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Road

Australia interstate, intrastate and capital city road freight forecasts – 2022 update

November 2022

BUREAU OF INFRASTRUCTURE AND TRANSPORT RESEARCH ECONOMICS

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Foreword

Road transport is the predominant mode for moving freight between states, within states and within urban areas. It represents a vital link in various logistics chains, providing access for freight to ports and terminals and urban freight distribution between warehouses and retail outlets. It is also the dominant mode for moving freight over relatively short distances and where other alternatives are not readily available.

This report provides estimates and forecasts of interstate, intrastate and capital city road freight for each state and territory in Australia. The estimates cover the period 1970 to 2020 and forecasts from 2020 to 2040.

The estimates and forecasts presented in this report were prepared by Dr David Gargett. Final report preparation assisted by David Mitchell and Joe O'Sullivan.

Shona Rosengren

Head of Bureau
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November 2022

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Introduction

Trucks are a common sight on Australian roads, be it in the outback or within our capital cities. The road freight that they carry is an important component of Australia's economic activity, both in its own right and in its role servicing most other sectors of the economy.

Truck volumes are an important determinant in the design and maintenance of the road network—increased truck numbers accelerate pavement wear and tear occasioning earlier repair and rehabilitation. Accordingly, road expected to carry higher truck volumes are generally built to a higher level of durability to accommodate the additional truck numbers and reduce the rate of pavement deterioration resulting from any individual truck movement. Hence, accurate estimates and forecasts of future road freight volumes are important to planning future infrastructure needs.

Given limited and inconsistent data sources, it has long been a challenge to derive consistent measures of road freight that stretch over enough years to allow accurate modelling and forecasting.

This report generates consistent measures of interstate, capital city and rest-of-state road freight for each of the eight states and territories over the past 50 years, and then forecasts these measures out to 2040. Interstate road freight is further split into three separate components for each state and territory, which enables derivation of the volume of interstate road freight carried within each jurisdiction:

- freight originating *from* each jurisdiction,
- freight arriving *to* each jurisdiction, and
- freight transiting *through* each jurisdiction.

Historical road freight trends in Australia

Since 1970 total road freight in Australia has increased at an average annual growth of 4.5 per cent per annum, from 25.1 billion tonne kilometres in 1970 to around 223 billion tonne kilometres in 2020.

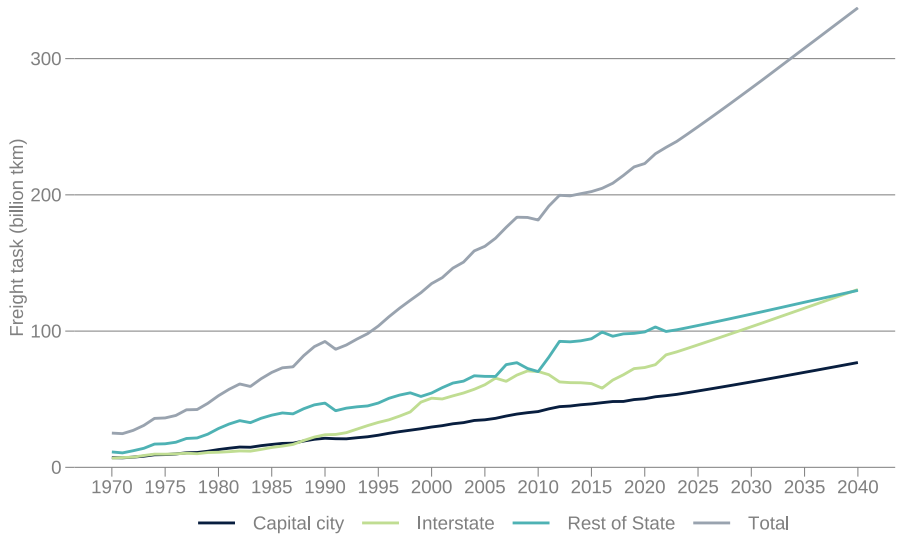
- Capital city road freight volumes have grown from around 7.1 billion tonne kilometres in 1971 to around 50.4 billion tonne kilometres in 2020, an average annual growth rate of 4.0 per cent per annum.
- Interstate road freight grew by nearly 5 per cent per annum between 1970 and 2020, from around 6.7 billion tonne kilometres in 1970 to around 73.2 billion tonne kilometres in 2020.
- Other within-state (*rest-of-state*) road freight has grown from around 11.3 billion tonne kilometres in 1970 to around 99.4 billion tonne kilometres in 2020.

In terms of freight share, interstate freight has increased from around 27 per cent of total road freight in 1970 to around 33 per cent in 2020, capital city road freight has declined from around 28 per cent of total road freight in 1970 to around 22.6 per cent in 2020. Rest-of-state road freight, around 45 per cent of total road freight in 1970, was only slightly smaller, around 44.6 per cent of total road freight by 2020.

'To', 'from' and 'through' interstate road freight estimates

Estimates of *from* and *to* interstate road freight both grew by around 5 per cent per annum between 1970 and 2020, from around 5.6 billion tonne kilometres in 1970 to 61.6 billion tonne kilometres. *Through* interstate freight increased from around 1.2 billion tonne kilometres in 1970 to 11.7 billion tonne kilometres in 2020, an average annual rate of growth of 4.7 per cent per annum.

Figure 1 Interstate, capital city, rest of state and total road freight tasks, 1971–2040



Source: ABS (2020b) and earlier issues, and BITRE estimates.

Forecast road freight trends in Australia

Key forecast assumptions

The national, metropolitan and interstate road freight forecast models presented in this report relate historical trends in road freight to historical population growth, per capita income growth and real road freight rates.

Projected Australian population growth is based on a combination of the Centre for Population (2021) Central Scenario and ABS (2018) Series B (Median) long-term population projections, which project the total population will grow from around 25.7 million persons in 2020 to just under 32.0 million persons by 2040.

Assumptions about projected future Australian economic growth are based broadly on the methodology underpinning the five-yearly Treasury Intergenerational Report (IGR) (Treasury 2021)—i.e. economic growth is broadly a function of population, workforce participation and productivity. However, BITRE assumes slightly slower productivity growth, more in line with recent economy-wide productivity trends. For the base case forecasts, gross national income is projected to grow from around $74,400 per person in 2020 to around $95,300 per person by 2040.

Real road freight rates are assumed to remain more or less unchanged between 2020 and 2040.

Interstate, capital city and rest-of-state road freight forecasts

Based on the forecast assumptions, total road freight is projected to grow by around 2.1 per cent per annum to around 337.2 billion tonne kilometres by 2040. Interstate freight is projected to grow by around 2.9 per cent per annum, to around 130.4 billion tonne kilometres by 2040. Capital city road freight is projected to grow 2.2 per cent per annum to 76.9 billion tonnes kilometres by 2040 (or by 52 per cent between 2020 and 2040). Lastly, all other road freight, is projected grow by 1.3 per cent per annum to 129.9 billion tonne kilometres by 2040 (or 30 per cent between 2020 and 2040) (see Table 1).

Figure 1 shows the past trends and future forecasts of interstate, capital city and rest-of-state road freight.

Comparing the forecast (2020–2040) and long-term historical growth (1970–2020), all road freight segments are projected to grow at far lower rates than they did historically. In part, this reflects the significant productivity growth and increasing cost competitiveness of road freight during the 1970, 1980 and 1990s, which led to significant growth in long distance road freight (see Table 1).

In terms of road freight shares, interstate freight's share increased in the past (between 1970 and 2020) and is forecast to continue to increase to 2040. By contrast, capital city road freight's share has decreased to 2020, but is forecast to increase slightly to 2040. Rest-of-state share of total road freight is forecast to decrease by 2040.

Table 1 Road freight tasks and growth rates for interstate, all capitals, rest of state and total Australia, 1970–2040

Road freight components	Units	Estimates			Forecasts	
		1970	2020	Growth 1970–2020 (% p.a.)	2040	Growth 2020–2040 (% p.a.)
Interstate	Task (billion tkm)	6.7	73.2	4.9	130.4	2.9
	Share (per cent)	26.9	32.8	-	38.7	-
All capitals	Task (billion tkm)	7.1	50.4	4.0	76.9	2.2
	Share (per cent)	28.2	22.6	-	22.8	-
Rest of state	Task (billion tkm)	11.3	99.4	4.4	129.9	1.3
	Share (per cent)	44.9	44.6	-	38.5	-
Total	Task (billion tkm)	25.1	222.9	4.5	337.2	2.1
	Share (per cent)	100.0	100.0	-	100.0	-

Source: BITRE estimates.

Table 2 Interstate road freight tasks and growth rates, Australia, 1970–2040

Road freight components	Units	Estimates			Forecasts	
		1970	2020	Growth 1970–2020 (% p.a.)	2040	Growth 2020–2040 (% p.a.)
To	(billion tkm)	2.8	33.3	5.1	59.3	2.9
From	(billion tkm)	2.8	28.3	4.8	55.3	3.4
Through	(billion tkm)	1.2	11.7	4.7	15.8	1.5
Total	(billion tkm)	6.8	73.3	4.9	130.5	2.9

Source: BITRE estimates.

'To', 'from' and 'through' interstate road freight forecasts

Interstate road freight volumes are also projected to grow less strongly over the forecast period (2020–2040) in comparison with long-term historical growth. Interstate *from* and *to* freight segments are projected to grow by around 2.9 and 3.4 per cent per annum, respectively, between 2020 and 2040, down on the long-term historical growth of 5.1 and 4.8 per cent per annum. *Through* interstate road freight volumes are also projected to grow by less than historical growth (see Table 2).

State and territory road freight forecasts

Lastly, the forecasts imply road freight growth will be slower in each state and territory between 2020 and 2040, in comparison with historical growth experienced between 1970 and 2020 (see Table 3).

Across all states and territories, total road freight is projected to grow most strongly in Victoria (by 2.9 per cent per annum between 2020 and 2040), followed by New South Wales (2.3 per cent per annum) and Queensland (1.7 per cent per annum).

Interstate road freight growth is forecast to be highest in Victoria (by 3.3 per cent per annum between 2020 and 2040), followed by New South Wales (3.1 per cent per annum) and Queensland (2.7 per cent per annum). Interstate road freight to and from the Northern Territory is also projected to grow relatively strongly, by around 2.7 per cent per annum between 2020 and 2040, albeit from a low base.

Interstate road freight is projected to grow faster than total road freight in every state and territory (excepting Tasmania and the ACT), between 2020 and 2040, with the result that interstate freight will increase as a share of total road freight in those jurisdictions, while the proportion of rest-of-state road freight is projected to decline over the forecast horizon.

Capital city road freight is projected to grow most strongly in Melbourne (by 2.4 per cent per annum between 2020 and 2040), followed by Perth (2.3 per cent per annum) and Brisbane (2.2 per cent per annum). Between 1970 and 2020, Brisbane experienced the strongest growth in road freight, increasing by an average rate of 5.7 per cent per annum over that period.

Table 3 State-territory road freight tasks and growth rates, Australia, 1970–2040

Road freight components	Estimates			Forecasts	
	1970	2020	Growth 1970–2020 (% p.a.)	2040	Growth 2020–2040 (% p.a.)
New South Wales					
Interstate	3.60	39.10	4.9	71.90	3.1
Capital city	2.80	13.20	3.1	18.80	1.8
RoS	3.50	22.90	3.8	27.40	0.9
Total	10.00	75.20	4.1	118.20	2.3
Victoria					
Interstate	1.60	14.50	4.5	27.80	3.3
Capital city	1.90	16.00	4.4	25.80	2.4
RoS	2.60	13.50	3.3	23.50	2.8
Total	6.20	44.00	4.0	77.20	2.9
Queensland					
Interstate	0.52	7.10	5.4	12.20	2.7
Capital city	0.62	10.00	5.7	15.50	2.2
RoS	2.30	24.00	4.8	30.40	1.2
Total	3.50	41.10	5.0	58.10	1.7
South Australia					
Interstate	0.58	7.60	5.3	11.20	2.0
Capital city	0.67	3.20	3.2	4.30	1.5
RoS	1.20	4.60	2.7	4.70	0.1
Total	2.50	15.40	3.7	20.20	1.4
Western Australia					
Interstate	0.24	3.40	5.4	4.90	1.8
Capital city	0.78	6.60	4.4	10.50	2.3
RoS	1.20	30.30	6.7	39.40	1.3
Total	2.20	40.40	6.0	54.80	1.5
Tasmania					
Interstate	-	-	-	-	-
Capital city	0.13	0.75	3.6	1.10	1.9
RoS	0.40	2.70	3.9	3.20	0.8
Total	0.53	3.50	3.8	4.30	1.0
Northern Territory					
Interstate	0.14	1.40	4.7	2.40	2.7
Capital city	0.04	0.34	4.4	0.46	1.4
RoS	0.03	1.40	8.0	1.20	-0.8
Total	0.22	3.20	5.5	4.10	1.2
Australian Capital Territory					
Interstate	-	-	-	-	-
Capital city	0.10	0.30	2.2	0.34	0.6
RoS	-	-	-	-	-
Total	0.10	0.30	2.2	0.34	0.6

Source: BITRE estimates.

Conclusions

The road freight estimates and forecasts presented in this report are designed to help inform longer-term infrastructure planning by state and federal governments, particularly around future road network infrastructure capacity to accommodate the expected growth in the road freight vehicle movements.

The key finding from this work is that, despite freight growth *rates* projected to be slower over the forecast horizon, in comparison with historical growth, the forecasts still imply relatively significant increases in road freight volumes and number of freight vehicles on the road network. In particular, by 2040, interstate road freight is projected to be 78 per cent above 2020 levels, capital city road freight is projected to increase 53 per cent above 2020 levels and rest-of-state road freight is projected to increase by 31 per cent between 2020 and 2040. The total national road freight task in 2040 is expected to be increase by 50 per cent between 2020 and 2040.

Data challenges

The forecasts presented in this report rely heavily on historical road freight movement estimates provided by the Survey of Motor Vehicle Use (SMVU) (ABS 2020b, and earlier issues), and the 2014 Road Freight Movements Survey (RFMS) and 2001 Freight Movements Survey (FMS) (ABS 2015, ABS 2002).

BITRE has developed a replacement collection for the ABS MVC and recently published the first issue (BITRE 2022b). BITRE is also working with key transport stakeholders to explore options for establishing a replacement to the SMVU. However, a replacement collection is unlikely to be available in the near term. The absence of reliable and regular estimates of road freight activity will impact BITRE's ability to update these forecasts in the medium term.

1. Introduction

1.1 Road freight in Australia

Australia's road and rail transport networks are significant economic assets that are essential to the nation's economic performance and international competitiveness. These networks, along with coastal shipping services, are important to Australia's role as a major trading nation. For example, rail plays a vital role in the export supply chains of Australia's largest export commodities—iron ore and coal.

Road freight transport is the predominant domestic freight transport mode for all but the major iron ore and coal export commodity supply chains. In particular, road transport is the largest transport mode for intercapital and interstate freight, and for freight moved within our major urban areas. Due to a combination of the size of the country and dispersed geographic spread of both the population and economic activity, Australia has among the highest levels of road network kilometres per capita and is also among the most intensive users of road freight, on a tonne-kilometre (tkm) per capita basis (see, BITRE 2022a).

Road freight transport also represents a vital link in various logistics chains, providing access for freight to ports and terminals, and urban freight distribution between warehouses and retail outlets. It is also the dominant mode for moving freight over relatively short distances and where other alternative modes are not readily available. Most non-bulk goods carried by other modes also use road transport for part of their journey. Approximately 80 per cent of road freight is transported over distances of less than 100 kilometres (ABS 2020b).

Of the estimated 782 billion tonne kilometres of total freight in Australia in 2019–20, road freight comprised approximately 28.5 per cent—223 billion tonne kilometres (BITRE 2021).

The road freight transport industry is an important industry not only in its own right but also in terms of its role in the general economy. In Australia, the road freight transport sector dominates employment in the 'Transport, Postal and Warehousing' sector, comprising around 28 per cent of total sector employment in May 2022 (BITRE estimates, based on ABS 2022).

1.2 Study objectives

The main purpose of this report was to produce consistent time series estimates and forecasts of road freight on interstate origin–destination routes, as well as for capital cities and other intrastate road freight.

The volume of freight on the nations roads has a range of economic, environmental and safety implications for the operation of the road network.

For example, truck volumes are a significant consideration in the design and maintenance of the road network—the greater the number of trucks the faster the rate of pavement wear and tear, necessitating earlier repair and rehabilitation. Accordingly, road segments expected to carry higher truck volumes are generally built to a higher standard (i.e. more durability), which, while more costly in construction, have a lower marginal cost in use. Hence, reliable estimates of current truck numbers and forecasts of future road freight volumes are very important to planning future infrastructure needs.

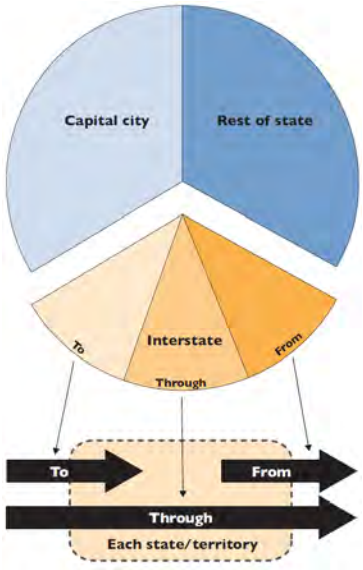
The road safety implications of road freight vehicles are also significant. Though trucks have lower road crash rates per vehicle kilometre, the cost of road crashes involving one or more trucks are significantly higher than crashes involving no truck.

For these reasons, understanding likely future growth in road freight activity, and the implications for road freight vehicles on the network, are important for road network operators, safety regulators and policy makers.

1.3 Data sources

The Survey of Motor Vehicle Use (SMVU), conducted by the Australian Bureau of Statistics (ABS), is the primary data source of road freight estimates in Australia (ABS 2020b, and earlier issues), and the basis for the estimates presented in this report. The SMVU provides estimates of road freight movements within capital

Figure 1.1 Schematic diagram of road freight market segments



cities, other major urban centres, other areas within the state of vehicle registration and freight carried outside the state of vehicle registration.

SMVU road freight estimates are based on a *non-longitudinal* survey of approximately 8000 randomly sampled freight vehicles. Undertaken more or less every 2–3 years since 1970, SMVU estimates can vary significantly from survey to survey due to variations in sample composition and other sampling and/or non-sampling errors. Inter-sample variations are typically greater at sub-state level. For these reasons, the ABS has long cautioned users about using SMVU estimates for time series analysis. Nonetheless, as the only long-standing source of reliable data on national, state and territory road freight activity, the SMVU has been used by BITRE, and other organisations, to monitor trends in Australian road freight.

In order to *correct* for any significant unexplained variation in SMVU estimates, BITRE *adjusts* the raw SMVU estimates, using a combination of *in-sample* information and BITRE smoothing assumptions. The methods are outlined in Chapter 2.

1.4 Capital city, interstate and rest-of-state road freight task measures

The road freight measures presented in this report comprise three principal market segments:

- Capital city road freight – road freight carried within the greater metropolitan areas of each of the eight state and territory capitals—Sydney, Melbourne, Brisbane, Adelaide, Perth, Hobart, Darwin and Canberra.
- Interstate road freight – is defined in this report as road freight moving between different states and territories. Interstate road freight is further split into freight *from* each state/territory, to each state/territory and *through* each state/territory.
- Rest-of-state road freight – is defined as all other intrastate freight not included in the interstate or capital city freight measures.

Figure 1.1 provides a schematic of the road freight market segments.

1.4.1 Estimating interstate road freight

The SMVU defines *interstate* freight as 'freight carried outside the state or territory of vehicle registration', for example, freight carried in New South Wales, Queensland and other states by trucks registered in Victoria. Excluded from this definition is that portion of interstate tonne-kilometres performed by New South Wales' registered trucks within New South Wales as they head to, say Victoria. On both counts, the SMVU *interstate*

freight task estimates for New South Wales, say, do not measure what transport planners and analysts would prefer, i.e. state-to-state freight carried by all trucks on a state's roads.

The interstate road freight estimation methods used in this report, reallocate the typical SMVU matrix of *interstate* freight flows, derived from the ABS Survey of Motor Vehicle Use data cubes (ABS 2020b, and earlier issues, Table 18), which present the origin as 'state/territory of registration of the vehicle' rather than as 'state/territory origin of trip'. Rest-of-state freight estimates are developed, and integrated into a methodology for deriving estimates of freight moving within each state and territory.

The disaggregated interstate road freight estimates provide a framework for estimating road freight tasks from 1969–70 to 2019–20 by state and territory, i.e. into interstate ('from', 'to' and 'thru'), and enable estimation of *new* disaggregated interstate road freight time series' estimates, from 1969–70 to 2019–20, for 36 state-to-state origin–destination (OD) pairs.

1.5 Structure of the report

The report is structured as follows:

- Chapter 2 provides an overview of BITRE's road freight estimation adjustment and forecast methodologies.
- Chapter 3 provides road freight estimates and forecasts of capital city road freight between 1970 and 2040, for each of the eight state and territory capitals.
- Chapter 4 presents the historical origin–destination (OD) road freight matrices, outlines the estimation methodology and presents estimates of interstate OD road freight for 36 interstate OD pairs.
- Chapter 5 provides rest-of-state road freight estimates and forecasts between 1970 and 2040, for each state and territory.
- Chapter 6 brings together the estimates presented in Chapters 3, 4, and 5, and provides final estimates and forecasts of state and territory road freight and components—capital city, interstate and rest of state—between 1970 and 2040.
- Finally, Chapter 7 provides some concluding remarks.

Several appendices provide supporting details on the estimation methods and models, list particular raw input data and present summary tables of state and territory, capital city, interstate and rest-of-state freight estimates and forecasts.

2. Road freight estimation and forecast methodology

2.1 Introduction

This chapter outlines BITRE's methodology for estimating and forecasting capital city, interstate and rest-of-state road freight.

The methodology allows data from Survey of Motor Vehicle Use (SMVU) to be smoothed and adjusted for significant inter-sample variation and construct time series' estimates for each state and territory stretching back to 1970, and forecasts out to 2040. The methods also re-arrange the SMVU data to construct estimate of interstate origin–destination (OD) freight data.

The estimation methods and forecast models also enable production of multiple alternative forecast scenarios. For example, different assumptions about future economic activity and population growth, and the distribution of growth across states and territories can be examined using the models.

2.2 Road freight estimation methodology

The methodology used in this report to estimate domestic road freight has four principal elements:

- National road freight adjustment methodology
- Capital city road freight adjustment methodology
- Interstate road freight estimation methodology
- Rest-of-state road freight estimation methodology.

Each element involves multiple steps. All four elements, and sub-steps, are outlined in the freight estimation methodology schema, in Figure 2.1.

The remainder of this chapter describes each of the estimation components.

2.2.1 Total road freight adjustment estimation methodology

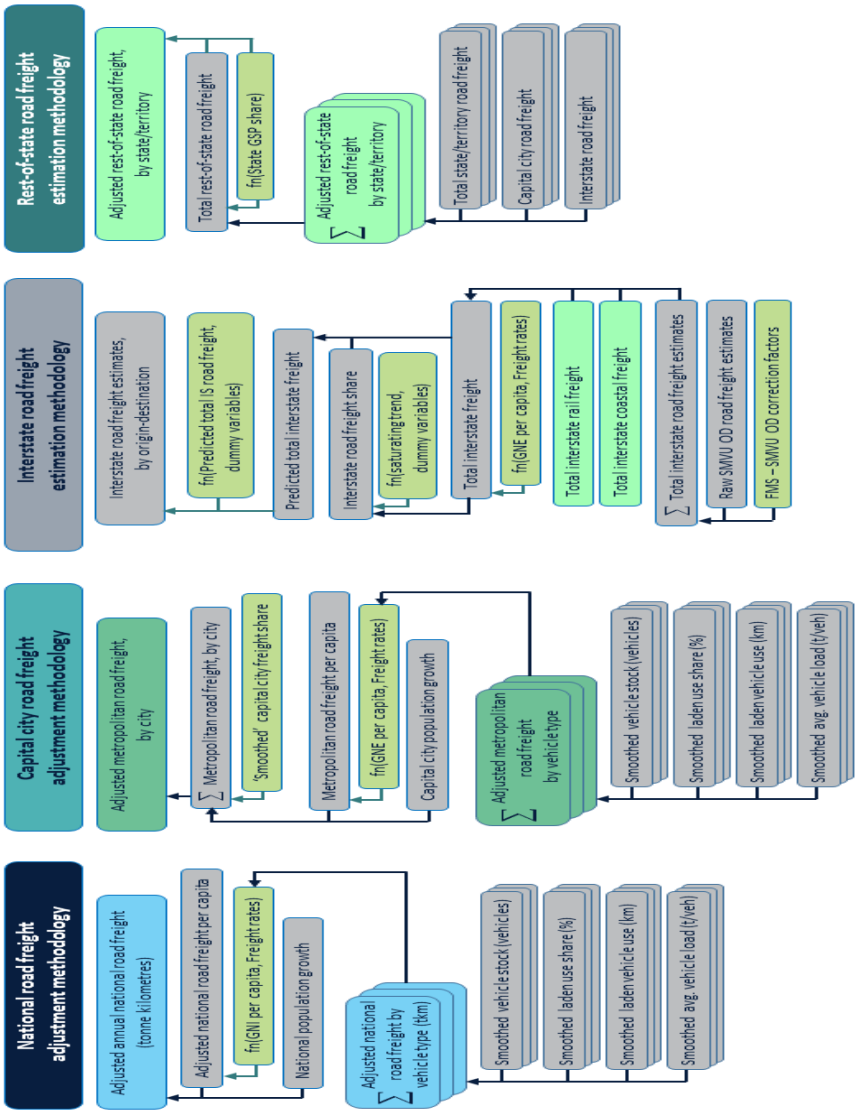
Adjusted estimates of total national road freight are derived as the sum product of:

i) smoothed and adjusted vehicle numbers, for each of LCVs, rigid trucks and articulated trucks
ii) smoothed fraction of laden business use, for each vehicle type
iii) smoothed average laden vehicle use (i.e. kilometres / vehicle), for each vehicle type and
iv) smoothed average load per laden vehicle kilometre, for each vehicle type.

Figure 2.2 shows the adjusted (smoothed) and raw SMVU components for each truck type. The figure illustrates the variation existing in the raw SMVU freight component measures, and the result for smoothed estimates of Australia-level freight estimates derived from multiplying the component estimates together. The adjusted tonne kilometres for the three vehicle types (the last row of Figure 2.3) are added to produce estimated total national road freight estimate. The adjusted estimates are compared to the raw SMVU series in Figure 2.3.

One additional step is used to derive adjusted *annual* national road freight estimates, which is to model the adjusted road freight estimates as a function of domestic economic activity, proxied by gross national income (GNI) per capita, and real road freight rates. The regression model results are listed in Appendix Table A.1. Figure 2.4 shows the adjusted data series (points) and the model-based annual estimates for all years from 1970 to 2020 (line).

Figure 2.1 Capital city, interstate and rest-of-state road freight estimation methodology



Source: BITRE.

2.2.2 Capital city road freight estimation methodology

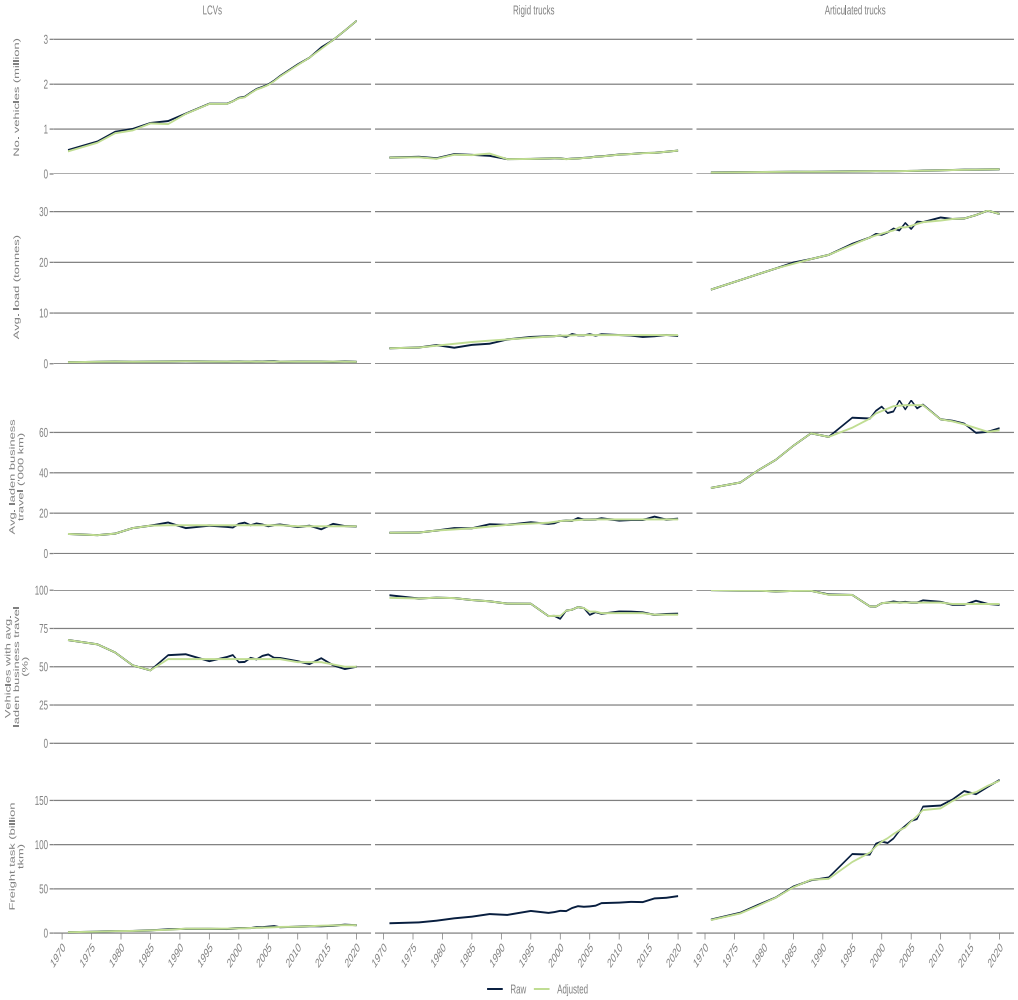
The procedure for estimating capital city road freight time series is similar to the national freight methodology, and also shown in Figure 2.1. The procedure involves applying national fractional adjustments to the raw SMVU metropolitan road freight task by vehicle type, using smoothed trends in vehicle numbers, laden vehicle use fraction, laden vehicle kilometres and vehicle load when laden.

The *smoothed* total national metropolitan road freight estimates are then modelled as a function of per capita GNI and real road freight rates (and relevant dummy variables), to derive *raw* annual metropolitan road freight estimates for each capital city. One additional step is applied to derive the final capital city road freight estimates, that is to smooth the trend capital city freight shares. Further details of the capital city road freight estimation and forecasting procedures are outlined in Chapter 3.

2.2.3 Interstate origin–destination road freight estimation methodology

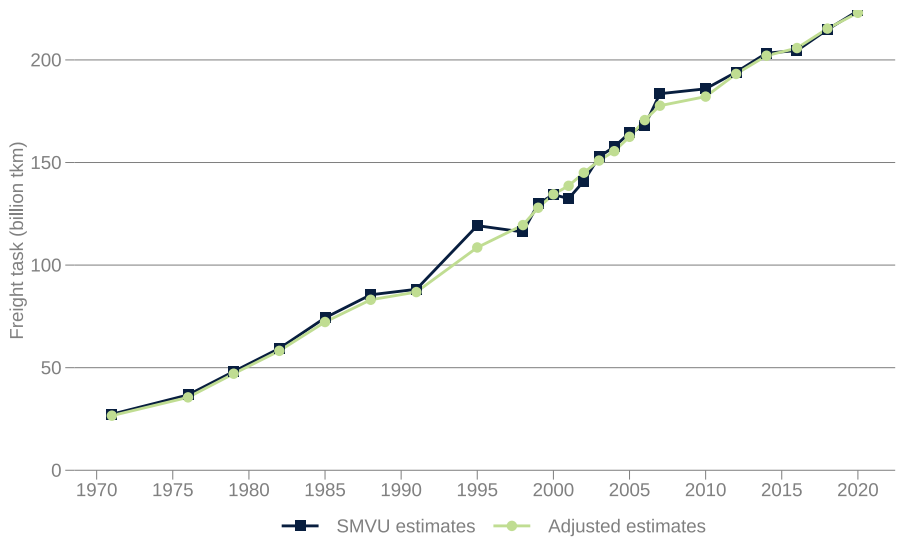
The process for estimating interstate origin–destination road freight is more involved than the procedures for deriving adjusted national and metropolitan road freight estimates, as it involves re-arranging the SMVU data

Figure 2.2 Raw and adjusted series for all freight vehicle types



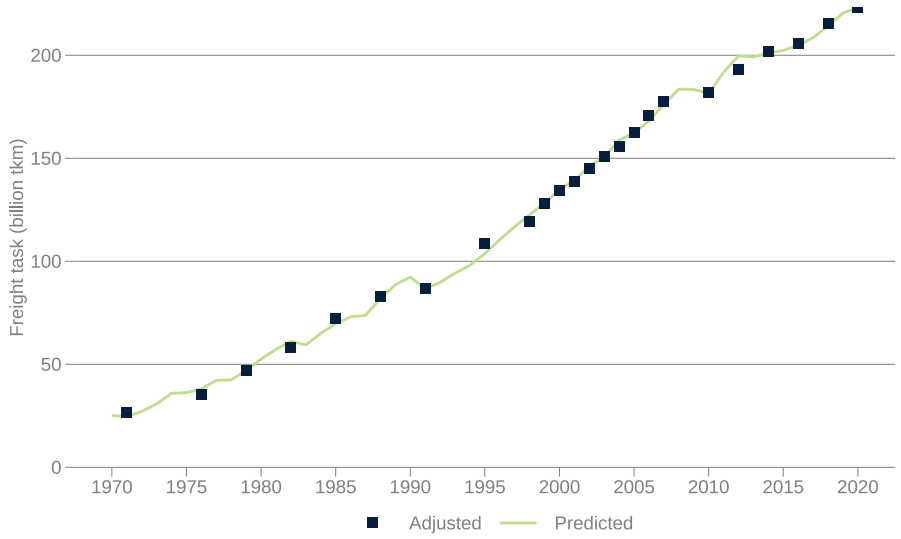
Source: ABS (2020b) and earlier issues, and BITRE estimates.

Figure 2.3 Raw versus adjusted total road freight estimates



Source: ABS (2020b) and earlier issues, and BITRE estimates.

Figure 2.4 Actual and predicted/forecast Total adjusted Australian road tkm



Source: ABS (2020b) and earlier issues, and BITRE estimates.

to construct estimates of interstate origin–destination (OD) freight movements.

The issue with the raw SMVU estimates are that they implicitly define all freight carried by a vehicle registered in a state or territory as *originating* in that jurisdiction. Thus the SMVU provides 'state of registration to state of destination' estimates. Hence, Victoria, which has a high proportion of heavy vehicle registrations due in part to legacy freight transport business location decisions, appears to be over-represented as an origin state for SMVU interstate flows.

The less frequent Freight Movements Surveys (FMS) (ABS 2002, ABS 2015) provide periodic measures, for 2000–01 and 2013–14 respectively, of origin–destination road freight movements, by actual freight origin and freight destination. The FMS estimates are used in BITRE's estimation method to derive correction factor matrices, which are then applied to the SMVU raw data to derive adjusted SMVU-based OD road freight estimates for 36 state-to-state OD pairs.

The OD estimates are then summed across all 36 interstate OD pairs for each SMVU year to derive *raw adjusted* interstate road freight estimate, which is combined with non-bulk rail and coastal shipping interstate freight volumes to derive total interstate non-bulk freight. The latter is divided by the population and then modelled as a function of GNI per person, road freight rates and relevant dummy variables, and the predictions used to annualise total interstate non-bulk freight volumes.

The next step in estimating interstate OD road freight flows is to model road's share of total (*all modes*) interstate freight, which is captured by a logistic model of road's share as a function of time and relevant dummy variables.

The final step involves modelling each of the 36 OD series against the predicted total interstate freight, which is used to *smooth* the individual OD series. Further details are provided in Chapter 4 and Appendix F.

2.2.4 Rest-of-state road freight estimation methodology

The final estimation procedure is for estimating rest-of-state road freight trends. The procedure is more straightforward that the capital city and interstate road freight estimation procedures, and involves only a couple of steps:

- Total adjusted Australian rest-of-state road freight is calculated as total Australian road freight less total adjusted Australian metropolitan road freight less total adjusted Australian interstate road tonne kilometres.
- The second step involves estimating and smoothing each jurisdiction's share of total rest-of-state road freight, and applying the smoothed rest-of-state shares to total national rest-of-state freight to derive rest-of-state for each jurisdiction.

2.3 Road freight estimates by state and territory

Lastly, the state-specific capital city, interstate, and rest-of-state freight are summed to provide state-based road freight estimates and forecasts, between 1970 and 2040.

3. Capital city road freight estimates and forecasts

This chapter outlines the capital city road freight estimation method and presents time series estimates (1970–2020) and forecasts (2020–2040) of capital city road freight, by state and territory.

3.1 Capital city road freight estimation process

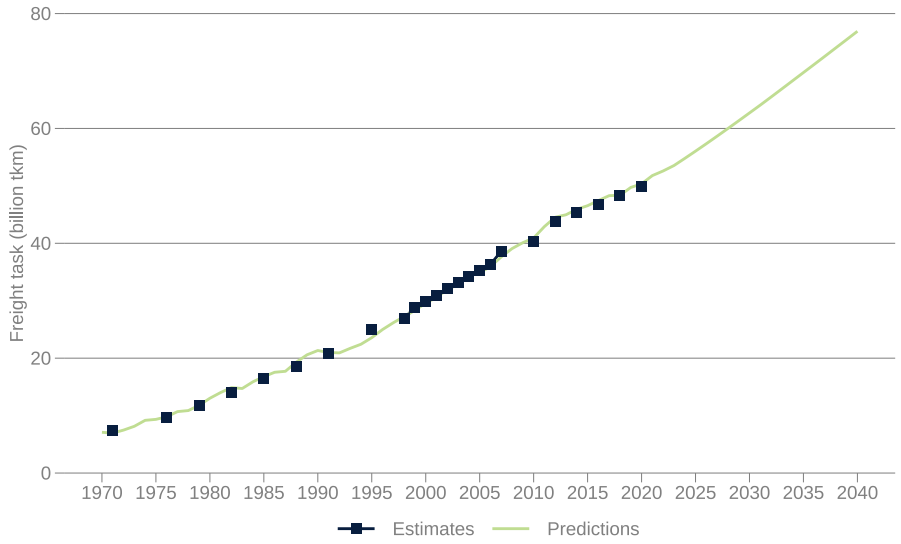
As outlined in Chapter 2, the process for estimating consistent time series estimates of capital city road freight involves the following steps:

- applying national fractional adjustments to raw SMVU metropolitan road freight task by vehicle type, using:
    - smoothed trends in vehicle numbers,
    - smoothed average laden freight vehicle use, and
    - smoothed average vehicle loads.
- summing the *smoothed* Australia-wide total capital city road freight estimates, dividing by national population and modelling as a function of per capita GNI, real road freight rates and relevant dummy variables, to derive *annual* metropolitan road freight estimates for each capital city.
- lastly, smoothing each capital city's road freight share estimate, based on each city's share of the total metropolitan population, and using the applying the smoothed freight shares to total estimated metropolitan road freight to derive the final *adjusted* estimates of road freight for each city.

Figure 3.1 shows the raw SMVU and adjusted total metropolitan road freight series, covering the period from 1970 to 2020. Figure 3.2 provides an example of freight–population share smoothing procedure for Sydney, which illustrates there is an excellent relationship between the two series.

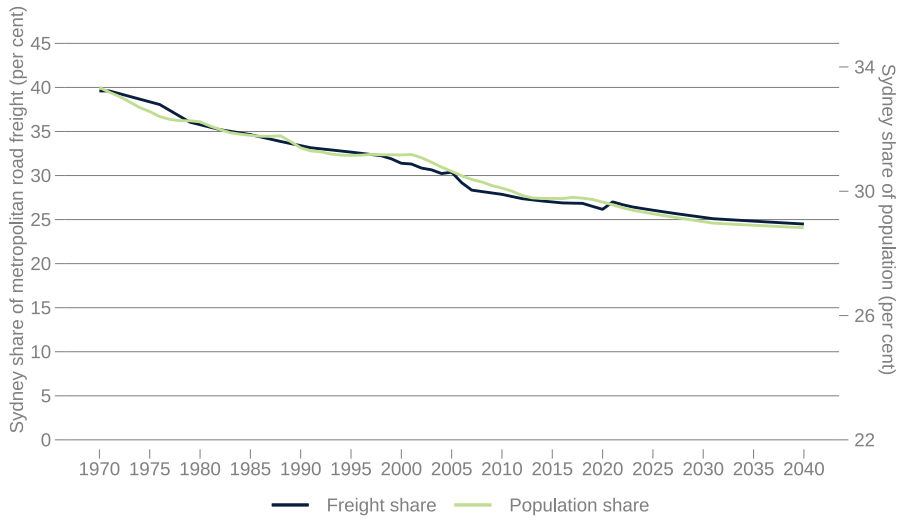
Similar analyses are done for all the capital cities, and the sum of the forecast shares is normalised (to 1.0), and smoothed shares calculated for each capital city, shown in Figure 3.3.

Figure 3.1 Total adjusted metropolitan road freight estimates (1970–2020) and forecasts (2020–2040)



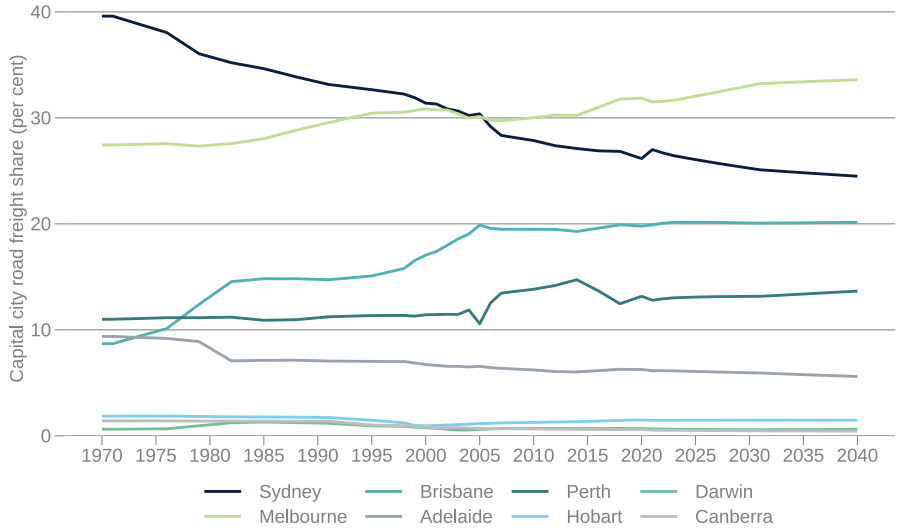
Source: ABS (2020b) and earlier issues

Figure 3.2 Sydney shares of metropolitan road freight and metropolitan population



Source: ABS (2020b) and earlier issues

Figure 3.3 Estimated and forecast city shares of metropolitan road freight



Source: ABS (2020b) and earlier issues

3.2 Capital city road freight estimates and forecasts

Based on these methods, BITRE estimates capital city road freight volumes have increased from around 7.1 billion tonne kilometres in 1971 to around 50.4 billion tonne kilometres in 2020, an average annual growth rate of 4.0 per cent per annum. Across all capital cities, much of this growth is attributable to growth in the metropolitan population and associated activity, although some of this growth will have been due to expansion in the geographic extent of the cities over that time.

- In Sydney, road freight volumes increased from around 2.8 billion tonne kilometres in 1970 to nearly 13.2 billion tonne kilometres in 2020, average annual growth of 3.1 per cent per annum.
- In Melbourne, road freight volumes grew by an average of 4.3 per cent per annum between 1970 and 2020, from 1.9 billion tonne kilometres in 1970 to just over 16.0 billion tonne kilometres in 2020.
- Brisbane metropolitan area freight increased even faster over that period, by an average of 5.7 per cent per annum, from 0.6 billion tonne kilometres in 1970 to around 10.0 billion tonne kilometres in 2020.

Table 3.1 Capital city road freight estimates (1970–2020) and forecasts (2021–2040) (million tkm)

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	Total
1970	2,809	1,947	616	665	780	132	44	100	7,093
1980	4,658	3,571	1,709	1,079	1,454	236	136	181	13,023
1990	7,124	6,253	3,149	1,511	2,377	370	257	294	21,334
2000	9,288	9,132	5,045	1,992	3,379	281	227	247	29,590
2010	11,402	12,280	7,975	2,544	5,659	517	284	264	40,926
2020	13,174	16,043	9,964	3,150	6,630	753	343	299	50,355
2030	15,832	20,709	12,592	3,730	8,249	923	364	297	62,696
2040	18,842	25,842	15,495	4,307	10,502	1,130	463	336	76,915

Source: BITRE estimates.

- Road freight volumes in Adelaide grew by around 3.2 per annum between 1970 and 2020, from around 0.67 billion tonne kilometres in 1970 to around 3.15 billion tonne kilometres in 2020.
- In Perth, road freight grew from around 0.8 billion tonne kilometres in 1970 to around 6.6 billion tonne kilometres in 2020, average annual growth of around 4.4 per cent per annum.
- In the smaller state and territory capitals, metropolitan road freight volumes, while far less, have grown significantly:
    - Hobart – road freight grew 3.5 per cent per annum, from 0.13 billion tonne kilometres in 1970 to 0.75 billion tonne kilometres in 2020.
    - Darwin – road freight grew by 4.2 per cent per annum, from 0.04 billion tonne kilometres in 1970 to 0.34 billion tonne kilometres in 2020.
    - Canberra – road freight volumes grew 2.2 per cent per annum, from 0.1 billion tonne kilometres in 1970 to around 0.3 billion tonne kilometres in 2020.

Over the forecast period, capital city road freight is projected to grow by 2.2 per cent per annum to 76.9 billion tonnes kilometres by 2040 (i.e. overall growth of 52 per cent between 2020 and 2040) – see Table 3.1.

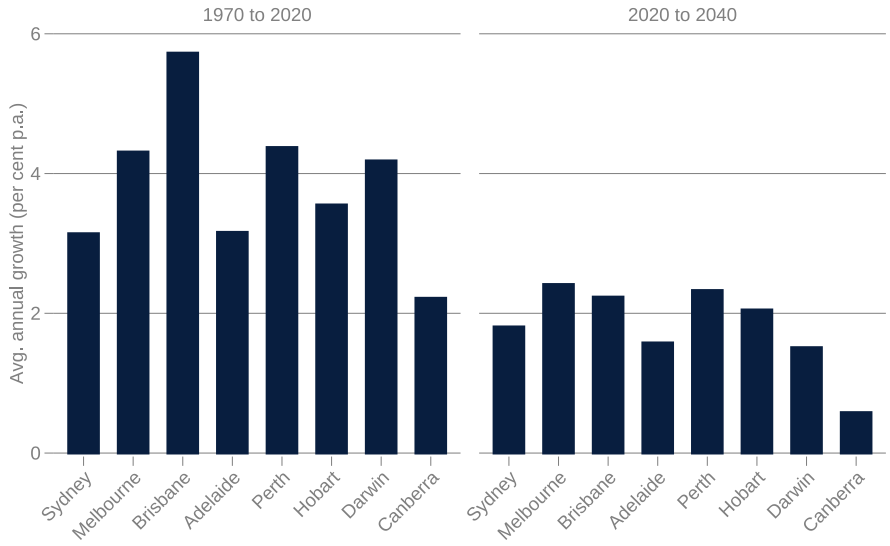
Figure 3.4 provides a comparison of the actual historical and projected future growth in metropolitan road freight for each capital city. Across all capital cities, road freight is projected to grow more slowly between 2020 and 2040, than was experienced between 1970 and 2020.

- In Sydney, road freight volumes are projected to grow by 1.8 per cent per annum to around 18.8 billion tonne kilometres by 2040.
- In Melbourne, road freight volumes are projected to grow by 2.4 per cent per annum to around 25.8 billion tonne kilometres by 2040.
- In Brisbane, road freight volumes are projected to grow by 2.2 per cent per annum to around 15.5 billion tonne kilometres by 2040.
- In Adelaide, road freight volumes are projected to grow by 1.6 per cent per annum to around 4.3 billion tonne kilometres by 2040.
- In Perth, road freight volumes are projected to grow by 2.3 per cent per annum to around 10.5 billion tonne kilometres by 2040.
- Across the three smaller capital cities, road freight volumes are projected to grow by around 2.0 per cent per annum in Hobart, 1.5 per cent per annum in Darwin and 0.6 per cent per annum in Canberra, to around 1.1 billion tonne kilometres in Hobart, 0.46 billion tonne kilometres in Darwan and 0.34 billion tonne kilometres in Canberra, by

  2040.

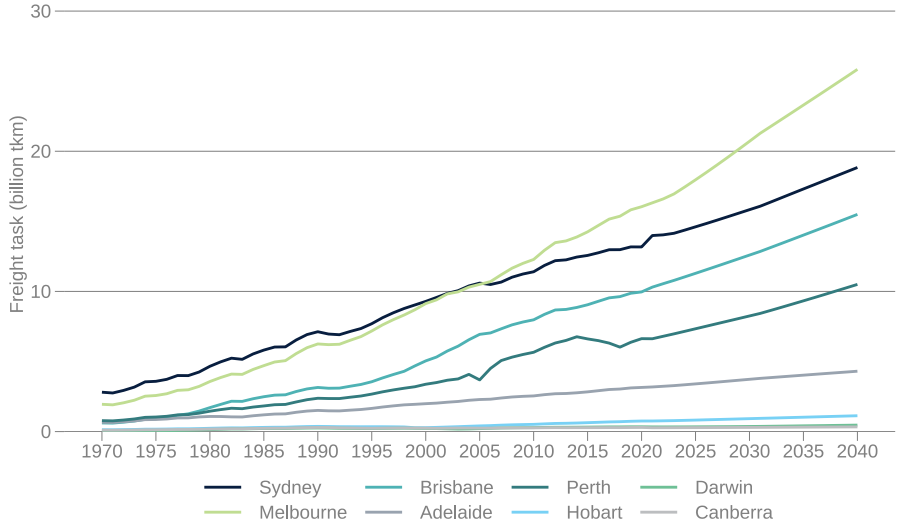
Figure 3.5 illustrates the actual and projected future growth in capital city road freight for each capital city. The estimates and forecasts are listed in Appendix Table B.1.

Figure 3.4 Capital city road freight growth estimates and forecasts



Source: ABS (2020b) and earlier issues

Figure 3.5 Capital city road freight estimates and forecasts



Source: ABS (2020b) and earlier issues

4. Interstate road freight estimates and forecasts

This chapter presents the interstate origin–destination road freight estimation methods and time series' estimates (1970–2020) and forecasts (2020–2040).

4.1 Interstate origin-destination road freight estimation process

As outlined in Chapter 2, the process for estimating consistent interstate road freight involves re-arranging the SMVU data to construct annual estimates of interstate origin–destination (OD) road freight movements between 1972 and 2020. The procedure for estimating interstate road freight involves multiple steps, as shown in Figure 2.1.

4.1.1 Adjusting the raw SMVU estimates

The Survey of Motor Vehicle Use (SMVU) (ABS 2020b, and earlier issues) is the source of most of the data on patterns of interstate freight flows. The SMVU defines all freight carried by a vehicle registered in a state or territory as *originating* from that jurisdiction. Thus the SMVU provides 'state of registration to state of destination' road freight estimates. Hence, Victoria, which has a high proportion of heavy vehicle registrations, appears over-represented as an origin state for SMVU interstate flows.

The Freight Movements Survey (FMS), undertaken in 2000–01 and 2013–14, provides actual estimate state-to-state origin–destination road freight movements for the two specified sample years. The FMS estimates are first used to derive *correction factor* matrices for the SMVU estimates. The correction factor matrix for the period 1998 to 2002 was derived from a comparison of the SMVU data cubes for 1999, 2000 and 2001 (Table 18) with the ABS 2000–01 Freight Movement Survey (FMS) OD table. And a matrix of correction factors for 2013–14 onwards was derived from a comparison of the SMVU data cube for 2012 and 2014 (Table 18) with the ABS 2013–14 Freight Movement Survey (FMS) OD tables. The correction factor matrices for 2001 and 2014 are listed in Tables 4.1 and 4.2.

The table provides the scaling factor that needs to be applied to the SMVU raw state-to-state road freight estimates to FMS-equivalent OD freight measures. For example, the correction factor for 2001 for NSW–Victoria freight, is 3.56, while from Victoria to NSW, the factor is 0.70 (Table 4.1). These measures imply the SMVU NSW–Victoria estimate needs to be multiplied by 3.56 to produce FMS-equivalent estimates. And the Victoria–NSW measures need to be multiplied by 0.70, to produce FMS-equivalent estimates. The 2014 factors for NSW–Victoria and Victoria–NSW are 3.23 and 0.74, respectively. (Table 4.2). For the years between 2000 and 2014, the correction factors are interpolated.

The construction of correction matrices prior to 1998 were discussed in BITRE (2010a). A complete set of the raw state-to-state OD freight matrices, and correction matrices, are listed in Appendix F.

Table 4.1 Correction matrix for 2001

	Destination								
Origin	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Total
NSW	-	3.56	3.78	4.01	4.55	0	6.79	4.53	1.30
Vic.	0.70	-	1.51	1.08	0.97	0	0.98	1.48	0.77
Qld	0.93	2.89	-	1.78	2.00	0	1.27	55.73	0.93
SA	0.83	1.14	1.65	-	2.07	0	2.43	2.50	0.90
WA	2.00	4.49	2.87	2.40	-	0	4.25	0.00	1.16
Tas.	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.98
NT	1.67	1.00	2.19	0.85	1.96	0	-	0.00	0.81
ACT	0.32	0.44	0.72	1.61	0.00	0	0.00	-	0.56

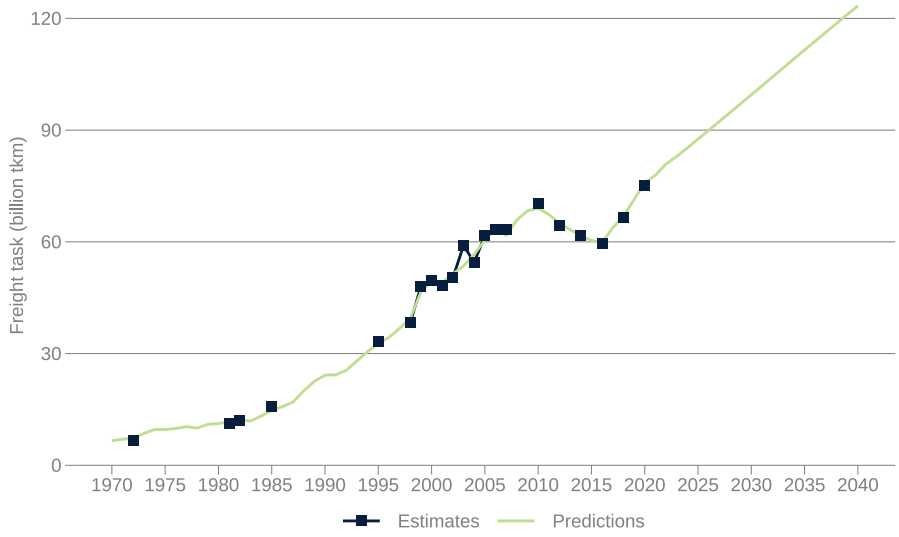
Source: BITRE estimates.

Table 4.2 Correction matrix for 2014

	Destination								
Origin	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Total
NSW	-	3.23	3.73	4.89	2.39	0	8.09	3.23	1.29
Vic.	0.74	-	1.10	0.98	0.47	0	1.00	3.36	0.75
Qld	0.94	2.03	-	1.44	2.33	0	1.54	0.89	0.93
SA	1.21	1.09	1.22	-	1.28	0	4.47	2.50	1.00
WA	0.28	2.48	2.85	1.16	-	0	1.18	0.00	1.02
Tas.	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.97
NT	1.00	1.00	0.84	1.00	0.45	0	-	0.00	1.42
ACT	0.75	0.74	1.26	1.00	0.00	0	0.00	-	0.70

Source: BITRE estimates.

Figure 4.1 All-modes interstate freight and prediction/forecast



Source: ABS (2020b) and earlier issues, and BITRE estimates.

Summing all 36 interstate ODs for any SMVU year gives the *raw adjusted* road interstate road freight estimate.

4.1.2 Adjusting total interstate road freight estimates

The OD estimates are then summed across all 36 interstate OD pairs for each SMVU year to derive *raw adjusted* interstate road freight estimate. This is combined with non-bulk rail and coastal shipping interstate freight volumes to derive *total* non-bulk interstate freight. The latter is divided by the population and then modelled as a function of GNI per capita, road freight rates and relevant dummy variables. and the predictions used to annualise total interstate non-bulk freight volumes. The regression results are listed in Appendix Table A.3 and the predictions and forecasts shown in Figure 4.1.

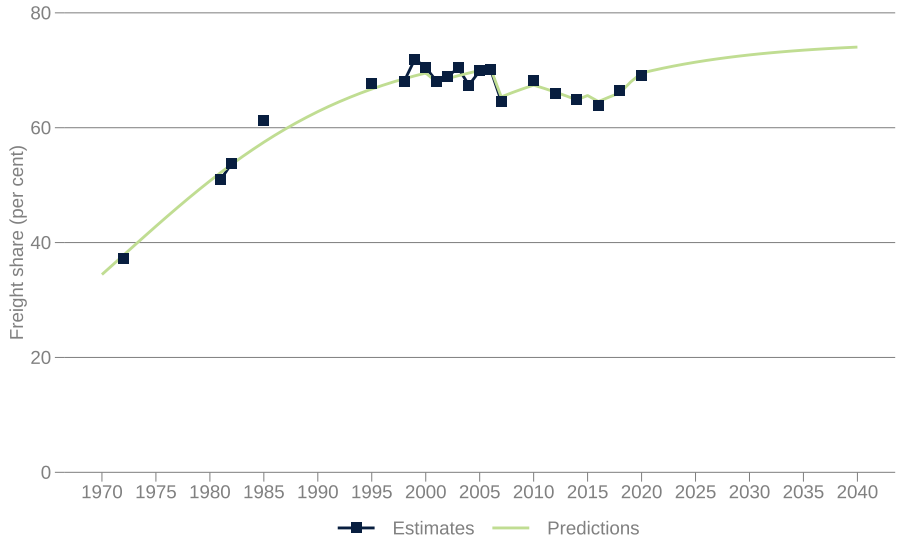
The next step in estimating (forecasting) interstate OD freight flows is to predict/forecast road's share of total (*all modes*) interstate freight. The model assumes a logistic curve of road freight's share of all-modes interstate freight, modelled against a time trend term and relevant dummy variables. Figure 4.2 shows the predictions and forecasts. The model results are listed in Appendix Table A.4.

Then the predicted total road interstate freight is calculated as *all modes* interstate freight times road's predicted share of interstate freight. Figure 4.3 shows the estimate/forecast against the actual data points.

4.1.3 Individual origin–destination freight estimates and forecasts

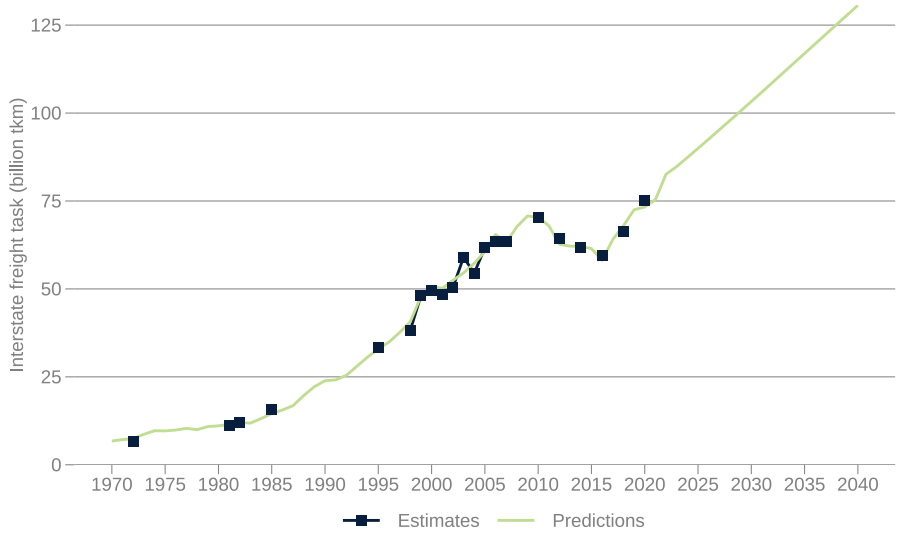
In the final step of the interstate road freight estimation process, each of the 36 individual OD road freight series is modelled against predicted total interstate road freight, and relevant dummy variables. Partial model

Figure 4.2 Actual and predicted interstate road freight shares



Source: ABS (2020b) and earlier issues, and BITRE estimates.

Figure 4.3 Actual and predicted interstate road freight task



Source: ABS (2020b) and earlier issues, and BITRE estimates.

results are listed in Appendix Table A.5, only the major dummy variables are listed. The regressions were in two groups:

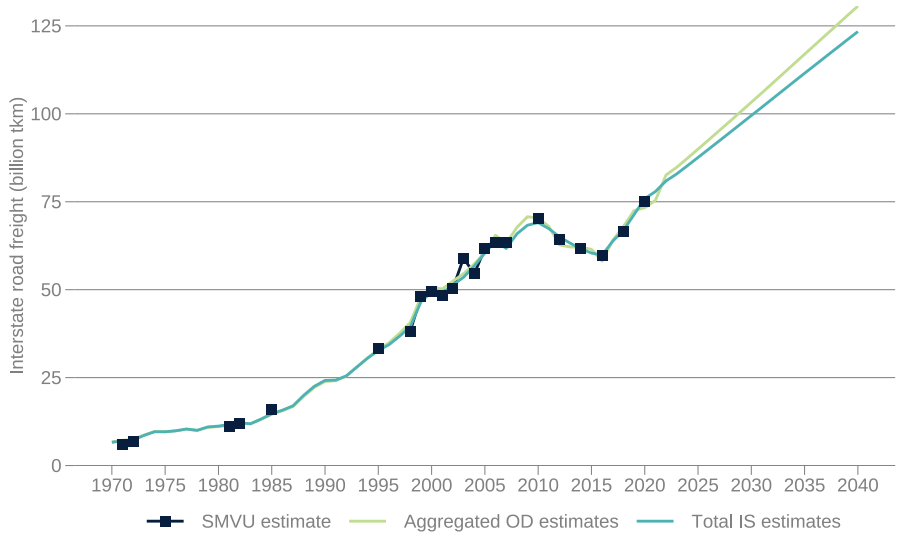
- The first group of regressions use the natural logarithm of both the dependent variable (OD freight) and major explanatory variable (total interstate freight) (shown in Figure 4.3).
- The second group of regressions model raw OD freight against raw total interstate freight.

A comparison of predicted total interstate road freight and the sum of individual OD pair interstate freight estimates are shown in Figure 4.4, which show the two series closely approximate each other, roughly validating the method of modelling each OD separately.

Figure 4.5 shows the estimated (1970–2020) and forecast (2020–2040) total interstate road freight volumes, by interstate OD pair. The figure highlights a number of the key features of the interstate road freight task estimates:

- BITRE estimates total interstate road freight volumes have increased from around 6.8 billion tonne kilome-

Figure 4.4 Comparison of aggregated interstate OD versus total interstate road freight estimates, 1970–2040



Source: BITRE estimates.

tres in 1970 to around 73.4 billion tonne kilometres in 2020, an average annual growth rate of 4.9 per cent per annum.

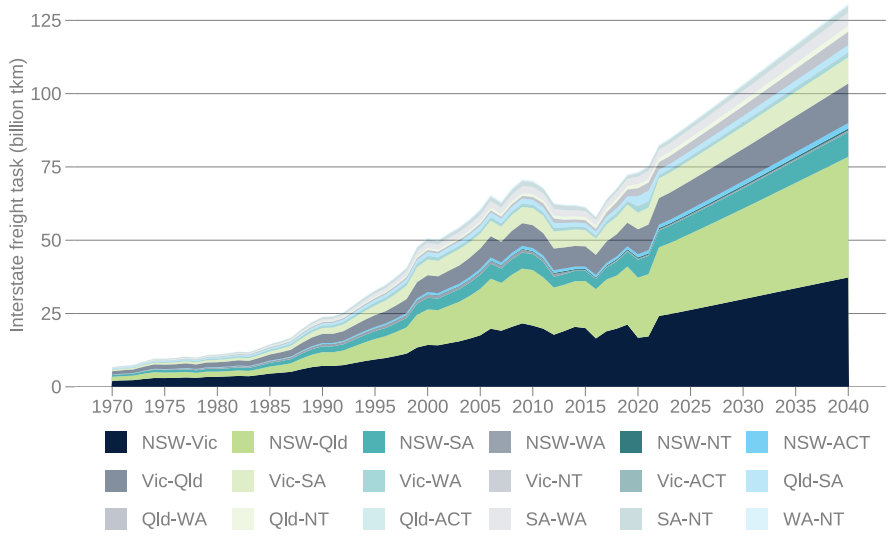
- Over the forecast period, total interstate road freight is projected to grow by 2.9 per cent per annum to 130.5 billion tonnes kilometres by 2040 (i.e. overall growth of 78 per cent between 2020 and 2040).
- Interstate road freight is estimated to have dipped during the 2010s due principally due to the Global Financial Crisis and subsequent industry restructuring, which resulted in, for example, closure of the domestic motor vehicle manufacturing industry, and associated freight movements.
- NSW–Vic, NSW–Qld and Vic–Qld together comprise about 65 per cent, of total interstate OD road freight – NSW–Vic comprises around 28–30 per cent, NSW–Qld currently around 27 per cent, up from around 20 per cent in 1970, and Vic–Qld about 11 per cent.
- Over the twenty years 2020–2040:
    - NSW–Vic OD road freight is projected to grow by 4.1 per cent per annum to around 37.3 billion tonne kilometres by 2040,
    - NSW–Qld road freight is projected to grow by 3.5 per cent per annum to around 41.2 billion tonne kilometres by 2040,
    - Vic–Qld road freight is projected to grow by 2.3 per cent per annum to around 13.5 billion tonne kilometres by 2040
    - Across all other OD pairs, interstate road freight is projected to grow by 1.7 per cent per annum to around 38.7 billion tonne kilometres by 2040.

4.2 Interstate OD road freight estimates and forecasts

The last step of BITRE's interstate OD estimation method is the derivation of *from*, *to* and *through* interstate road freight components, by state and territory:

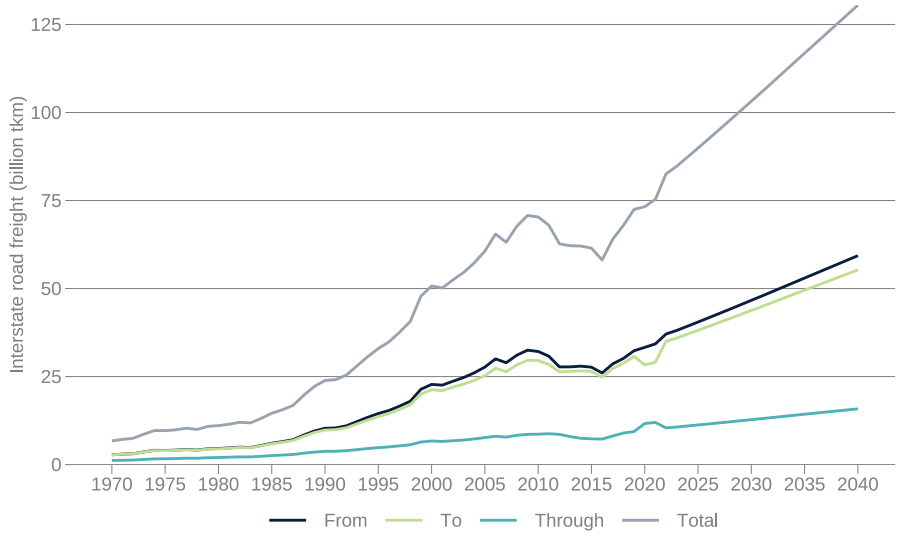
- the *from* interstate road freight estimates represent the mass-distance that interstate freight moves with the state of origin—the distance is assumed to be equivalent to that from the capital city to the border of the relevant destination jurisdiction.
- the *to* interstate road freight estimates reflect the mass-distance that interstate freight moves within the destination state of interstate freight—again, the distance is assumed to be equivalent to that of the border to the capital city of the relevant destination jurisdiction.
- if the route traverses another jurisdiction, between the origin and destination jurisdictions, the freight task involved in transiting the *through* state/territory is included as *through* interstate freight. For example, freight moving from Victoria to Queensland will include a *from* freight component (within Victoria), a *to* freight

Figure 4.5 Interstate OD road freight estimates, 1970–2020, and forecasts, 2020–2040, by OD-pair



Source: BITRE estimates.

Figure 4.6 Interstate 'from', 'to' and 'through' road freight task estimates, 1970–2040



Source: BITRE estimates.

component (within Queensland), and a *through* component for that part of the task undertaken within New South Wales.

The estimation of the *from*, to and *through* tasks are achieved by separating the OD freight estimates for each of the 36 state-to-state OD pairs into a *from* distance fraction, a to distance fraction, and a *through* distance fraction. The assumed *from*, to and *through* interstate distances for each interstate OD pair are listed in Appendix Table C.13.

The long-term trends in *from*, to, *through* and total interstate road freight for the period 1970 to 2020 and forecasts for 2020 to 2040, are shown in Figure 4.6 and listed in Appendix Table C.12. Table 4.3 provides summary estimates of total interstate road freight between 1970 and 2040.

BITRE estimates total interstate road freight volumes have increased from around 6.8 billion tonne kilometres in 1970 to around 73.4 billion tonne kilometres in 2020, an average annual growth rate of 4.9 per cent per annum.

- Interstate *from* road freight has increased from 2.8 billion tonne kilometres in 1970 to around 33.3 billion

Table 4.3 Interstate road freight estimates (1970-2020) and forecasts (1970–2040) (million tkm)

Year	From	To	Through	Total
1970	2,799	2,773	1,179	6,751
1980	4,569	4,482	2,016	11,068
1990	10,316	9,817	3,765	23,898
2000	22,779	21,254	6,702	50,735
2010	32,131	29,566	8,638	70,335
2020	33,303	28,284	11,668	73,255
2030	46,647	43,774	12,771	103,191
2040	59,343	55,308	15,842	130,493

Source: BITRE estimates.

tonne kilometres in 2020 (5.1 per cent per annum)
- Interstate to road freight has increased from 2.8 billion tonne kilometres in 1970 to around 28.3 billion tonne kilometres in 2020 (4.8 per cent per annum)
- Interstate *through* road freight has increase from around 1.2 billion tonne kilometres in 1970 to around 11.7 billion tonne kilometres in 2020 (4.7 per cent per annum).

Hence, the proportion of interstate *from* and interstate to road freight, both increased slightly, relative to interstate *through* road freight.

Over the forecast period, total interstate road freight is projected to grow by 2.9 per cent per annum to 130.5 billion tonnes kilometres by 2040 (i.e. overall growth of 78 per cent between 2020 and 2040).

- Interstate *from* road freight is projected grow by 2.9 per cent per annum, to 59.3 billion tonne kilometres by 2040.
- Interstate to road freight is projected grow by 3.4 per cent per annum, to 55.3 billion tonne kilometres by 2040.
- Interstate *through* road freight is projected to grow by only 1.5 per cent per annum between 2020 and 2040.

Hence *from* and to interstate freight tasks are projected to grow as a share of total interstate road freight between 2020 and 2040.

5. Rest-of-state road freight estimates and forecasts

This chapter presents the rest-of-state freight estimation methods and time series' estimates (1970–2020) and forecasts (2020–2040).

5.1 Rest-of-state road freight estimation process

As outlined in Chapter 2, the process for estimating and forecasting rest-of-state road freight volumes is relatively straightforward.

Total rest-of-state road freight estimates (1970–2020) and forecasts (2020–2040), for each state and territory, are calculated as the residual of total state/territory freight less the estimated interstate and capital city road freight tasks within each jurisdiction.

The resulting *raw* rest-of-state estimates are then regressed against each jurisdictions' share of gross domestic product (GDP), in order to adjust for inter-sample survey variation inherent in the raw SMVU estimates, and the regression rest-of-state share predictions *normalised* to derive the final rest-of-state share estimates. The rest-of-state road freight forecasts are then are calculated as real national-level GDP per person times state/territory population, recalibrated to match the ABS real gross state product series to 2020, which forms the basis for the regressions on historical data points (see ABS 2020a, and earlier issues).

Finally, rest-of-state road freight by state/territory is calculated by multiplying total adjusted Australian rest-of-state road freight times the jurisdiction-based rest-of-state shares.

The resulting raw predicted rest-of-state shares are often quite different from sections of the original raw calculations, but most are similar to recent raw shares by jurisdiction (see Appendix D).

5.2 Rest-of-state road freight estimates and forecasts

Figure 5.1 shows the resulting rest-of-state road freight estimates (1970–2020) and forecasts (2020–2040) by state and territory. (Appendix Table D.1 lists annual rest-of-state road freight estimates and forecasts between 1970 and 2040.)

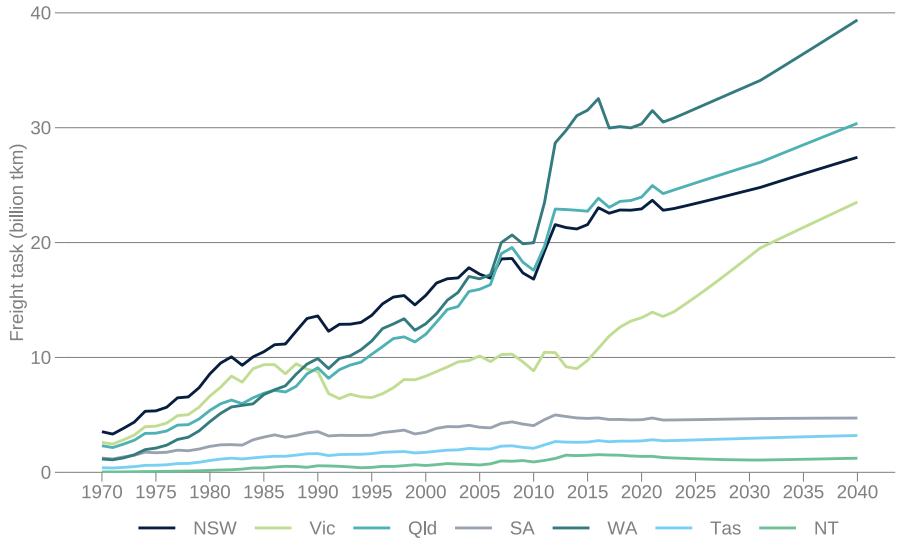
It can be seen from Figure 5.1 that New South Wales, Victoria, Queensland and Western Australia comprise the group of states having large and growing rest-of-state road freight volumes. Rest-of-state road freight is a relatively small share of total road freight across the other jurisdictions—South Australia, Tasmania and the Northern Territory—and not projected to grow significantly between 2020 and 2040.

Table 5.1 Rest-of-state road freight estimates (1970–2020) and forecasts (2021–2040), by state (million tkm)

Year	NSW	Vic	Qld	SA	WA	Tas	NT	Australia
1970	3,536	2,610	2,312	1,237	1,156	396	34	11,282
1980	8,570	6,641	5,390	2,258	4,410	1,029	168	28,465
1990	13,615	8,767	9,104	3,544	9,905	1,632	569	47,136
2000	15,400	8,374	12,017	3,488	12,929	1,739	592	54,539
2010	16,814	8,832	17,585	4,064	19,983	2,092	904	70,275
2020	22,930	13,458	23,962	4,580	30,331	2,733	1,390	99,383
2030	24,567	18,795	26,696	4,662	33,706	2,961	1,073	112,460
2040	27,423	23,526	30,382	4,725	39,376	3,206	1,230	129,868

Source: BITRE estimates.

Figure 5.1 'Rest of State' road freight tasks by states and territories, 1970–2040



Source: BITRE estimates.

6. Road freight estimates and forecasts by state and territory

This chapter combines the capital city (from Chapter 3), interstate (Chapter 4) and rest-of-state (from Chapter 5) road freight estimates and forecasts, to provide state, territory and total Australian estimates and forecasts of road freight between 1970 and 2040.

6.1 Total road freight estimates and forecasts, Australia, 1970–2040

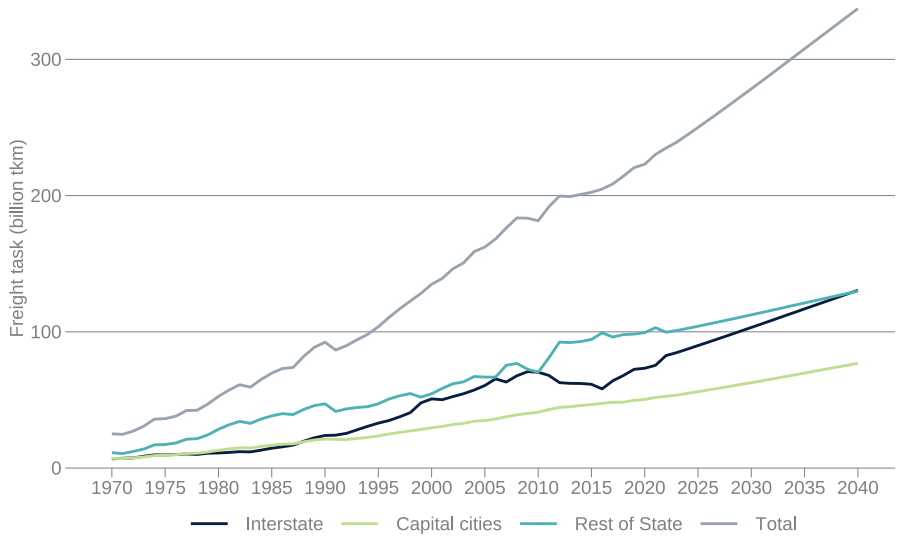
Figure 6.1 shows historical trends in domestic road freight as well as component—capital city, interstate and rest-of-state—road freight estimates from 1970 to 2020 and the forecasts from 2020 to 2040. (The annual estimates are listed in Appendix Table E.1.)

Across the eight state and territory capital cities, total capital city road freight grew from 7.1 billion tonne kilometres in 1970 to 50.4 billion tonne kilometres in 2020. Total interstate freight estimate in Australia was 6.7 billion tonne-kilometres in 1970 and this increased to 73.2 billion tonne kilometres in 2020. Rest-of-state road freight (i.e. freight carried entirely within the state or territory of vehicle registration), increased from around 11.3 billion tonne kilometres in 1970 to approximately 99.4 billion tonne kilometres in 2020. Aggregating these freight segments, total road freight across Australia increased from around 25.1 billion tonne kilometres in 1970 to 222.9 billion tonne kilometres in 2020.

In terms of growth, interstate road freight increased by 4.9 per cent per annum between 1970 and 2020, faster than either capital city road freight (4.0 per cent per annum) and rest-of-state road freight (4.4 per cent per annum) over this period. Overall, the average annual growth rate in total road freight across Australia was 4.5 per cent between 1970 and 2020 (see Table 6.2).

Over the forecast horizon, 2020 to 2040, capital city road freight is forecast to increase to 76.9 billion tonne kilometres by 2040, total interstate road freight is forecast to increase to around 130.4 billion tonne kilometres, and rest-of-state road freight is projected to grow from 99 billion tonne kilometres to 130 billion tonne kilometres by 2040. Aggregated, these forecasts imply total Australian road freight will grow to around 337.2 billion tonne kilometres by 2040 (see Figure 6.1 and Table E.1).

Figure 6.1 Road freight estimates and forecasts by interstate capital cities and rest of state, Australia, 1970–2040



Source: ABS (2020b) and earlier issues

Table 6.1 Road freight estimates (1970–2020) and forecasts (2021–2040) (billion tkm)

	Interstate						
Year	To	From	Through	Total	Capital city	Rest of State	All
1970	2.8	2.8	1.2	6.7	7.1	11.3	25.1
1980	4.6	4.5	2.0	11.1	13.0	28.5	52.5
1990	10.3	9.8	3.8	23.9	21.3	47.1	92.4
2000	22.8	21.2	6.7	50.7	29.6	54.5	134.8
2010	32.1	29.5	8.6	70.3	40.9	70.3	181.5
2020	33.3	28.2	11.7	73.2	50.4	99.4	222.9
2030	46.6	43.7	12.8	103.1	62.7	112.5	278.3
2040	59.3	55.2	15.8	130.4	76.9	129.9	337.2

Source: BITRE estimates.

Table 6.2 Average annual growth rates of capital city, interstate, rest-of-state and total Australian road freight estimates and forecasts, 1970–2040 (per cent pa)

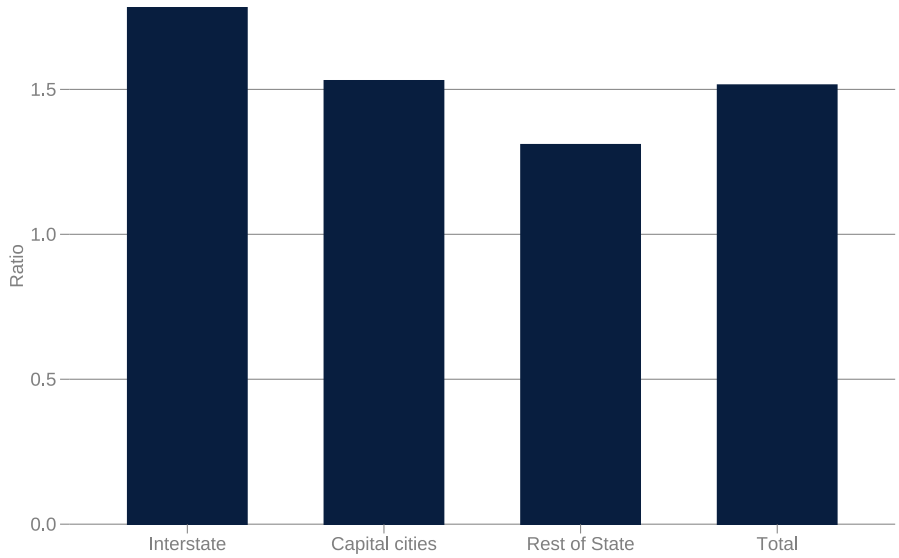
Period	Interstate	Capital city	Rest of State	Australia
1970 to 2020	4.9	4.0	4.4	4.5
2020 to 2040	2.9	2.1	1.3	2.1

Source: BITRE estimates.

For all three sub-national freight segments—capital city, interstate, rest-of-state—future growth is projected to be significantly lower than the 50-year historical (1970–2020) average annual growth rates , principally due to more moderate projected growth in future economic activity over the forecast horizon In particular, total capital city road freight is projected to grow by around 2.1 per cent per annum between 2020 and 2040, interstate freight is projected to grow by around 2.9 per cent per annum and rest-of-state road freight grow by 1.3 per cent per annum. Overall, total road freight is projected to grow by 2.1 per cent per annum between 2020 and 2040.

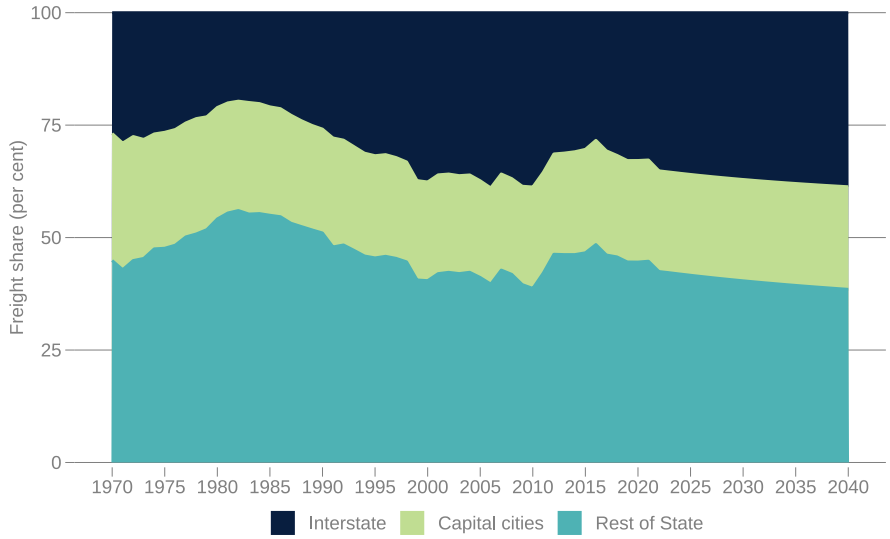
Though road freight volumes are projected to grow more slowly in the future, than previously, the implied growth still implies significant increases in overall road freight volumes. In particular, the forecast growth rates imply total interstate road freight will be 78 per cent larger in 2040, over 2020 levels, capital city road freight will be 53 per cent above 2020 levels by 2040, and rest-of-state road freight increase 31 per cent between 2020 and 2040. Total road freight volumes are expected to be approximately 50 per cent above 2020 levels by 2040 (see Figure 6.2).

Figure 6.2 Ratios of 2040 task to 2020 task for interstate, capital city, rest-of-state and total road freight



Source: BITRE estimates.

Figure 6.3 Interstate, capital city and rest of state road freight share, Australia, 1970–2040



Source: ABS (2020b) and earlier issues

Table 6.3 Comparison of projected average annual growth rate of total freight task in Australia, national average real GNI growth and national population growth

Parameters	Period	Growth
Avg. annual growth - Road freight	2020–2040	2.10
Avg. real GNI growth	2020–2040	2.35
Avg. national population growth	2020–2040	1.31

Source: BITRE estimates.

6.1.1 Road freight task shares

In proportionate terms, interstate road freight is projected to grow relative to capital city and rest-of-state road freight over the forecast horizon.

Figure 6.3 shows the proportion of national road freight by broad freight market—capital city, interstate and rest-of-state—between 1970 and 2040. Interstate road freight's share of total freight was 27 per cent in 1970, but declined to around 20 per cent by 1980, but thereafter steadily increased to around 39 per cent by 2010. However, as a result of the Global Financial Crisis, the interstate freight share again fell to around 33 per cent by 2020. Interstate freight's share is forecast to increase again from 2020 to 39 per cent by 2040.

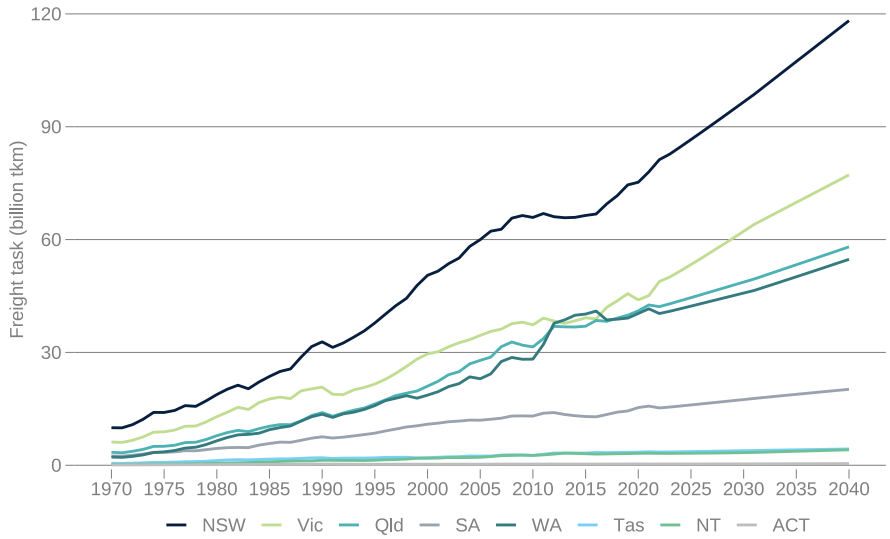
By contrast, the capital city road freight share was 28 per cent in 1970, decreased to 24 per cent by 1980, and 21 per cent by 2007, before increasing slightly to and it decreased to 22.5 per cent in 2020. This share is forecast to increase slightly to around 22.5 per cent by 2020. Capital city road freight is projected to remain around 22–23 per cent between 2020 and 2040.

The rest-of-state road freight share has varied, by between 39 and 55 per cent between 1970 and 2020. The rest-of-state road freight share is forecast to It started and ended the 1970 to decrease from around 45 per cent in 2020 to around 39 per cent by 2040.

6.1.2 Road freight growth drivers

The principle drivers of more muted future growth in road freight are slower population growth, national population growth is projected to grow by 1.31 per cent per annum between 2020 and 2040, and slower economic growth, gross national income (GNI) is projected to grow by 2.35 per cent per annum over the same period (see Table 6.3).

Figure 6.4 Road freight estimates and forecasts, by state and territory, 1970–2040



Source: ABS (2020b) and earlier issues

6.2 Road freight estimates and forecasts, by state and territory, 1970–2040

Aggregating the road freight forecasts by state and territory implies that, across all states, total road freight is projected to grow most strongly in Victoria (by 2.9 per cent per annum between 2020 and 2040), followed by New South Wales (2.3 per cent per annum) and Queensland (1.7 per cent per annum). Road freight volumes are projected to grow by less than 1.5 per cent per annum across other jurisdictions. Figure 6.4 shows estimated and forecast future road freight volumes by state and territory.

- In New South Wales, road freight volumes are projected to increase from around 75.2 billion tonne kilometres in 2020 to nearly 118.2 billion tonne kilometres by 2040.
- In Victoria, road freight volumes are projected to grow from around 44.0 billion tonne kilometres in 2020 to around 77.2 billion tonne kilometres in 2040.
- Queensland road freight volumes are projected to increase from around 41.1 billion tonne kilometres in 2020 to around 58.1 billion tonne kilometres in 2040.
- South Australian road freight volumes are projected to grow from around 15.4 billion tonne kilometres in 2020 to around 20.2 billion tonne kilometres in 2040.
- In Western Australia, road freight volumes are projected to grow from around 40.4 billion tonne kilometres in 2020 to around 54.8 billion tonne kilometres in 2040.
- In Tasmania and the two territories:
    - Tasmania: road freight volumes are projected to grow from around 3.5 billion tonne kilometres in 2020 to around 4.4 billion tonne kilometres by 2040..
    - Northern Territory: road freight volumes are projected to grow from 3.2 billion tonne kilometres in 2020 to around 4.1 billion tonne kilometres by 2040.
    - Australian Capital Territory: road freight volumes are projected to grow from around 0.35 billion tonne kilometres in 2020 to around 0.44 billion tonne kilometres by 2040.

Table 6.4 presents, and Figure 6.5 summarises, the average annual growth rates for the road freight estimates (1970–2020) and forecasts (2020–2040) of interstate (*from*, *to*, *through*, and total), capital city, rest-of-state and total road freight for each state and territory. The forecast growth rates (2020–2040) of road freight are projected to be slower in all states and territories, in comparison with historical growth rates (e.g. 1970–2020). This is due to the lower assumed economic growth rate and an assumed tapering off in the growth in freight per person.

Appendix Tables E.2 to E.9 provide a full list of state and territory road freight forecasts, broken down by interstate (*from*, *to*, *through* and total), capital city, rest-of-state and total state/territory road freight between 1970 and 2040.

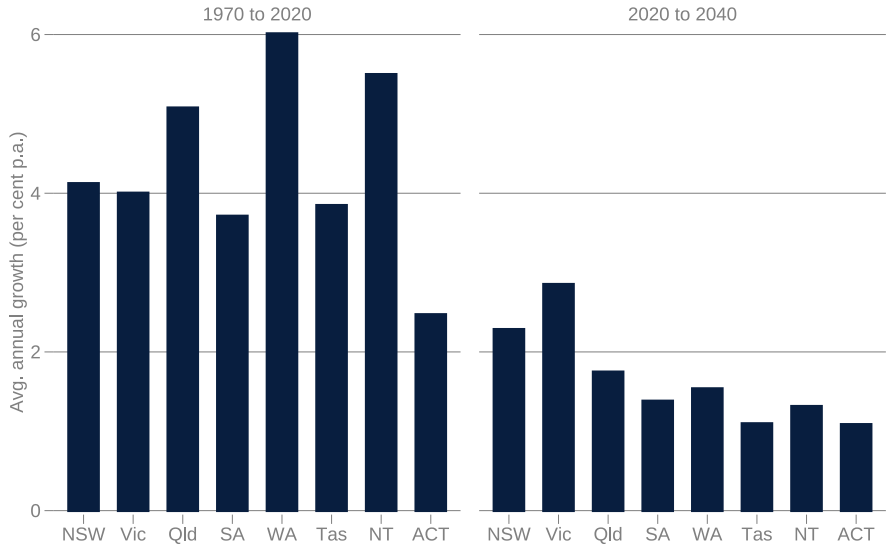
Table 6.4 Average annual growth rates of road freight estimates and forecasts, by state and territory, 1970–2040 (per cent pa)

	Interstate						
Period	To	From	Through	Total	Capital city	Rest of State	All
New South Wales							
1970 to 2020	5.5	4.5	4.4	4.9	3	3.8	4.1
2020 to 2040	3.0	4.0	1.7	3.1	2	0.9	2.3
Victoria							
1970 to 2020	4.1	4.8	4.8	4.5	4	3.3	4.0
2020 to 2040	3.2	3.7	1.2	3.3	2	2.8	2.9
Queensland							
1970 to 2020	5.7	5.0	-	5.4	6	4.8	5.1
2020 to 2040	2.6	2.9	-	2.7	2	1.2	1.7
South Australia							
1970 to 2020	4.9	5.1	6.4	5.3	3	2.7	3.7
2020 to 2040	3.3	1.1	1.0	1.9	2	0.2	1.4
Western Australia							
1970 to 2020	5.5	5.3	-	5.4	4	6.8	6.0
2020 to 2040	1.0	3.0	-	1.8	2	1.3	1.5
Tasmania							
1970 to 2020	-	-	-	-	4	3.9	3.8
2020 to 2040	-	-	-	-	2	0.8	1.1
Northern Territory							
1970 to 2020	3.8	5.3	-	4.8	4	7.7	5.5
2020 to 2040	3.7	2.2	-	2.6	2	-0.6	1.3
Australian Capital Territory							
1970 to 2020	-	-	-	-	2	-	2.2
2020 to 2040	-	-	-	-	1	-	0.6
Australia							
1970 to 2020	5.1	4.8	4.7	4.9	4	4.4	4.5
2020 to 2040	2.9	3.4	1.5	2.9	2	1.3	2.1

- * Not applicable

Source: BITRE estimates.

Figure 6.5 Average annual growth in total road freight, by state, actual (1970–2020) and forecast (2020–2040)



Source: BITRE estimates.

7. Concluding remarks

This report has presented a methodology, estimates and forecasts of capital city, interstate, rest-of-state and total road freight by state and territory. The methodology 'adjusts' and 'smooths' the raw estimates of state and territory road freight to remove unexplained survey variation.

7.1 Historical trends in road freight 1970–2020

Over the past 50 years national road freight in Australia has increased from approximately 25 billion tonne kilometres in 1970 to around 223 billion tonne kilometres in 2020—averaging growth of 4.5 per cent per annum. The growth in road freight over the past 50 years reflects the importance of road freight to the Australian economy and the domestic supply chains on which it depends.

Between 1970 and 2020, estimated total interstate road freight in Australia increased from around 6.7 billion tonne kilometres in 1970 to around 73 billion tonne kilometres in 2020, at an average growth rate of 4.9 per cent per annum. Over the same period, total road freight across the eight state and territory capital cities increased from 7.1 billion tonne kilometres 1970 to 50 billion tonne kilometres by 2020 (an average annual growth rate of 4.0 per cent) and rest-of-state road freight increased from 11.3 billion tonne kilometres in 1970 to 99 billion tonne kilometres by 2020 (an average annual growth rate of 4.4 per cent).

While the long-term trend has involved significant growth, there have been short periods during which road freight growth either slowed or contracted slightly. In particular, road freight volumes declined in response to domestic recessions in the early 1980s and 1990s, as well as declining due to the effects of the Global Financial Crisis and the subsequent closure of manufacturing operations that saw the end of some interstate shipments of manufactured goods. Otherwise, road freight volumes have increased almost continuously over this period.

7.2 Forecast trends of road freight tasks, 2020–2040

Over the 20 years from 2020 to 2040, total road freight in Australia is forecast to increase by 51 per cent, from 223 billion tonne kilometres in 2020 to 337 billion tonne kilometres by 2040—an average annual growth rate of 2.1 per cent per annum. The slower forecast rate of growth in future road freight reflects more muted growth in future economic activity, as measured by gross national income (GNI), and smaller expected reductions in road freight transport costs into the future.

Between 2020 and 2040, total interstate road freight in Australia is forecast to increase from 73 billion tonne kilometres in 2020 to 130 billion tonne kilometres by 2040—an average growth rate of 2.9 per cent per annum or 78 per cent increase on 2020 interstate volumes.

Capital city road freight task is forecast to increase from 50 billion tonne kilometres in 2020 to 77 billion tonne kilometres by 2040—an average growth rate of 2.1 per cent per annum or 53 per cent increase over 2020 levels.

Rest-of-state road freight task is forecast to increase from 99 billion tonne kilometres in 2020 to 130 billion tonne kilometres by 2040—an average growth rate of 1.3 per cent per annum or 31 per cent increase over 2020 levels.

The overall tonne-kilometre total road freight task in Australia is projected to grow faster (2.1 per cent per annum) than the rate of national population growth (1.31 per cent per annum), and slightly slower than the projected moderate GNI growth rate in Australia (2.35 per cent per annum).

7.3 Challenges of future growth in the road freight task

The projected increase in road freight to 2040 has implications for road network operations, maintenance and future investment requirements.

Increasing road freight volumes imply more trucks on the road, increase the demand for drivers, impose more wear and tear on road pavements, and potentially have adverse safety outcomes. While some of these impacts

might be ameliorated by increased use of larger and higher mass vehicle combinations, the scope for such vehicles to assist in managing this growth is likely to be limited to particular parts of the road network, and further road infrastructure investment will be necessary in some places to accommodate the additional number of trucks using the network.

There are also potential environmental consequences of increased truck movements—increased road noise in urban areas, increased air pollution in capital cities, and, of course, the contribution of freight vehicles to Australia's greenhouse emissions. Potential solutions to these issues may include the use of cleaner fuels for heavy vehicles, the improvement of rail freight service to more effectively compete with road freight, and the implementation of innovative freight 'hubbing'.

7.4 Data challenges

The forecasts presented in this report rely heavily on historical road freight movement estimates provided by the Survey of Motor Vehicle Use (SVMU) (ABS 2020b, and earlier issues), and the 2014 Road Freight Movements Survey (RFMS) and 2001 Freight Movements Survey (FMS) (ABS 2015, ABS 2002). The cessation of the ABS SMVU collection in 2020, and cessation of the ABS Motor Vehicle Census (MVC) collection in 2021, leave significant gaps in information about the road freight vehicle fleet and the national road freight task.

BITRE has developed a replacement collection for the ABS MVC and recently published the first issue (BITRE 2022b). BITRE is also working with key transport stakeholders, including states and territories, to explore options for establishing a replacement to the SMVU. However, a new collection is unlikely to be available within the next 12–18 months. The absence of reliable and regular estimates of road freight activity will impact BITRE's ability to produce reliable long-term forecasts of future national, state and territory road freight activity at over the medium term.

Appendix A – Freight forecast model results

This appendix presents selected freight forecast model results discussed in the body of the report.

- Table A.1 lists the regression results for the aggregate per capita road freight model.
- Table A.2 shows the model results for the metropolitan per capita road freight model.
- Table A.3 shows the model results for the total (*all modes*) interstate per capita road freight model.
- Table A.4 shows the model results for the interstate road freight share model.
- Table A.5 shows the individual interstate OD pair estimation results.

Table A.1 Estimation results – aggregate per capita road freight models

	Model 1
Intercept	-18290.800***
	(1425.255)
log(GNI per capita)	7525.865***
	(232.762)
log(Freight rate)	-2157.340***
	(277.754)
Dummy - Post-GFC	-612.551***
	(121.892)
Dummy - 1991	-203.953
	(143.087)
Num.Obs.	24
R2	0.997
R2 Adj.	0.996
Log.Lik.	-147.342
F	1198.522
RMSE	112.20

Source: BITRE estimates.
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table A.2 Estimation results – metropolitan road freight per capita model

	Model 1
Intercept	-4026.522***
	(354.838)
Log (GNI per capita)	2064.899***
	(54.702)
Log (Freight rate)	-854.109***
	(83.088)
Dummy - Post-2016	-332.518***
	(85.225)
Num.Obs.	24
R2	0.994
R2 Adj.	0.994
Log.Lik.	-126.268
F	1182.088
RMSE	46.63

Source: BITRE estimates.
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table A.3 Estimation results – total (all-modes) interstate freight per capita model

	Model 1
Intercept	-25.983***
	(3.809)
Log (GNI per capita)	2.560***
	(0.331)
Log (Freight rate)	0.365+
	(0.208)
Dummy - Pre-1998	-0.992***
	(0.175)
Dummy - Post-2012	-0.877***
	(0.117)
Num.Obs.	22
R2	0.989
R2 Adj.	0.987
Log.Lik.	21.038
F	389.864
RMSE	0.09

Source: BITRE estimates.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.4 Estimation results – interstate road freight share model

	Model 1
Intercept	-0.239
	(0.167)
Trend	0.094***
	(0.007)
Dummy - Post-2001	-0.423***
	(0.060)
Dummy - GFC	-0.656*
	(0.257)
Num.Obs.	21
R2	0.930
R2 Adj.	0.912
Log.Lik.	4.777
F	52.842
RMSE	0.19

Source: BITRE estimates.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.5 Interstate OD forecasting models – selected parameter estimates

					Dummy variables			
Interstate pair	OD pair	Specification	Intercept	IS freight	GFC	Man. closures	COVID-19	Mining boom
NSW-Vic	NSW-Vic	Log-linear	-2.158	1.028	-0.198	-0.138	-0.299	-
	Vic-NSW	Log-linear	-2.080	1.030	-0.194	-0.228	-0.307	-
NSW-Qld	NSW-Qld	Log-linear	-5.586	1.334	-0.079	-	0.021	-
	Qld-NSW	Log-linear	-5.673	1.318	-0.091	-	-0.138	-
NSW-SA	NSW-SA	Log-linear	-3.734	1.060	-	-	0.695	-
	SA-NSW	Log-linear	-1.552	0.833	-	-	-0.370	-
NSW-WA	WA-NSW	Log-linear	-4.100	0.933	-	-	-	-
NSW-NT	NSW-NT	Linear	-478.692	-	-	-	-	-
	NT-NSW	Linear	18.563	-	-	-	-	-
NSW-ACT	ACT-NSW	Log-linear	-5.877	1.022	-0.391	-	-	-
	NSW-ACT	Log-linear	-5.834	1.124	-	-	-	-
Vic-Qld	Qld-Vic	Log-linear	-4.783	1.178	-	-	-	-
	Vic-Qld	Log-linear	1.338	0.615	-	-	-	-
Vic-SA	SA-Vic	Log-linear	-0.404	0.771	-	-	-0.209	-
	Vic-SA	Log-linear	1.423	0.594	-	-	-	-
Vic-WA	WA-Vic	Log-linear	-5.826	1.088	-	-	1.052	-
Vic-NT	NT-Vic	Linear	3.616	-	-	-	-	-
	Vic-NT	Linear	-1.719	-	-	-	-	-
Vic-ACT	ACT-Vic	Log-linear	0.092	2.723	-	-	-	-
	Vic-ACT	Log-linear	-2.054	4.381	-	-	-	-
Qld-SA	Qld-SA	Log-linear	-5.102	1.083	-	-	1.072	-
	SA-Qld	Log-linear	0.408	0.560	-	-	-	-
Qld-WA	WA-Qld	Log-linear	-12.078	1.649	-0.589	-	0.243	0.499
Qld-NT	NT-Qld	Linear	-13.512	-	-	-	-	-
	Qld-NT	Linear	-20.232	-	-	-	-	-
Qld-ACT	ACT-Qld	Linear	6.120	-	-	-	-	-
	Qld-ACT	Linear	2.588	-	-	-	-	-
SA-WA	SA-WA	Log-linear	0.657	0.488	-	-	-	0.047
	WA-SA	Log-linear	-2.592	0.878	-	-	-	-
SA-NT	NT-SA	Linear	8.749	-	-	-	-	-
	SA-NT	Linear	23.664	-	-	-	-	-
WA-NT	NT-WA	Log-linear	-8.806	1.282	-	-	-	0.212
	WA-NT	Log-linear	-2.377	0.739	-	-	-	-0.855

[a] NSW–WA, Vic–WA and Qld–WA interstate freight movements not modelled separately and extrapolated from trends in eastern states–WA freight share.
Source:
BITRE estimates.

Appendix B – Road freight estimates and forecasts by capital city

This appendix lists annual capital city road freight estimates (1970–2020) and forecasts (2020-2040).

Table B.1 Capital city road freight estimates (1970–2020) and forecasts (2021–2040), by city (million tkm)

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	Total
1970	2,809	1,947	616	665	780	132	44	100	7,093
1971	2,755	1,909	605	652	765	129	43	98	6,957
1972	2,938	2,054	671	698	824	139	47	105	7,477
1973	3,173	2,238	754	757	900	151	52	115	8,139
1974	3,550	2,526	876	850	1,017	171	59	130	9,179
1975	3,585	2,574	919	862	1,039	174	61	132	9,346
1976	3,726	2,699	991	900	1,091	182	65	138	9,792
1977	3,999	2,940	1,164	972	1,192	198	81	150	10,696
1978	3,994	2,982	1,267	978	1,212	200	93	152	10,878
1979	4,248	3,222	1,462	1,048	1,313	215	112	164	11,783
1980	4,658	3,571	1,709	1,079	1,454	236	136	181	13,023
1981	4,976	3,856	1,940	1,076	1,567	253	160	194	14,023
1982	5,237	4,102	2,164	1,051	1,665	267	184	206	14,875
1983	5,155	4,082	2,155	1,043	1,634	263	185	204	14,721
1984	5,538	4,433	2,342	1,130	1,749	284	204	220	15,899
1985	5,815	4,705	2,488	1,196	1,830	299	219	233	16,785
1986	6,032	4,965	2,600	1,251	1,916	311	225	243	17,543
1987	6,046	5,061	2,626	1,264	1,938	313	224	245	17,716
1988	6,536	5,565	2,860	1,377	2,115	339	240	267	19,298
1989	6,921	5,983	3,043	1,463	2,274	359	252	284	20,580
1990	7,124	6,253	3,149	1,511	2,377	370	257	294	21,334
1991	6,959	6,203	3,092	1,481	2,358	362	248	288	20,991
1992	6,911	6,230	3,100	1,475	2,356	348	235	269	20,923
1993	7,144	6,513	3,236	1,528	2,451	347	231	260	21,709
1994	7,352	6,778	3,363	1,577	2,539	344	225	248	22,426
1995	7,697	7,176	3,555	1,655	2,675	347	223	240	23,567
1996	8,126	7,616	3,828	1,753	2,837	347	231	249	24,988
1997	8,478	7,987	4,073	1,836	2,973	341	237	256	26,181
1998	8,782	8,317	4,302	1,908	3,094	332	241	260	27,237
1999	9,035	8,693	4,686	1,945	3,199	274	234	254	28,320
2000	9,288	9,132	5,045	1,992	3,379	281	227	247	29,590
2001	9,570	9,400	5,318	2,031	3,498	301	215	234	30,567
2002	9,859	9,826	5,746	2,096	3,664	326	199	245	31,961
2003	10,054	9,969	6,095	2,149	3,758	350	180	253	32,806
2004	10,393	10,305	6,550	2,233	4,083	379	189	251	34,383
2005	10,594	10,505	6,938	2,288	3,687	405	212	245	34,874
2006	10,493	10,700	7,039	2,311	4,505	426	232	247	35,954
2007	10,666	11,192	7,334	2,396	5,068	460	259	256	37,632
2008	11,014	11,657	7,616	2,469	5,310	483	270	262	39,081
2009	11,241	12,001	7,817	2,514	5,499	501	278	264	40,114
2010	11,402	12,280	7,975	2,544	5,659	517	284	264	40,926
2011	11,852	12,933	8,361	2,635	6,011	551	299	273	42,915
2012	12,192	13,480	8,676	2,701	6,319	581	311	280	44,539
2013	12,252	13,604	8,716	2,719	6,503	593	311	277	44,974
2014	12,451	13,884	8,856	2,768	6,766	612	315	277	45,929
2015	12,568	14,251	9,049	2,835	6,612	635	320	279	46,549
2016	12,758	14,709	9,299	2,919	6,489	662	327	283	47,445
2017	12,975	15,160	9,541	3,001	6,311	690	334	285	48,299
2018	12,979	15,366	9,629	3,035	6,024	707	336	284	48,358
2019	13,177	15,821	9,870	3,115	6,371	735	342	293	49,724
2020	13,174	16,043	9,964	3,150	6,630	753	343	299	50,355

(continued)

Table B.1 Capital city road freight estimates (1970–2020) and forecasts (2021–2040), by city (million tkm) *(continued)*

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	Total
2021	13,988	16,322	10,307	3,183	6,624	756	335	275	51,789
2022	14,036	16,597	10,551	3,231	6,800	769	334	276	52,594
2023	14,148	16,954	10,787	3,280	6,972	783	334	278	53,536
2024	14,375	17,451	11,037	3,341	7,153	802	337	281	54,777
2025	14,607	17,962	11,292	3,403	7,336	821	340	284	56,046
2026	14,845	18,487	11,548	3,467	7,519	841	344	286	57,337
2027	15,087	19,025	11,807	3,531	7,701	861	348	289	58,650
2028	15,333	19,577	12,068	3,597	7,884	881	352	292	59,983
2029	15,583	20,139	12,330	3,663	8,066	902	358	295	61,336
2030	15,832	20,709	12,592	3,730	8,249	923	364	297	62,696
2031	16,079	21,285	12,854	3,796	8,433	944	371	300	64,061
2032	16,387	21,786	13,144	3,854	8,653	964	380	304	65,472
2033	16,695	22,288	13,434	3,912	8,876	985	390	308	66,887
2034	17,002	22,791	13,725	3,969	9,101	1,005	400	312	68,306
2035	17,309	23,295	14,017	4,026	9,329	1,026	410	316	69,729
2036	17,615	23,801	14,311	4,083	9,559	1,047	421	320	71,156
2037	17,922	24,309	14,605	4,139	9,792	1,067	431	324	72,588
2038	18,228	24,818	14,900	4,195	10,026	1,088	441	328	74,024
2039	18,535	25,329	15,197	4,251	10,263	1,109	452	332	75,467
2040	18,842	25,842	15,495	4,307	10,502	1,130	463	336	76,915

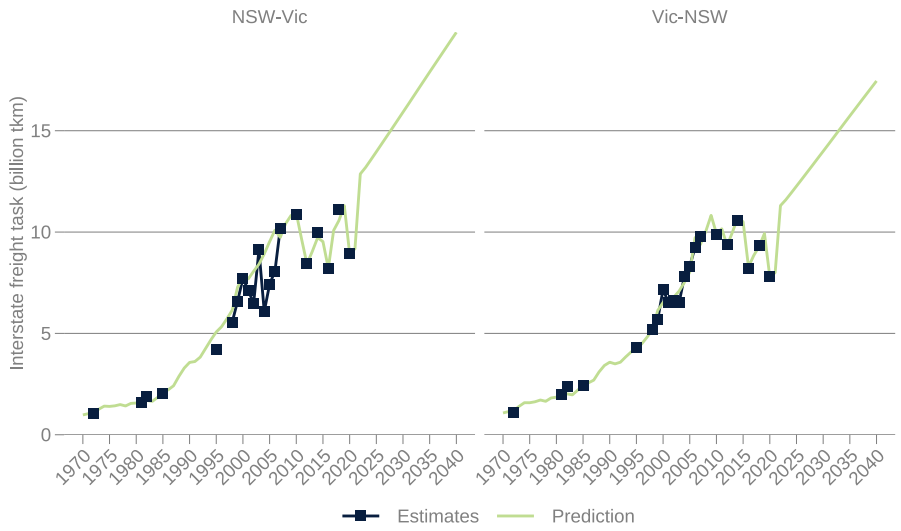
Source: BITRE estimates.

Appendix C – Interstate origin–destination road freight task estimates and forecasts

This appendix presents selected interstate origin–destination road freight estimation outputs.

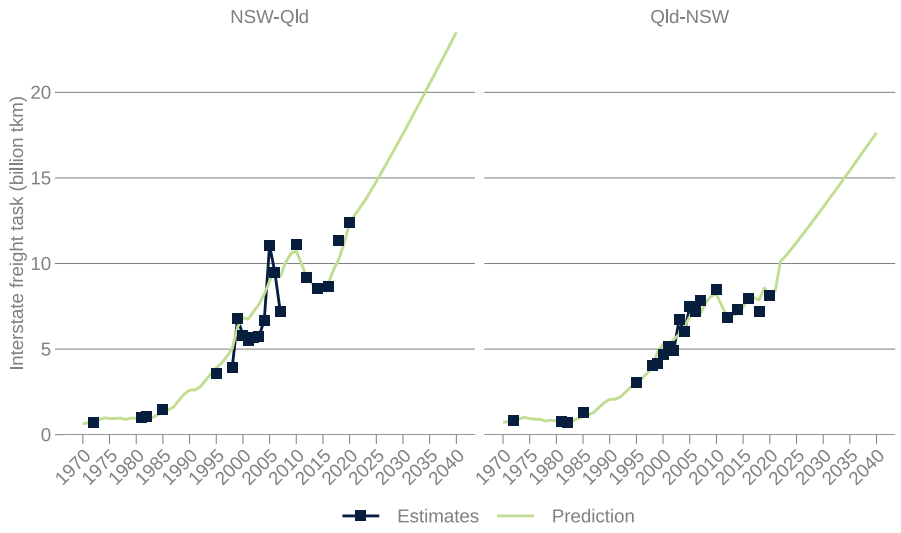
Figures C.1 to C.17 show the results of the regression fits for each of the 18 interstate OD pair estimation models described in Chapter 4.

Figure C.1 Estimated and predicted interstate origin–destination road freight, NSW–Vic, 1970–2040



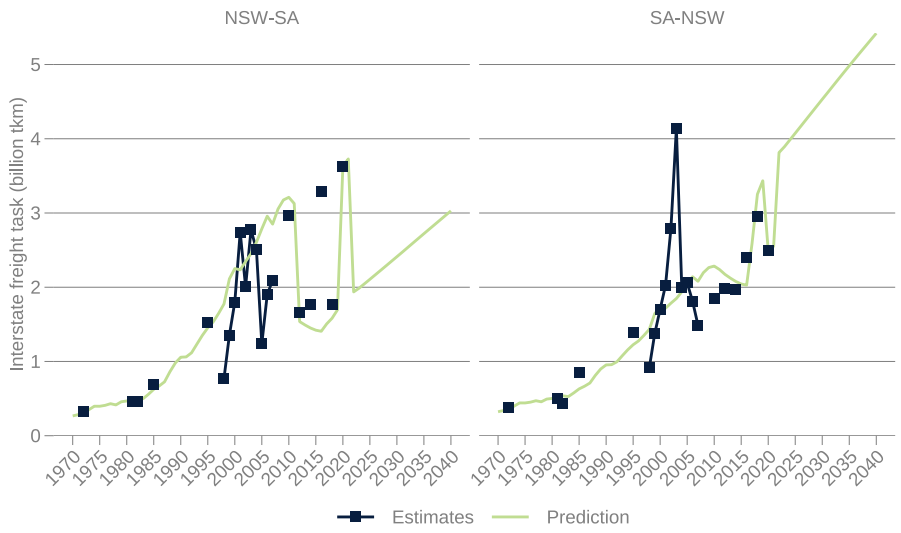
Source: BITRE estimates.

Figure C.2 Estimated and predicted interstate origin–destination road freight, NSW–Qld, 1970–2040



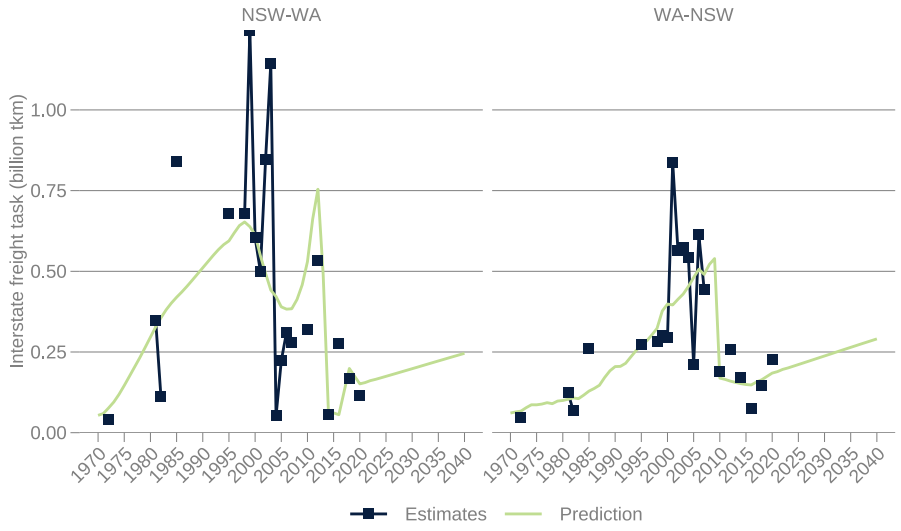
Source: BITRE estimates.

Figure C.3 Estimated and predicted interstate origin–destination road freight, NSW–SA, 1970–2040



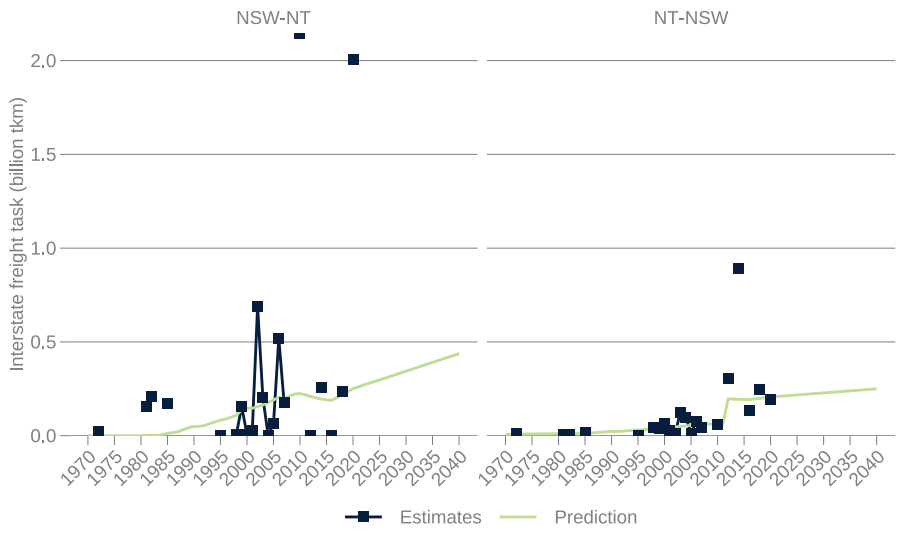
Source: BITRE estimates.

Figure C.4 Estimated and predicted interstate origin–destination road freight, NSW–WA, 1970–2040



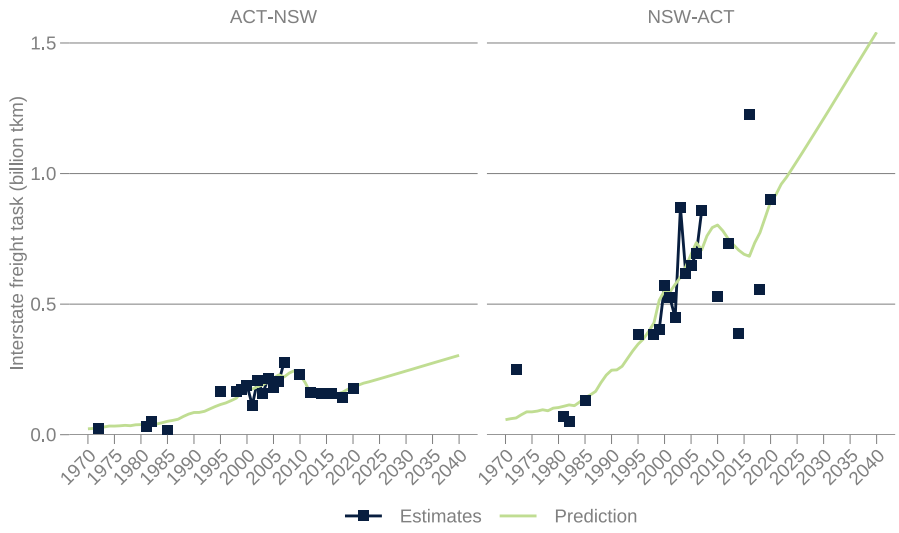
Source: BITRE estimates.

Figure C.5 Estimated and predicted interstate origin–destination road freight, NSW–NT, 1970–2040



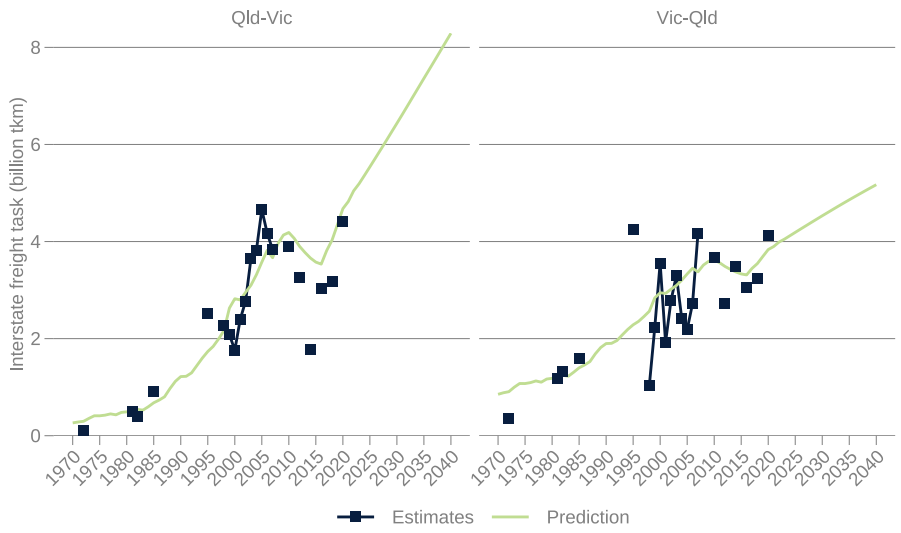
Source: BITRE estimates.

Figure C.6 Estimated and predicted interstate origin–destination road freight, NSW–ACT, 1970–2040



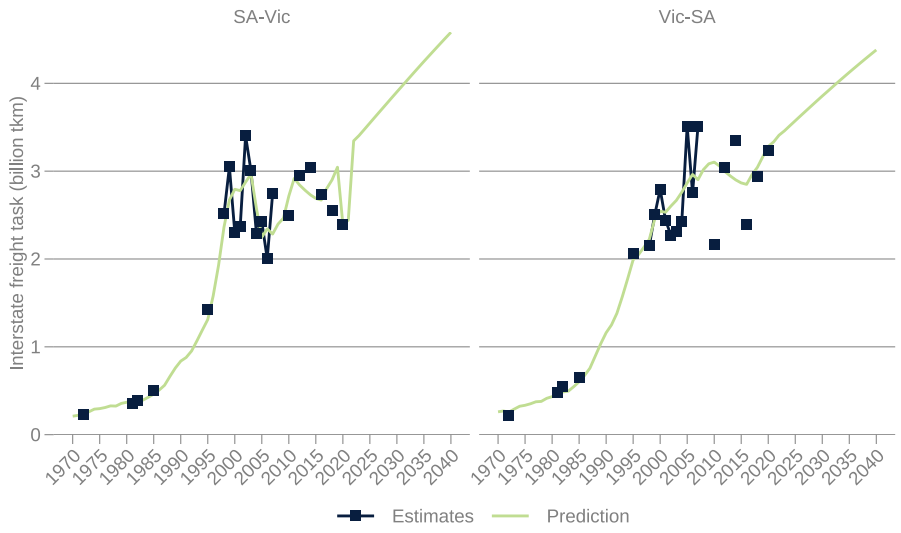
Source: BITRE estimates.

Figure C.7 Estimated and predicted interstate origin–destination road freight, Vic–Qld, 1970–2040



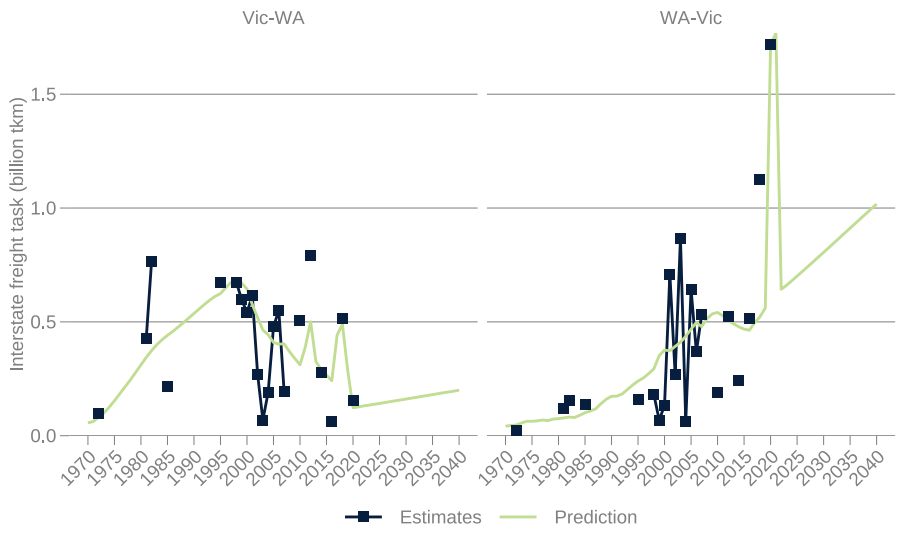
Source: BITRE estimates.

Figure C.8 Estimated and predicted interstate origin–destination road freight, Vic–SA, 1970–2040



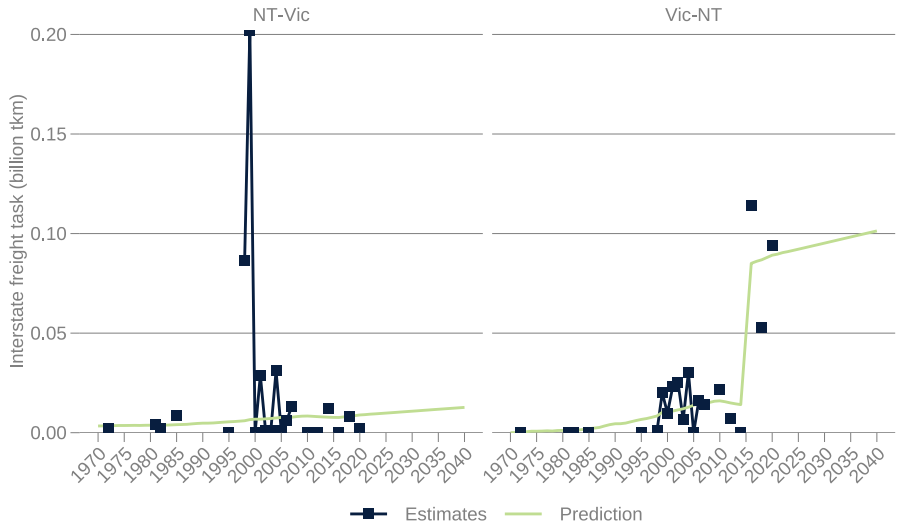
Source: BITRE estimates.

Figure C.9 Estimated and predicted interstate origin–destination road freight, Vic–WA, 1970–2040



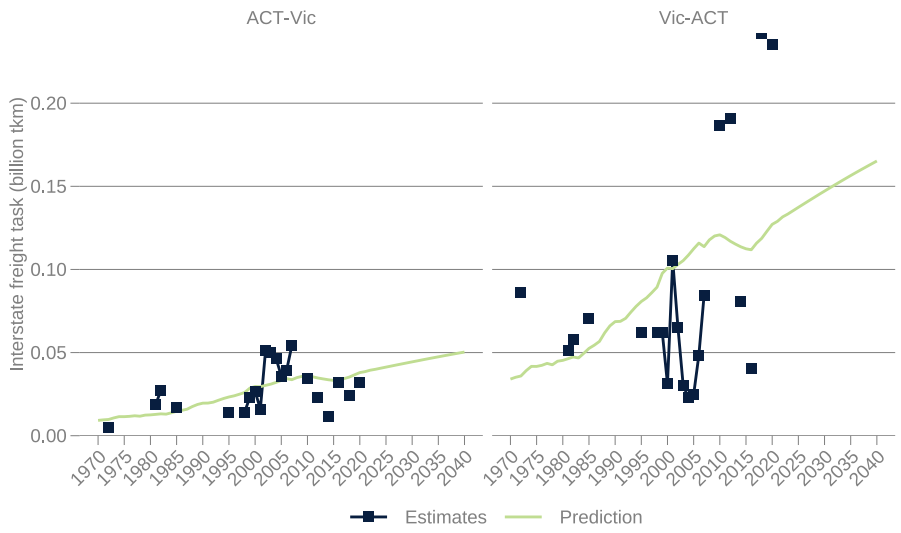
Source: BITRE estimates.

Figure C.10 Estimated and predicted interstate origin–destination road freight, Vic–NT, 1970–2040



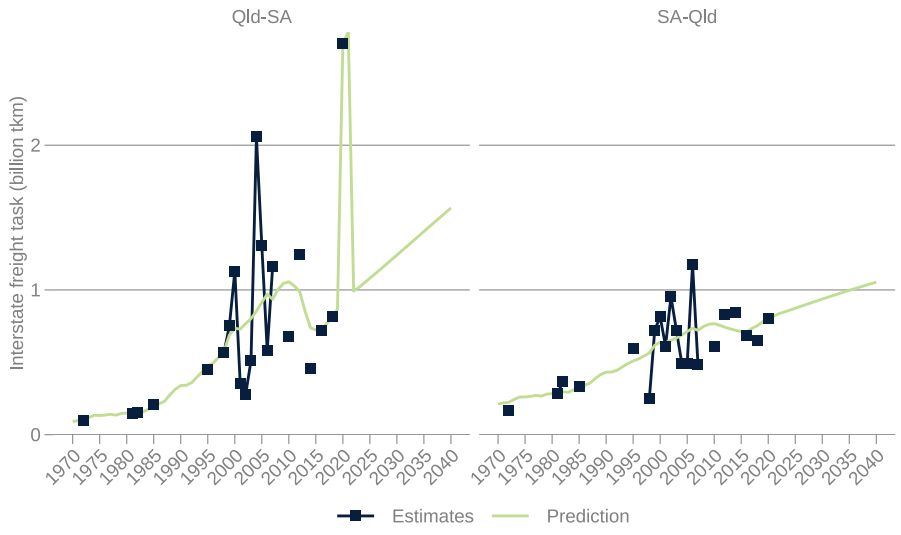
Source: BITRE estimates.

Figure C.11 Estimated and predicted interstate origin–destination road freight, Vic–ACT, 1970–2040



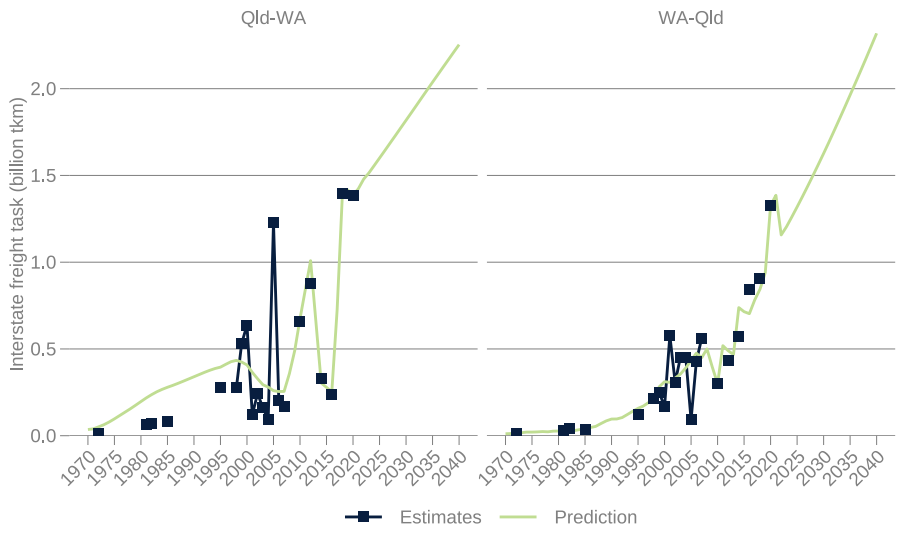
Source: BITRE estimates.

Figure C.12 Estimated and predicted interstate origin–destination road freight, Qld–SA, 1970–2040



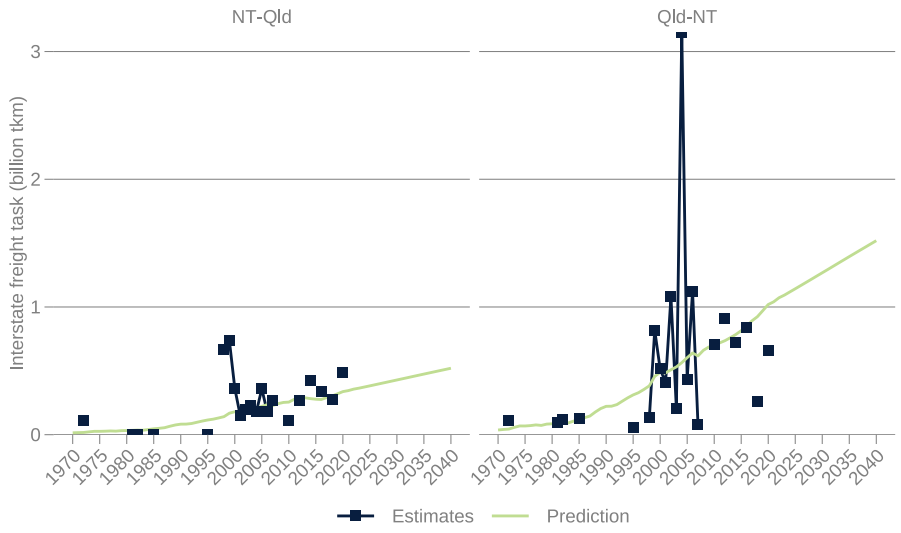
Source: BITRE estimates.

Figure C.13 Estimated and predicted interstate origin–destination road freight, Qld–WA, 1970–2040



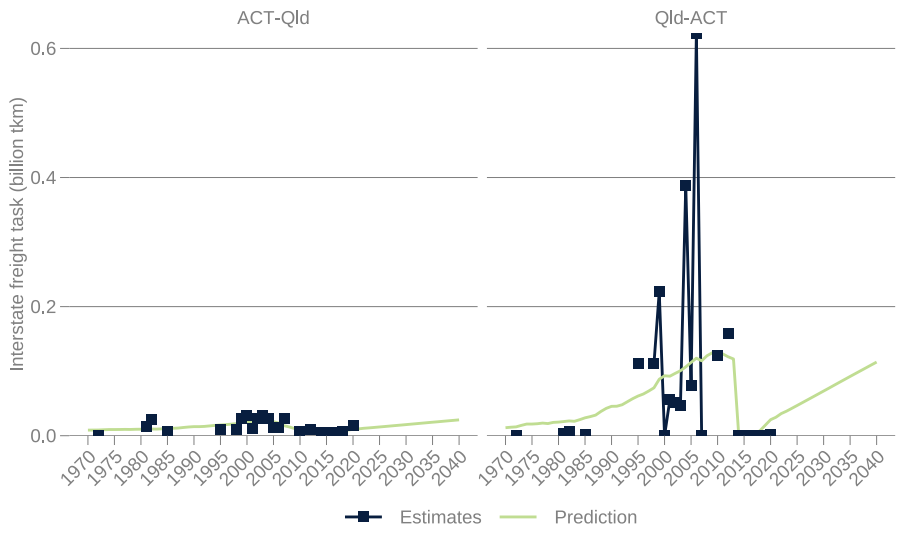
Source: BITRE estimates.

Figure C.14 Estimated and predicted interstate origin–destination road freight, Qld–NT, 1970–2040



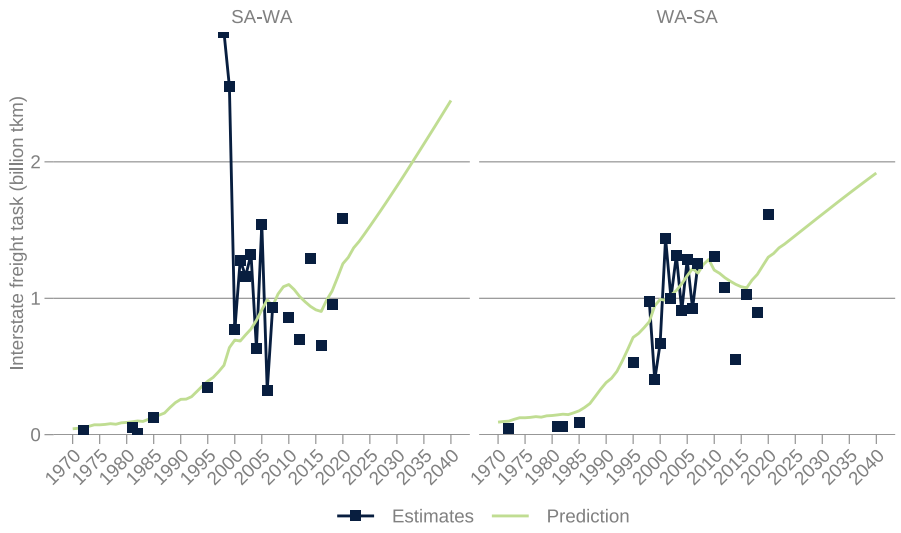
Source: BITRE estimates.

Figure C.15 Estimated and predicted interstate origin–destination road freight, Qld–ACT, 1970–2040



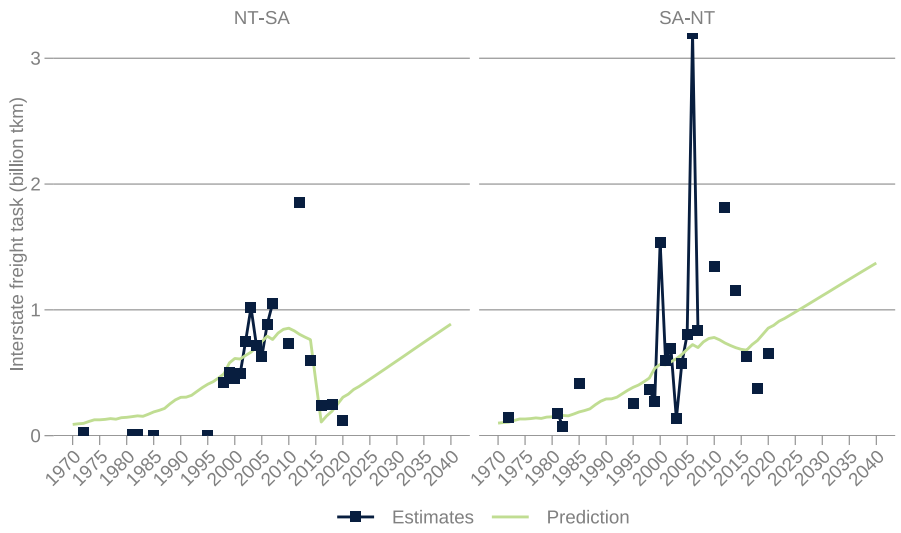
Source: BITRE estimates.

Figure C.16 Estimated and predicted interstate origin–destination road freight, SA–WA, 1970–2040



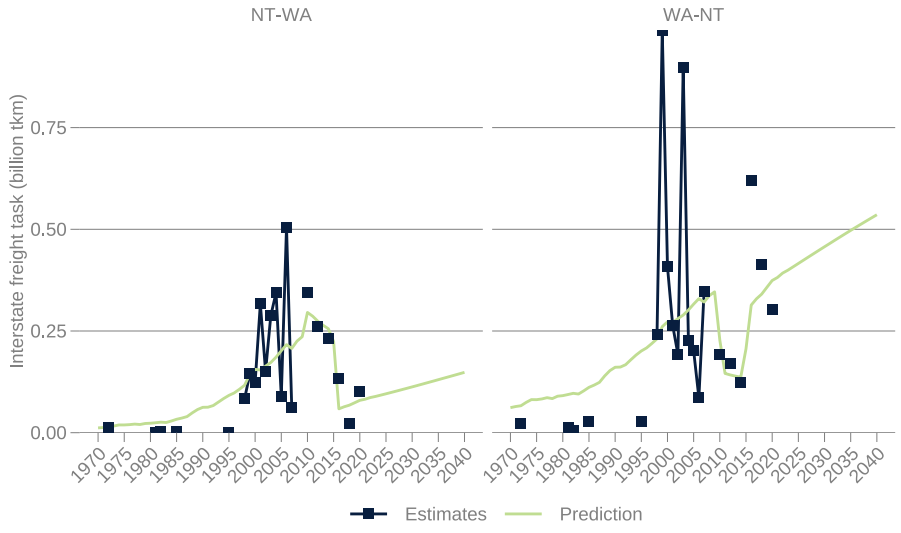
Source: BITRE estimates.

Figure C.17 Estimated and predicted interstate origin–destination road freight, SA–NT, 1970–2040



Source: BITRE estimates.

Figure C.18 Estimated and predicted interstate origin–destination road freight, WA–NT, 1970–2040



Source: BITRE estimates.

Tables C.1 to C.7 list estimated and forecast interstate road freight, by origin–destination state pairs, between 1970 and 2040.

Table C.1 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: NSW (million tkm)

	Destination state					
Year	Vic	Qld	SA	WA	NT	ACT
1970	978	639	267	54	0	57
1971	1,039	692	284	59	0	61
1972	1,082	730	296	77	0	64
1973	1,262	870	350	95	0	77
1974	1,413	982	397	119	0	88
1975	1,398	942	397	146	0	87
1976	1,427	942	409	175	0	90
1977	1,489	970	431	204	0	96
1978	1,420	887	415	233	0	92
1979	1,547	967	457	264	0	102
1980	1,565	956	467	296	0	104
1981	1,617	971	488	327	0	109
1982	1,688	1,028	510	356	2	114
1983	1,646	994	497	381	1	111
1984	1,838	1,150	557	402	6	125
1985	2,055	1,331	625	420	12	141
1986	2,218	1,455	670	436	16	152
1987	2,417	1,612	726	454	21	166
1988	2,881	2,008	862	473	33	199
1989	3,290	2,365	980	492	43	228
1990	3,569	2,603	1,057	511	49	247
1991	3,612	2,616	1,061	530	50	248
1992	3,828	2,793	1,117	549	54	262
1993	4,256	3,175	1,235	567	64	292
1994	4,684	3,562	1,352	583	74	321
1995	5,068	3,907	1,454	594	83	346
1996	5,333	4,178	1,532	619	89	366
1997	5,720	4,582	1,647	642	99	396
1998	6,149	5,038	1,774	653	109	428
1999	7,285	6,295	2,113	638	137	515
2000	7,748	6,827	2,252	613	148	551
2001	7,688	6,757	2,234	549	146	546
2002	8,064	7,195	2,346	494	156	576
2003	8,414	7,608	2,451	442	164	603
2004	8,925	8,221	2,605	422	176	643
2005	9,526	8,956	2,786	390	191	691
2006	10,093	9,663	2,957	383	205	736
2007	9,738	9,219	2,850	384	196	707
2008	10,413	10,068	3,054	413	212	761
2009	10,814	10,581	3,175	458	222	793
2010	10,933	10,734	3,211	530	225	803
2011	9,650	9,974	3,127	662	218	781
2012	8,429	9,142	1,536	754	209	750
2013	9,042	8,801	1,491	491	202	727
2014	9,724	8,499	1,451	67	196	706
2015	9,529	8,612	1,421	61	191	691
2016	8,214	8,841	1,406	56	189	683
2017	10,078	9,644	1,506	127	204	734
2018	10,573	10,271	1,582	199	216	774
2019	11,305	11,216	1,695	175	234	833
2020	8,931	12,401	3,627	151	252	892
2021	9,174	12,847	3,728	155	259	919
2022	12,868	13,296	1,937	161	271	959
2023	13,193	13,740	1,987	165	279	986
2024	13,575	14,264	2,047	170	288	1,017
2025	13,960	14,798	2,107	175	297	1,049
2026	14,347	15,341	2,167	179	307	1,080
2027	14,737	15,890	2,228	184	316	1,113

(continued)

Table C.1 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: NSW (million tkm) *(continued)*

	Destination state					
Year	Vic	Qld	SA	WA	NT	ACT
2028	15,129	16,448	2,289	189	325	1,145
2029	15,523	17,013	2,350	194	335	1,178
2030	15,915	17,580	2,411	198	344	1,210
2031	16,307	18,151	2,472	203	353	1,243
2032	16,707	18,738	2,535	208	363	1,276
2033	17,105	19,327	2,597	213	372	1,309
2034	17,501	19,918	2,659	217	382	1,343
2035	17,896	20,510	2,721	222	391	1,376
2036	18,290	21,105	2,783	227	400	1,409
2037	18,682	21,702	2,844	232	410	1,442
2038	19,074	22,302	2,906	236	419	1,475
2039	19,464	22,904	2,967	241	428	1,508
2040	19,854	23,510	3,029	246	437	1,541

Source: BITRE estimates.

Table C.2 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: Victoria (million tkm)

	Destination state					
Year	NSW	Qld	SA	WA	NT	ACT
1970	1,074	853	260	56	0	34
1971	1,141	885	270	62	0	35
1972	1,188	907	257	80	0	36
1973	1,400	1,000	292	100	0	39
1974	1,581	1,075	324	125	1	42
1975	1,579	1,074	335	153	1	42
1976	1,627	1,094	352	184	1	42
1977	1,713	1,128	375	215	1	43
1978	1,649	1,103	379	245	1	43
1979	1,814	1,167	414	278	1	45
1980	1,853	1,182	433	311	1	45
1981	1,931	1,212	459	344	1	46
1982	2,017	1,244	486	374	1	47
1983	1,967	1,225	496	400	1	47
1984	2,196	1,308	546	422	2	50
1985	2,455	1,399	602	441	2	53
1986	2,559	1,457	673	458	2	54
1987	2,693	1,526	757	477	3	57
1988	3,100	1,687	896	496	3	62
1989	3,417	1,817	1,035	517	4	66
1990	3,579	1,898	1,160	537	4	69
1991	3,498	1,903	1,250	557	5	69
1992	3,579	1,960	1,383	577	5	71
1993	3,841	2,078	1,572	596	5	74
1994	4,082	2,190	1,778	612	6	78
1995	4,264	2,284	1,990	624	7	81
1996	4,487	2,355	2,050	650	7	83
1997	4,814	2,456	2,135	674	8	86
1998	5,175	2,564	2,225	686	8	89
1999	6,133	2,838	2,454	671	10	98
2000	6,524	2,945	2,543	645	11	101
2001	6,473	2,931	2,532	577	11	100
2002	6,791	3,016	2,603	519	11	103
2003	7,086	3,094	2,667	464	12	105
2004	7,517	3,205	2,760	443	13	109
2005	8,024	3,332	2,866	410	14	112
2006	9,728	3,450	2,963	402	15	116
2007	9,385	3,376	2,902	403	14	114
2008	10,037	3,515	3,017	370	15	118
2009	10,825	3,595	3,084	340	16	120
2010	9,932	3,619	3,103	311	16	121
2011	10,161	3,563	3,057	389	16	119
2012	9,336	3,487	2,994	501	15	117
2013	9,993	3,427	2,945	326	15	115
2014	10,722	3,373	2,900	290	14	114
2015	10,508	3,333	2,866	266	49	112
2016	8,282	3,313	2,849	242	85	112
2017	8,850	3,447	2,961	442	86	116
2018	9,285	3,547	3,044	489	87	119
2019	9,929	3,692	3,164	286	88	123
2020	7,787	3,835	3,282	123	89	127
2021	7,999	3,897	3,333	126	90	129
2022	11,305	3,989	3,409	131	90	132
2023	11,591	4,049	3,459	134	91	133
2024	11,927	4,119	3,516	138	92	135
2025	12,266	4,188	3,574	142	92	137
2026	12,607	4,258	3,630	146	93	139
2027	12,950	4,326	3,687	149	93	141
2028	13,295	4,395	3,743	153	94	143
2029	13,641	4,463	3,799	157	95	145
2030	13,987	4,530	3,855	161	95	147

(continued)

Table C.2 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: Victoria (million tkm) *(continued)*

	Destination state					
Year	NSW	Qld	SA	WA	NT	ACT
2031	14,332	4,597	3,909	165	96	149
2032	14,683	4,664	3,964	169	96	151
2033	15,034	4,730	4,018	173	97	153
2034	15,383	4,795	4,072	177	98	155
2035	15,731	4,860	4,125	181	98	156
2036	16,077	4,923	4,177	184	99	158
2037	16,423	4,986	4,228	188	100	160
2038	16,768	5,049	4,279	192	100	162
2039	17,112	5,110	4,330	196	101	164
2040	17,455	5,171	4,380	200	101	165

Source: BITRE estimates.

Table C.3 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: Queensland (million tkm)

	Destination state					
Year	NSW	Vic	SA	WA	NT	ACT
1970	710	264	91	36	37	12
1971	768	283	97	39	41	13
1972	809	296	101	51	44	14
1973	928	357	119	63	57	16
1974	1,009	410	134	79	68	18
1975	938	410	133	97	68	18
1976	907	424	135	116	71	19
1977	902	450	142	136	77	20
1978	799	431	135	155	73	19
1979	840	480	147	176	83	21
1980	803	492	149	197	85	21
1981	788	516	154	218	90	22
1982	833	542	161	236	95	23
1983	807	526	157	253	92	22
1984	929	597	176	267	106	25
1985	1,072	679	198	279	122	28
1986	1,169	734	213	290	133	30
1987	1,292	802	231	302	146	32
1988	1,601	971	276	314	178	38
1989	1,878	1,120	314	327	205	42
1990	2,062	1,218	340	340	222	46
1991	2,072	1,223	341	353	223	46
1992	2,209	1,295	359	365	236	48
1993	2,503	1,448	398	377	262	53
1994	2,800	1,601	437	387	289	57
1995	3,065	1,735	470	395	311	61
1996	3,272	1,839	496	411	329	65
1997	3,579	1,993	534	427	354	69
1998	3,927	2,165	576	434	383	74
1999	4,880	2,629	689	424	457	87
2000	5,281	2,822	735	408	487	93
2001	5,229	2,797	729	365	483	92
2002	5,559	2,954	767	328	508	97
2003	5,870	3,101	802	294	531	101
2004	6,331	3,318	853	280	564	107
2005	6,882	3,575	914	259	603	114
2006	7,412	3,820	971	255	640	120
2007	7,079	3,666	935	255	617	116
2008	7,715	3,959	1,004	358	661	124
2009	8,098	4,134	1,044	490	687	128
2010	8,212	4,186	1,056	673	694	130
2011	7,524	4,065	1,028	841	719	127
2012	6,927	3,900	990	1,009	736	122
2013	6,985	3,773	854	656	759	119
2014	7,066	3,660	739	304	785	0
2015	7,455	3,576	723	279	814	0
2016	7,966	3,535	715	253	850	0
2017	8,009	3,813	767	724	892	2
2018	7,866	4,028	807	1,396	924	8
2019	8,572	4,350	866	1,417	971	16
2020	8,101	4,677	2,702	1,386	1,019	25
2021	8,386	4,824	2,780	1,423	1,040	29
2022	10,119	5,045	992	1,478	1,072	34
2023	10,448	5,191	1,018	1,515	1,093	38
2024	10,837	5,363	1,050	1,557	1,118	42
2025	11,233	5,538	1,081	1,600	1,142	47
2026	11,634	5,715	1,113	1,643	1,167	51
2027	12,041	5,893	1,144	1,687	1,192	56
2028	12,453	6,072	1,176	1,730	1,217	60
2029	12,869	6,254	1,209	1,774	1,243	65
2030	13,288	6,435	1,241	1,818	1,268	69

(continued)

Table C.3 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: Queensland (million tkm) *(continued)*

	Destination state					
Year	NSW	Vic	SA	WA	NT	ACT
2031	13,709	6,617	1,273	1,861	1,293	74
2032	14,141	6,803	1,306	1,906	1,318	78
2033	14,574	6,989	1,339	1,950	1,344	83
2034	15,009	7,175	1,371	1,994	1,369	87
2035	15,444	7,361	1,404	2,037	1,394	92
2036	15,881	7,546	1,437	2,081	1,419	96
2037	16,319	7,732	1,469	2,124	1,444	101
2038	16,759	7,918	1,501	2,168	1,469	105
2039	17,200	8,104	1,534	2,211	1,494	110
2040	17,643	8,290	1,566	2,254	1,519	114

Source: BITRE estimates.

Table C.4 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: SA (million tkm)

	Destination state					
Year	NSW	Vic	Qld	WA	NT	ACT
1970	323	211	212	43	100	-
1971	339	220	219	47	105	-
1972	350	227	224	49	108	-
1973	400	261	244	62	121	-
1974	442	291	261	73	133	-
1975	441	297	260	72	133	-
1976	452	309	264	75	136	-
1977	471	328	272	81	141	-
1978	457	326	266	77	137	-
1979	493	356	280	87	148	-
1980	502	369	283	90	150	-
1981	519	389	290	95	155	-
1982	538	401	296	100	161	-
1983	527	394	293	97	158	-
1984	576	427	310	113	172	-
1985	630	462	329	131	189	-
1986	666	508	341	143	200	-
1987	710	562	356	159	213	-
1988	813	664	389	199	246	-
1989	899	760	416	235	274	-
1990	954	838	432	259	292	-
1991	957	879	433	261	293	-
1992	996	953	445	279	306	-
1993	1,078	1,069	468	318	334	-
1994	1,157	1,192	491	357	361	-
1995	1,225	1,312	509	393	384	-
1996	1,277	1,580	523	420	403	-
1997	1,352	1,931	543	462	429	-
1998	1,433	2,362	565	509	458	-
1999	1,644	2,671	618	639	535	-
2000	1,728	2,794	639	694	566	-
2001	1,717	2,778	636	686	562	-
2002	1,785	2,876	652	732	588	-
2003	1,848	2,966	667	775	611	-
2004	1,938	2,576	688	839	646	-
2005	2,043	2,248	713	915	686	-
2006	2,141	2,344	735	989	724	-
2007	2,080	2,284	721	942	700	-
2008	2,196	2,398	747	1,031	746	-
2009	2,265	2,464	763	1,085	773	-
2010	2,285	2,717	767	1,101	781	-
2011	2,238	2,917	757	1,063	762	-
2012	2,173	2,842	742	1,013	737	-
2013	2,123	2,783	731	975	717	-
2014	2,078	2,730	721	941	699	-
2015	2,044	2,690	713	915	686	-
2016	2,027	2,670	709	903	680	-
2017	2,587	2,802	734	987	723	-
2018	3,253	2,901	753	1,052	756	-
2019	3,434	3,045	781	1,151	805	-
2020	2,497	2,394	808	1,253	855	-
2021	2,552	2,441	819	1,299	877	-
2022	3,814	3,345	837	1,370	910	-
2023	3,892	3,406	848	1,416	931	-
2024	3,983	3,477	861	1,471	957	-
2025	4,074	3,548	874	1,528	982	-
2026	4,166	3,619	886	1,585	1,008	-
2027	4,257	3,690	899	1,643	1,034	-
2028	4,349	3,761	912	1,702	1,060	-
2029	4,440	3,832	924	1,761	1,086	-
2030	4,531	3,902	937	1,821	1,112	-

(continued)

Table C.4 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: SA (million tkm) *(continued)*

	Destination state					
Year	NSW	Vic	Qld	WA	NT	ACT
2031	4,621	3,971	949	1,882	1,138	-
2032	4,713	4,042	961	1,944	1,165	-
2033	4,804	4,111	973	2,006	1,191	-
2034	4,894	4,180	985	2,069	1,217	-
2035	4,983	4,248	997	2,131	1,243	-
2036	5,072	4,316	1,009	2,195	1,269	-
2037	5,160	4,383	1,020	2,258	1,295	-
2038	5,247	4,449	1,032	2,322	1,321	-
2039	5,334	4,515	1,043	2,386	1,347	-
2040	5,421	4,581	1,054	2,450	1,372	-

Source: BITRE estimates.

Table C.5 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: WA (million tkm)

	Destination state					
Year	NSW	Vic	Qld	SA	NT	ACT
1970	61	42	11	92	62	-
1971	64	45	12	97	64	-
1972	67	47	13	100	66	-
1973	77	56	17	113	74	-
1974	86	63	21	124	81	-
1975	86	63	21	124	81	-
1976	89	65	22	127	83	-
1977	93	69	24	132	86	-
1978	90	66	22	128	84	-
1979	98	73	26	138	90	-
1980	100	75	27	141	91	-
1981	104	78	29	145	94	-
1982	108	82	31	150	97	-
1983	105	80	30	147	95	-
1984	116	90	35	160	103	-
1985	129	101	42	175	111	-
1986	137	108	47	199	117	-
1987	147	118	53	228	124	-
1988	171	140	70	281	140	-
1989	192	160	85	334	153	-
1990	205	173	96	382	161	-
1991	205	174	97	414	161	-
1992	215	183	105	464	167	-
1993	235	203	122	541	179	-
1994	254	223	141	625	191	-
1995	271	240	158	713	201	-
1996	284	253	171	742	208	-
1997	303	273	191	783	219	-
1998	323	294	215	829	231	-
1999	377	352	282	945	261	-
2000	399	376	311	992	273	-
2001	396	373	307	986	271	-
2002	413	392	332	1,023	280	-
2003	430	410	355	1,057	289	-
2004	453	437	391	1,107	302	-
2005	481	468	434	1,164	316	-
2006	507	497	476	1,218	330	-
2007	490	479	449	1,184	321	-
2008	521	514	500	1,248	337	-
2009	539	535	396	1,285	346	-
2010	169	541	300	1,207	228	-
2011	165	527	519	1,183	146	-
2012	160	507	490	1,150	142	-
2013	156	492	468	1,125	139	-
2014	152	478	738	1,102	136	-
2015	149	468	715	1,085	206	-
2016	148	463	703	1,076	314	-
2017	157	497	782	1,133	329	-
2018	164	522	844	1,176	341	-
2019	174	561	940	1,239	358	-
2020	185	1,718	1,327	1,301	374	-
2021	189	1,768	1,386	1,329	381	-
2022	196	643	1,157	1,370	392	-
2023	201	660	1,204	1,396	399	-
2024	206	681	1,261	1,428	408	-
2025	211	701	1,318	1,459	416	-
2026	216	722	1,378	1,490	424	-
2027	222	742	1,438	1,522	433	-
2028	227	763	1,500	1,553	441	-
2029	232	784	1,563	1,584	449	-
2030	238	805	1,627	1,615	457	-

(continued)

Table C.5 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: WA (million tkm) *(continued)*

	Destination state					
Year	NSW	Vic	Qld	SA	NT	ACT
2031	243	826	1,692	1,646	465	-
2032	248	848	1,758	1,677	473	-
2033	254	869	1,826	1,708	481	-
2034	259	890	1,894	1,739	489	-
2035	264	912	1,963	1,769	497	-
2036	270	933	2,033	1,800	505	-
2037	275	954	2,104	1,829	513	-
2038	280	975	2,175	1,859	521	-
2039	285	996	2,247	1,889	528	-
2040	291	1,018	2,319	1,918	536	-

Source: BITRE estimates.

Table C.6 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: NT (million tkm)

	Destination state					
Year	NSW	Vic	Qld	SA	WA	ACT
1970	7	3	15	90	12	-
1971	7	3	16	94	13	-
1972	7	3	17	98	13	-
1973	8	4	22	113	16	-
1974	9	4	26	126	19	-
1975	9	4	26	126	19	-
1976	10	4	27	130	20	-
1977	10	4	29	136	21	-
1978	10	4	28	131	20	-
1979	11	4	32	143	23	-
1980	11	4	32	146	23	-
1981	11	4	34	152	24	-
1982	12	4	36	158	26	-
1983	11	4	35	154	25	-
1984	13	4	40	171	29	-
1985	14	4	46	189	33	-
1986	15	4	50	202	36	-
1987	16	4	55	217	40	-
1988	19	4	66	253	49	-
1989	21	5	76	285	57	-
1990	23	5	83	305	62	-
1991	23	5	83	306	63	-
1992	24	5	88	321	67	-
1993	26	5	97	352	75	-
1994	28	5	107	383	84	-
1995	30	5	115	409	92	-
1996	32	6	122	429	98	-
1997	34	6	131	459	107	-
1998	36	6	141	492	117	-
1999	43	7	169	579	144	-
2000	46	7	180	614	156	-
2001	45	7	178	609	154	-
2002	47	7	187	638	164	-
2003	49	7	195	664	173	-
2004	52	7	208	703	186	-
2005	55	8	222	748	201	-
2006	59	8	235	791	216	-
2007	57	8	227	764	207	-
2008	60	8	243	815	225	-
2009	63	8	252	846	236	-
2010	63	8	255	854	296	-
2011	62	8	277	834	286	-
2012	197	8	296	805	274	-
2013	195	8	289	783	264	-
2014	194	8	282	763	255	-
2015	193	8	278	432	224	-
2016	192	8	276	109	59	-
2017	196	8	291	158	64	-
2018	199	8	303	195	68	-
2019	203	9	320	250	74	-
2020	207	9	337	305	80	-
2021	209	9	345	330	82	-
2022	211	9	357	367	86	-
2023	213	9	364	391	89	-
2024	215	10	373	420	92	-
2025	217	10	382	449	96	-
2026	220	10	392	478	99	-
2027	222	10	401	507	102	-
2028	224	10	410	536	106	-
2029	226	11	419	565	109	-
2030	228	11	428	595	113	-

(continued)

Table C.6 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: NT (million tkm) *(continued)*

	Destination state					
Year	NSW	Vic	Qld	SA	WA	ACT
2031	230	11	438	624	116	-
2032	233	11	447	654	120	-
2033	235	11	456	683	123	-
2034	237	12	465	713	127	-
2035	239	12	475	742	130	-
2036	241	12	484	771	134	-
2037	243	12	493	800	137	-
2038	246	12	502	829	141	-
2039	248	13	511	858	145	-
2040	250	13	520	887	148	-

Source: BITRE estimates.

Table C.7 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: ACT (million tkm)

	Destination state					
Year	NSW	Vic	Qld	SA	WA	NT
1970	23	9	9	-	-	-
1971	24	10	9	-	-	-
1972	25	10	9	-	-	-
1973	29	11	9	-	-	-
1974	33	11	10	-	-	-
1975	33	11	10	-	-	-
1976	34	12	10	-	-	-
1977	36	12	10	-	-	-
1978	34	12	10	-	-	-
1979	38	12	10	-	-	-
1980	39	13	10	-	-	-
1981	40	13	10	-	-	-
1982	42	13	10	-	-	-
1983	41	13	10	-	-	-
1984	46	14	11	-	-	-
1985	51	15	11	-	-	-
1986	55	15	11	-	-	-
1987	59	16	12	-	-	-
1988	70	18	13	-	-	-
1989	79	19	14	-	-	-
1990	85	20	14	-	-	-
1991	85	20	14	-	-	-
1992	90	20	14	-	-	-
1993	99	21	15	-	-	-
1994	108	22	16	-	-	-
1995	116	23	17	-	-	-
1996	122	24	17	-	-	-
1997	130	25	18	-	-	-
1998	140	26	19	-	-	-
1999	166	29	21	-	-	-
2000	176	30	22	-	-	-
2001	175	29	22	-	-	-
2002	183	30	22	-	-	-
2003	191	31	23	-	-	-
2004	203	32	24	-	-	-
2005	216	33	22	-	-	-
2006	229	34	20	-	-	-
2007	221	34	16	-	-	-
2008	236	35	14	-	-	-
2009	245	36	11	-	-	-
2010	230	36	8	-	-	-
2011	199	35	7	-	-	-
2012	158	35	7	-	-	-
2013	153	34	6	-	-	-
2014	149	34	6	-	-	-
2015	146	33	5	-	-	-
2016	145	33	5	-	-	-
2017	155	34	6	-	-	-
2018	162	35	7	-	-	-
2019	174	37	9	-	-	-
2020	185	38	10	-	-	-
2021	190	39	11	-	-	-
2022	197	39	11	-	-	-
2023	202	40	12	-	-	-
2024	208	41	13	-	-	-
2025	214	41	14	-	-	-
2026	220	42	14	-	-	-
2027	226	43	15	-	-	-
2028	232	43	16	-	-	-
2029	238	44	16	-	-	-
2030	244	44	17	-	-	-

(continued)

Table C.7 Interstate origin–destination road freight estimates (1970–2020) and forecasts (1970–2040), Origin: ACT (million tkm) *(continued)*

	Destination state					
Year	NSW	Vic	Qld	SA	WA	NT
2031	250	45	18	-	-	-
2032	256	46	19	-	-	-
2033	262	46	19	-	-	-
2034	268	47	20	-	-	-
2035	274	47	21	-	-	-
2036	280	48	22	-	-	-
2037	286	49	22	-	-	-
2038	292	49	23	-	-	-
2039	298	50	24	-	-	-
2040	304	50	25	-	-	-

Source: BITRE estimates.

Appendix Tables C.8 and C.11 shows *from*, *to* and *through* interstate road freight for each state and territory.

Table C.8 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm)

	NSW				Vic			
Year	From	To	Through	Total	From	To	Through	Total
1970	1,254	1,369	1,013	3,636	871	673	81	1,624
1971	1,345	1,463	1,059	3,866	917	713	85	1,715
1972	1,412	1,529	1,093	4,033	937	741	89	1,768
1973	1,669	1,771	1,232	4,672	1,086	864	103	2,053
1974	1,882	1,963	1,350	5,195	1,214	969	116	2,298
1975	1,850	1,904	1,353	5,107	1,223	964	117	2,305
1976	1,883	1,912	1,388	5,183	1,265	989	122	2,376
1977	1,964	1,968	1,446	5,377	1,332	1,037	129	2,498
1978	1,855	1,841	1,411	5,108	1,302	997	127	2,426
1979	2,030	1,987	1,516	5,533	1,422	1,089	139	2,649
1980	2,048	1,985	1,545	5,578	1,460	1,109	143	2,712
1981	2,112	2,027	1,598	5,736	1,525	1,151	149	2,825
1982	2,222	2,121	1,654	5,997	1,594	1,199	156	2,950
1983	2,168	2,066	1,629	5,862	1,574	1,171	155	2,900
1984	2,450	2,321	1,769	6,539	1,739	1,301	170	3,209
1985	2,771	2,611	1,923	7,305	1,922	1,447	186	3,555
1986	3,000	2,771	2,025	7,796	2,030	1,567	197	3,794
1987	3,283	2,974	2,150	8,406	2,163	1,713	210	4,087
1988	3,966	3,513	2,444	9,923	2,484	2,040	241	4,765
1989	4,573	3,968	2,693	11,234	2,754	2,332	267	5,353
1990	4,981	4,244	2,854	12,079	2,929	2,538	284	5,751
1991	5,023	4,214	2,866	12,103	2,945	2,586	286	5,817
1992	5,330	4,398	2,984	12,712	3,079	2,752	299	6,131
1993	5,968	4,837	3,226	14,030	3,350	3,067	325	6,742
1994	6,607	5,264	3,461	15,332	3,617	3,385	350	7,351
1995	7,176	5,626	3,665	16,467	3,856	3,676	371	7,902
1996	7,606	5,949	3,824	17,379	4,020	3,990	389	8,399
1997	8,239	6,425	4,053	18,717	4,257	4,425	413	9,095
1998	8,944	6,955	4,302	20,201	4,515	4,932	440	9,887
1999	10,841	8,384	4,951	24,175	5,182	5,778	506	11,466
2000	11,626	8,976	5,211	25,812	5,449	6,121	532	12,102
2001	11,506	8,898	5,164	25,568	5,405	6,077	524	12,006
2002	12,139	9,381	5,367	26,888	5,615	6,355	543	12,512
2003	12,733	9,834	5,556	28,123	5,809	6,613	560	12,982
2004	13,624	10,499	5,843	29,966	6,100	6,678	589	13,366
2005	14,679	11,288	6,174	32,141	6,437	6,832	622	13,890
2006	15,692	12,651	6,491	34,834	7,369	7,221	654	15,245
2007	15,056	12,159	6,287	33,502	7,147	6,978	634	14,758
2008	16,278	13,098	6,696	36,071	7,584	7,441	676	15,702
2009	17,018	13,859	6,919	37,796	8,010	7,717	702	16,428
2010	17,253	13,411	7,006	37,670	7,576	7,938	695	16,209
2011	15,955	12,912	6,968	35,835	7,662	7,392	694	15,749
2012	13,557	11,970	6,803	32,329	7,212	6,704	533	14,449
2013	13,470	12,305	6,473	32,248	7,476	6,950	495	14,922
2014	13,414	12,697	6,156	32,266	7,799	7,237	458	15,493
2015	13,368	12,873	6,041	32,282	7,665	7,099	449	15,213
2016	12,874	12,155	5,975	31,005	6,539	6,422	444	13,404
2017	14,589	12,879	6,471	33,938	6,942	7,487	529	14,958
2018	15,449	13,457	6,940	35,847	7,234	7,837	624	15,695
2019	16,705	14,485	7,354	38,544	7,631	8,353	660	16,643
2020	17,873	12,396	8,870	39,139	6,636	6,986	859	14,481
2021	18,451	12,774	9,097	40,322	6,786	7,169	881	14,836
2022	19,446	16,707	8,241	44,394	8,503	9,451	737	18,691
2023	20,027	17,174	8,433	45,634	8,688	9,679	754	19,121
2024	20,712	17,724	8,658	47,094	8,904	9,947	774	19,625
2025	21,407	18,281	8,885	48,574	9,122	10,217	793	20,132
2026	22,111	18,845	9,114	50,069	9,341	10,488	813	20,642
2027	22,822	19,413	9,344	51,579	9,560	10,760	833	21,154
2028	23,541	19,986	9,576	53,104	9,780	11,034	854	21,668

(continued)

Table C.8 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm) *(continued)*

	NSW				Vic			
Year	From	To	Through	Total	From	To	Through	Total
2029	24,267	20,565	9,809	54,640	10,001	11,309	874	22,183
2030	24,995	21,143	10,041	56,179	10,220	11,583	894	22,697
2031	25,725	21,723	10,273	57,722	10,439	11,856	914	23,209
2032	26,473	22,317	10,510	59,300	10,661	12,135	934	23,730
2033	27,222	22,910	10,747	60,878	10,882	12,412	955	24,249
2034	27,971	23,503	10,982	62,456	11,102	12,688	975	24,765
2035	28,721	24,095	11,217	64,034	11,321	12,963	995	25,279
2036	29,472	24,687	11,451	65,611	11,538	13,237	1,015	25,790
2037	30,224	25,280	11,685	67,189	11,755	13,510	1,035	26,299
2038	30,978	25,873	11,919	68,769	11,970	13,782	1,055	26,807
2039	31,733	26,466	12,152	70,351	12,185	14,054	1,074	27,313
2040	32,490	27,060	12,385	71,935	12,399	14,324	1,094	27,817

Source: BITRE estimates.

Table C.9 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm)

	Qld				SA			
Year	From	To	Through	Total	From	To	Through	Total
1970	226	299	0	524	238	255	86	579
1971	244	316	0	560	250	267	93	610
1972	258	328	0	586	258	268	110	636
1973	303	376	0	679	296	309	134	739
1974	339	415	0	753	329	344	162	835
1975	325	407	0	732	331	348	186	865
1976	325	411	0	736	342	361	213	915
1977	333	424	0	758	359	380	242	981
1978	308	402	0	710	351	374	265	990
1979	333	432	0	766	382	408	299	1,089
1980	331	433	0	764	391	421	328	1,140
1981	337	443	0	780	408	440	359	1,207
1982	356	461	0	818	423	462	388	1,272
1983	347	450	0	798	414	459	407	1,281
1984	396	500	0	896	454	508	437	1,398
1985	451	556	0	1,007	497	562	465	1,524
1986	489	594	0	1,083	536	619	488	1,642
1987	536	641	0	1,177	582	687	514	1,783
1988	651	757	0	1,409	682	818	556	2,056
1989	753	859	0	1,612	771	943	595	2,309
1990	821	926	0	1,747	836	1,045	627	2,507
1991	826	929	0	1,755	854	1,098	645	2,596
1992	876	978	0	1,854	908	1,197	672	2,777
1993	982	1,083	0	2,065	1,006	1,354	711	3,070
1994	1,087	1,187	0	2,275	1,105	1,520	748	3,373
1995	1,181	1,279	0	2,460	1,198	1,686	778	3,661
1996	1,254	1,351	0	2,605	1,339	1,752	815	3,907
1997	1,362	1,457	0	2,819	1,530	1,847	859	4,236
1998	1,483	1,575	0	3,058	1,758	1,952	895	4,604
1999	1,806	1,896	0	3,703	2,031	2,222	952	5,205
2000	1,941	2,030	0	3,971	2,141	2,329	960	5,431
2001	1,919	2,013	0	3,932	2,127	2,315	899	5,342
2002	2,027	2,122	0	4,150	2,216	2,402	875	5,493
2003	2,128	2,226	0	4,354	2,299	2,482	852	5,633
2004	2,281	2,378	0	4,659	2,212	2,598	868	5,678
2005	2,462	2,559	0	5,020	2,161	2,733	879	5,774
2006	2,636	2,732	0	5,367	2,277	2,859	911	6,046
2007	2,526	2,622	0	5,149	2,205	2,780	888	5,873
2008	2,744	2,830	0	5,573	2,342	2,929	956	6,227
2009	2,879	2,943	0	5,823	2,424	3,017	978	6,419
2010	2,931	2,971	0	5,903	2,541	2,998	937	6,475
2011	2,800	2,841	0	5,640	2,583	2,938	1,107	6,628
2012	2,674	2,671	0	5,344	2,501	2,561	1,253	6,315
2013	2,620	2,586	0	5,206	2,438	2,495	994	5,927
2014	2,563	2,534	0	5,097	2,381	2,437	858	5,676
2015	2,642	2,545	0	5,187	2,339	2,255	839	5,433
2016	2,758	2,584	0	5,342	2,318	2,091	828	5,237
2017	2,878	2,784	0	5,661	2,547	2,212	1,127	5,886
2018	2,959	2,938	0	5,897	2,771	2,304	1,408	6,483
2019	3,186	3,171	0	6,356	2,941	2,438	1,376	6,754
2020	3,654	3,474	0	7,128	2,570	3,112	1,939	7,622
2021	3,765	3,583	0	7,348	2,635	3,186	1,998	7,819
2022	3,680	3,678	0	7,358	3,301	2,718	1,449	7,468
2023	3,786	3,785	0	7,571	3,376	2,775	1,489	7,640
2024	3,912	3,912	0	7,824	3,464	2,842	1,537	7,843
2025	4,039	4,041	0	8,080	3,552	2,909	1,585	8,047
2026	4,168	4,171	0	8,339	3,642	2,977	1,634	8,252
2027	4,298	4,304	0	8,602	3,731	3,044	1,684	8,459
2028	4,430	4,437	0	8,867	3,821	3,111	1,734	8,666
2029	4,563	4,573	0	9,136	3,911	3,179	1,785	8,875
2030	4,696	4,708	0	9,405	4,001	3,246	1,836	9,082

(continued)

Table C.9 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm) *(continued)*

	Qld				SA			
Year	From	To	Through	Total	From	To	Through	Total
2031	4,830	4,845	0	9,675	4,091	3,312	1,887	9,290
2032	4,967	4,985	0	9,951	4,182	3,379	1,939	9,501
2033	5,104	5,125	0	10,229	4,273	3,446	1,992	9,711
2034	5,241	5,265	0	10,506	4,364	3,512	2,044	9,921
2035	5,379	5,406	0	10,784	4,455	3,578	2,097	10,130
2036	5,516	5,547	0	11,063	4,545	3,643	2,150	10,338
2037	5,654	5,688	0	11,342	4,634	3,708	2,203	10,545
2038	5,792	5,830	0	11,622	4,724	3,773	2,256	10,752
2039	5,930	5,972	0	11,902	4,813	3,837	2,309	10,959
2040	6,068	6,115	0	12,184	4,903	3,900	2,362	11,165

Source: BITRE estimates.

Table C.10 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm)

	WA				Tas			
Year	From	To	Through	Total	From	To	Through	Total
1970	149	94	0	243	0	0	0	0
1971	157	102	0	259	0	0	0	0
1972	162	117	0	279	0	0	0	0
1973	186	152	0	338	0	0	0	0
1974	206	187	0	393	0	0	0	0
1975	206	218	0	424	0	0	0	0
1976	211	253	0	465	0	0	0	0
1977	221	290	0	511	0	0	0	0
1978	214	321	0	534	0	0	0	0
1979	232	363	0	595	0	0	0	0
1980	236	401	0	637	0	0	0	0
1981	244	441	0	685	0	0	0	0
1982	253	477	0	730	0	0	0	0
1983	248	503	0	751	0	0	0	0
1984	273	538	0	810	0	0	0	0
1985	300	571	0	871	0	0	0	0
1986	325	598	0	923	0	0	0	0
1987	356	629	0	985	0	0	0	0
1988	422	678	0	1,100	0	0	0	0
1989	482	725	0	1,207	0	0	0	0
1990	528	763	0	1,291	0	0	0	0
1991	544	786	0	1,330	0	0	0	0
1992	585	820	0	1,405	0	0	0	0
1993	657	867	0	1,524	0	0	0	0
1994	732	911	0	1,643	0	0	0	0
1995	804	948	0	1,752	0	0	0	0
1996	840	995	0	1,835	0	0	0	0
1997	893	1,049	0	1,942	0	0	0	0
1998	952	1,093	0	2,045	0	0	0	0
1999	1,106	1,164	0	2,269	0	0	0	0
2000	1,168	1,172	0	2,340	0	0	0	0
2001	1,160	1,094	0	2,254	0	0	0	0
2002	1,211	1,061	0	2,271	0	0	0	0
2003	1,258	1,030	0	2,288	0	0	0	0
2004	1,326	1,050	0	2,376	0	0	0	0
2005	1,406	1,064	0	2,471	0	0	0	0
2006	1,482	1,105	0	2,587	0	0	0	0
2007	1,434	1,076	0	2,510	0	0	0	0
2008	1,524	1,166	0	2,690	0	0	0	0
2009	1,537	1,251	0	2,788	0	0	0	0
2010	1,187	1,388	0	2,575	0	0	0	0
2011	1,163	1,511	0	2,674	0	0	0	0
2012	1,124	1,619	0	2,743	0	0	0	0
2013	1,094	1,281	0	2,375	0	0	0	0
2014	1,154	924	0	2,079	0	0	0	0
2015	1,192	865	0	2,057	0	0	0	0
2016	1,273	698	0	1,971	0	0	0	0
2017	1,357	1,004	0	2,361	0	0	0	0
2018	1,420	1,297	0	2,717	0	0	0	0
2019	1,516	1,260	0	2,775	0	0	0	0
2020	2,168	1,225	0	3,392	0	0	0	0
2021	2,228	1,264	0	3,492	0	0	0	0
2022	1,720	1,324	0	3,043	0	0	0	0
2023	1,763	1,363	0	3,126	0	0	0	0
2024	1,813	1,409	0	3,223	0	0	0	0
2025	1,864	1,457	0	3,321	0	0	0	0
2026	1,915	1,504	0	3,420	0	0	0	0
2027	1,967	1,553	0	3,520	0	0	0	0
2028	2,020	1,601	0	3,621	0	0	0	0
2029	2,072	1,651	0	3,723	0	0	0	0
2030	2,125	1,700	0	3,825	0	0	0	0

(continued)

Table C.10 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm) *(continued)*

	WA				Tas			
Year	From	To	Through	Total	From	To	Through	Total
2031	2,178	1,750	0	3,928	0	0	0	0
2032	2,232	1,801	0	4,033	0	0	0	0
2033	2,286	1,851	0	4,137	0	0	0	0
2034	2,340	1,902	0	4,242	0	0	0	0
2035	2,394	1,953	0	4,347	0	0	0	0
2036	2,448	2,004	0	4,452	0	0	0	0
2037	2,502	2,055	0	4,557	0	0	0	0
2038	2,556	2,107	0	4,662	0	0	0	0
2039	2,610	2,158	0	4,768	0	0	0	0
2040	2,664	2,210	0	4,873	0	0	0	0

Source: BITRE estimates.

Table C.11 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm)

	NT				ACT			
Year	From	To	Through	Total	From	To	Through	Total
1970	60	80	0	140	1	3	0	5
1971	63	85	0	148	1	4	0	5
1972	66	88	0	154	1	4	0	5
1973	77	99	0	176	2	4	0	6
1974	87	110	0	197	2	5	0	7
1975	86	110	0	197	2	5	0	7
1976	89	113	0	202	2	5	0	7
1977	93	119	0	212	2	5	0	7
1978	90	115	0	205	2	5	0	7
1979	99	125	0	224	2	6	0	8
1980	101	128	0	228	2	6	0	8
1981	105	133	0	238	2	6	0	8
1982	109	139	0	248	2	6	0	9
1983	107	135	0	242	2	6	0	9
1984	119	152	0	271	3	7	0	10
1985	132	171	0	303	3	8	0	11
1986	141	183	0	324	3	8	0	11
1987	152	199	0	351	3	9	0	12
1988	179	236	0	415	4	11	0	15
1989	202	267	0	469	4	12	0	17
1990	217	288	0	505	5	13	0	18
1991	218	289	0	507	5	14	0	18
1992	228	304	0	532	5	14	0	19
1993	251	335	0	586	5	16	0	21
1994	274	366	0	639	6	17	0	23
1995	293	392	0	685	6	19	0	25
1996	308	412	0	720	6	20	0	26
1997	330	442	0	772	7	21	0	28
1998	354	475	0	829	7	23	0	30
1999	418	561	0	979	9	28	0	36
2000	444	596	0	1,040	9	29	0	39
2001	441	592	0	1,032	9	29	0	38
2002	462	620	0	1,082	10	31	0	40
2003	482	646	0	1,128	10	32	0	42
2004	511	685	0	1,195	11	34	0	45
2005	544	730	0	1,274	11	37	0	48
2006	576	772	0	1,348	12	39	0	51
2007	556	746	0	1,302	12	38	0	49
2008	594	796	0	1,390	12	40	0	53
2009	617	826	0	1,443	13	42	0	55
2010	632	817	0	1,448	12	43	0	55
2011	627	801	0	1,427	10	41	0	52
2012	671	789	0	1,460	8	40	0	48
2013	654	784	0	1,438	8	39	0	47
2014	639	781	0	1,420	8	36	0	44
2015	453	810	0	1,263	8	36	0	43
2016	253	851	0	1,104	8	35	0	43
2017	287	899	0	1,186	8	38	0	46
2018	313	936	0	1,250	8	40	0	48
2019	352	991	0	1,343	9	43	0	52
2020	392	1,046	0	1,438	10	46	0	56
2021	409	1,070	0	1,479	10	47	0	57
2022	436	1,107	0	1,542	10	49	0	60
2023	453	1,131	0	1,584	11	51	0	61
2024	473	1,159	0	1,632	11	52	0	63
2025	493	1,187	0	1,681	11	54	0	65
2026	514	1,216	0	1,730	11	55	0	67
2027	535	1,245	0	1,779	12	57	0	69
2028	555	1,274	0	1,829	12	59	0	71
2029	576	1,302	0	1,879	12	60	0	73
2030	597	1,331	0	1,928	13	62	0	75

(continued)

Table C.11 Interstate road freight estimates (1970–2020) and forecasts (1970–2040) by state and territory (million tkm) *(continued)*

	NT				ACT			
Year	From	To	Through	Total	From	To	Through	Total
2031	618	1,360	0	1,978	13	64	0	77
2032	639	1,389	0	2,028	13	65	0	79
2033	660	1,418	0	2,078	14	67	0	81
2034	681	1,447	0	2,128	14	69	0	83
2035	701	1,476	0	2,178	14	70	0	85
2036	722	1,505	0	2,227	14	72	0	87
2037	743	1,534	0	2,277	15	74	0	88
2038	764	1,562	0	2,326	15	75	0	90
2039	784	1,591	0	2,375	15	77	0	92
2040	805	1,619	0	2,424	16	79	0	94

Source: BITRE estimates.

Table C.12 Interstate road freight estimates (1970–2020) and forecasts (1970–2040), Australia (million tkm)

	Total (million tkm)				Share (%)		
Year	From	To	Through	Total	From	To	Through
1970	2,799	2,773	1,179	6,751	41.5	41.1	17.5
1971	2,977	2,949	1,237	7,163	41.6	41.2	17.3
1972	3,094	3,075	1,292	7,461	41.5	41.2	17.3
1973	3,618	3,576	1,470	8,664	41.8	41.3	17.0
1974	4,058	3,993	1,628	9,679	41.9	41.3	16.8
1975	4,023	3,957	1,657	9,636	41.7	41.1	17.2
1976	4,116	4,045	1,723	9,884	41.6	40.9	17.4
1977	4,305	4,224	1,817	10,345	41.6	40.8	17.6
1978	4,121	4,055	1,803	9,979	41.3	40.6	18.1
1979	4,499	4,411	1,954	10,864	41.4	40.6	18.0
1980	4,569	4,482	2,016	11,068	41.3	40.5	18.2
1981	4,733	4,640	2,106	11,479	41.2	40.4	18.3
1982	4,960	4,867	2,198	12,025	41.3	40.5	18.3
1983	4,861	4,791	2,191	11,843	41.0	40.5	18.5
1984	5,431	5,326	2,375	13,132	41.4	40.6	18.1
1985	6,077	5,925	2,573	14,575	41.7	40.7	17.7
1986	6,524	6,342	2,710	15,575	41.9	40.7	17.4
1987	7,075	6,853	2,874	16,801	42.1	40.8	17.1
1988	8,388	8,054	3,240	19,682	42.6	40.9	16.5
1989	9,540	9,107	3,555	22,202	43.0	41.0	16.0
1990	10,316	9,817	3,765	23,898	43.2	41.1	15.8
1991	10,414	9,916	3,797	24,126	43.2	41.1	15.7
1992	11,012	10,464	3,955	25,431	43.3	41.1	15.6
1993	12,218	11,558	4,261	28,038	43.6	41.2	15.2
1994	13,427	12,650	4,558	30,636	43.8	41.3	14.9
1995	14,513	13,626	4,814	32,953	44.0	41.3	14.6
1996	15,375	14,469	5,028	34,872	44.1	41.5	14.4
1997	16,619	15,666	5,325	37,610	44.2	41.7	14.2
1998	18,013	17,005	5,637	40,655	44.3	41.8	13.9
1999	21,393	20,032	6,409	47,834	44.7	41.9	13.4
2000	22,779	21,254	6,702	50,735	44.9	41.9	13.2
2001	22,568	21,017	6,587	50,172	45.0	41.9	13.1
2002	23,680	21,972	6,785	52,437	45.2	41.9	12.9
2003	24,719	22,863	6,968	54,550	45.3	41.9	12.8
2004	26,063	23,922	7,299	57,285	45.5	41.8	12.7
2005	27,701	25,242	7,675	60,618	45.7	41.6	12.7
2006	30,044	27,380	8,056	65,479	45.9	41.8	12.3
2007	28,936	26,398	7,809	63,143	45.8	41.8	12.4
2008	31,078	28,300	8,328	67,706	45.9	41.8	12.3
2009	32,497	29,655	8,599	70,751	45.9	41.9	12.2
2010	32,131	29,566	8,638	70,335	45.7	42.0	12.3
2011	30,800	28,436	8,769	68,006	45.3	41.8	12.9
2012	27,747	26,353	8,589	62,689	44.3	42.0	13.7
2013	27,759	26,440	7,963	62,163	44.7	42.5	12.8
2014	27,957	26,646	7,472	62,075	45.0	42.9	12.0
2015	27,667	26,482	7,329	61,478	45.0	43.1	11.9
2016	26,023	24,837	7,246	58,106	44.8	42.7	12.5
2017	28,608	27,304	8,126	64,037	44.7	42.6	12.7
2018	30,156	28,809	8,973	67,938	44.4	42.4	13.2
2019	32,339	30,739	9,390	72,468	44.6	42.4	13.0
2020	33,303	28,284	11,668	73,255	45.5	38.6	15.9
2021	34,285	29,093	11,976	75,354	45.5	38.6	15.9
2022	37,096	35,033	10,427	82,556	44.9	42.4	12.6
2023	38,103	35,958	10,676	84,737	45.0	42.4	12.6
2024	39,289	37,045	10,968	87,303	45.0	42.4	12.6
2025	40,490	38,146	11,264	89,899	45.0	42.4	12.5
2026	41,702	39,256	11,562	92,520	45.1	42.4	12.5
2027	42,925	40,375	11,861	95,162	45.1	42.4	12.5
2028	44,159	41,503	12,163	97,826	45.1	42.4	12.4
2029	45,403	42,639	12,467	100,508	45.2	42.4	12.4
2030	46,647	43,774	12,771	103,191	45.2	42.4	12.4

(continued)

Table C.12 Interstate road freight estimates (1970–2020) and forecasts (1970–2040), Australia (million tkm) *(continued)*

	Total (million tkm)				Share (%)		
Year	From	To	Through	Total	From	To	Through
2031	47,893	44,910	13,074	105,877	45.2	42.4	12.3
2032	49,167	46,071	13,384	108,622	45.3	42.4	12.3
2033	50,441	47,230	13,693	111,364	45.3	42.4	12.3
2034	51,713	48,387	14,001	114,102	45.3	42.4	12.3
2035	52,985	49,542	14,309	116,836	45.3	42.4	12.2
2036	54,256	50,696	14,616	119,568	45.4	42.4	12.2
2037	55,526	51,849	14,923	122,298	45.4	42.4	12.2
2038	56,798	53,002	15,229	125,028	45.4	42.4	12.2
2039	58,070	54,154	15,535	127,760	45.5	42.4	12.2
2040	59,343	55,308	15,842	130,493	45.5	42.4	12.1

Source: BITRE estimates.

Table C.13 lists the assumed state/territory OD distance fraction for each of the 36 OD routes. These distance fractions, multiplied by the OD tonne kilometres allow calculation of the from, to and thru interstate tonne kilometres and their assignment to state/territory totals for these components.

Table C.13 Distance fractions for individual interstate OD pairs

	Interstate OD distance fraction							
Destination	NSW	Vic	Qld	SA	WA	NT	ACT	Total
Origin: NSW								
Vic	0.50	0.50	-	-	-	-	-	1
Qld	0.80	-	0.20	-	-	-	-	1
SA	0.70	0.10	-	0.20	-	-	-	1
WA	0.25	0.05	-	0.20	0.50	-	-	1
Tas	-	-	-	-	-	-	-	0
NT	0.25	-	-	0.35	-	0.40	-	1
ACT	0.95	-	-	-	-	-	0.05	1
Origin: Vic								
NSW	0.50	0.50	-	-	-	-	-	1
Qld	0.70	0.18	0.12	-	-	-	-	1
SA	-	0.60	-	0.40	-	-	-	1
WA	-	0.13	-	0.45	0.42	-	-	1
Tas	-	-	-	-	-	-	-	0
NT	-	0.12	-	0.43	-	0.45	-	1
ACT	0.54	0.45	-	-	-	-	0.01	1
Origin: Qld								
NSW	0.80	-	0.20	-	-	-	-	1
Vic	0.70	0.18	0.12	-	-	-	-	1
SA	0.58	0.05	0.27	0.10	-	-	-	1
WA	0.29	0.02	0.08	0.31	0.30	-	-	1
Tas	-	-	-	-	-	-	-	0
NT	-	-	0.62	-	-	0.38	-	1
ACT	-	-	-	-	-	-	-	0
Origin: SA								
NSW	0.70	0.10	-	0.20	-	-	-	1
Vic	-	0.60	-	0.40	-	-	-	1
Qld	0.58	0.05	0.27	0.10	-	-	-	1
WA	-	-	-	0.51	0.49	-	-	1
Tas	-	-	-	-	-	-	-	0
NT	-	-	-	0.46	-	0.54	-	1
ACT	-	-	-	-	-	-	-	0
Origin: WA								
NSW	0.25	0.05	-	0.20	0.50	-	-	1
Vic	-	0.13	-	0.45	0.42	-	-	1
Qld	0.29	0.02	0.08	0.31	0.30	-	-	1
SA	-	-	-	0.51	0.49	-	-	1
Tas	-	-	-	-	-	-	-	0
NT	-	-	-	-	0.85	0.15	-	1
ACT	-	-	-	-	-	-	-	0
Origin: NT								
NSW	0.25	-	-	0.35	-	0.40	-	1
Vic	-	0.12	-	0.43	-	0.45	-	1
Qld	-	-	0.62	-	-	0.38	-	1
SA	-	-	-	0.46	-	0.54	-	1
WA	-	-	-	-	0.85	0.15	-	1
Tas	-	-	-	-	-	-	-	0
ACT	-	-	-	-	-	-	-	0
Origin: ACT								
NSW	0.95	-	-	-	-	-	0.05	1
Vic	0.54	0.45	-	-	-	-	0.01	1
Qld	0.86	-	0.13	-	-	-	0.01	1
SA	-	-	-	-	-	-	-	0
WA	-	-	-	-	-	-	-	0
Tas	-	-	-	-	-	-	-	0
NT	-	-	-	-	-	-	-	0

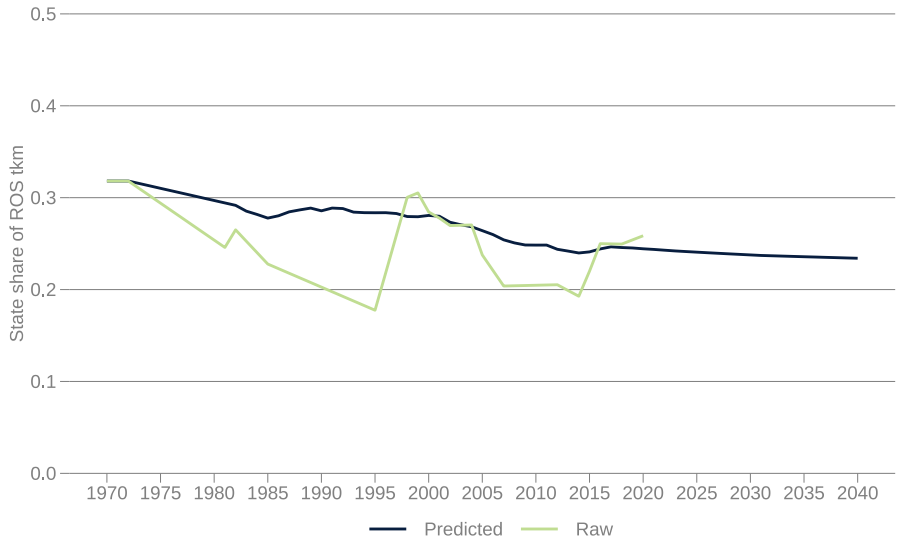
- * Not applicable

Source: BITRE estimates.

Appendix D – Rest-of-state road freight task estimates and forecasts

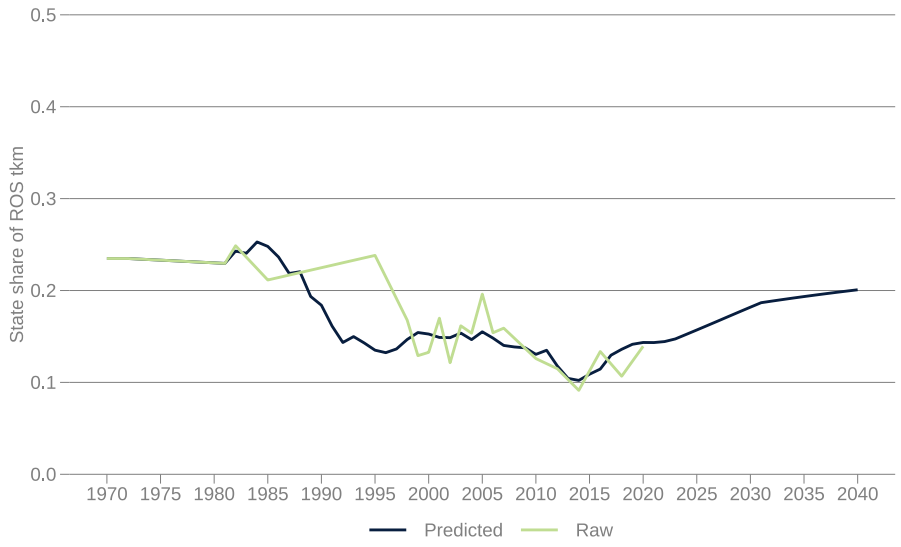
This appendix presents selected rest-of-state road freight estimates and forecasts (1970–2040). Figures D.1 to D.7 show the results of the regression fits for rest-of-state road freight for each state and territory. Table D.1 lists the annual rest-of-state road freight estimates and forecasts.

Figure D.1 NSW ROS share raw estimates and prediction/forecast



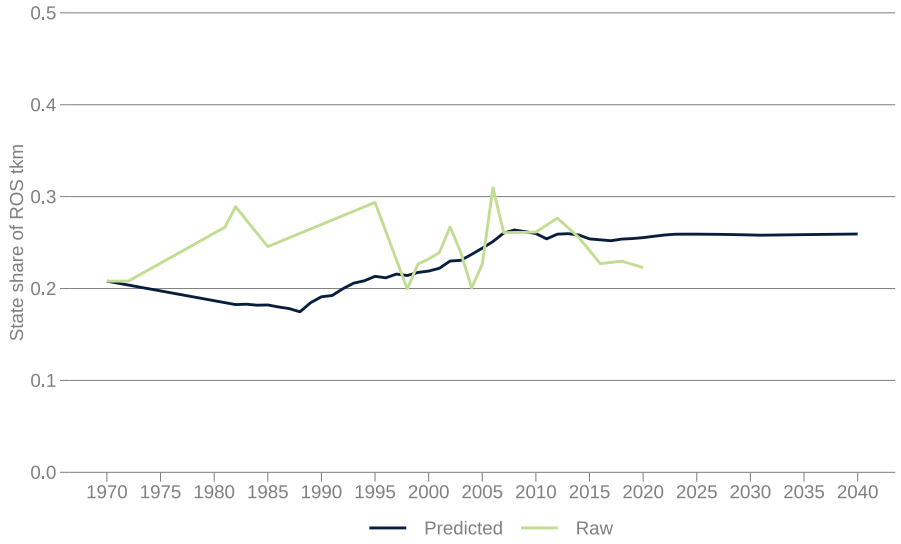
Source: BITRE estimates.

Figure D.2 Victorian ROS share raw estimates and prediction/forecast



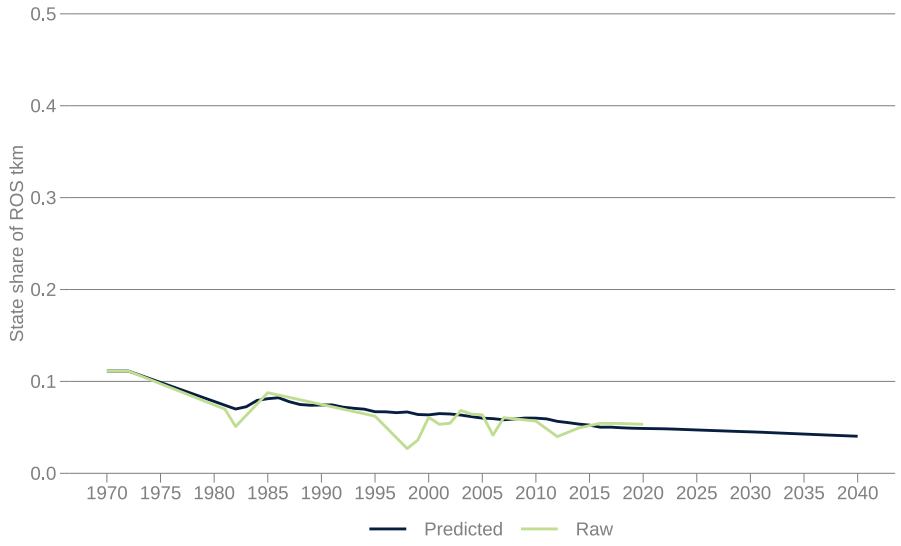
Source: BITRE estimates.

Figure D.3 Queensland ROS share raw estimates and prediction/forecast



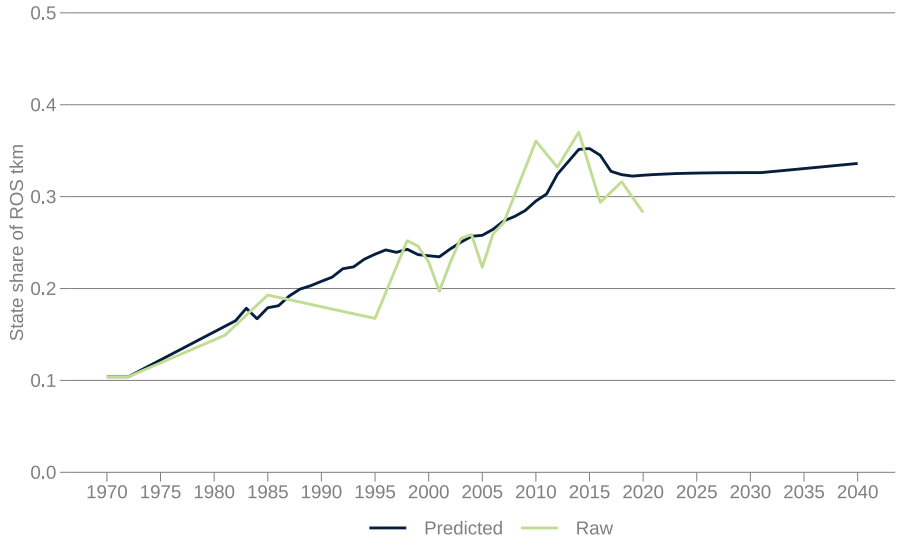
Source: BITRE estimates.

Figure D.4 South Australian ROS share raw estimates and prediction/forecast



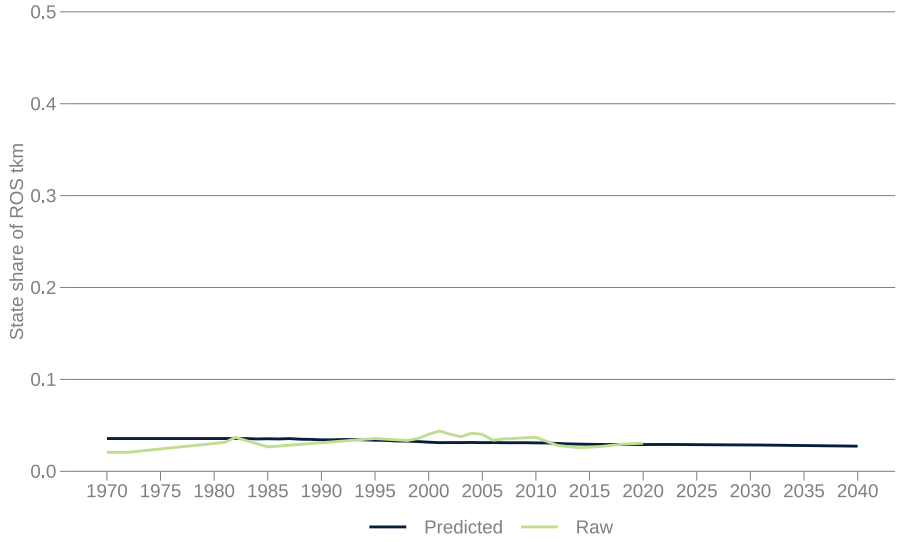
Source: BITRE estimates.

Figure D.5 Western Australian ROS share raw estimates and prediction/forecast



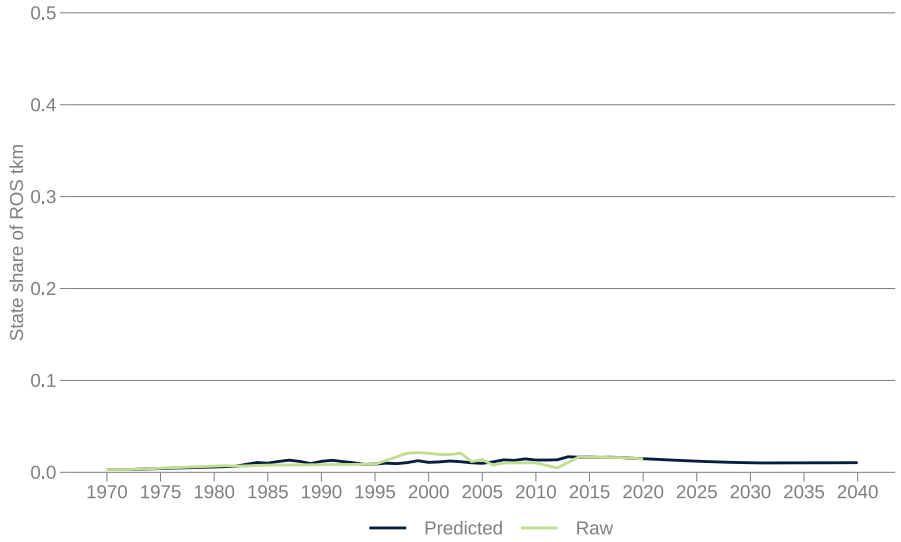
Source: BITRE estimates.

Figure D.6 Tasmanian ROS share raw estimates and prediction/forecast



Source: BITRE estimates.

Figure D.7 Northern Territory ROS share raw estimates and prediction/forecast



Source: BITRE estimates.

Table D.1 Rest-of-state road freight estimates (1970–2020) and forecasts (2021–2040), by state (million tkm)

Year	NSW	Vic	Qld	SA	WA	Tas	NT	Australia
1970	3,536	2,610	2,312	1,237	1,156	396	34	11,282
1971	3,329	2,457	2,154	1,165	1,088	373	32	10,598
1972	3,833	2,829	2,455	1,341	1,253	430	37	12,177
1973	4,371	3,245	2,794	1,485	1,525	494	47	13,960
1974	5,314	3,968	3,389	1,750	1,974	606	63	17,064
1975	5,349	4,019	3,404	1,706	2,109	615	70	17,273
1976	5,668	4,284	3,599	1,747	2,366	657	82	18,402
1977	6,484	4,931	4,108	1,928	2,861	759	101	21,172
1978	6,564	5,022	4,148	1,879	3,053	775	111	21,552
1979	7,364	5,670	4,643	2,025	3,606	877	134	24,318
1980	8,570	6,641	5,390	2,258	4,410	1,029	168	28,465
1981	9,512	7,418	5,968	2,395	5,136	1,153	199	31,781
1982	10,054	8,374	6,292	2,412	5,687	1,229	224	34,272
1983	9,318	7,853	5,974	2,366	5,830	1,165	284	32,790
1984	10,052	9,021	6,488	2,830	5,961	1,257	381	35,989
1985	10,494	9,369	6,881	3,068	6,767	1,339	375	38,293
1986	11,109	9,372	7,132	3,259	7,185	1,395	469	39,920
1987	11,170	8,578	6,993	3,060	7,530	1,397	520	39,247
1988	12,297	9,452	7,490	3,210	8,549	1,499	506	43,003
1989	13,392	8,977	8,567	3,434	9,420	1,611	439	45,841
1990	13,615	8,767	9,104	3,544	9,905	1,632	569	47,136
1991	12,278	6,857	8,182	3,167	9,032	1,457	557	41,532
1992	12,886	6,413	8,934	3,220	9,907	1,548	522	43,430
1993	12,895	6,798	9,337	3,210	10,141	1,566	470	44,417
1994	13,049	6,571	9,587	3,210	10,667	1,573	397	45,053
1995	13,666	6,508	10,276	3,229	11,436	1,628	432	47,176
1996	14,669	6,844	10,945	3,460	12,514	1,738	515	50,686
1997	15,257	7,359	11,641	3,560	12,918	1,778	510	53,025
1998	15,389	8,077	11,791	3,675	13,367	1,808	579	54,686
1999	14,573	8,050	11,350	3,339	12,363	1,689	658	52,022
2000	15,400	8,374	12,017	3,488	12,929	1,739	592	54,539
2001	16,480	8,772	13,078	3,827	13,813	1,837	667	58,473
2002	16,848	9,170	14,175	3,980	14,980	1,927	760	61,840
2003	16,924	9,613	14,432	3,966	15,661	1,954	720	63,270
2004	17,814	9,728	15,741	4,094	17,049	2,083	688	67,198
2005	17,252	10,129	15,931	3,922	16,848	2,037	639	66,759
2006	16,902	9,640	16,339	3,870	17,198	2,033	738	66,721
2007	18,575	10,250	19,036	4,255	19,996	2,276	991	75,379
2008	18,617	10,286	19,572	4,393	20,663	2,309	963	76,802
2009	17,357	9,614	18,294	4,199	19,895	2,173	1,022	72,556
2010	16,814	8,832	17,585	4,064	19,983	2,092	904	70,275
2011	19,236	10,452	19,673	4,586	23,452	2,387	1,034	80,821
2012	21,564	10,421	22,920	4,998	28,681	2,680	1,206	92,470
2013	21,307	9,194	22,874	4,858	29,758	2,630	1,494	92,115
2014	21,185	9,024	22,813	4,732	31,045	2,616	1,454	92,868
2015	21,566	9,745	22,730	4,691	31,524	2,632	1,485	94,373
2016	23,035	10,799	23,863	4,732	32,536	2,758	1,537	99,261
2017	22,556	11,860	23,061	4,596	29,971	2,665	1,505	96,214
2018	22,837	12,641	23,583	4,603	30,097	2,713	1,489	97,964
2019	22,818	13,161	23,663	4,563	29,983	2,712	1,423	98,323
2020	22,930	13,458	23,962	4,580	30,331	2,733	1,390	99,383
2021	23,686	13,935	24,964	4,726	31,493	2,836	1,390	103,029
2022	22,814	13,568	24,264	4,549	30,492	2,744	1,287	99,717
2023	22,962	13,975	24,581	4,559	30,840	2,768	1,247	100,931
2024	23,178	14,610	24,886	4,572	31,245	2,793	1,212	102,496
2025	23,401	15,265	25,192	4,586	31,655	2,820	1,180	104,098
2026	23,628	15,940	25,497	4,601	32,065	2,847	1,150	105,728
2027	23,860	16,632	25,801	4,616	32,475	2,874	1,124	107,382
2028	24,094	17,343	26,101	4,631	32,887	2,903	1,102	109,061
2029	24,332	18,066	26,401	4,646	33,298	2,932	1,084	110,758
2030	24,567	18,795	26,696	4,662	33,706	2,961	1,073	112,460
2031	24,802	19,530	26,988	4,676	34,114	2,990	1,068	114,168

(continued)

Table D.1 Rest-of-state road freight estimates (1970–2020) and forecasts (2021–2040), by state (million tkm) *(continued)*

Year	NSW	Vic	Qld	SA	WA	Tas	NT	Australia
2032	25,101	19,980	27,370	4,685	34,690	3,016	1,084	115,926
2033	25,398	20,428	27,751	4,693	35,269	3,041	1,100	117,680
2034	25,693	20,874	28,131	4,700	35,850	3,066	1,118	119,431
2035	25,985	21,319	28,509	4,706	36,434	3,090	1,135	121,177
2036	26,276	21,762	28,886	4,711	37,019	3,114	1,153	122,921
2037	26,565	22,204	29,261	4,716	37,606	3,138	1,172	124,661
2038	26,852	22,645	29,636	4,719	38,195	3,161	1,190	126,398
2039	27,138	23,085	30,009	4,722	38,785	3,184	1,210	128,134
2040	27,423	23,526	30,382	4,725	39,376	3,206	1,230	129,868

Source: BITRE estimates.

Appendix E – Road freight estimates and forecasts by state and territory

This appendix lists annual interstate, capital city and rest-of-state road freight estimates (1970–2020) and forecasts (2020-2040) by state and territory. Table E.1 shows estimated and forecast total interstate, capital city and rest-of-state road freight between 1970 and 2040.

Figures E.1 to E.15 show capital city, interstate, rest of state and total road freight for each state and territory, and the interstate, capital city and rest of state road freight share of road freight for each state and territory between 1970 and 2040. Tables E.2 to E.9 list the state and territory based road freight estimates and forecasts.

Between 1970 and 2020, rest-of-state road freight dominated, when compared to capital cities and interstate road freight, in Queensland (Table E.4), Western Australia (Table E.6) and Tasmania (with interstate assumed zero, Table E.7). On the other hand, rest-of-state road freight dominated in the early period, while interstate road freight dominated in the later period in New South Wales (Table E.2), Victoria (Table E.3) and South Australia (Table E.5). In the Northern Territory, interstate road freight equalled rest of state (Table E.8). In the Australian Capital Territory, rest-of-state is assumed to be zero (Table E.9).

In general, interstate road freight is forecast to grow as a proportion of total state and territory road freight between 2020 and 2040, while the rest of state and capital city road freight proportions are forecast to remain constant or decline, across most states and territories, except in Queensland (Table E.4) and Western Australia (Table E.6), where the rest-of-state road freight movements are forecast to be predominant.

In terms of interstate road freight growth, most jurisdictions experienced growth of around 5 per cent per annum) between 1970 and 2020. However, interstate road freight growth is projected to be more muted in the future, with the highest rates of growth forecast to be in New South Wales, Queensland, and Western Australia (3.0, 3.1 and 2.9 per cent per annum) between 2020 and 2040.

In terms of capital city road freight growth, Brisbane had the highest growth rate during 1970 to 2020. Hobart is forecast to grow faster between 2020 and 2040 compared to other capital cities.

Table E.1 Road freight estimates (1970–2020) and forecasts (2021–2040) (billion tkm)

	Interstate						
Year	To	From	Through	Total	Capital city	Rest of State	All
1970	2.8	2.8	1.2	6.7	7.1	11.3	25.1
1971	3.0	2.9	1.2	7.2	7.0	10.6	24.7
1972	3.1	3.1	1.3	7.5	7.5	12.2	27.1
1973	3.6	3.6	1.5	8.7	8.1	14.0	30.8
1974	4.1	4.0	1.6	9.7	9.2	17.1	35.9
1975	4.0	4.0	1.7	9.6	9.3	17.3	36.2
1976	4.1	4.0	1.7	9.9	9.8	18.4	38.1
1977	4.3	4.2	1.8	10.3	10.7	21.2	42.2
1978	4.1	4.0	1.8	10.0	10.9	21.6	42.4
1979	4.5	4.4	2.0	10.9	11.8	24.3	47.0
1980	4.6	4.5	2.0	11.1	13.0	28.5	52.5
1981	4.7	4.6	2.1	11.5	14.0	31.8	57.3
1982	5.0	4.9	2.2	12.0	14.9	34.3	61.2
1983	4.9	4.8	2.2	11.8	14.7	32.8	59.3
1984	5.4	5.3	2.4	13.1	15.9	36.0	65.0
1985	6.1	5.9	2.6	14.6	16.8	38.3	69.6
1986	6.5	6.3	2.7	15.6	17.5	39.9	73.0
1987	7.1	6.8	2.9	16.8	17.7	39.2	73.8
1988	8.4	8.0	3.2	19.7	19.3	43.0	82.0
1989	9.5	9.1	3.6	22.2	20.6	45.8	88.6
1990	10.3	9.8	3.8	23.9	21.3	47.1	92.4
1991	10.4	9.9	3.8	24.1	21.0	41.5	86.6
1992	11.0	10.4	4.0	25.4	20.9	43.4	89.8
1993	12.2	11.5	4.3	28.0	21.7	44.4	94.1
1994	13.4	12.6	4.6	30.6	22.4	45.1	98.1
1995	14.5	13.6	4.8	32.9	23.6	47.2	103.7
1996	15.4	14.4	5.0	34.8	25.0	50.7	110.5
1997	16.6	15.6	5.3	37.6	26.2	53.0	116.8
1998	18.0	17.0	5.6	40.6	27.2	54.7	122.5
1999	21.4	20.0	6.4	47.8	28.3	52.0	128.1
2000	22.8	21.2	6.7	50.7	29.6	54.5	134.8
2001	22.6	21.0	6.6	50.1	30.6	58.5	139.2
2002	23.7	21.9	6.8	52.4	32.0	61.8	146.2
2003	24.7	22.8	7.0	54.5	32.8	63.3	150.6
2004	26.1	23.9	7.3	57.2	34.4	67.2	158.8
2005	27.7	25.2	7.7	60.6	34.9	66.8	162.2
2006	30.0	27.3	8.1	65.4	36.0	66.7	168.1
2007	28.9	26.4	7.8	63.1	37.6	75.4	176.1
2008	31.1	28.3	8.3	67.7	39.1	76.8	183.5
2009	32.5	29.6	8.6	70.7	40.1	72.6	183.4
2010	32.1	29.5	8.6	70.3	40.9	70.3	181.5
2011	30.8	28.4	8.8	68.0	42.9	80.8	191.7
2012	27.7	26.3	8.6	62.6	44.5	92.5	199.6
2013	27.8	26.4	8.0	62.1	45.0	92.1	199.2
2014	27.9	26.6	7.5	62.0	45.9	92.9	200.8
2015	27.7	26.4	7.3	61.4	46.5	94.4	202.4
2016	26.0	24.8	7.2	58.1	47.4	99.3	204.8
2017	28.6	27.3	8.1	64.0	48.3	96.2	208.5
2018	30.1	28.8	9.0	67.9	48.4	98.0	214.2
2019	32.3	30.7	9.4	72.4	49.7	98.3	220.5
2020	33.3	28.2	11.7	73.2	50.4	99.4	222.9
2021	34.3	29.0	12.0	75.3	51.8	103.0	230.1
2022	37.1	35.0	10.4	82.5	52.6	99.7	234.8
2023	38.1	35.9	10.7	84.7	53.5	100.9	239.1
2024	39.3	37.0	11.0	87.2	54.8	102.5	244.5
2025	40.5	38.1	11.3	89.8	56.0	104.1	250.0
2026	41.7	39.2	11.6	92.5	57.3	105.7	255.5
2027	42.9	40.3	11.9	95.1	58.6	107.4	261.1
2028	44.1	41.4	12.2	97.8	60.0	109.1	266.8
2029	45.4	42.6	12.5	100.4	61.3	110.8	272.5
2030	46.6	43.7	12.8	103.1	62.7	112.5	278.3
2031	47.9	44.8	13.1	105.8	64.1	114.2	284.0

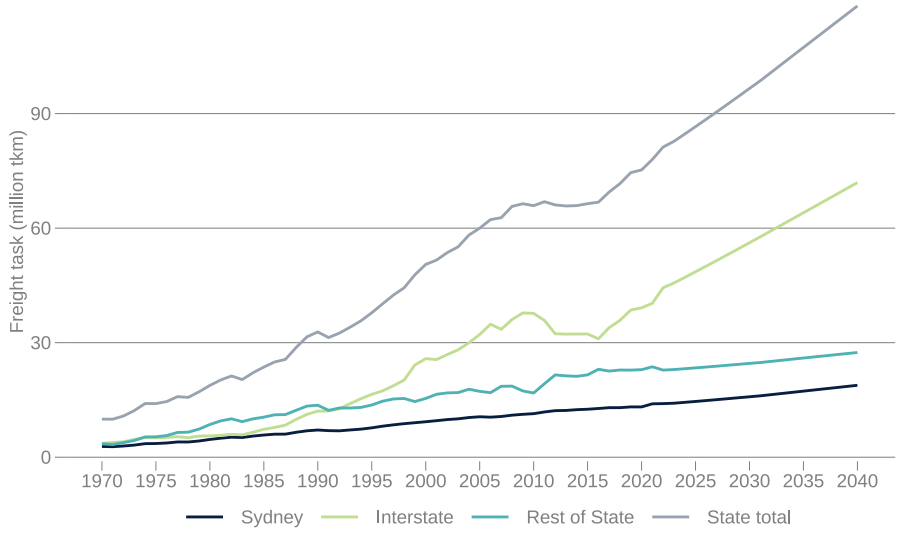
(continued)

Table E.1 Road freight estimates (1970–2020) and forecasts (2021–2040) (billion tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Capital city	Rest of State	All
2032	49.2	46.0	13.4	108.5	65.5	115.9	289.9
2033	50.4	47.2	13.7	111.3	66.9	117.7	295.9
2034	51.7	48.3	14.0	114.0	68.3	119.4	301.8
2035	53.0	49.5	14.3	116.8	69.7	121.2	307.7
2036	54.2	50.6	14.6	119.5	71.2	122.9	313.6
2037	55.5	51.8	14.9	122.2	72.6	124.7	319.5
2038	56.8	52.9	15.2	124.9	74.0	126.4	325.4
2039	58.1	54.1	15.5	127.7	75.5	128.1	331.3
2040	59.3	55.2	15.8	130.4	76.9	129.9	337.2

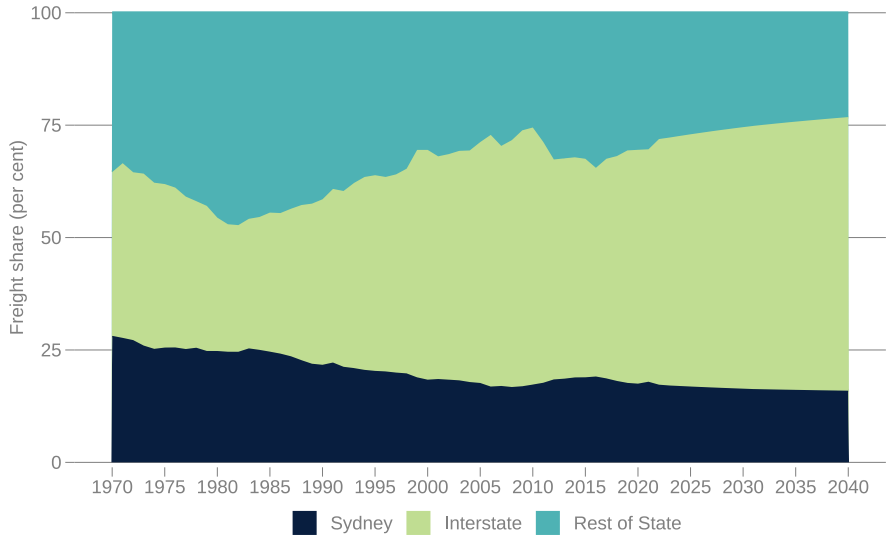
Source: BITRE estimates.

Figure E.1 Sydney, interstate, rest of state and New South Wales total road freight, 1970–2040



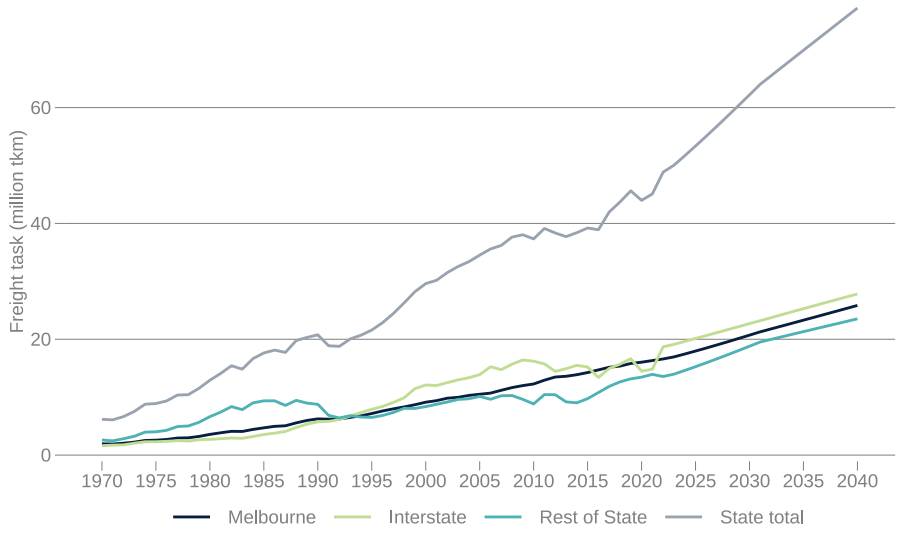
Source: BITRE estimates.

Figure E.2 Road freight share by area of operation, New South Wales, 1970–2040



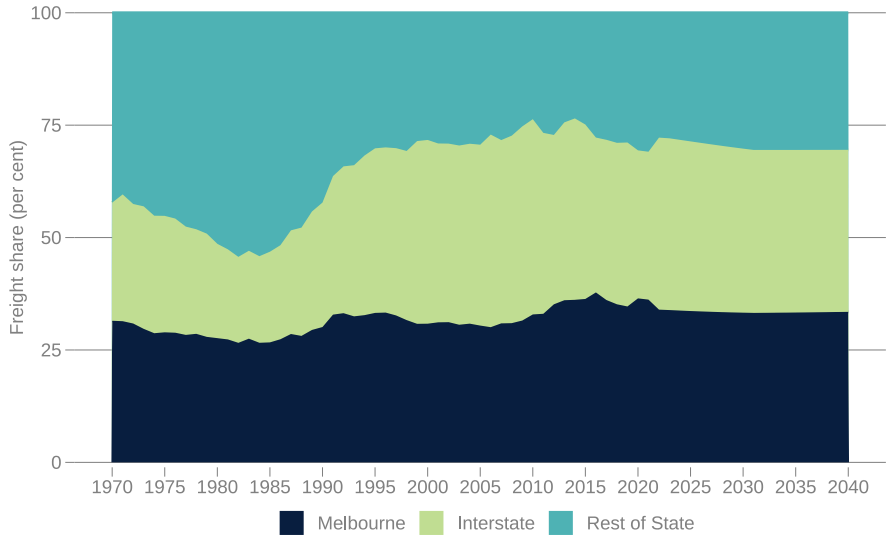
Source: BITRE estimates.

Figure E.3 Melbourne, interstate, rest of state and Victoria total road freight, 1970–2040



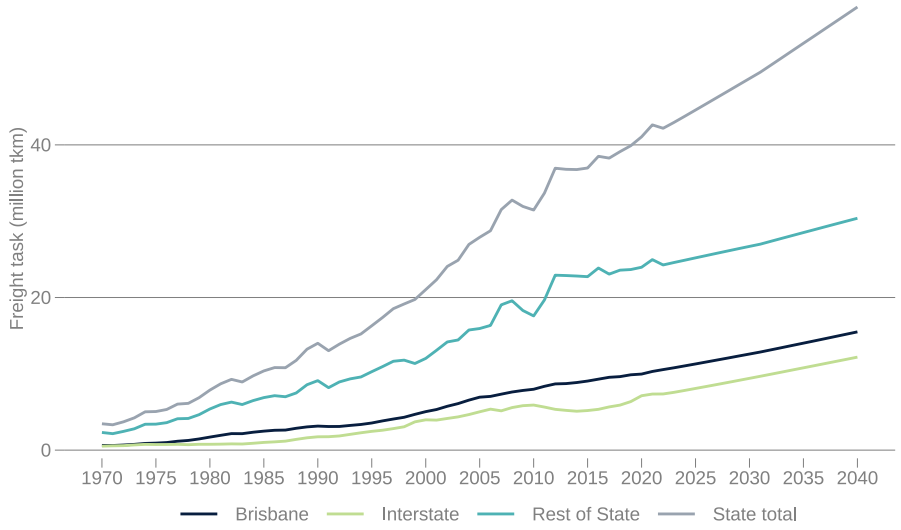
Source: BITRE estimates.

Figure E.4 Road freight share by area of operation, Victoria, 1970–2040



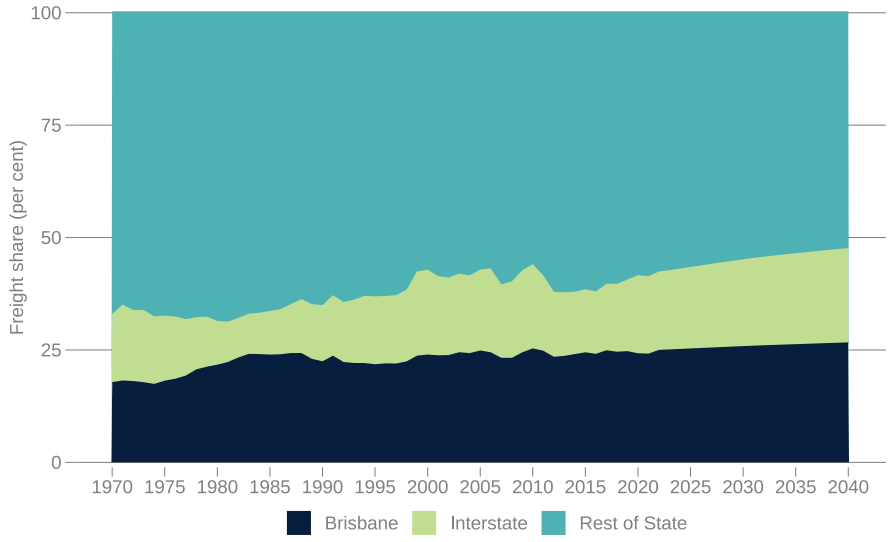
Source: BITRE estimates.

Figure E.5 Brisbane, interstate, rest of state and Queensland total road freight, 1970–2040



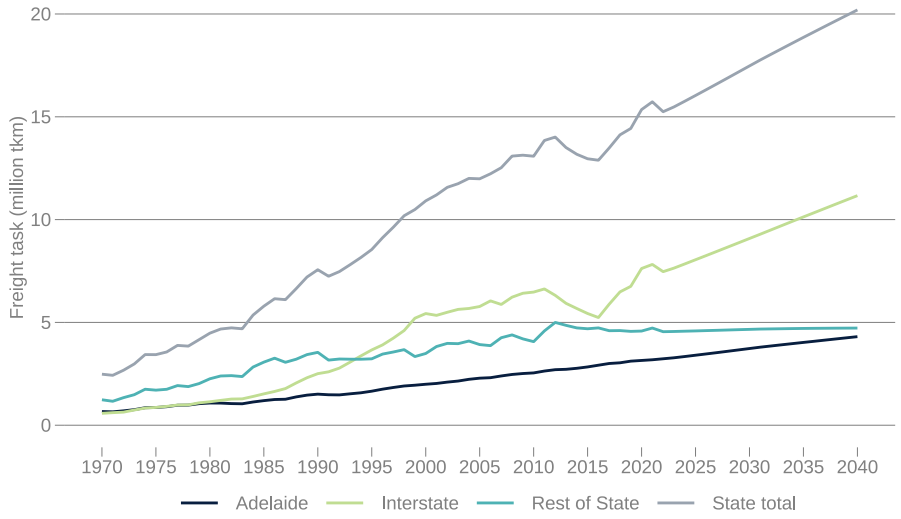
Source: BITRE estimates.

Figure E.6 Road freight share by area of operation, Queensland, 1970–2040



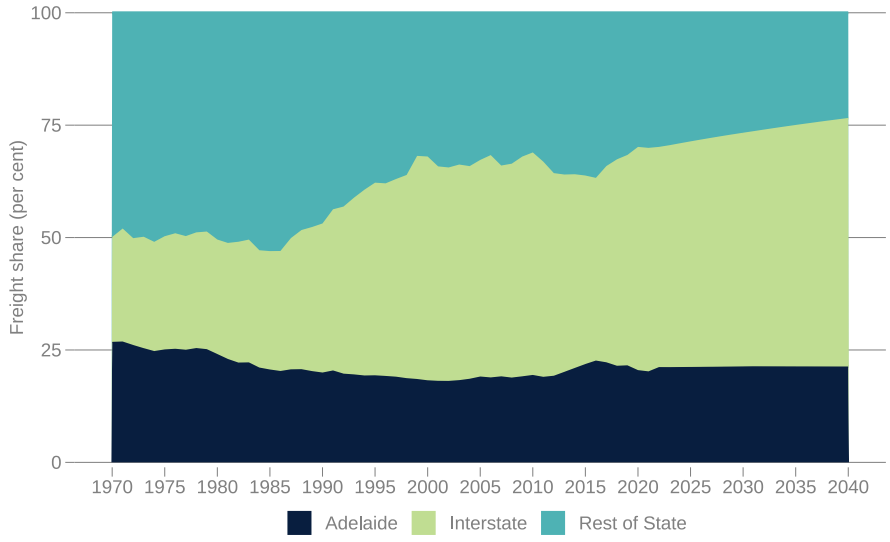
Source: BITRE estimates.

Figure E.7 Adelaide, interstate, rest of state and South Australia total road freight, 1970–2040



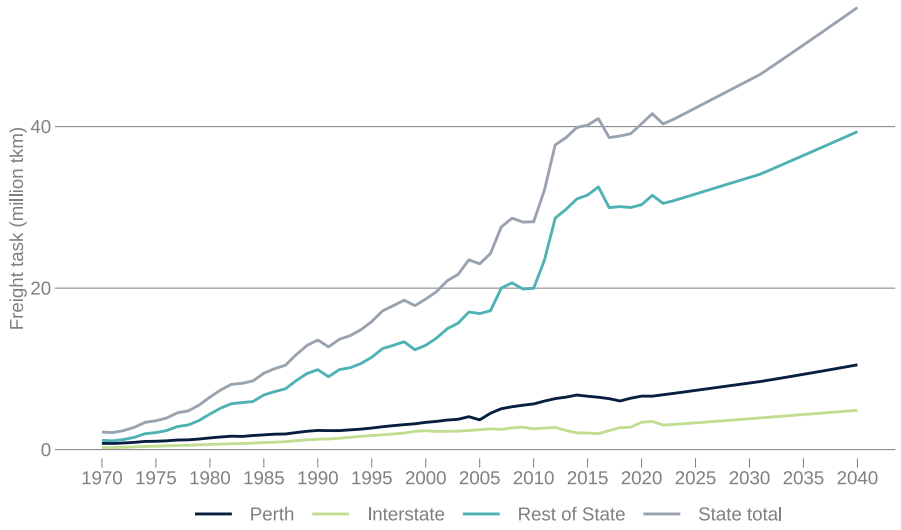
Source: BITRE estimates.

Figure E.8 Road freight share by area of operation, South Australia, 1970–2040



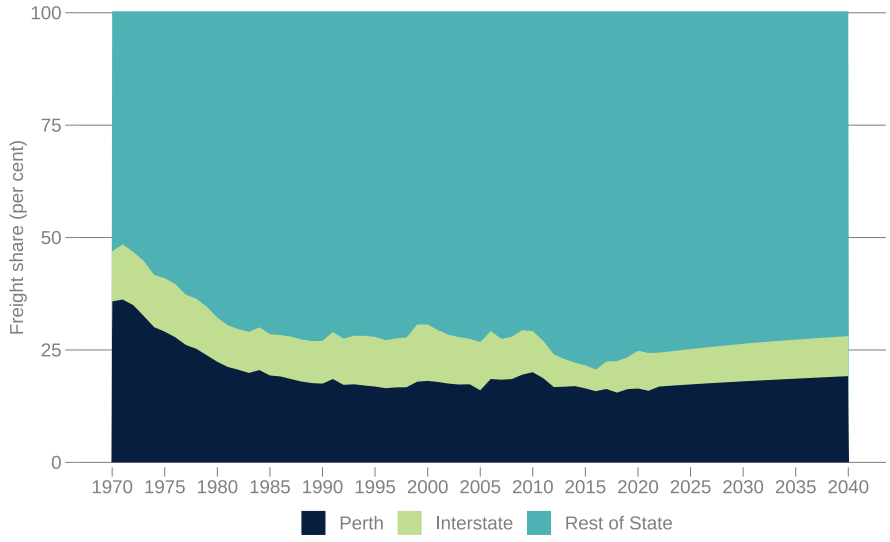
Source: BITRE estimates.

Figure E.9 Perth, interstate, rest of state and Western Australia total road freight, 1970–2040



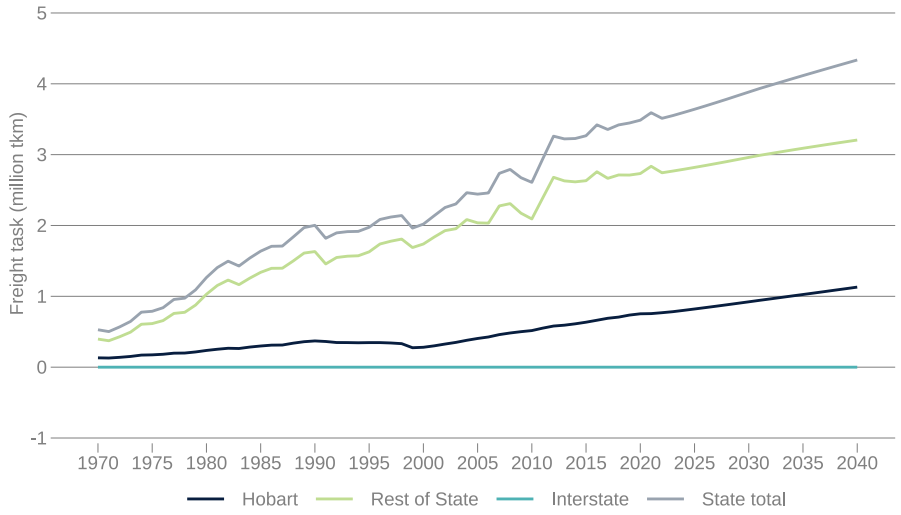
Source: BITRE estimates.

Figure E.10 Road freight share by area of operation, Western Australia, 1970–2040



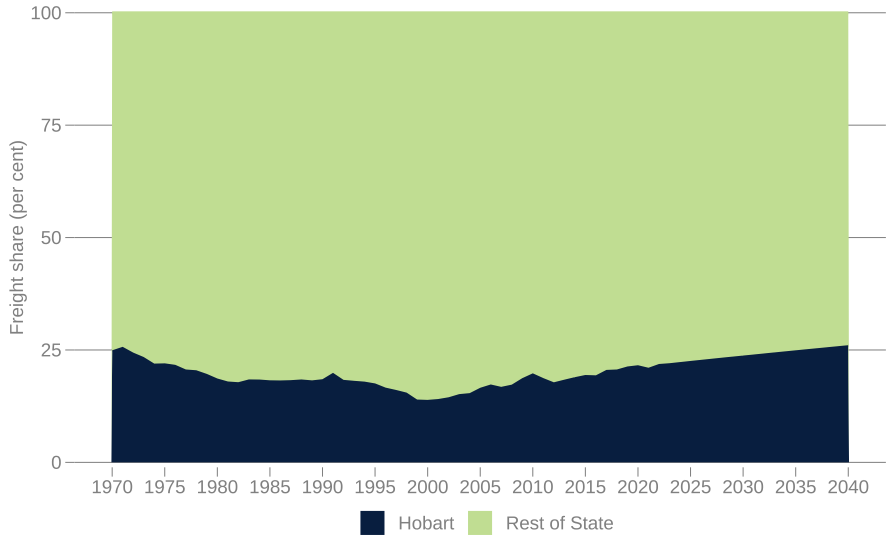
Source: BITRE estimates.

Figure E.11 Hobart, rest of state and Tasmania total road freight, 1970–2040



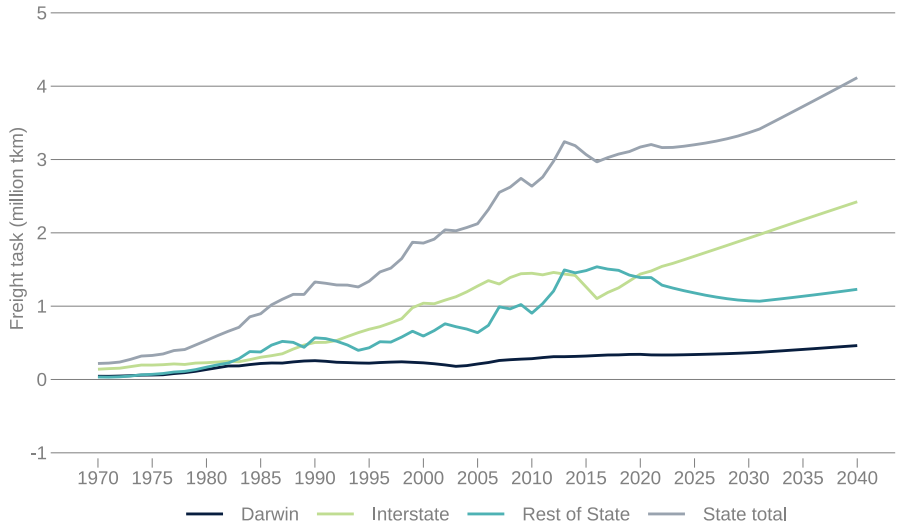
Source: BITRE estimates.

Figure E.12 Road freight share by area of operation, Tasmania, 1970–2040



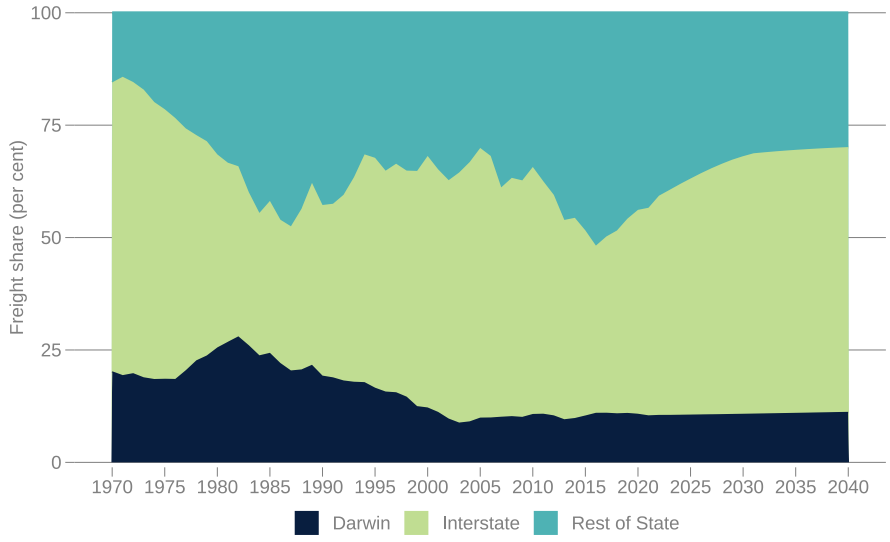
Source: BITRE estimates.

Figure E.13 Darwin, interstate, rest of state and Northern Territory total road freight, 1970–2040



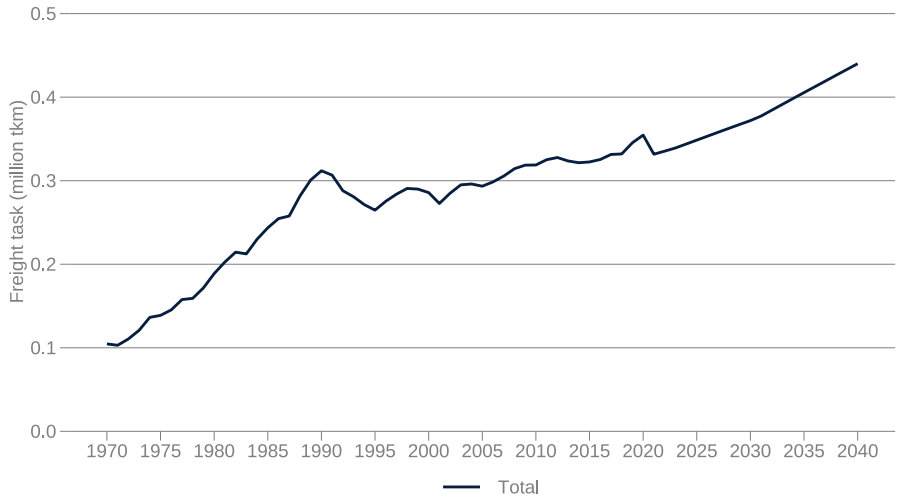
Source: BITRE estimates.

Figure E.14 Road freight share by area of operation, Northern Territory, 1970–2040



Source: BITRE estimates.

Figure E.15 ACT total road freight, 1970–2040



Source: BITRE estimates.

Table E.2 Road freight estimates (1970–2020) and forecasts (2021–2040), New South Wales (million tkm)

	Interstate						
Year	To	From	Through	Total	Sydney	Rest of State	NSW
1970	1,254	1,369	1,013	3,636	2,809	3,536	9,981
1971	1,345	1,463	1,059	3,866	2,755	3,329	9,949
1972	1,412	1,529	1,093	4,033	2,938	3,833	10,804
1973	1,669	1,771	1,232	4,672	3,173	4,371	12,216
1974	1,882	1,963	1,350	5,195	3,550	5,314	14,058
1975	1,850	1,904	1,353	5,107	3,585	5,349	14,042
1976	1,883	1,912	1,388	5,183	3,726	5,668	14,576
1977	1,964	1,968	1,446	5,377	3,999	6,484	15,860
1978	1,855	1,841	1,411	5,108	3,994	6,564	15,665
1979	2,030	1,987	1,516	5,533	4,248	7,364	17,145
1980	2,048	1,985	1,545	5,578	4,658	8,570	18,806
1981	2,112	2,027	1,598	5,736	4,976	9,512	20,224
1982	2,222	2,121	1,654	5,997	5,237	10,054	21,288
1983	2,168	2,066	1,629	5,862	5,155	9,318	20,336
1984	2,450	2,321	1,769	6,539	5,538	10,052	22,129
1985	2,771	2,611	1,923	7,305	5,815	10,494	23,614
1986	3,000	2,771	2,025	7,796	6,032	11,109	24,937
1987	3,283	2,974	2,150	8,406	6,046	11,170	25,622
1988	3,966	3,513	2,444	9,923	6,536	12,297	28,756
1989	4,573	3,968	2,693	11,234	6,921	13,392	31,547
1990	4,981	4,244	2,854	12,079	7,124	13,615	32,818
1991	5,023	4,214	2,866	12,103	6,959	12,278	31,340
1992	5,330	4,398	2,984	12,712	6,911	12,886	32,509
1993	5,968	4,837	3,226	14,030	7,144	12,895	34,068
1994	6,607	5,264	3,461	15,332	7,352	13,049	35,733
1995	7,176	5,626	3,665	16,467	7,697	13,666	37,830
1996	7,606	5,949	3,824	17,379	8,126	14,669	40,175
1997	8,239	6,425	4,053	18,717	8,478	15,257	42,453
1998	8,944	6,955	4,302	20,201	8,782	15,389	44,373
1999	10,841	8,384	4,951	24,175	9,035	14,573	47,783
2000	11,626	8,976	5,211	25,812	9,288	15,400	50,501
2001	11,506	8,898	5,164	25,568	9,570	16,480	51,617
2002	12,139	9,381	5,367	26,888	9,859	16,848	53,595
2003	12,733	9,834	5,556	28,123	10,054	16,924	55,101
2004	13,624	10,499	5,843	29,966	10,393	17,814	58,173
2005	14,679	11,288	6,174	32,141	10,594	17,252	59,987
2006	15,692	12,651	6,491	34,834	10,493	16,902	62,230
2007	15,056	12,159	6,287	33,502	10,666	18,575	62,743
2008	16,278	13,098	6,696	36,071	11,014	18,617	65,702
2009	17,018	13,859	6,919	37,796	11,241	17,357	66,394
2010	17,253	13,411	7,006	37,670	11,402	16,814	65,886
2011	15,955	12,912	6,968	35,835	11,852	19,236	66,923
2012	13,557	11,970	6,803	32,329	12,192	21,564	66,085
2013	13,470	12,305	6,473	32,248	12,252	21,307	65,806
2014	13,414	12,697	6,156	32,266	12,451	21,185	65,902
2015	13,368	12,873	6,041	32,282	12,568	21,566	66,416
2016	12,874	12,155	5,975	31,005	12,758	23,035	66,798
2017	14,589	12,879	6,471	33,938	12,975	22,556	69,470
2018	15,449	13,457	6,940	35,847	12,979	22,837	71,662
2019	16,705	14,485	7,354	38,544	13,177	22,818	74,539
2020	17,873	12,396	8,870	39,139	13,174	22,930	75,242
2021	18,451	12,774	9,097	40,322	13,988	23,686	77,995
2022	19,446	16,707	8,241	44,394	14,036	22,814	81,244
2023	20,027	17,174	8,433	45,634	14,148	22,962	82,743
2024	20,712	17,724	8,658	47,094	14,375	23,178	84,646
2025	21,407	18,281	8,885	48,574	14,607	23,401	86,582
2026	22,111	18,845	9,114	50,069	14,845	23,628	88,542
2027	22,822	19,413	9,344	51,579	15,087	23,860	90,525
2028	23,541	19,986	9,576	53,104	15,333	24,094	92,531
2029	24,267	20,565	9,809	54,640	15,583	24,332	94,555
2030	24,995	21,143	10,041	56,179	15,832	24,567	96,578

(continued)

Table E.2 Road freight estimates (1970–2020) and forecasts (2021–2040), New South Wales (million tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Sydney	Rest of State	NSW
2031	25,725	21,723	10,273	57,722	16,079	24,802	98,603
2032	26,473	22,317	10,510	59,300	16,387	25,101	100,788
2033	27,222	22,910	10,747	60,878	16,695	25,398	102,971
2034	27,971	23,503	10,982	62,456	17,002	25,693	105,151
2035	28,721	24,095	11,217	64,034	17,309	25,985	107,328
2036	29,472	24,687	11,451	65,611	17,615	26,276	109,502
2037	30,224	25,280	11,685	67,189	17,922	26,565	111,676
2038	30,978	25,873	11,919	68,769	18,228	26,852	113,849
2039	31,733	26,466	12,152	70,351	18,535	27,138	116,024
2040	32,490	27,060	12,385	71,935	18,842	27,423	118,200

Source: BITRE estimates.

Table E.3 Road freight estimates (1970–2020) and forecasts (2021–2040), Victoria (million tkm)

	Interstate						
Year	To	From	Through	Total	Melbourne	Rest of State	Victoria
1970	871	673	81	1,624	1,947	2,610	6,181
1971	917	713	85	1,715	1,909	2,457	6,081
1972	937	741	89	1,768	2,054	2,829	6,650
1973	1,086	864	103	2,053	2,238	3,245	7,536
1974	1,214	969	116	2,298	2,526	3,968	8,792
1975	1,223	964	117	2,305	2,574	4,019	8,897
1976	1,265	989	122	2,376	2,699	4,284	9,359
1977	1,332	1,037	129	2,498	2,940	4,931	10,369
1978	1,302	997	127	2,426	2,982	5,022	10,430
1979	1,422	1,089	139	2,649	3,222	5,670	11,541
1980	1,460	1,109	143	2,712	3,571	6,641	12,923
1981	1,525	1,151	149	2,825	3,856	7,418	14,099
1982	1,594	1,199	156	2,950	4,102	8,374	15,425
1983	1,574	1,171	155	2,900	4,082	7,853	14,834
1984	1,739	1,301	170	3,209	4,433	9,021	16,663
1985	1,922	1,447	186	3,555	4,705	9,369	17,629
1986	2,030	1,567	197	3,794	4,965	9,372	18,130
1987	2,163	1,713	210	4,087	5,061	8,578	17,726
1988	2,484	2,040	241	4,765	5,565	9,452	19,782
1989	2,754	2,332	267	5,353	5,983	8,977	20,314
1990	2,929	2,538	284	5,751	6,253	8,767	20,772
1991	2,945	2,586	286	5,817	6,203	6,857	18,877
1992	3,079	2,752	299	6,131	6,230	6,413	18,774
1993	3,350	3,067	325	6,742	6,513	6,798	20,052
1994	3,617	3,385	350	7,351	6,778	6,571	20,700
1995	3,856	3,676	371	7,902	7,176	6,508	21,586
1996	4,020	3,990	389	8,399	7,616	6,844	22,859
1997	4,257	4,425	413	9,095	7,987	7,359	24,442
1998	4,515	4,932	440	9,887	8,317	8,077	26,281
1999	5,182	5,778	506	11,466	8,693	8,050	28,210
2000	5,449	6,121	532	12,102	9,132	8,374	29,607
2001	5,405	6,077	524	12,006	9,400	8,772	30,177
2002	5,615	6,355	543	12,512	9,826	9,170	31,507
2003	5,809	6,613	560	12,982	9,969	9,613	32,564
2004	6,100	6,678	589	13,366	10,305	9,728	33,399
2005	6,437	6,832	622	13,890	10,505	10,129	34,524
2006	7,369	7,221	654	15,245	10,700	9,640	35,584
2007	7,147	6,978	634	14,758	11,192	10,250	36,200
2008	7,584	7,441	676	15,702	11,657	10,286	37,645
2009	8,010	7,717	702	16,428	12,001	9,614	38,044
2010	7,576	7,938	695	16,209	12,280	8,832	37,322
2011	7,662	7,392	694	15,749	12,933	10,452	39,134
2012	7,212	6,704	533	14,449	13,480	10,421	38,350
2013	7,476	6,950	495	14,922	13,604	9,194	37,720
2014	7,799	7,237	458	15,493	13,884	9,024	38,401
2015	7,665	7,099	449	15,213	14,251	9,745	39,208
2016	6,539	6,422	444	13,404	14,709	10,799	38,913
2017	6,942	7,487	529	14,958	15,160	11,860	41,978
2018	7,234	7,837	624	15,695	15,366	12,641	43,703
2019	7,631	8,353	660	16,643	15,821	13,161	45,625
2020	6,636	6,986	859	14,481	16,043	13,458	43,981
2021	6,786	7,169	881	14,836	16,322	13,935	45,093
2022	8,503	9,451	737	18,691	16,597	13,568	48,857
2023	8,688	9,679	754	19,121	16,954	13,975	50,050
2024	8,904	9,947	774	19,625	17,451	14,610	51,685
2025	9,122	10,217	793	20,132	17,962	15,265	53,359
2026	9,341	10,488	813	20,642	18,487	15,940	55,069
2027	9,560	10,760	833	21,154	19,025	16,632	56,811
2028	9,780	11,034	854	21,668	19,577	17,343	58,587
2029	10,001	11,309	874	22,183	20,139	18,066	60,388
2030	10,220	11,583	894	22,697	20,709	18,795	62,200
2031	10,439	11,856	914	23,209	21,285	19,530	64,024

(continued)

Table E.3 Road freight estimates (1970–2020) and forecasts (2021–2040), Victoria (million tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Melbourne	Rest of State	Victoria
2032	10,661	12,135	934	23,730	21,786	19,980	65,496
2033	10,882	12,412	955	24,249	22,288	20,428	66,964
2034	11,102	12,688	975	24,765	22,791	20,874	68,430
2035	11,321	12,963	995	25,279	23,295	21,319	69,893
2036	11,538	13,237	1,015	25,790	23,801	21,762	71,353
2037	11,755	13,510	1,035	26,299	24,309	22,204	72,811
2038	11,970	13,782	1,055	26,807	24,818	22,645	74,269
2039	12,185	14,054	1,074	27,313	25,329	23,085	75,726
2040	12,399	14,324	1,094	27,817	25,842	23,526	77,185

Source: BITRE estimates.

Table E.4 Road freight estimates (1970–2020) and forecasts (2021–2040), Queensland (million tkm)

	Interstate						
Year	To	From	Through	Total	Brisbane	Rest of State	Queensland
1970	226	299	0	524	616	2,312	3,453
1971	244	316	0	560	605	2,154	3,319
1972	258	328	0	586	671	2,455	3,712
1973	303	376	0	679	754	2,794	4,227
1974	339	415	0	753	876	3,389	5,019
1975	325	407	0	732	919	3,404	5,055
1976	325	411	0	736	991	3,599	5,325
1977	333	424	0	758	1,164	4,108	6,030
1978	308	402	0	710	1,267	4,148	6,125
1979	333	432	0	766	1,462	4,643	6,871
1980	331	433	0	764	1,709	5,390	7,864
1981	337	443	0	780	1,940	5,968	8,688
1982	356	461	0	818	2,164	6,292	9,274
1983	347	450	0	798	2,155	5,974	8,927
1984	396	500	0	896	2,342	6,488	9,726
1985	451	556	0	1,007	2,488	6,881	10,376
1986	489	594	0	1,083	2,600	7,132	10,815
1987	536	641	0	1,177	2,626	6,993	10,795
1988	651	757	0	1,409	2,860	7,490	11,759
1989	753	859	0	1,612	3,043	8,567	13,222
1990	821	926	0	1,747	3,149	9,104	13,999
1991	826	929	0	1,755	3,092	8,182	13,029
1992	876	978	0	1,854	3,100	8,934	13,888
1993	982	1,083	0	2,065	3,236	9,337	14,638
1994	1,087	1,187	0	2,275	3,363	9,587	15,224
1995	1,181	1,279	0	2,460	3,555	10,276	16,292
1996	1,254	1,351	0	2,605	3,828	10,945	17,379
1997	1,362	1,457	0	2,819	4,073	11,641	18,534
1998	1,483	1,575	0	3,058	4,302	11,791	19,150
1999	1,806	1,896	0	3,703	4,686	11,350	19,739
2000	1,941	2,030	0	3,971	5,045	12,017	21,032
2001	1,919	2,013	0	3,932	5,318	13,078	22,328
2002	2,027	2,122	0	4,150	5,746	14,175	24,071
2003	2,128	2,226	0	4,354	6,095	14,432	24,881
2004	2,281	2,378	0	4,659	6,550	15,741	26,951
2005	2,462	2,559	0	5,020	6,938	15,931	27,890
2006	2,636	2,732	0	5,367	7,039	16,339	28,746
2007	2,526	2,622	0	5,149	7,334	19,036	31,519
2008	2,744	2,830	0	5,573	7,616	19,572	32,762
2009	2,879	2,943	0	5,823	7,817	18,294	31,934
2010	2,931	2,971	0	5,903	7,975	17,585	31,463
2011	2,800	2,841	0	5,640	8,361	19,673	33,675
2012	2,674	2,671	0	5,344	8,676	22,920	36,941
2013	2,620	2,586	0	5,206	8,716	22,874	36,796
2014	2,563	2,534	0	5,097	8,856	22,813	36,765
2015	2,642	2,545	0	5,187	9,049	22,730	36,966
2016	2,758	2,584	0	5,342	9,299	23,863	38,504
2017	2,878	2,784	0	5,661	9,541	23,061	38,264
2018	2,959	2,938	0	5,897	9,629	23,583	39,109
2019	3,186	3,171	0	6,356	9,870	23,663	39,889
2020	3,654	3,474	0	7,128	9,964	23,962	41,053
2021	3,765	3,583	0	7,348	10,307	24,964	42,619
2022	3,680	3,678	0	7,358	10,551	24,264	42,172
2023	3,786	3,785	0	7,571	10,787	24,581	42,939
2024	3,912	3,912	0	7,824	11,037	24,886	43,747
2025	4,039	4,041	0	8,080	11,292	25,192	44,563
2026	4,168	4,171	0	8,339	11,548	25,497	45,384
2027	4,298	4,304	0	8,602	11,807	25,801	46,210
2028	4,430	4,437	0	8,867	12,068	26,101	47,036
2029	4,563	4,573	0	9,136	12,330	26,401	47,867
2030	4,696	4,708	0	9,405	12,592	26,696	48,693
2031	4,830	4,845	0	9,675	12,854	26,988	49,517

(continued)

Table E.4 Road freight estimates (1970–2020) and forecasts (2021–2040), Queensland (million tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Brisbane	Rest of State	Queensland
2032	4,967	4,985	0	9,951	13,144	27,370	50,465
2033	5,104	5,125	0	10,229	13,434	27,751	51,414
2034	5,241	5,265	0	10,506	13,725	28,131	52,363
2035	5,379	5,406	0	10,784	14,017	28,509	53,311
2036	5,516	5,547	0	11,063	14,311	28,886	54,259
2037	5,654	5,688	0	11,342	14,605	29,261	55,208
2038	5,792	5,830	0	11,622	14,900	29,636	56,158
2039	5,930	5,972	0	11,902	15,197	30,009	57,108
2040	6,068	6,115	0	12,184	15,495	30,382	58,060

Source: BITRE estimates.

Table E.5 Road freight estimates (1970–2020) and forecasts (2021–2040), South Australia (million tkm)

	Interstate						
Year	To	From	Through	Total	Adelaide	Rest of State	SA
1970	238	255	86	579	665	1,237	2,481
1971	250	267	93	610	652	1,165	2,427
1972	258	268	110	636	698	1,341	2,675
1973	296	309	134	739	757	1,485	2,981
1974	329	344	162	835	850	1,750	3,435
1975	331	348	186	865	862	1,706	3,433
1976	342	361	213	915	900	1,747	3,562
1977	359	380	242	981	972	1,928	3,881
1978	351	374	265	990	978	1,879	3,846
1979	382	408	299	1,089	1,048	2,025	4,161
1980	391	421	328	1,140	1,079	2,258	4,477
1981	408	440	359	1,207	1,076	2,395	4,679
1982	423	462	388	1,272	1,051	2,412	4,735
1983	414	459	407	1,281	1,043	2,366	4,690
1984	454	508	437	1,398	1,130	2,830	5,357
1985	497	562	465	1,524	1,196	3,068	5,788
1986	536	619	488	1,642	1,251	3,259	6,152
1987	582	687	514	1,783	1,264	3,060	6,106
1988	682	818	556	2,056	1,377	3,210	6,643
1989	771	943	595	2,309	1,463	3,434	7,207
1990	836	1,045	627	2,507	1,511	3,544	7,562
1991	854	1,098	645	2,596	1,481	3,167	7,245
1992	908	1,197	672	2,777	1,475	3,220	7,472
1993	1,006	1,354	711	3,070	1,528	3,210	7,809
1994	1,105	1,520	748	3,373	1,577	3,210	8,159
1995	1,198	1,686	778	3,661	1,655	3,229	8,545
1996	1,339	1,752	815	3,907	1,753	3,460	9,120
1997	1,530	1,847	859	4,236	1,836	3,560	9,632
1998	1,758	1,952	895	4,604	1,908	3,675	10,187
1999	2,031	2,222	952	5,205	1,945	3,339	10,489
2000	2,141	2,329	960	5,431	1,992	3,488	10,911
2001	2,127	2,315	899	5,342	2,031	3,827	11,200
2002	2,216	2,402	875	5,493	2,096	3,980	11,569
2003	2,299	2,482	852	5,633	2,149	3,966	11,747
2004	2,212	2,598	868	5,678	2,233	4,094	12,004
2005	2,161	2,733	879	5,774	2,288	3,922	11,984
2006	2,277	2,859	911	6,046	2,311	3,870	12,228
2007	2,205	2,780	888	5,873	2,396	4,255	12,524
2008	2,342	2,929	956	6,227	2,469	4,393	13,089
2009	2,424	3,017	978	6,419	2,514	4,199	13,132
2010	2,541	2,998	937	6,475	2,544	4,064	13,083
2011	2,583	2,938	1,107	6,628	2,635	4,586	13,849
2012	2,501	2,561	1,253	6,315	2,701	4,998	14,014
2013	2,438	2,495	994	5,927	2,719	4,858	13,504
2014	2,381	2,437	858	5,676	2,768	4,732	13,177
2015	2,339	2,255	839	5,433	2,835	4,691	12,958
2016	2,318	2,091	828	5,237	2,919	4,732	12,888
2017	2,547	2,212	1,127	5,886	3,001	4,596	13,483
2018	2,771	2,304	1,408	6,483	3,035	4,603	14,121
2019	2,941	2,438	1,376	6,754	3,115	4,563	14,433
2020	2,570	3,112	1,939	7,622	3,150	4,580	15,351
2021	2,635	3,186	1,998	7,819	3,183	4,726	15,729
2022	3,301	2,718	1,449	7,468	3,231	4,549	15,248
2023	3,376	2,775	1,489	7,640	3,280	4,559	15,479
2024	3,464	2,842	1,537	7,843	3,341	4,572	15,756
2025	3,552	2,909	1,585	8,047	3,403	4,586	16,037
2026	3,642	2,977	1,634	8,252	3,467	4,601	16,320
2027	3,731	3,044	1,684	8,459	3,531	4,616	16,606
2028	3,821	3,111	1,734	8,666	3,597	4,631	16,894
2029	3,911	3,179	1,785	8,875	3,663	4,646	17,184
2030	4,001	3,246	1,836	9,082	3,730	4,662	17,474
2031	4,091	3,312	1,887	9,290	3,796	4,676	17,762

(continued)

Table E.5 Road freight estimates (1970–2020) and forecasts (2021–2040), South Australia (million tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Adelaide	Rest of State	SA
2032	4,182	3,379	1,939	9,501	3,854	4,685	18,040
2033	4,273	3,446	1,992	9,711	3,912	4,693	18,316
2034	4,364	3,512	2,044	9,921	3,969	4,700	18,590
2035	4,455	3,578	2,097	10,130	4,026	4,706	18,862
2036	4,545	3,643	2,150	10,338	4,083	4,711	19,132
2037	4,634	3,708	2,203	10,545	4,139	4,716	19,400
2038	4,724	3,773	2,256	10,752	4,195	4,719	19,667
2039	4,813	3,837	2,309	10,959	4,251	4,722	19,932
2040	4,903	3,900	2,362	11,165	4,307	4,725	20,197

Source: BITRE estimates.

Table E.6 Road freight estimates (1970–2020) and forecasts (2021–2040), Western Australia (million tkm)

	Interstate						
Year	To	From	Through	Total	Perth	Rest of State	WA
1970	149	94	0	243	780	1,156	2,180
1971	157	102	0	259	765	1,088	2,112
1972	162	117	0	279	824	1,253	2,357
1973	186	152	0	338	900	1,525	2,764
1974	206	187	0	393	1,017	1,974	3,385
1975	206	218	0	424	1,039	2,109	3,572
1976	211	253	0	465	1,091	2,366	3,922
1977	221	290	0	511	1,192	2,861	4,563
1978	214	321	0	534	1,212	3,053	4,800
1979	232	363	0	595	1,313	3,606	5,514
1980	236	401	0	637	1,454	4,410	6,501
1981	244	441	0	685	1,567	5,136	7,388
1982	253	477	0	730	1,665	5,687	8,083
1983	248	503	0	751	1,634	5,830	8,215
1984	273	538	0	810	1,749	5,961	8,520
1985	300	571	0	871	1,830	6,767	9,468
1986	325	598	0	923	1,916	7,185	10,024
1987	356	629	0	985	1,938	7,530	10,453
1988	422	678	0	1,100	2,115	8,549	11,763
1989	482	725	0	1,207	2,274	9,420	12,901
1990	528	763	0	1,291	2,377	9,905	13,573
1991	544	786	0	1,330	2,358	9,032	12,720
1992	585	820	0	1,405	2,356	9,907	13,668
1993	657	867	0	1,524	2,451	10,141	14,116
1994	732	911	0	1,643	2,539	10,667	14,848
1995	804	948	0	1,752	2,675	11,436	15,863
1996	840	995	0	1,835	2,837	12,514	17,186
1997	893	1,049	0	1,942	2,973	12,918	17,834
1998	952	1,093	0	2,045	3,094	13,367	18,506
1999	1,106	1,164	0	2,269	3,199	12,363	17,831
2000	1,168	1,172	0	2,340	3,379	12,929	18,649
2001	1,160	1,094	0	2,254	3,498	13,813	19,564
2002	1,211	1,061	0	2,271	3,664	14,980	20,915
2003	1,258	1,030	0	2,288	3,758	15,661	21,706
2004	1,326	1,050	0	2,376	4,083	17,049	23,508
2005	1,406	1,064	0	2,471	3,687	16,848	23,005
2006	1,482	1,105	0	2,587	4,505	17,198	24,291
2007	1,434	1,076	0	2,510	5,068	19,996	27,574
2008	1,524	1,166	0	2,690	5,310	20,663	28,663
2009	1,537	1,251	0	2,788	5,499	19,895	28,182
2010	1,187	1,388	0	2,575	5,659	19,983	28,217
2011	1,163	1,511	0	2,674	6,011	23,452	32,138
2012	1,124	1,619	0	2,743	6,319	28,681	37,743
2013	1,094	1,281	0	2,375	6,503	29,758	38,636
2014	1,154	924	0	2,079	6,766	31,045	39,890
2015	1,192	865	0	2,057	6,612	31,524	40,193
2016	1,273	698	0	1,971	6,489	32,536	40,996
2017	1,357	1,004	0	2,361	6,311	29,971	38,643
2018	1,420	1,297	0	2,717	6,024	30,097	38,839
2019	1,516	1,260	0	2,775	6,371	29,983	39,129
2020	2,168	1,225	0	3,392	6,630	30,331	40,354
2021	2,228	1,264	0	3,492	6,624	31,493	41,609
2022	1,720	1,324	0	3,043	6,800	30,492	40,335
2023	1,763	1,363	0	3,126	6,972	30,840	40,937
2024	1,813	1,409	0	3,223	7,153	31,245	41,621
2025	1,864	1,457	0	3,321	7,336	31,655	42,311
2026	1,915	1,504	0	3,420	7,519	32,065	43,004
2027	1,967	1,553	0	3,520	7,701	32,475	43,696
2028	2,020	1,601	0	3,621	7,884	32,887	44,392
2029	2,072	1,651	0	3,723	8,066	33,298	45,087
2030	2,125	1,700	0	3,825	8,249	33,706	45,781

(continued)

Table E.6 Road freight estimates (1970–2020) and forecasts (2021–2040), Western Australia (million tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Perth	Rest of State	WA
2031	2,178	1,750	0	3,928	8,433	34,114	46,474
2032	2,232	1,801	0	4,033	8,653	34,690	47,376
2033	2,286	1,851	0	4,137	8,876	35,269	48,283
2034	2,340	1,902	0	4,242	9,101	35,850	49,194
2035	2,394	1,953	0	4,347	9,329	36,434	50,110
2036	2,448	2,004	0	4,452	9,559	37,019	51,030
2037	2,502	2,055	0	4,557	9,792	37,606	51,955
2038	2,556	2,107	0	4,662	10,026	38,195	52,884
2039	2,610	2,158	0	4,768	10,263	38,785	53,816
2040	2,664	2,210	0	4,873	10,502	39,376	54,751

Source: BITRE estimates.

Table E.7 Road freight estimates (1970–2020) and forecasts (2021–2040), Tasmania (million tkm)

Year	Interstate	Hobart	Rest of State	Tasmania
1970	0	132	396	528
1971	0	129	373	502
1972	0	139	430	568
1973	0	151	494	645
1974	0	171	606	776
1975	0	174	615	789
1976	0	182	657	839
1977	0	198	759	956
1978	0	200	775	974
1979	0	215	877	1,091
1980	0	236	1,029	1,265
1981	0	253	1,153	1,406
1982	0	267	1,229	1,496
1983	0	263	1,165	1,428
1984	0	284	1,257	1,541
1985	0	299	1,339	1,638
1986	0	311	1,395	1,706
1987	0	313	1,397	1,709
1988	0	339	1,499	1,838
1989	0	359	1,611	1,970
1990	0	370	1,632	2,002
1991	0	362	1,457	1,820
1992	0	348	1,548	1,896
1993	0	347	1,566	1,913
1994	0	344	1,573	1,917
1995	0	347	1,628	1,975
1996	0	347	1,738	2,085
1997	0	341	1,778	2,119
1998	0	332	1,808	2,140
1999	0	274	1,689	1,963
2000	0	281	1,739	2,019
2001	0	301	1,837	2,138
2002	0	326	1,927	2,254
2003	0	350	1,954	2,304
2004	0	379	2,083	2,463
2005	0	405	2,037	2,442
2006	0	426	2,033	2,459
2007	0	460	2,276	2,736
2008	0	483	2,309	2,791
2009	0	501	2,173	2,674
2010	0	517	2,092	2,609
2011	0	551	2,387	2,937
2012	0	581	2,680	3,261
2013	0	593	2,630	3,222
2014	0	612	2,616	3,228
2015	0	635	2,632	3,267
2016	0	662	2,758	3,421
2017	0	690	2,665	3,355
2018	0	707	2,713	3,420
2019	0	735	2,712	3,447
2020	0	753	2,733	3,486
2021	0	756	2,836	3,592
2022	0	769	2,744	3,513
2023	0	783	2,768	3,551
2024	0	802	2,793	3,595
2025	0	821	2,820	3,641
2026	0	841	2,847	3,688
2027	0	861	2,874	3,735
2028	0	881	2,903	3,784
2029	0	902	2,932	3,834
2030	0	923	2,961	3,884
2031	0	944	2,990	3,933
2032	0	964	3,016	3,980
2033	0	985	3,041	4,025

(continued)

Table E.7 Road freight estimates (1970–2020) and forecasts (2021–2040), Tasmania (million tkm) *(continued)*

Year	Interstate	Hobart	Rest of State	Tasmania
2034	0	1,005	3,066	4,071
2035	0	1,026	3,090	4,116
2036	0	1,047	3,114	4,160
2037	0	1,067	3,138	4,205
2038	0	1,088	3,161	4,249
2039	0	1,109	3,184	4,293
2040	0	1,130	3,206	4,336

Source: BITRE estimates.

Table E.8 Road freight estimates (1970–2020) and forecasts (2021–2040), Northern Territory (million tkm)

	Interstate						
Year	To	From	Through	Total	Darwin	Rest of State	NT
1970	60	80	0	140	44	34	218
1971	63	85	0	148	43	32	224
1972	66	88	0	154	47	37	238
1973	77	99	0	176	52	47	274
1974	87	110	0	197	59	63	320
1975	86	110	0	197	61	70	328
1976	89	113	0	202	65	82	348
1977	93	119	0	212	81	101	395
1978	90	115	0	205	93	111	409
1979	99	125	0	224	112	134	470
1980	101	128	0	228	136	168	532
1981	105	133	0	238	160	199	597
1982	109	139	0	248	184	224	657
1983	107	135	0	242	185	284	712
1984	119	152	0	271	204	381	855
1985	132	171	0	303	219	375	897
1986	141	183	0	324	225	469	1,018
1987	152	199	0	351	224	520	1,094
1988	179	236	0	415	240	506	1,161
1989	202	267	0	469	252	439	1,160
1990	217	288	0	505	257	569	1,330
1991	218	289	0	507	248	557	1,312
1992	228	304	0	532	235	522	1,289
1993	251	335	0	586	231	470	1,287
1994	274	366	0	639	225	397	1,262
1995	293	392	0	685	223	432	1,340
1996	308	412	0	720	231	515	1,467
1997	330	442	0	772	237	510	1,519
1998	354	475	0	829	241	579	1,649
1999	418	561	0	979	234	658	1,872
2000	444	596	0	1,040	227	592	1,860
2001	441	592	0	1,032	215	667	1,914
2002	462	620	0	1,082	199	760	2,041
2003	482	646	0	1,128	180	720	2,028
2004	511	685	0	1,195	189	688	2,072
2005	544	730	0	1,274	212	639	2,124
2006	576	772	0	1,348	232	738	2,318
2007	556	746	0	1,302	259	991	2,552
2008	594	796	0	1,390	270	963	2,623
2009	617	826	0	1,443	278	1,022	2,743
2010	632	817	0	1,448	284	904	2,637
2011	627	801	0	1,427	299	1,034	2,761
2012	671	789	0	1,460	311	1,206	2,977
2013	654	784	0	1,438	311	1,494	3,243
2014	639	781	0	1,420	315	1,454	3,189
2015	453	810	0	1,263	320	1,485	3,068
2016	253	851	0	1,104	327	1,537	2,968
2017	287	899	0	1,186	334	1,505	3,026
2018	313	936	0	1,250	336	1,489	3,074
2019	352	991	0	1,343	342	1,423	3,109
2020	392	1,046	0	1,438	343	1,390	3,170
2021	409	1,070	0	1,479	335	1,390	3,204
2022	436	1,107	0	1,542	334	1,287	3,163
2023	453	1,131	0	1,584	334	1,247	3,165
2024	473	1,159	0	1,632	337	1,212	3,181
2025	493	1,187	0	1,681	340	1,180	3,201
2026	514	1,216	0	1,730	344	1,150	3,224
2027	535	1,245	0	1,779	348	1,124	3,251
2028	555	1,274	0	1,829	352	1,102	3,283
2029	576	1,302	0	1,879	358	1,084	3,320
2030	597	1,331	0	1,928	364	1,073	3,366

(continued)

Table E.8 Road freight estimates (1970–2020) and forecasts (2021–2040), Northern Territory (million tkm) *(continued)*

	Interstate						
Year	To	From	Through	Total	Darwin	Rest of State	NT
2031	618	1,360	0	1,978	371	1,068	3,416
2032	639	1,389	0	2,028	380	1,084	3,492
2033	660	1,418	0	2,078	390	1,100	3,569
2034	681	1,447	0	2,128	400	1,118	3,646
2035	701	1,476	0	2,178	410	1,135	3,723
2036	722	1,505	0	2,227	421	1,153	3,801
2037	743	1,534	0	2,277	431	1,172	3,879
2038	764	1,562	0	2,326	441	1,190	3,958
2039	784	1,591	0	2,375	452	1,210	4,037
2040	805	1,619	0	2,424	463	1,230	4,116

Source: BITRE estimates.

Table E.9 Road freight estimates (1970–2020) and forecasts (2021–2040), Australian Capital Territory (million tkm)

Year	Interstate	Canberra	Rest of State	ACT
1970	0	100	0	100
1971	0	98	0	98
1972	0	105	0	105
1973	0	115	0	115
1974	0	130	0	130
1975	0	132	0	132
1976	0	138	0	138
1977	0	150	0	150
1978	0	152	0	152
1979	0	164	0	164
1980	0	181	0	181
1981	0	194	0	194
1982	0	206	0	206
1983	0	204	0	204
1984	0	220	0	220
1985	0	233	0	233
1986	0	243	0	243
1987	0	245	0	245
1988	0	267	0	267
1989	0	284	0	284
1990	0	294	0	294
1991	0	288	0	288
1992	0	269	0	269
1993	0	260	0	260
1994	0	248	0	248
1995	0	240	0	240
1996	0	249	0	249
1997	0	256	0	256
1998	0	260	0	260
1999	0	254	0	254
2000	0	247	0	247
2001	0	234	0	234
2002	0	245	0	245
2003	0	253	0	253
2004	0	251	0	251
2005	0	245	0	245
2006	0	247	0	247
2007	0	256	0	256
2008	0	262	0	262
2009	0	264	0	264
2010	0	264	0	264
2011	0	273	0	273
2012	0	280	0	280
2013	0	277	0	277
2014	0	277	0	277
2015	0	279	0	279
2016	0	283	0	283
2017	0	285	0	285
2018	0	284	0	284
2019	0	293	0	293
2020	0	299	0	299
2021	0	275	0	275
2022	0	276	0	276
2023	0	278	0	278
2024	0	281	0	281
2025	0	284	0	284
2026	0	286	0	286
2027	0	289	0	289
2028	0	292	0	292
2029	0	295	0	295
2030	0	297	0	297
2031	0	300	0	300

(continued)

Table E.9 Road freight estimates (1970–2020) and forecasts (2021–2040), Australian Capital Territory (million tkm) *(continued)*

Year	Interstate	Canberra	Rest of State	ACT
2032	0	304	0	304
2033	0	308	0	308
2034	0	312	0	312
2035	0	316	0	316
2036	0	320	0	320
2037	0	324	0	324
2038	0	328	0	328
2039	0	332	0	332
2040	0	336	0	336

Source: BITRE estimates.

Appendix F – Interstate road freight tasks: SMVU raw OD matrices, correction matrices and adjusted OD matrices

This appendix provides raw interstate OD matrices (in million tonne-kilometres) sourced from the ABS Survey of Motor Vehicle Use (SMVU) (various years from 1998).

Also given for each SMVU data year is a correction matrix.

The OD elements in the raw matrix are then multiplied by the correction OD factors in the correction matrix. The result is an 'SMVU Factored' matrix, which is a matrix of OD freight flows converted to the Freight Movements Survey definition of origin as *state of departure* (rather than the SMVU definition of origin as the *state of registration* of the vehicle).

Also given for each year are the intrastate freight (from the corrected diagonal, the capital city freight and the resulting raw estimate of the 'rest of state' raw freight estimates (from which the raw state share estimates are calculated for Chapter 4).

Table F.1 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 1998

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	23,890	1,563	1,040	192	149	1	1	85	26,921
Vic	7,413	22,286	688	2,000	697	460	1	42	33,587
Qld	4,342	787	17,440	317	138	1	106	2	23,133
SA	1,101	2,198	151	6,369	1,424	10	151	1	11,405
WA	141	40	74	405	14,418	1	57	1	15,137
Tas	9	7	5	1	1	2,016	1	1	2,041
NT	26	3	304	491	43	1	2,314	1	3,183
ACT	511	32	13	10	8	1	1	171	747
Total	37,433	26,916	19,715	9,785	16,878	2,491	2,632	304	116,154
SMVU factored									
NSW	23,726	5,562	3,926	770	678	0	7	385	35,054
Vic	5,188	16,663	1,038	2,154	673	0	1	62	25,779
Qld	4,017	2,276	14,235	566	277	0	135	111	21,616
SA	917	2,513	249	3,245	2,950	0	367	2	10,243
WA	282	180	212	974	15,635	0	242	0	17,524
Tas	0	0	0	0	0	2,000	0	0	2,000
NT	44	87	664	419	84	0	1,275	0	2,573
ACT	166	14	9	16	0	0	0	210	416
Total	34,340	27,294	20,333	8,143	20,296	2,000	2,027	772	115,205
SMVU IS factored									
NSW	-	5,562	3,926	770	678	0	7	385	11,329
Vic	5,188	-	1,038	2,154	673	0	1	62	9,116
Qld	4,017	2,276	-	566	277	0	135	111	7,382
SA	917	2,513	249	-	2,950	0	367	2	6,998
WA	282	180	212	974	-	0	242	0	1,889
Tas	0	0	0	0	0	-	0	0	0
NT	44	87	664	419	84	0	-	0	1,298
ACT	166	14	9	16	0	0	0	-	205
Total	10,614	10,631	6,098	4,899	4,661	0	752	562	38,217
Correction factor									
NSW	-	3.56	3.78	4.01	6.79	-	6.79	4.53	1.30
Vic	0.70	-	1.51	1.08	0.97	-	0.98	1.48	0.77
Qld	0.93	2.89	-	1.78	2.00	-	1.27	55.73	0.93
SA	0.83	1.14	1.65	-	2.07	-	2.43	2.50	0.90
WA	2.00	4.49	2.87	2.40	-	-	4.25	-	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.67	28.87	2.19	0.85	1.96	-	-	-	0.81
ACT	0.32	0.44	0.72	1.61	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.2 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 1999

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	27,782	1,853	1,799	338	274	1	23	89	32,159
Vic	8,139	22,149	1,473	2,323	620	3	20	42	34,769
Qld	4,505	720	20,573	422	265	1	643	4	27,133
SA	1,651	2,667	439	7,103	1,232	1	112	1	13,206
WA	150	15	87	167	15,198	-	233	1	15,851
Tas	37	47	18	1	1	2,112	1	2	2,219
NT	22	7	336	589	74	1	2,678	1	3,708
ACT	534	52	38	5	2	1	10	198	840
Total	42,820	27,510	24,763	10,948	17,666	2,120	3,720	338	129,885
SMVU factored									
NSW	25,327	6,594	6,791	1,356	1,247	0	156	403	41,875
Vic	5,696	15,586	2,222	2,502	599	0	20	62	26,686
Qld	4,168	2,082	16,780	753	531	0	817	223	25,354
SA	1,375	3,049	723	3,886	2,552	0	272	2	11,860
WA	300	67	250	401	16,343	0	989	0	18,351
Tas	0	0	0	0	0	2,174	0	0	2,174
NT	37	202	734	503	145	0	1,377	0	2,998
ACT	173	23	27	8	0	0	0	236	468
Total	37,077	27,603	27,527	9,409	21,417	2,174	3,631	927	129,765
SMVU IS factored									
NSW	-	6,594	6,791	1,356	1,247	0	156	403	16,548
Vic	5,696	-	2,222	2,502	599	0	20	62	11,101
Qld	4,168	2,082	-	753	531	0	817	223	8,574
SA	1,375	3,049	723	-	2,552	0	272	2	7,974
WA	300	67	250	401	-	0	989	0	2,007
Tas	0	0	0	0	0	-	0	0	0
NT	37	202	734	503	145	0	-	0	1,621
ACT	173	23	27	8	0	0	0	-	232
Total	11,750	12,018	10,747	5,523	5,073	0	2,255	691	48,057
Correction factor									
NSW	-	3.56	3.78	4.01	6.79	-	6.79	4.53	1.30
Vic	0.70	-	1.51	1.08	0.97	-	0.98	1.48	0.77
Qld	0.93	2.89	-	1.78	2.00	-	1.27	55.73	0.93
SA	0.83	1.14	1.65	-	2.07	-	2.43	2.50	0.90
WA	2.00	4.49	2.87	2.40	-	-	4.25	-	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.67	28.87	2.19	0.85	1.96	-	-	-	0.81
ACT	0.32	0.44	0.72	1.61	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.3 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2000

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	27,131	2,166	1,539	449	89	0	1	126	31,501
Vic	10,240	23,767	2,358	2,594	560	2	10	21	39,552
Qld	5,052	610	21,053	633	318	1	405	0	28,072
SA	2,044	2,013	494	8,338	371	1	632	57	13,950
WA	147	30	58	278	14,366	1	96	0	14,976
Tas	13	24	2	1	1	2,455	1	0	2,497
NT	40	0	166	530	63	1	2,101	1	2,902
ACT	583	60	43	16	-	1	0	234	937
Total	45,250	28,670	25,713	12,839	15,768	2,462	3,246	439	134,387
SMVU factored									
NSW	24,564	7,708	5,810	1,801	605	0	7	571	41,066
Vic	7,167	16,259	3,556	2,794	541	0	10	31	30,357
Qld	4,674	1,764	17,512	1,129	638	0	515	0	26,231
SA	1,703	2,301	814	5,263	769	0	1,537	142	12,528
WA	294	135	166	668	15,667	0	408	0	17,338
Tas	0	0	0	0	0	2,446	0	0	2,446
NT	67	0	363	453	123	0	1,339	1	2,346
ACT	189	27	31	26	0	0	0	249	522
Total	38,658	28,194	28,251	12,133	18,342	2,446	3,815	995	132,834
SMVU IS factored									
NSW	-	7,708	5,810	1,801	605	0	7	571	16,502
Vic	7,167	-	3,556	2,794	541	0	10	31	14,099
Qld	4,674	1,764	-	1,129	638	0	515	0	8,720
SA	1,703	2,301	814	-	769	0	1,537	142	7,265
WA	294	135	166	668	-	0	408	0	1,671
Tas	0	0	0	0	0	-	0	0	0
NT	67	0	363	453	123	0	-	1	1,006
ACT	189	27	31	26	0	0	0	-	272
Total	14,094	11,935	10,740	6,870	2,675	0	2,476	746	49,535
Correction factor									
NSW	-	3.56	3.78	4.01	6.79	-	6.79	4.53	1.30
Vic	0.70	-	1.51	1.08	0.97	-	0.98	1.48	0.77
Qld	0.93	2.89	-	1.78	2.00	-	1.27	55.73	0.93
SA	0.83	1.14	1.65	-	2.07	-	2.43	2.50	0.90
WA	2.00	4.49	2.87	2.40	-	-	4.25	1.00	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.67	1.00	2.19	0.85	1.96	-	-	1.00	0.81
ACT	0.32	0.44	0.72	1.61	1.00	-	1.00	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.4 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2001

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	26,538	2,006	1,346	683	110	1	4	116	30,804
Vic	9,318	25,348	1,276	2,268	638	35	23	71	38,977
Qld	6,318	828	21,172	199	60	2	322	1	28,902
SA	1,906	2,070	372	7,344	618	1	246	8	12,565
WA	419	158	201	599	13,790	1	62	1	15,231
Tas	9	20	4	1	1	2,609	1	1	2,646
NT	18	1	69	579	162	1	1,953	1	2,784
ACT	348	36	16	4	1	1	1	228	635
Total	44,874	30,467	24,456	11,677	15,380	2,651	2,612	427	132,544
SMVU factored									
NSW	24,097	7,139	5,081	2,740	501	0	27	526	40,110
Vic	6,522	18,283	1,925	2,442	616	0	23	105	29,916
Qld	5,846	2,394	17,827	355	120	0	409	56	27,007
SA	1,588	2,366	613	4,819	1,280	0	598	20	11,284
WA	837	710	577	1,440	13,806	0	263	0	17,633
Tas	0	0	0	0	0	2,592	0	0	2,592
NT	30	29	151	494	317	0	1,230	0	2,251
ACT	113	16	11	6	0	0	0	207	353
Total	39,033	30,937	26,184	12,297	16,640	2,592	2,550	914	131,147
SMVU IS factored									
NSW	-	7,139	5,081	2,740	501	0	27	526	16,013
Vic	6,522	-	1,925	2,442	616	0	23	105	11,633
Qld	5,846	2,394	-	355	120	0	409	56	9,180
SA	1,588	2,366	613	-	1,280	0	598	20	6,465
WA	837	710	577	1,440	-	0	263	0	3,827
Tas	0	0	0	0	0	-	0	0	0
NT	30	29	151	494	317	0	-	0	1,021
ACT	113	16	11	6	0	0	0	-	147
Total	14,935	12,654	8,357	7,478	2,834	0	1,321	707	48,287
Correction factor									
NSW	-	3.56	3.78	4.01	6.79	-	6.79	4.53	1.30
Vic	0.70	-	1.51	1.08	0.97	-	0.98	1.48	0.77
Qld	0.93	2.89	-	1.78	2.00	-	1.27	55.73	0.93
SA	0.83	1.14	1.65	-	2.07	-	2.43	2.50	0.90
WA	2.00	4.49	2.87	2.40	-	-	4.25	-	1.16
Tas	-	-	-	-	-	-	-	-	-
NT	1.67	1.00	2.19	0.85	1.96	-	-	-	0.81
ACT	0.32	0.44	0.72	1.61	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.5 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2002

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	27,716	1,829	1,503	492	131	1	100	101	31,873
Vic	9,403	23,831	1,881	2,121	292	1	28	40	37,597
Qld	5,338	981	25,246	157	120	1	836	1	32,680
SA	3,356	2,987	591	8,145	578	58	267	4	15,986
WA	303	62	107	434	15,594	1	48	1	16,550
Tas	12	17	9	4	2	2,670	1	1	2,716
NT	7	1	95	491	82	1	1,929	1	2,607
ACT	580	110	35	11	1	1	1	206	945
Total	46,715	29,818	29,467	11,855	16,800	2,734	3,210	355	140,954
SMVU factored									
NSW	25,429	6,463	5,669	2,007	846	0	689	448	41,550
Vic	6,611	16,836	2,778	2,269	271	0	28	65	28,857
Qld	4,943	2,772	21,172	276	244	0	1,079	52	30,537
SA	2,894	3,402	954	5,244	1,162	0	691	10	14,357
WA	565	269	307	1,002	16,824	0	192	1	19,160
Tas	0	0	0	0	0	2,661	0	0	2,661
NT	11	1	198	425	151	0	1,321	1	2,107
ACT	207	51	27	17	1	0	1	222	526
Total	40,662	29,793	31,104	11,239	19,498	2,661	4,001	798	139,756
SMVU IS factored									
NSW	-	6,463	5,669	2,007	846	0	689	448	16,121
Vic	6,611	-	2,778	2,269	271	0	28	65	12,021
Qld	4,943	2,772	-	276	244	0	1,079	52	9,366
SA	2,894	3,402	954	-	1,162	0	691	10	9,113
WA	565	269	307	1,002	-	0	192	1	2,337
Tas	0	0	0	0	0	-	0	0	0
NT	11	1	198	425	151	0	-	1	787
ACT	207	51	27	17	1	0	1	-	304
Total	15,232	12,957	9,932	5,996	2,674	0	2,680	576	50,048
Correction factor									
NSW	-	3.53	3.77	4.08	6.46	-	6.89	4.43	1.30
Vic	0.70	-	1.48	1.07	0.93	-	0.98	1.63	0.77
Qld	0.93	2.83	-	1.76	2.03	-	1.29	51.51	0.93
SA	0.86	1.14	1.61	-	2.01	-	2.59	2.50	0.90
WA	1.87	4.34	2.87	2.31	-	-	4.01	0.92	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.62	1.00	2.08	0.87	1.84	-	-	0.92	0.81
ACT	0.36	0.47	0.76	1.56	0.92	-	0.92	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.6 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2003

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	27,780	2,599	1,515	669	187	20	29	201	33,000
Vic	9,215	27,691	2,285	2,178	77	110	8	17	41,581
Qld	7,243	1,326	24,898	295	78	1	157	1	33,999
SA	4,968	2,646	457	8,876	678	1	49	1	17,676
WA	330	207	158	594	18,487	1	238	1	20,016
Tas	16	21	1	1	1	2,623	1	1	2,665
NT	64	1	116	463	167	1	2,228	1	3,041
ACT	408	102	39	10	1	1	1	252	814
Total	50,024	34,593	29,469	13,086	19,676	2,758	2,711	475	152,792
SMVU factored									
NSW	23,201	9,117	5,709	2,774	1,144	0	203	871	43,020
Vic	6,508	19,684	3,303	2,314	68	0	8	30	31,915
Qld	6,713	3,659	20,473	511	160	0	206	47	31,770
SA	4,430	3,002	723	6,261	1,322	0	134	2	15,875
WA	572	866	453	1,315	19,068	0	898	1	23,173
Tas	0	0	0	0	0	2,611	0	0	2,611
NT	100	1	229	406	288	0	1,433	1	2,458
ACT	159	50	31	15	1	0	1	196	453
Total	41,684	36,379	30,921	13,596	22,052	2,611	2,883	1,148	151,274
SMVU IS factored									
NSW	-	9,117	5,709	2,774	1,144	0	203	871	19,818
Vic	6,508	-	3,303	2,314	68	0	8	30	12,231
Qld	6,713	3,659	-	511	160	0	206	47	11,297
SA	4,430	3,002	723	-	1,322	0	134	2	9,613
WA	572	866	453	1,315	-	0	898	1	4,105
Tas	0	0	0	0	0	-	0	0	0
NT	100	1	229	406	288	0	-	1	1,025
ACT	159	50	31	15	1	0	1	-	257
Total	18,483	16,695	10,448	7,335	2,984	0	1,450	953	58,347
Correction factor									
NSW	-	3.51	3.77	4.15	6.12	-	6.99	4.33	1.30
Vic	0.71	-	1.45	1.06	0.89	-	0.99	1.77	0.77
Qld	0.93	2.76	-	1.73	2.05	-	1.31	47.29	0.93
SA	0.89	1.13	1.58	-	1.95	-	2.74	2.50	0.90
WA	1.73	4.18	2.87	2.21	-	-	3.77	0.85	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.57	1.00	1.98	0.88	1.72	-	-	0.85	0.81
ACT	0.39	0.49	0.80	1.51	0.85	-	0.85	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.7 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2004

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	30,010	1,747	1,774	595	9	2	0	146	34,283
Vic	11,012	28,452	1,705	2,298	225	74	40	12	43,818
Qld	6,516	1,419	26,679	1,206	45	-	2,366	9	38,240
SA	2,392	2,027	319	8,957	336	60	197	21	14,309
WA	338	16	158	429	19,568	23	64	1	20,597
Tas	18	36	12	1	1	3,185	8	1	3,262
NT	46	31	97	250	214	1	1,622	1	2,262
ACT	510	91	31	2	1	1	1	267	904
Total	50,842	33,819	30,775	13,738	20,399	3,346	4,298	458	157,675
SMVU factored									
NSW	28,751	6,084	6,679	2,508	52	0	0	618	44,692
Vic	7,812	20,730	2,411	2,425	191	0	39	23	33,632
Qld	6,044	3,822	20,177	2,057	94	0	3,151	388	35,733
SA	2,203	2,291	494	6,604	635	0	572	52	12,851
WA	541	64	453	909	21,651	0	226	1	23,845
Tas	0	0	0	0	0	3,196	0	0	3,196
NT	70	31	182	222	344	0	979	1	1,829
ACT	216	47	26	3	1	0	1	210	503
Total	45,637	33,070	30,422	14,727	22,968	3,196	4,968	1,293	156,280
SMVU IS factored									
NSW	-	6,084	6,679	2,508	52	0	0	618	15,941
Vic	7,812	-	2,411	2,425	191	0	39	23	12,901
Qld	6,044	3,822	-	2,057	94	0	3,151	388	15,556
SA	2,203	2,291	494	-	635	0	572	52	6,246
WA	541	64	453	909	-	0	226	1	2,194
Tas	0	0	0	0	0	-	0	0	0
NT	70	31	182	222	344	0	-	1	849
ACT	216	47	26	3	1	0	1	-	293
Total	16,886	12,339	10,245	8,123	1,317	0	3,989	1,083	53,982
Correction factor									
NSW	-	3.48	3.77	4.21	5.78	-	7.09	4.23	1.30
Vic	0.71	-	1.41	1.06	0.85	-	0.99	1.92	0.77
Qld	0.93	2.69	-	1.71	2.08	-	1.33	43.07	0.93
SA	0.92	1.13	1.55	-	1.89	-	2.90	2.50	0.90
WA	1.60	4.03	2.87	2.12	-	-	3.54	0.77	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.52	1.00	1.87	0.89	1.61	-	-	0.77	0.81
ACT	0.42	0.51	0.84	1.47	0.77	-	0.77	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.8 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2005

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	30,316	2,147	2,929	289	41	1	9	157	35,889
Vic	11,665	32,140	1,582	3,351	588	0	0	12	49,338
Qld	8,075	1,773	28,057	779	583	0	322	2	39,591
SA	2,471	2,152	324	9,617	844	0	264	0	15,672
WA	143	166	32	634	16,873	0	61	0	17,909
Tas	4	11	1	3	0	3,086	0	0	3,105
NT	6	1	203	177	60	0	1,700	0	2,147
ACT	394	67	14	8	5	0	0	253	741
Total	53,074	38,457	33,142	14,858	18,994	3,087	2,356	424	164,392
SMVU factored									
NSW	26,171	7,423	11,018	1,238	223	0	65	649	46,786
Vic	8,312	23,355	2,187	3,511	478	0	0	25	37,868
Qld	7,497	4,659	21,790	1,308	1,227	0	435	78	36,995
SA	2,348	2,422	491	6,462	1,544	0	807	0	14,075
WA	210	643	92	1,282	18,305	0	201	0	20,734
Tas	0	0	0	0	0	3,042	0	0	3,042
NT	9	1	359	159	90	0	1,118	0	1,736
ACT	180	36	12	11	3	0	0	169	412
Total	44,726	38,539	35,950	13,972	21,870	3,042	2,627	921	161,647
SMVU IS factored									
NSW	-	7,423	11,018	1,238	223	0	65	649	20,615
Vic	8,312	-	2,187	3,511	478	0	0	25	14,513
Qld	7,497	4,659	-	1,308	1,227	0	435	78	15,205
SA	2,348	2,422	491	-	1,544	0	807	0	7,612
WA	210	643	92	1,282	-	0	201	0	2,429
Tas	0	0	0	0	0	-	0	0	0
NT	9	1	359	159	90	0	-	0	618
ACT	180	36	12	11	3	0	0	-	243
Total	18,556	15,184	14,160	7,510	3,565	0	1,509	751	61,235
Correction factor									
NSW	-	3.46	3.76	4.28	5.44	-	7.19	4.13	1.30
Vic	0.71	-	1.38	1.05	0.81	-	0.99	2.06	0.77
Qld	0.93	2.63	-	1.68	2.10	-	1.35	38.85	0.93
SA	0.95	1.13	1.52	-	1.83	-	3.06	2.50	0.90
WA	1.47	3.87	2.86	2.02	-	-	3.30	0.69	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.47	1.00	1.77	0.90	1.49	-	-	0.69	0.81
ACT	0.46	0.54	0.89	1.42	0.69	-	0.69	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.9 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2006

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	28,432	2,352	2,505	437	61	0	71	172	34,030
Vic	12,937	28,752	2,016	2,645	712	223	27	22	47,334
Qld	7,778	1,628	33,839	351	96	5	819	18	44,534
SA	2,176	1,786	792	9,562	184	0	995	3	15,498
WA	458	99	150	480	19,703	0	28	1	20,919
Tas	32	33	17	5	6	2,643	0	0	2,736
NT	32	6	107	210	367	4	1,360	0	2,086
ACT	415	70	13	2	0	0	0	300	800
Total	52,260	34,726	39,439	13,692	21,129	2,875	3,300	516	167,937
SMVU factored									
NSW	23,452	8,072	9,415	1,901	311	0	518	694	44,362
Vic	9,259	20,968	2,724	2,752	552	0	27	49	36,330
Qld	7,228	4,171	27,683	580	204	0	1,124	623	41,614
SA	2,131	2,003	1,175	5,079	325	0	3,198	7	13,919
WA	613	368	430	925	21,796	0	86	1	24,218
Tas	0	0	0	0	0	2,680	0	0	2,680
NT	45	6	178	191	505	0	760	0	1,686
ACT	203	39	12	3	0	0	0	188	445
Total	42,931	35,626	41,617	11,432	23,694	2,680	5,713	1,562	165,255
SMVU IS factored									
NSW	-	8,072	9,415	1,901	311	0	518	694	20,910
Vic	9,259	-	2,724	2,752	552	0	27	49	15,362
Qld	7,228	4,171	-	580	204	0	1,124	623	13,930
SA	2,131	2,003	1,175	-	325	0	3,198	7	8,840
WA	613	368	430	925	-	0	86	1	2,422
Tas	0	0	0	0	0	-	0	0	0
NT	45	6	178	191	505	0	-	0	926
ACT	203	39	12	3	0	0	0	-	257
Total	19,479	14,658	13,934	6,353	1,898	0	4,952	1,374	62,648
Correction factor									
NSW	-	3.43	3.76	4.35	5.10	-	7.29	4.03	1.30
Vic	0.72	-	1.35	1.04	0.77	-	0.99	2.21	0.77
Qld	0.93	2.56	-	1.65	2.13	-	1.37	34.64	0.93
SA	0.98	1.12	1.48	-	1.77	-	3.21	2.50	0.90
WA	1.34	3.72	2.86	1.93	-	-	3.07	0.62	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.41	1.00	1.67	0.91	1.38	-	-	0.62	0.81
ACT	0.49	0.56	0.93	1.37	0.62	-	0.62	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.10 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2007

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	31,123	2,991	1,905	474	59	0	24	218	36,794
Vic	13,605	33,949	3,157	3,396	266	105	27	36	54,541
Qld	8,444	1,537	33,683	713	79	11	58	0	44,525
SA	1,787	2,456	332	10,337	546	0	247	2	15,707
WA	369	149	196	685	24,624	0	123	0	26,146
Tas	6	12	23	0	0	3,351	0	0	3,392
NT	17	13	172	215	49	0	1,574	0	2,040
ACT	530	93	28	12	0	0	0	265	928
Total	55,881	41,200	39,496	15,832	25,623	3,467	2,053	521	184,073
SMVU factored									
NSW	27,213	10,189	7,153	2,094	281	0	177	857	47,966
Vic	9,780	24,098	4,167	3,509	196	0	27	85	41,862
Qld	7,853	3,836	28,505	1,160	170	0	81	0	41,605
SA	1,803	2,743	482	7,309	932	0	833	5	14,106
WA	445	531	561	1,255	27,130	0	348	0	30,270
Tas	0	0	0	0	0	3,323	0	0	3,323
NT	23	13	269	198	62	0	1,084	0	1,649
ACT	277	54	27	16	0	0	0	142	517
Total	47,394	41,465	41,164	15,541	28,771	3,323	2,550	1,089	181,298
SMVU IS factored									
NSW	-	10,189	7,153	2,094	281	0	177	857	20,752
Vic	9,780	-	4,167	3,509	196	0	27	85	17,763
Qld	7,853	3,836	-	1,160	170	0	81	0	13,100
SA	1,803	2,743	482	-	932	0	833	5	6,797
WA	445	531	561	1,255	-	0	348	0	3,140
Tas	0	0	0	0	0	-	0	0	0
NT	23	13	269	198	62	0	-	0	565
ACT	277	54	27	16	0	0	0	-	374
Total	20,181	17,366	12,659	8,232	1,641	0	1,466	947	62,492
Correction factor									
NSW	-	3.41	3.76	4.42	4.76	-	7.39	3.93	1.30
Vic	0.72	-	1.32	1.03	0.74	-	0.99	2.35	0.77
Qld	0.93	2.50	-	1.63	2.15	-	1.39	30.42	0.93
SA	1.01	1.12	1.45	-	1.71	-	3.37	2.50	0.90
WA	1.21	3.56	2.86	1.83	-	-	2.83	0.54	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.36	1.00	1.56	0.92	1.26	-	-	0.54	0.81
ACT	0.52	0.58	0.97	1.33	0.54	-	0.54	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.11 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2010

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	31,370	3,264	2,945	641	85	0	279	146	38,730
Vic	13,535	30,035	2,998	2,136	812	70	72	67	49,725
Qld	9,144	1,698	33,017	438	296	13	483	7	45,096
SA	2,220	2,263	452	10,354	564	0	351	0	16,204
WA	235	61	105	843	28,745	0	91	0	30,080
Tas	21	32	4	1	1	3,296	0	0	3,355
NT	20	0	88	106	376	0	1,434	0	2,024
ACT	373	53	6	0	0	0	0	269	701
Total	56,918	37,406	39,615	14,519	30,879	3,379	2,710	489	185,915
SMVU factored									
NSW	22,632	10,870	11,029	2,963	318	0	2,146	530	50,489
Vic	9,858	21,709	3,674	2,161	505	0	72	187	38,165
Qld	8,526	3,902	27,546	678	660	0	702	124	42,139
SA	2,434	2,498	611	6,801	861	0	1,348	0	14,553
WA	190	189	300	1,303	32,648	0	193	0	34,824
Tas	0	0	0	0	0	3,287	0	0	3,287
NT	24	0	110	101	344	0	1,057	0	1,636
ACT	232	34	7	0	0	0	0	117	390
Total	43,898	39,202	43,278	14,007	35,336	3,287	5,518	958	185,484
SMVU IS factored									
NSW	-	10,870	11,029	2,963	318	0	2,146	530	27,857
Vic	9,858	-	3,674	2,161	505	0	72	187	16,457
Qld	8,526	3,902	-	678	660	0	702	124	14,593
SA	2,434	2,498	611	-	861	0	1,348	0	7,752
WA	190	189	300	1,303	-	0	193	0	2,176
Tas	0	0	0	0	0	-	0	0	0
NT	24	0	110	101	344	0	-	0	579
ACT	232	34	7	0	0	0	0	-	273
Total	21,265	17,494	15,732	7,206	2,688	0	4,461	841	69,686
Correction factor									
NSW	-	3.33	3.75	4.62	3.75	-	7.69	3.63	1.30
Vic	0.73	-	1.23	1.01	0.62	-	0.99	2.78	0.77
Qld	0.93	2.30	-	1.55	2.23	-	1.45	17.76	0.93
SA	1.10	1.10	1.35	-	1.53	-	3.84	2.50	0.90
WA	0.81	3.10	2.86	1.55	-	-	2.12	0.31	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.21	1.00	1.25	0.96	0.91	-	-	0.31	0.81
ACT	0.62	0.65	1.10	1.20	0.31	-	0.31	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.12 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2012

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	32,717	2,570	2,433	350	174	0	0	213	38,457
Vic	12,802	31,660	2,347	3,050	1,454	8	48	62	51,431
Qld	7,416	1,506	38,060	831	384	0	610	17	48,824
SA	2,387	2,695	644	10,201	497	14	437	2	16,877
WA	472	188	151	798	30,287	2	103	20	32,021
Tas	38	108	33	21	0	2,849	0	0	3,049
NT	92	0	259	224	381	0	1,815	0	2,771
ACT	235	33	8	3	0	0	2	323	604
Total	56,159	38,760	43,935	15,478	33,177	2,873	3,015	637	194,034
SMVU factored									
NSW	29,679	8,429	9,096	1,665	534	0	0	731	50,134
Vic	9,406	23,267	2,729	3,041	794	0	48	191	39,475
Qld	6,927	3,262	32,245	1,243	876	0	912	159	45,622
SA	2,757	2,951	829	6,102	698	0	1,815	5	15,157
WA	257	525	431	1,081	34,604	0	170	3	37,071
Tas	0	0	0	0	0	2,987	0	0	2,987
NT	102	0	270	896	260	0	712	0	2,240
ACT	162	23	9	3	0	0	0	139	336
Total	49,289	38,457	45,610	14,032	37,765	2,987	3,657	1,226	193,022
SMVU IS factored									
NSW	-	8,429	9,096	1,665	534	0	0	731	20,454
Vic	9,406	-	2,729	3,041	794	0	48	191	16,207
Qld	6,927	3,262	-	1,243	876	0	912	159	13,377
SA	2,757	2,951	829	-	698	0	1,815	5	9,055
WA	257	525	431	1,081	-	0	170	3	2,468
Tas	0	0	0	0	0	-	0	0	0
NT	102	0	270	896	260	0	-	0	1,528
ACT	162	23	9	3	0	0	0	-	198
Total	19,610	15,189	13,364	7,930	3,161	0	2,945	1,088	63,288
Correction factor									
NSW	-	3.28	3.74	4.76	3.07	-	7.89	3.43	1.30
Vic	0.73	-	1.16	1.00	0.55	-	1.00	3.07	0.77
Qld	0.93	2.17	-	1.50	2.28	-	1.49	9.33	0.93
SA	1.16	1.10	1.29	-	1.40	-	4.15	2.50	0.90
WA	0.54	2.79	2.86	1.36	-	-	1.65	0.15	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.10	1.00	1.04	0.98	0.68	-	-	0.15	0.81
ACT	0.69	0.69	1.18	1.09	0.15	-	0.15	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.13 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2014

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	33,881	3,091	2,289	361	23	0	32	120	39,797
Vic	14,275	31,128	3,161	3,412	596	269	802	24	53,667
Qld	7,842	875	37,373	316	142	0	470	0	47,018
SA	1,620	2,803	692	11,269	1,008	0	259	34	17,685
WA	606	98	201	473	36,382	0	105	0	37,865
Tas	26	153	45	25	6	2,866	6	0	3,127
NT	247	12	510	62	513	0	2,233	0	3,577
ACT	207	16	4	2	0	0	0	331	560
Total	58,704	38,176	44,275	15,920	38,670	3,135	3,907	509	203,296
SMVU factored									
NSW	30,890	9,980	8,542	1,767	55	0	259	388	51,880
Vic	10,578	22,621	3,477	3,352	280	0	802	81	41,191
Qld	7,337	1,780	33,309	456	331	0	722	0	43,935
SA	1,966	3,045	845	7,491	1,294	0	1,157	85	15,883
WA	170	243	574	551	42,176	0	124	0	43,837
Tas	0	0	0	0	0	3,063	0	0	3,063
NT	247	12	427	62	231	0	1,913	0	2,892
ACT	156	12	5	2	0	0	0	137	312
Total	51,344	37,693	47,179	13,681	44,367	3,063	4,976	690	202,993
SMVU IS factored									
NSW	-	9,980	8,542	1,767	55	0	259	388	20,991
Vic	10,578	-	3,477	3,352	280	0	802	81	18,570
Qld	7,337	1,780	-	456	331	0	722	0	10,625
SA	1,966	3,045	845	-	1,294	0	1,157	85	8,391
WA	170	243	574	551	-	0	124	0	1,661
Tas	0	0	0	0	0	-	0	0	0
NT	247	12	427	62	231	0	-	0	979
ACT	156	12	5	2	0	0	0	-	175
Total	20,454	15,072	13,869	6,190	2,191	0	3,063	553	61,393
Correction factor									
NSW	-	3.23	3.73	4.89	2.39	-	8.09	3.23	1.30
Vic	0.74	-	1.10	0.98	0.47	-	1.00	3.36	0.77
Qld	0.94	2.03	-	1.44	2.33	-	1.54	0.89	0.93
SA	1.21	1.09	1.22	-	1.28	-	4.47	2.50	0.90
WA	0.28	2.48	2.85	1.16	-	-	1.18	-	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.00	1.00	0.84	1.00	0.45	-	-	-	0.81
ACT	0.75	0.74	1.26	1.00	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.14 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2016

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	39,186	2,544	2,326	672	116	1	0	380	45,225
Vic	11,088	37,681	2,768	2,437	130	74	114	12	54,304
Qld	8,514	1,488	36,317	499	102	0	546	0	47,466
SA	1,983	2,514	563	10,904	512	0	633	0	17,109
WA	270	208	295	880	30,969	4	526	0	33,152
Tas	82	125	6	5	5	3,151	0	2	3,376
NT	137	0	405	242	298	3	2,342	0	3,427
ACT	211	43	4	2	0	0	0	250	510
Total	61,471	44,603	42,684	15,641	32,132	3,233	4,161	644	204,569
SMVU factored									
NSW	37,268	8,214	8,680	3,289	277	0	0	1,228	58,956
Vic	8,216	27,809	3,045	2,394	61	0	114	40	41,680
Qld	7,966	3,026	31,565	720	238	0	839	0	44,354
SA	2,407	2,731	687	8,250	657	0	633	0	15,365
WA	76	516	842	1,025	35,302	0	620	0	38,381
Tas	0	0	0	0	0	3,307	0	0	3,307
NT	137	0	339	242	134	0	1,918	0	2,770
ACT	159	32	5	2	0	0	0	86	284
Total	56,229	42,329	45,163	15,922	36,670	3,307	4,123	1,354	205,098
SMVU IS factored									
NSW	-	8,214	8,680	3,289	277	0	0	1,228	21,688
Vic	8,216	-	3,045	2,394	61	0	114	40	13,871
Qld	7,966	3,026	-	720	238	0	839	0	12,789
SA	2,407	2,731	687	-	657	0	633	0	7,115
WA	76	516	842	1,025	-	0	620	0	3,078
Tas	0	0	0	0	0	-	0	0	0
NT	137	0	339	242	134	0	-	0	852
ACT	159	32	5	2	0	0	0	-	198
Total	18,961	14,520	13,598	7,672	1,368	0	2,205	1,268	59,592
Correction factor									
NSW	-	3.23	3.73	4.89	2.39	-	8.09	3.23	1.30
Vic	0.74	-	1.10	0.98	0.47	-	1.00	3.36	0.77
Qld	0.94	2.03	-	1.44	2.33	-	1.54	0.89	0.93
SA	1.21	1.09	1.22	-	1.28	-	1.00	2.50	0.90
WA	0.28	2.48	2.85	1.16	-	-	1.18	-	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.00	1.00	0.84	1.00	0.45	-	-	-	0.81
ACT	0.75	0.74	1.26	1.00	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.15 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2018

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	41,598	3,439	3,040	362	70	0	29	172	48,710
Vic	12,630	35,653	2,949	2,992	1,101	1	53	72	55,451
Qld	7,707	1,558	38,438	566	599	0	171	0	49,039
SA	2,435	2,350	531	11,448	742	24	377	34	17,941
WA	519	454	318	771	33,540	0	352	0	35,954
Tas	32	131	19	4	3	3,581	0	0	3,770
NT	247	8	334	246	52	0	2,541	0	3,428
ACT	191	33	5	1	0	0	0	273	503
Total	65,359	43,626	45,634	16,390	36,107	3,606	3,523	551	214,796
SMVU factored									
NSW	38,322	11,104	11,345	1,772	167	0	235	556	63,500
Vic	9,359	26,206	3,244	2,939	517	0	53	242	42,560
Qld	7,211	3,169	32,969	817	1,396	0	263	0	45,823
SA	2,955	2,553	648	8,542	952	0	377	85	16,113
WA	145	1,127	908	898	38,132	0	415	0	41,625
Tas	0	0	0	0	0	3,693	0	0	3,693
NT	247	8	279	246	23	0	1,967	0	2,771
ACT	144	24	6	1	0	0	0	104	280
Total	58,383	44,191	49,399	15,215	41,188	3,693	3,309	987	216,365
SMVU IS factored									
NSW	-	11,104	11,345	1,772	167	0	235	556	25,178
Vic	9,359	-	3,244	2,939	517	0	53	242	16,354
Qld	7,211	3,169	-	817	1,396	0	263	0	12,855
SA	2,955	2,553	648	-	952	0	377	85	7,571
WA	145	1,127	908	898	-	0	415	0	3,492
Tas	0	0	0	0	0	-	0	0	0
NT	247	8	279	246	23	0	-	0	804
ACT	144	24	6	1	0	0	0	-	176
Total	20,062	17,985	16,430	6,673	3,056	0	1,342	883	66,430
Correction factor									
NSW	-	3.23	3.73	4.89	2.39	-	8.09	3.23	1.30
Vic	0.74	-	1.10	0.98	0.47	-	1.00	3.36	0.77
Qld	0.94	2.03	-	1.44	2.33	-	1.54	0.89	0.93
SA	1.21	1.09	1.22	-	1.28	-	1.00	2.50	0.90
WA	0.28	2.48	2.85	1.16	-	-	1.18	-	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.00	1.00	0.84	1.00	0.45	-	-	-	0.81
ACT	0.75	0.74	1.26	1.00	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Table F.16 SMVU raw OD matrix, correction factor matrix, and factored origin-destination (OD) matrix, 2020

	Destination								
Origin	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Raw SMVU									
NSW	43,814	2,766	3,323	741	48	57	248	279	51,276
Vic	10,508	41,247	3,744	3,291	329	2	94	70	59,285
Qld	8,659	2,170	39,104	1,872	595	1	430	2	52,833
SA	2,057	2,204	656	11,439	1,235	12	656	13	18,272
WA	811	692	465	1,383	30,866	2	258	0	34,477
Tas	117	93	19	0	12	3,632	0	0	3,873
NT	194	2	584	121	222	11	2,210	0	3,344
ACT	234	43	13	1	7	0	0	293	591
Total	66,394	49,217	47,908	18,848	33,314	3,717	3,896	657	223,951
SMVU factored									
NSW	38,864	8,931	12,401	3,627	115	0	2,006	901	66,845
Vic	7,787	29,881	4,119	3,233	154	0	94	235	45,503
Qld	8,101	4,413	32,103	2,702	1,386	0	660	2	49,369
SA	2,497	2,394	801	8,444	1,585	0	656	32	16,410
WA	227	1,718	1,327	1,610	34,728	0	304	0	39,915
Tas	0	0	0	0	0	3,794	0	0	3,794
NT	194	2	488	121	100	0	1,798	0	2,703
ACT	177	32	16	1	0	0	0	103	329
Total	57,846	47,371	51,255	19,739	38,069	3,794	5,518	1,274	224,867
SMVU IS factored									
NSW	-	8,931	12,401	3,627	115	0	2,006	901	27,981
Vic	7,787	-	4,119	3,233	154	0	94	235	15,622
Qld	8,101	4,413	-	2,702	1,386	0	660	2	17,266
SA	2,497	2,394	801	-	1,585	0	656	32	7,965
WA	227	1,718	1,327	1,610	-	0	304	0	5,187
Tas	0	0	0	0	0	-	0	0	0
NT	194	2	488	121	100	0	-	0	906
ACT	177	32	16	1	0	0	0	-	226
Total	18,982	17,490	19,152	11,294	3,341	0	3,721	1,171	75,152
Correction factor									
NSW	-	3.23	3.73	4.89	2.39	-	8.09	3.23	1.30
Vic	0.74	-	1.10	0.98	0.47	-	1.00	3.36	0.77
Qld	0.94	2.03	-	1.44	2.33	-	1.54	0.89	0.93
SA	1.21	1.09	1.22	-	1.28	-	1.00	2.50	0.90
WA	0.28	2.48	2.85	1.16	-	-	1.18	-	1.16
Tas	-	-	-	-	-	-	-	-	0.98
NT	1.00	1.00	0.84	1.00	0.45	-	-	-	0.81
ACT	0.75	0.74	1.26	1.00	-	-	-	-	0.56

- * Not applicable

Source: BITRE estimates.

Glossary and abbreviations

ABS – Australian Bureau of Statistics

ACT – Australian Capital Territory

ANOVA – Analysis of Variance

BITRE – Bureau of Infrastructure, Transport and Regional (Research) Economics

BTE – Bureau of Transport Economics

BTRE – Bureau of Transport and Regional Economics

DFAT – Department of Foreign Affairs and Trade

FMS – Freight Movements Survey

GNE – Gross National Expenditure

GNI – Gross National Income

NT – Northern Territory

NSW – New South Wales

OD – origin–destination

Qld – Queensland

RFMS – Road Freight Movement Survey

SA – South Australia

SMVU – Survey of Motor Vehicle Use

Tas – Tasmania

Vic. – Victoria

WA – Western Australia

tkm – tonne kilometre, a measure of freight activity that represents mass (in tonnes) moved by distance travelled (in kilometres). One tonne kilometre is equivalent to one tonne moved one kilometre.

References

Australian Bureau of Statistics 1982, *Interstate Freight Movements, 1980–81 to 1992–93*, Catalogue no. 9212.0, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/9212.0.

—— 1996, *Experimental Estimates of Freight Movements, Australia, Quarterly, Sep 1994 to Sep 1995*, Catalogue no. 9217.0, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/9217.0.

—— 2002, *Freight Movements, Australia, Summary, Reissue*, Catalogue no. 9220.0, Reference period: 12 Months ended 31 March 2001, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/.

—— 2015, *Road Freight Movements, Australia*, Catalogue no. 9223.0, Reference period: 12 Months ended 30 June 2014, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/9223.0.

—— 2018, *Population Projections, Australia, 2017 (base) - 2066*, Catalogue no. 5216.0, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3222.0.

—— 2020a, *Australian National Accounts: State Accounts, 2019–20*, Catalogue no. 5220.0, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-state-accounts.

—— 2020b, *Survey of Motor Vehicle Use, Australia*, Catalogue no. 9208.0, Reference period: 12 Months ended 30 June 2020, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/.

—— 2021a, *Australian System of National Accounts, 2020–21*, Catalogue no. 5204.0, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/statistics/economy/national-accounts/australian-system-national-accounts.

—— 2021b, *Motor Vehicle Census, Australia*, Reference period: 31 January 2021, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/.

—— 2022, *Labour Force, Australia, Detailed, Quarterly, February 2022*, Catalogue no. 6291.0.55.003, Australian Bureau of Statistics, Canberra, URL: https://www.abs.gov.au/.

Beavis, P., J. Black and R. Golzar 2005, "Functional specification of strategic urban freight models: Modelling attributes for the port and landside freight task in Sydney", *Journal of the Eastern Asia Society for Transportation Studies*, vol. 6, pp. 2975–2990.

Bureau of Infrastructure and Transport Research Economics 2022a, *Australian aggregate freight forecasts – 2022 update*, Research Report 154, BITRE, Canberra, URL: http://www.bitre.gov.au/.

—— 2022b, *Motor Vehicles, Australia, January 2022 (First issue)*, Statistical Release, BITRE, Canberra, URL: http://www.bitre.gov.au/mvc.

Bureau of Infrastructure, Transport and Regional Economics 2009a, *National road network intercity traffic projections to 2040*, Working Paper 75, BITRE, Canberra, URL: http://www.bitre.gov.au/.

—— 2009b, *Road and rail freight: competitors or complements?* Information Sheet 34, BITRE, Canberra, URL: http://www.bitre.gov.au/.

—— 2010a, *Interstate freight in Australia*, Research Report 120, BITRE, Canberra, URL: http://www.bitre.gov.au/.

—— 2010b, *Road freight estimates and forecasts in Australia: interstate, capital cities and rest of state*, Research Report 121, BITRE, Canberra, URL: http://www.bitre.gov.au/.

—— 2014a, *Australian road freight estimates: 2014 update*, Information Sheet 62, BITRE, Canberra, URL: http://www.bitre.gov.au/.

—— 2014b, *Freightline 1 – Australian freight transport overview*, BITRE, Canberra, URL: http://www.bitre.gov.au/.

——2017, *Freight rates in Australia*, Information Sheet 90, BITRE, Canberra, URL: http://www.bitre.gov.au/.

——2020, *Australian Infrastructure Statistics – Yearbook 2020*, BITRE, Canberra, URL: http://www.bitre.gov.au/.

——2021, *Australian Infrastructure and Transport Statistics – Yearbook 2021*, BITRE, Canberra, URL: http://www.bitre.gov.au/.

Bureau of Transport and Regional Economics 2003, *Freight Measurement and Modelling in Australia*, Report 112, BTRE, Canberra, URL: http://www.bitre.gov.au/.

——2005a, *An overview of the Australian road freight transport industry*, Working Paper 60, BTRE, Canberra, URL: http://www.bitre.gov.au/.

——2005b, *Greenhouse policy options for transport*, Research Report 105, BTRE, Canberra, URL: http://www.bitre.gov.au/.

Bureau of Transport Economics 1975, *Estimates of Australian Interregional Freight Movements, 1971–72*, Information Bulletin, BTE, Canberra, URL: http://www.bitre.gov.au/.

Centre for Population 2021, *Population Statement 2021*, Report, The Australian Government, Canberra, URL: https://population.gov.au/publications/statements/2021-population-statement, Accessed: 25 Dec. 2021.

Cosgrove, D. and D. Mitchell 2001, "Standardised Time-series for the Australian Road Transport Task", *Papers of the Australasian Transport Research Forum*, vol. 23, Paper presented at the 23rd Australasian Transport Research Forum, Hobart, Tasmania, April 2001, ATRF, URL: https://www.australasiantransportresearchforum.org.au/papers.

D. Ortúzar, J. de and L. Willumsen 2006, *Modelling Transport*, Third, John Wiley & Sons Ltd, Chichester, West Sussex.

Department of Foreign Affairs and Trade 2019, *About Australia: Land transport in Australia*, Fact Sheet, DFAT, Canberra, URL: http://www.dfat.gov.au/.

Freisz, T. and R. Harker 1983, "Predictive Intercity Freight Network Models: The State of the Art", *Transportation Research Part A*, vol. 17A, no. 6, pp. 409–417.

Gargett, D. and M. Cregan 2005, "Road Freight Growth in Australian States and Cities", *Papers of the Australasian Transport Research Forum*, vol. 28, Paper presented at the 28th Australasian Transport Research Forum, Sydney, New South Wales, September 2005, ATRF, URL: https://www.australasiantransportresearchforum.org.au/papers.

Gargett, D. and A. Hussain 2008, "Road freight estimates by State and Territory,", *Papers of the Australasian Transport Research Forum*, vol. 31, Paper presented at the 31st Australasian Transport Research Forum, Gold Coast, Queensland, 2-3 October 2008, ATRF, URL: https://www.australasiantransportresearchforum.org.au/papers.

Gargett, D., A. Hussain and D. Cosgrove 2006, "Interstate freight on State roads", *Papers of the Australasian Transport Research Forum*, vol. 29, Paper presented at the 29th Australasian Transport Research Forum, Gold Coast, Queensland, September 2008, ATRF, URL: https://www.australasiantransportresearchforum.org.au/papers.

Gargett, D. and R. Perry 1998, "Interstate non-bulk freight", *Papers of the Australasian Transport Research Forum*, vol. 22, Paper presented at the 22nd Australasian Transport Research Forum, Sydney, New South Wales, 2-3 October 1998, ATRF„ pp. 19–28, URL: https://www.australasiantransportresearchforum.org.au/papers.

Harker, R. 1985, "The state of the art in predictive analysis of freight transport systems", *Transport Reviews*, vol. 5, no. 2, pp. 143–164.

Ogden, K. 1992, *Urban Goods Movement: A Guide to Policy and Planning*, Ashgate, Brookfield, UK.

Pendyala, R., V. Shankar and R. McCullough 2000, "Freight travel demand modelling: synthesis of approaches and development of a framework", *Transportation Research Record*, no. 1725, pp. 9–18.

R. Hwang 2005, *Oregon Freight Modelling*, URL: http://web.cecs.pdx.edu/~monserec/courses/freight/classprojects/PPT%20%20Oregon%20Freight%20Model.pdf, Accessed: 21 Nov. 2021.

RARE Consulting 2009, *Challenges of growth in road freight*, Sydney.

Russo, F. and A. Comi 2003, "Urban freight movements and logistics: an acquisition model", *Proceedings of European Transport Conference - PTRC 2003*, Strasbourg, France, URL: https://aetransport.org/public/-downloads/jBDTm/814-514ec5127eb05.pdf.

Soames, L., A. Hossain and D. Gargett 2007, "Interstate freight in Australia, 1972–2005", *Papers of the Australasian Transport Research Forum*, vol. 30, Paper presented at the 30th Australasian Transport Research Forum, Melbourne, Victoria, September 2007, ATRF, URL: https://www.australasiantransportresearchforum.org.au/papers.

Southworth, F. 2002, "Freight transportation planning: models and methods", *Transportation Systems Planning: Methods and Applications*, CRC Press, chap. 4.

Spasovic, L., M. Bieber and A. Bladikas 1999, *Multi-modal freight transportation: regional data development and analysis*, Final report prepared for the New Jersey Department of Transportation, New Jersey Department of Transportation, New Jersey, U.S., URL: http://kimon.njit.edu/nctip/final_report/-multi_modal_freight.htm.

Strong, C., R.Harrison and H. Mahmassani 1996, *A methodology for determining the freight border transportation impact of the North American free trade agreement*, Research Report 131-4, University of Texas Center for Transportation, Texas, U.S..

The Treasury, Australian Government 2021, *2021 Intergenerational Report Australia over the next 40 years*, Canberra, URL: https://treasury.gov.au/publication/2021-intergenerational-report.

van Es, J. 2003, "Freight transport: an evaluation", *ECMT Round Table*, no. 58.

Watson, L. and M. Greig 2002, "Experience with measuring freight movements in Australia", *Papers of the Australasian Transport Research Forum*, vol. 25, Paper presented at the 25th Australasian Transport Research Forum, Canberra, ACT, 2-4 October 2002, ATRF, URL: https://www.australasiantransportresearchforum.org.au/papers.

Winston, C. 1983, "The demand for freight transportation: Models and applications", *Transportation Research - A*, vol. 17A, no. 6, pp. 419–427.

WSP 2003, *Review of Freight Modelling*, Final report prepared for the Department for Transport, Department for Transport, London, U.K..

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