

Australian Government

Department of Infrastructure and Regional Development

Bureau of Infrastructure, Transport and Regional Economics



Freight Rates in Australia

At a Glance

Freight rates are a key factor influencing freight mode choice and the costs of freight-reliant business sectors, such as mining, construction, and the retail and wholesale trades. As such, they affect the profitability of Australian industry.

This Information Sheet presents an estimate of interstate freight rates for road, rail, sea and air modes back to 1965. Models of the first three modes are also presented, allowing an understanding of the determinants of the level and movement of freight rates in Australia. The estimates and models presented show that following rapid declines in real freight rates during 1975 to 1985 for road and 1985 to 1995 for rail and sea, the trend has since been basically sideways – higher or lower due to trends in technology, fuel prices and the economy. Air freight rates have had steep rises and falls, but have also been stable since the late 1990s.

Interstate Road, Rail and Sea Freight Rates

The estimates of real interstate road, rail and sea freight rates are presented in Figure 1. The road freight rates are an average for non-bulk freight on interstate freight routes. The rail and sea rates are for non-bulk freight on the Eastern States to Perth route.

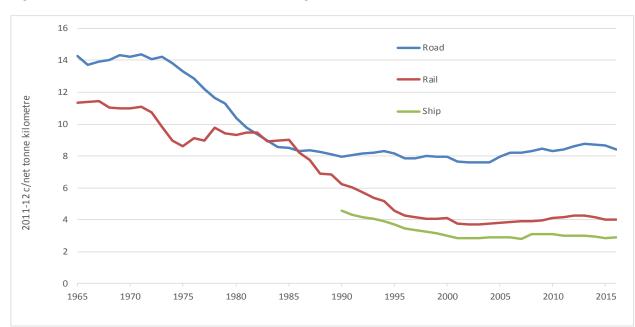


Figure I Real interstate road, rail and sea freight rates

06

As shown in Figure 1, the major trends are steep declines - from 1975 to 1985 for road, and from 1985 to 1995 for rail - and then a basically flat trend. Sea freight rates match rail at a lower level.

As shown in Table I, nominal freight rates for road are about 9 cents/net tonne kilometre, rail 4 cents and sea 3 cents. The air rates in Table I are for an average of interstate routes (currently 184 cents per net tonne-kilometre). A mainland to Tasmania fare is also shown (18 cents).

	Nominal o	c/ntkm						Real c/nt	km 2011-12			
FY						CPI	FY					
	Air IS	Road IS	Rail IS	Ship Tasmania	Ship IS	(2011-12 = 100)		Air IS	Road	Rail	Ship Tasmania	Ship IS
1965	14.36	1.17	0.93	0.88		8.2	1965	175.12	14.27	11.34	10.73	
1966	14.71	1.17	0.97	0.91		8.5	1966	172.55	13.72	11.38	10.67	
1967	15.00	1.22	1.00	0.97		8.8	1967	171.43	13.94	11.43	11.09	
1968	15.00	1.27	1.00	1.02		9.1	1968	165.75	14.03	11.05	11.27	
1969	15.00	1.33	1.02	1.05		9.3	1969	161.29	14.30	10.97	11.29	
1970	15.00	1.36	1.05	1.13		9.6	1970	156.66	14.20	10.97	11.80	
1971	16.51	1.44	1.11	1.25		10.0	1971	164.69	14.36	11.07	12.47	
1972	17.23	1.51	1.15	1.33		10.7	1972	160.65	14.08	10.72	12.40	
1973	17.23	1.62	1.12	1.47		11.4	1973	151.47	14.24	9.85	12.92	
1974	19.38	1.77	1.15	1.59		12.8	1974	151.11	13.80	8.97	12.40	
1975 1976	21.53 26.56	2.00 2.18	1.29	1.76		15.0	1975 1976	143.53	13.33	8.60 9.10	11.73 14.42	
						16.9		156.93	12.88			
1977	26.56	2.35	1.73	3.81		19.3	1977	137.97	12.21	8.99	19.79	
1978 1979	27.99	2.46	2.07	4.57		21.1	1978	132.50	11.64	9.80	21.63	
1979	32.30 39.48	2.58	2.15	4.97		22.8	1979	141.51	11.30	9.42	21.77	
		2.61	2.34	6.16		25.2	1980	156.82	10.37	9.29	24.47	
1981	47.37	2.69	2.61	7.25		27.5	1981	172.25	9.78	9.49	26.36	
1982	59.22	2.85	2.88	8.55		30.4	1982	194.96	9.38	9.48	28.15	
1983	63.17	3.04	3.02	9.56		33.9	1983	186.48	8.97	8.92	28.22	
1984	71.06	3.10	3.25	9.76		36.2	1984	196.30	8.56	8.98	26.96	
1985	78.96	3.22	3.41	9.76		37.8	1985	209.17	8.53	9.03	25.85	
1986	86.85 90.80	3.41	3.35 3.46	9.72 9.64		40.9	1986 1987	212.22	8.32	8.19	23.75	
1987		3.73						203.02	8.34	7.74	21.55	
1988	95.93	3.96	3.30	10.08		48.0	1988	199.75	8.24	6.87	20.99	
1989	95.93	4.18	3.53	10.24		51.5	1989	186.18	8.12	6.85	19.87	
1990	104.62	4.44	3.48	10.05	2.54	55.7	1990	187.91	7.97	6.25	18.05	4.56
1991	118.44	4.71	3.53	10.94	2.54	58.6	1991	202.12	8.03	6.02	18.67	4.33
1992	114.49	4.88	3.42	10.80	2.47	59.7	1992	191.78	8.17	5.73	18.09	4.14
1993	114.49	4.96	3.24	10.71	2.45	60.3	1993	189.79	8.23	5.37	17.75	4.06
1994	114.49	5.09	3.18	10.98	2.39	61.4	1994	186.39	8.29	5.18	17.88	3.89
1995	114.49	5.16	2.89	11.11	2.35	63.4	1995	180.58	8.13	4.56	17.52	3.71
1996	102.25	5.18	2.81	11.11	2.30	66.1	1996	154.69	7.84	4.25	16.81	3.48
1997	102.25	5.27	2.78	12.34	2.24	67.0	1997	152.67	7.87	4.15	18.42	3.34
1998	102.25	5.34	2.73	13.24	2.18	67.0	1998	152.73	7.98	4.08	19.78	3.26
1999	102.25	5.41	2.76	11.90	2.13	67.8	1999	150.81	7.97	4.07	17.55	3.14
2000	102.25	5.51	2.84	11.81	2.08	69.4	2000	147.28	7.94	4.09	17.01	3.00
2001	111.73	5.64	2.75	12.54	2.08	73.6	2001	151.81	7.66	3.74	17.04	2.83
2002	117.15	5.76	2.81	11.62	2.15	75.7	2002	154.76	7.61	3.71	15.35	2.84
2003	121.63	5.93	2.90	12.63	2.21	78.0	2003	155.99	7.60	3.72	16.20	2.83
2004	126.19	6.07	2.99	14.05	2.30	79.9	2004	158.03	7.61	3.74	17.60	2.88
2005	131.48	6.48	3.10	13.53	2.37	81.8	2005	160.78	7.93	3.79	16.55	2.90
2006	135.39	6.92	3.24	13.11	2.45	84.4	2006	160.41	8.20	3.84	15.53	2.90
2007	136.35	7.11	3.41	14.81	2.45	86.9	2007	156.90	8.18	3.92	17.04	2.82
2008	135.88	7.45	3.52	14.77	2.80	89.8	2008	151.27	8.29	3.92	16.44	3.12
2009	134.22	7.85	3.68	14.84	2.87	92.6	2009	144.91	8.48	3.97	16.03	3.10
2010	137.77	7.87	3.89	13.94	2.94	94.8	2010	145.36	8.30	4.10	14.71	3.10
2011	146.62	8.22	4.08	15.48	2.94	97.7	2011	150.03	8.41	4.17	15.84	3.01
2012	155.47	8.59	4.28	15.78	3.02	100	2012	155.51	8.59	4.28	15.79	3.02
2013	159.01	8.97	4.36	17.12	3.06	102.3	2013	155.51	8.77	4.26	16.74	2.99
2014	173.60	9.15	4.39	18.02	3.10	105.0	2014	165.30	8.72	4.18	17.16	2.95
2015	184.42	9.24	4.30	17.31	3.06	106.8	2015	172.64	8.65	4.02	16.21	2.86
2016	183.77	9.08	4.32	17.69	3.14	108.3	2016	169.69	8.38	3.99	16.34	2.90
2017							2017		8.17-8.23	3.95		2.83
2018							2018		8.23-8.63	3.95		2.83
2019							2019		8.28-8.93	3.95		2.83
2020							2020		8.30-9.34	3.95		2.83
2021							2021		8.32-9.76	3.95		2.83
2022							2022		8.32-9.76	3.95		2.83
2023							2023		8.31-9.75	3.95		2.83
2024							2024		8.33-9.74	3.95		2.83
2025							2025		8.34-9.73	3.95		2.83
2026							2026		8.36-9.72	3.95		2.83
2027							2027		8.37-9.71	3.95		2.83
2028							2028		8.38-9.70	3.95		2.83
2029							2029		8.39-9.69	3.95		2.83
2030							2030		8.40-9.68	3.95		2.83

Table I Australian interstate freight rates

Source: BITRE estimates

In the next section, the movements in the real freight rates for road, rail and sea shown in Figure 1 are modelled, in order to shed some light on their determinants. The forecasts shown come from this modelling.

Interstate Road Freight Rates

The sharp decline in real road freight rates between 1975 and 1985 was basically a function of small articulated trucks (less than 6 axles) being replaced with larger articulated trucks (6 and more axles).

As shown in Table 2, the proportion of the freight task at the national level performed by articulated trucks of less than 6 axles fell dramatically during that decade, from 47 per cent in 1975 to 15 per cent in 1985. At the same time, the share for 6 axle articulated rose from 13 per cent to 47 per cent – a mirror image change.

Table 2 Share of Australian freight task by vehicle type

			ent of total net		1				
Cost (c/ntk)				9.8					
FY	LCV	Rigid	Artic<6axle	Artic 6axle	B-double	Road train	Australia	Artic total	Structural cost
1965									
1966									
1967									
1968									
1969									
1970				0.0		3.0		-	
1971	4.0			0.0		3.0			
1972				3.2		2.8			
1973				6.4	0.0	2.6		58.8	
1974				9.6	0.0	2.4		60.2	
1975				12.8		2.2	-	61.6	
1976				16.0	0.0	2.0			
1977		31.0	42.3	20.0		2.0			
1978			39.7	24.0		2.0		-	
1979				28.0		2.0			
1980			34.0	30.7	0.0	2.7	100.0		
1981	4.0			33.3		3.3			
1982				36.0		4.0			
1983				39.7	0.0	5.7	100.0	69.0	
1984				43.3		7.3		-	
1985				47.0		9.0			
1986	4.3	25.0	14.0	47.7		9.0			
1987	4.7	25.0	13.0	48.3		9.0			
1988		25.0	12.0	49.0		9.0			
1989	5.1	24.4	11.2	49.6	0.0	9.7	100.0	70.4	9.
1990				50.2	0.0	10.3	-	70.9	
1991	5.4			50.8	0.0	11.0			
1992			8.9	50.0	1.9	11.6		72.4	
1993		21.7	8.3	49.2		12.2		73.6	
1994				48.3		12.8			
1995				47.5		13.4			
1996		20.0	6.1	46.7	9.6	13.7	100.0		
1997				45.9	11.4	13.9			
1998	3.9	19.6	3.9	45.0		14.2	100.0	-	
1999			3.6	41.3		17.5	-		
2000	4.2	18.7	4.5	40.1	18.2	14.2		77.0	8.
2001	4.3		3.9	39.4	19.9	13.7			
2002			3.4	35.1	20.8	16.6			
2003				36.0	23.1	13.5		-	
2004		18.9	2.8	32.4		17.5			
2005			3.0	32.3	28.5	13.4	100.0	77.2	8.
2006				26.4	31.3	16.8	100.0	76.8	8.
2007	3.6			29.3		14.1	100.0		
2008				27.1	33.0	15.3			
2009									
2010									
2011									
2012									
2013				25.4		19.9			
2014		17.2	1.5					79.0	7.
2015									7.
2016									7.

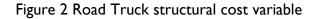
Source: ABS Survey of Motor Vehicle Use, BITRE estimates. Footnotes: Artic Total is the sum of Artic<6axle, Artic 6axle, B-double and Road train. Structural cost is explained below.

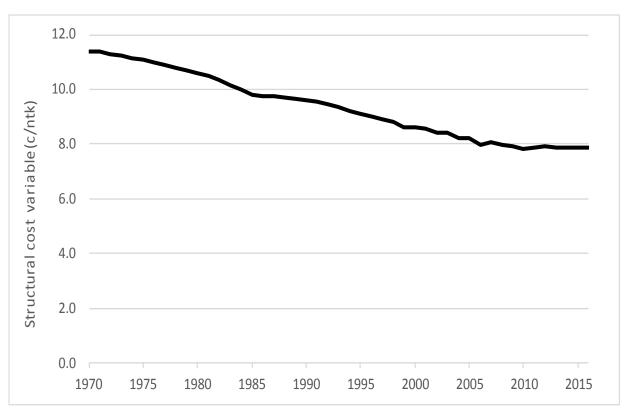
The percentage of the freight task performed by less than 6-axle articulated trucks from 1970 to 1985 is thus used as a proxy for the change in technology leading to the sharp fall in real road freight rates during this period.

But more generally, over the three and a half decades since 1970, the progressive shift from smaller, higher cost vehicles to larger, lower cost vehicles has generated a continuing productivity gain (lower costs).

A variable measuring this downward trend in structural cost is shown in the last column of Table 2. It is the result of multiplying the vehicle type share by the vehicle cost in cents per net tonne kilometre (shown in row 2 of Table 2), aggregating these calculations (except for light commercial vehicles and rigids) and the dividing by the aggregate percentage for all truck types (excluding LCVs and rigids).

The result of this calculation is shown in Figure 2, which shows a fairly steady downward structural cost effect, as the smaller, higher cost vehicles are replaced by larger, lower cost types.





Other key inputs to road freight rates are the real price of diesel fuel, shown in Figure 3 with its two-year average and, since 2000-01, the diesel fuel cost rebate, shown in Figure 4.

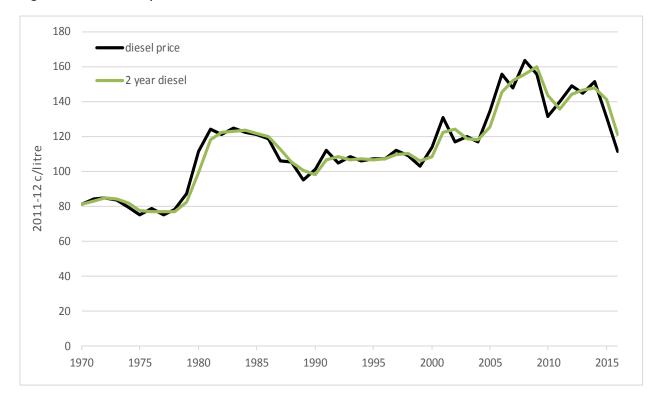
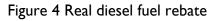
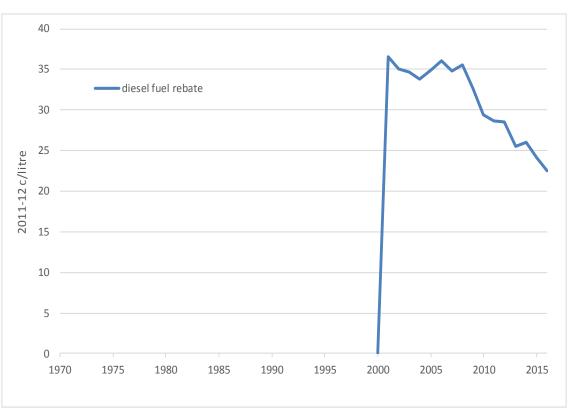


Figure 3 Real diesel price

90





Using these four variables and four dummy variables, a regression was fit which explains more than 99 per cent of the variation in the real road freight rate. The details of the equation are shown in Table 3. The dummy variables are included to account for unexplained, usually temporary influences on the freight rates.

Table 3 Real road freight rate equation

Regression Si	tatistics
Multiple R	0.999461826
R Square	0.998923942
Adjusted R Square	0.998723745
Standard Error	0.088010194
Observations	52

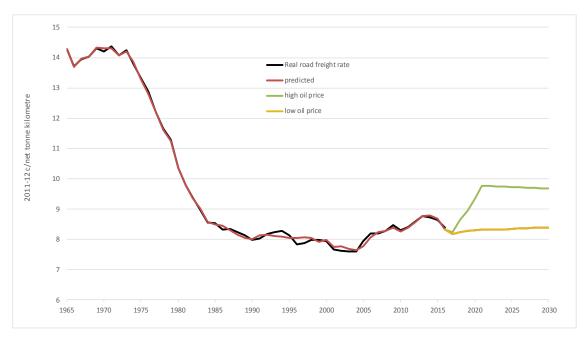
ANOVA

	df	SS	MS	F	Significance F
Regression	8	309.1940185	38.64925231	4989.708069	3.2915E-61
Residual	43	0.333069155	0.007745794		
Total	51	309.5270876			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	1.580977271	0.480850286	3.287878403	0.002017129	0.61125025	2.550704292
Structural cost	0.213733933	0.049259001	4.338982325	8.51734E-05	0.114393691	0.313074175
2 year diesel price	0.019266999	0.001355086	14.21828222	7.39521E-18	0.016534207	0.021999791
decline <6axle	0.164284235	0.002894902	56.74949604	4.57922E-42	0.158446109	0.170122362
dum7375	0.413763683	0.067160825	6.160789211	2.13363E-07	0.278320972	0.549206394
dum7784	-1.399982455	0.066452889	-21.06729248	2.77188E-24	-1.533997479	-1.265967432
diesel fuel rebate	-0.013137928	0.002033164	-6.461814156	7.7799E-08	-0.017238194	-0.009037662
dum10on	0.553150979	0.056123789	9.855909424	1.33858E-12	0.439966572	0.666335386
dum6668	-0.620541355	0.082779106	-7.496352419	2.47732E-09	-0.787481333	-0.453601377

The fit of the equation to the real road freight rate is shown in Figure 5, together with forecasts based on slow declines in the structural change variable and the fuel rebate, and two oil price scenarios (low equals \$US2015 60 to 70 per barrel and high equals \$150 per barrel from 2020).

Figure 4 Real road freight rates and prediction



Interstate Rail Freight Rates

As was shown in Figure 1, the substantial decline in real interstate rail fares from 1985 to 1995, lagged about a decade behind that for road fares. Rail implemented efficiency improvements over this period. These included containerisation, track improvements, and more efficient engines and rolling stock, changes that essentially revolutionised the handling of non-bulk freight by the railways.

A rough model of rail freight has been constructed using lagged 3-year average real road freight rates (an 11year lag to 1999-2000 and then held constant), a 2-year average of the national 'capital expenditure to GDP' ratio (from 2003-04 on), and a dummy variable. The regression is shown in Table 4.

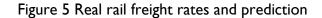
Table 4 Equation for real rail freight rates

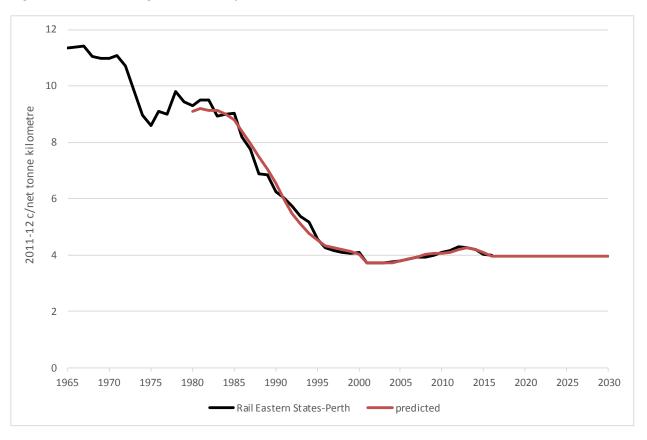
Regression St	atistics
Multiple R	0.995401053
R Square	0.990823256
Adjusted R Square	0.989989006
Standard Error	0.202961525
Observations	37

ANOVA

	df	SS	MS	F	Significance F	
Regression	3	146.773932	48.92464399	1187.682173	1.1307E-33	
Residual	33	1.359381566	0.041193381			
Total	36	148.1333135				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-4.845788936	0.59114882	-8.19724031	1.82718E-09	-6.048490253	-3.643087618
Roadles00 lag11	0.835051387	0.018606412	44.87976498	3.66504E-31	0.797196358	0.872906416
Roadiesoo lagi i	0.000001007	0.010000+12	44.07070400	0.000012 01	0.101100000	0.012000110
2yr Capex 04on	0.082003355	0.022962789	3.571140901	0.00111563	0.03528521	0.128721501

Figure 5 shows the fit to the rail freight rate series, as well as a prediction assuming a constant capex ratio to 2030.





Coastal Shipping Freight Rates

Real sea freight rates from the Eastern States to Perth have been modelled as a function of rail freight rates and a dummy variable. The regression is shown in Table 5.

Table 5 Equation for real Eastern States to Perth sea freight rates

SUMMARY OUTPUT

Regression S	tatistics					
Multiple R	0.978652868					
R Square	0.957761435					
Adjusted R Square	0.954241555					
Standard Error	0.109333794					
Observations	27					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	2	6.505314114	3.252657057	272.1005612	3.22485E-17	
Residual	24	0.286893085	0.011953879			
Total	26	6.792207199				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.420988425	0.134865044	3.121553311	0.004640944	0.142640655	0.699336196
Real rail freight rate	0.665737453	0.030229355	22.02287963	1.98987E-17	0.60334713	0.728127776
dum11on	-0.228370882	0.051137124	-4.465853071	0.000161551	-0.333912719	-0.122829046

Figure 6 shows the fit of the equation and a prediction to 2030 (using the rail freight rate prediction shown in Figure 5).

90

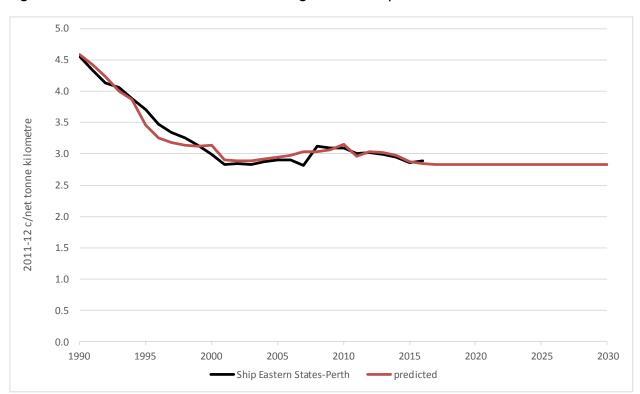
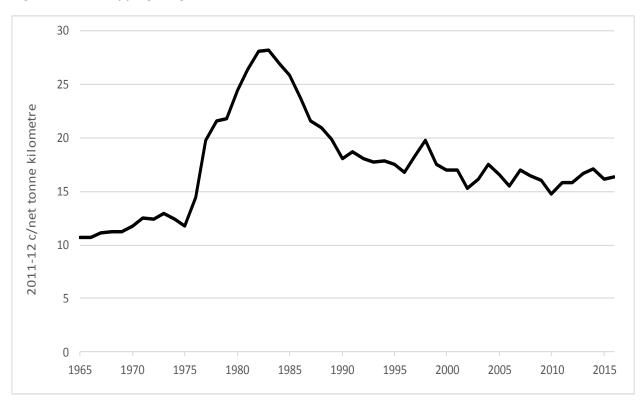


Figure 6 Real Eastern States to Perth sea freight rates and prediction

Sea Freight Rates to Tasmania

The path of real shipping freight rates to Tasmania since 1965 is shown in Figure 7. After gyrations from the late 1970s to 1990, the trend has been slowly declining, levelling out in the 2000s.

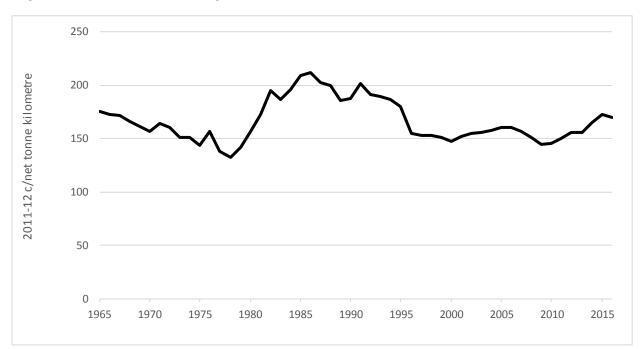
Figure 7 Real shipping freight rates to Tasmania



Interstate Air Freight Rates

The path of real interstate air freight rates since 1965 is shown in Figure 7. Except for a hike to a higher level during the 1980s and early 1990s, the trend has been roughly flat.





Conclusions

The paths of real interstate road, rail and sea freight rates since 1965 has been shown to each have two stages.

First, there has been in each mode a sharp drop in real freight rates since the 1960s, first in road, then in rail and sea. In each case the drop was due to significant changes in technologies, infrastructure and logistics.

Subsequently, there has been, since the early to late 1990s, a period of basically flat underlying trend rates, interrupted by fluctuations caused by input costs (e.g. diesel prices and rebates for road) or demand factors (e.g. changes in capital expenditure in the economy for rail).

The outlook for freight rates is 1) for road, flat or upward depending on oil prices, and 2) for rail and sea, flat.

ABS (2016) Consumer Price Index Australia, Cat. No. 6401.0. Canberra ACT.

ABS (2016) Producer Price Index Australia, Cat. No. 6427.0. Canberra ACT.

ABS (2016) Private New Capital Expenditure and Expected Expenditure, Cat. No. 5625.0. Canberra ACT.

BTRE (2002) Freight Rates in Australia, Information Sheet 19, Canberra, ACT.

BITRE (2008) Freight Rates in Australia 1964-65 to 2007-08, Information Sheet 28, Canberra, ACT.

TransEco (2013) Road Freight Cost Outlook June Quarter 2013, Melbourne, Victoria.

Other Data

FY	Structural	decline	diesel	real	Roadless00	
	Cost	<6axle	fuel rebate	diesel price	lag11	Capex
1965	11.4	53	0.0	82		16.
1966	11.4	53	0.0	85		17.
1967	11.4	53	0.0	84		17.
1968	11.4	53	0.0	85		17.
1969	11.4	53	0.0	83		17
1970	11.4	53	0.0	81		16
1971	11.4	53	0.0	84		16
1972	11.3	51	0.0	85		16
1973	11.2	50	0.0	84		16
1973	11.2	48	0.0	79		16
1974	11.1	40	0.0	75	14.0	15
1975						
	11.0	45	0.0	79	14.0	15
1977	10.9	42	0.0	75	14.0	15
1978	10.8	40	0.0	78	13.9	15
1979	10.7	37	0.0	87	14.1	16
1980	10.6	34	0.0	112	14.2	16
1981	10.5	31	0.0	124	14.3	18
1982	10.4	28	0.0	121	14.2	19
1983	10.2	24	0.0	125	14.2	17
1984	10.0	19	0.0	122	14.0	17
1985	9.8	15	0.0	121	13.8	18
1986	9.8	15	0.0	119	13.3	18
1987	9.7	15	0.0	106	12.8	18
1988	9.7	15	0.0	105	12.2	18
1989	9.7	15	0.0	95	11.7	20
1990	9.6	15	0.0	101	11.1	19
1991	9.6	15	0.0	112	10.5	17
1992	9.4	15	0.0	105	9.8	16
1993	9.3	15	0.0	109	9.4	17
1994	9.2	15	0.0	105	9.0	17
1995	9.1	15	0.0	100	8.7	18
1996	9.0	15	0.0	107	8.5	18
1990	8.9	15	0.0	112	8.3	19
1998	8.8	15	0.0	109 103	8.3	20
1999	8.6	15	0.0		8.2	20
2000	8.6	15	0.0	114	8.1	20
2001	8.6	15	36.6	131	8.1	18
2002	8.4	15	35.1	117	8.1	19
2003	8.4	15	34.7	120	8.1	21
2004	8.2	15	33.8	117	8.1	22
2005	8.2	15	34.9	135	8.1	23
2006	8.0	15	36.1	156	8.1	24
2007	8.1	15	34.8	148	8.1	24
2008	8.0	15	35.5	164	8.1	26
2009	7.9	15	32.7	156	8.1	26
2010	7.8	15	29.3	132	8.1	26
2011	7.9	15	28.6	140	8.1	26
2012	7.9	15	28.6	149	8.1	28
2013	7.9	15	25.5	145	8.1	28
2014	7.9	15	26.0	151	8.1	27
2015	7.9	15	24.2	131	8.1	25
2016	7.9	15	22.5	111	8.1	23
2017	7.9	15	22.0	121	8.1	23
2017	7.8	15	22.0	145	8.1	23
				145		
2019	7.8	15	21.4		8.1	23
2020	7.8	15	21.1	168	8.1	23
2021	7.8	15	20.8	167	8.1	23
2022	7.8	15	20.5	167	8.1	23
2023	7.8	15	20.2	166	8.1	23
2024	7.8	15	19.8	166	8.1	23
2025	7.8	15	19.5	165	8.1	23
2026	7.7	15	19.2	165	8.1	23
2027	7.7	15	18.9	165	8.1	23
2028	7.7	15	18.6	164	8.1	23
2029	7.7	15	18.3	164	8.1	23
-	7.7	15		163		23

© Commonwealth of Australia 2017

ISBN 978-1-925531-22-0

INFRA 3126

July 2017

Creative Commons Attribution 3.0 Australia Licence is a standard form licence agreement that allows you to copy, communicate and adapt this publication provided that you attribute the work to the Commonwealth and abide by the other licence terms. A summary of the licence terms is available from http://creativecommons.org/licenses/by/3.0/au/deed.en.

The full licence terms are available from http://creativecommons.org/licenses/by/3.0/au/legalcode.

This publication should be attributed in the following way; Bureau of Infrastructure, Transport and Regional Economics (2017), Freight Rates in Australia BITRE, Canberra.

Acknowledgement

This Information Sheet was prepared by Dr. David Gargett.

Use of the Coat of Arms

The Department of the Prime Minister and Cabinet sets the terms under which the Coat of Arms is used. Please refer to the Department's Commonwealth Coat of Arms and Government Branding web page http://www.dpmc.gov.au/guidelines/index.cfm#brand and in particular, the Guidelines on the use of the Commonwealth Coat of Arms publication.

Contact us

This publication is available in PDF format. All other rights are reserved, including in relation to any Departmental logos or trade marks which may exist. For enquiries regarding the licence and any use of this publication, please contact:

Department of Infrastructure and Regional Development Bureau of Infrastructure, Transport and Regional Economics (BITRE) GPO Box 501, Canberra ACT 2601, Australia

 Phone:
 (international) +61 2 6274 7210

 Fax:
 (international) +61 2 6274 6855

 Email:
 bitre@infrastructure.gov.au

 Website:
 www.bitre.gov.au