | 46.5 |
| South Australia | 30.2 | 21.1 | 8.1 |
| New South Wales | .. | 8.0 | 26.2 |
| Queensland | .. | 5.0 | 12.0 |
| Western Australia | .. | 1.0 | 6.5 |
| Tasmania | .. | 0.3 | 0.6 |
| Northern Territory | .. | .. | 0.1 |
| Australian Capital Territory | .. | .. | .. |
| **Australia** | **100.0** | **100.0** | **100.0** |

a Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819).

*Source*: Commission estimates based on PC (2008).

Table B1.5 Motor vehicles and parts industry employment in the MMRF database, estimated 2005‑06 basisa

Persons

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Passenger motor vehicle manufacturing | Automotive componentsb | Other automotive | Total automotive manufacturing |
| Victoria | 14 265 | 14 004 | 7 461 | 35 730 |
| South Australia | 5 384 | 4 592 | 1 545 | 11 521 |
| New South Wales | .. | 3 144 | 4 894 | 8 038 |
| Queensland | .. | 2 222 | 6 065 | 8 287 |
| Western Australia | .. | 650 | 2 204 | 2 854 |
| Tasmania | .. | 126 | 312 | 438 |
| Northern Territory | .. | 28 | 121 | 149 |
| Australian Capital Territory | .. | 34 | 48 | 82 |
| **Australia** | **19 649** | **24 800** | **22 650** | **67 099** |

a Estimates of national employment by activity allocated across states using the corresponding employment shares in ABS 2006 *Census of Population and Housing*. b Based on the ABS ANZSIC 1993 classes: automotive electrical component manufacturing (class 2813); and other motor vehicle parts manufacturing (class 2819).

*Sources*: Commission estimates based on: ABS (*Australian Industry,* 2011-12, Cat. no. 8155.0); ABS (*Census of Population and Housing*, 2006); DoI (2013).

## Annex B2 Use of Australian produced automotive components by passenger motor vehicle producers

There is no information that allows direct estimation of the share of total production of automotive components manufactured in Australia that is sold to domestic passenger motor vehicle producers. There are some estimates of the reliance of tier 1 and other supply chain firms on sales to passenger motor vehicle producers (Government of South Australia, sub. 68; Victorian Government, sub. PP284), but these do not align well with the automotive components industry as classified by the ABS, in particular because estimates that relate to tier 1 and other supply chain firms exclude firms that only supply the aftermarket.

The Commission has estimated the reliance of Australian automotive component manufacturers on passenger motor vehicle producers using two different approaches.

*The first approach* draws on the detail of inter-industry flows of goods and services in ABS *Input-Output Tables*. Some limitations with this approach are that input-output data:

* only provide information on the use of components by motor vehicle manufacturing industry (which includes the manufacture of passenger motor vehicles as well as trucks, buses, trailers, caravans and other specialist vehicles)
* do not provide a split of the use of automotive components manufacturing by the automotive manufacturing industry according to whether automotive components are manufactured in Australia or imported (although, for each IOPC product, there is a split between domestic and imported *total* sales to *all* Australian users, which is used by the ABS to obtain a pro-rata estimation of domestic supplied components)
* are most recently available for 2009-10.

An upper bound estimate is derived by assuming that truck and bus producers use domestic components one quarter as intensively as passenger motor vehicle producers[[9]](#footnote-9) and that 64 per cent of components used in the automotive manufacturing industry in 2009-10 were domestically sourced (Dowling 2014 and DoI 2013). A lower bound estimate is derived by assuming that truck and bus manufacturers use domestic components equally as intensively as passenger motor vehicle producers and that 40 per cent of components used in the automotive manufacturing industry were domestically sourced in 2009-10 (a lower‑bound because it is based on 2013 data from FAPM, sub. 69, and domestic content has declined between 2009‑10 and 2013). For both estimates, the share of domestically produced components going to passenger motor vehicle producers was assumed to decline by 5 per cent per year between 2009-10 and 2012‑13 (box B.2).

The *second approach* uses an estimate of the value of manufactured inputs that passenger motor vehicle producers sourced from Australian suppliers from Department of Industry data (DoI 2013) in conjunction with an estimate of the total sales and service income for automotive components producers from the ABS Australian Industry publication (ABS 2013a).[[10]](#footnote-10)

The limitations with this approach are:

* the estimate of the value of manufactured inputs supplied to passenger motor vehicles and parts manufacturing industries includes, not just automotive components manufacturing as classified by the ABS, but also other manufactured inputs such as windscreens, steel and paint
* latest industry survey data available are for 2011-12.

An upper bound estimate is derived by assuming that 60 per cent of all manufactured inputs supplied to passenger motor vehicle producers are automotive components (as noted in section B.2, the value of automotive components as classified by the ABS is about half the value of the total use of manufactured inputs by the automotive industry). A lower bound estimate is derived by assuming that 40 per cent of all manufactured inputs supplied to passenger motor vehicle producers are from automotive components manufacturing. As above, the share of domestically produced components going to passenger motor vehicle producers was assumed to decline by 5 per cent per year for both estimates. (Applying the same approach to comparable data for 2005-06 yields an estimated range of 25 to 38 per cent, demonstrating the decline in the importance of automotive components use by passenger vehicle manufacturers over recent years.)

The analysis presented here suggests that the share of total production of automotive components manufactured in Australia that was sold to domestic passenger motor vehicle producers in 2012‑13 is likely to lie between 17 and 32 per cent (table B2.1).

Table B2.1 Estimates of the fraction of domestically produced automotive components used in passenger motor vehicle manufacturing

Per cent

|  |  |  |
| --- | --- | --- |
| Approach | Upper bound | Lower bound |
| **2012‑13** |  |  |
| Based on ABS *Input-Output Tables* | 32 | 17 |
| Department of Industry data with ABS industry survey data | 25 | 17 |
| **2005‑06** |  |  |
| Department of Industry data with ABS industry survey data | 38 | 25 |

1. Further details of steps one to three are provided in CoPS (forthcoming) and Horridge, Madden and Wittwer (2005). [↑](#footnote-ref-1)
2. Reflecting the ABS *Input-Output Tables* on which it is based, the reference year in the latest MMRF database is 2005‑06. [↑](#footnote-ref-2)
3. There is no production of second hand passenger motor vehicles as part of the product ‘second hand motor vehicles’, so the treatment of this product has no effect on results. The second hand motor vehicles product accommodates sales of motor vehicles by final buyers (households and businesses). [↑](#footnote-ref-3)
4. This disaggregation broadly follows the approach adopted in the Commission’s 2008 study *Modelling* *Economy-wide Effects of Future Automotive Assistance* (PC 2008), except that in that earlier study items were grouped according to whether the general tariff rate was 10 per cent or otherwise. [↑](#footnote-ref-4)
5. There is some inconsistency between the ABS IOPC labels and the corresponding flows recorded in the ABS product details for 2005‑06. For example, IOIG 2801 ‘Motor vehicles and parts; other transport equipment’ uses $1 597 million of IOPC 28190025 ‘Motor vehicle parts and equipment nec (*excl associated with motor vehicle manufacturing*)’ [emphasis added]. The Commission has interpreted the IOPC labels more broadly to include items *used* in passenger motor vehicle manufacturing, as implied by the use of the products recorded in the ABS product detail data. [↑](#footnote-ref-5)
6. The ABS *Input-Output Tables* and accompanying product details do not differentiate the sale of automotive components to the production of passenger motor vehicles from sales to the production of trucks, buses, trailers, caravans and other automotive manufacturing. Information from the 2008 study and additional information provided in the course of this inquiry have been used to disaggregate the use of supplies to these two industries. [↑](#footnote-ref-6)
7. Data from the Department of Industry refer to the ‘value of components sourced from Australian suppliers’, but this includes a broader range of manufactured inputs than included in the ABS motor vehicle and motor vehicle part manufacturing industry. [↑](#footnote-ref-7)
8. The sub-state regions in Western Australia are based on those used by the Western Australian Government and differ somewhat from the ABS statistical divisions. [↑](#footnote-ref-8)
9. There is little publicly-available data on the use of domestically sourced components in bus and truck manufacturing in Australia. The assumption that domestically sourced components are used less intensively in bus and truck manufacturing than in passenger motor vehicle manufacturing is made in order to give an upper bound estimate of use of components in passenger motor vehicle manufacturing, rather than being based on any data. [↑](#footnote-ref-9)
10. An alternative approach is to use the Department of Industry data in conjunction with the Australian Automotive Aftermarket Association’s (AAAA) (sub. 54) estimate of turnover of firms that supply components to the aftermarket. This estimate is based on the AAAA’s database of members, plus an additional allowance for non‑member suppliers to the aftermarket based on visitor registration at the Aftermarket Trade Show. Depending on the assumptions used, the estimate of the reliance of component manufacturers using this approach is about 30 per cent. [↑](#footnote-ref-10)