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11

The Economics of Australian Railway Deficits

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Centre for Research on Federal Financial Relations
The Australian National University

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THE ECONOMICS OF AUSTRALIAN RAILWAY DEFICITS

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PREFACE

This paper was prepared by John Dodgson during 1977, when he held a Visiting Lectureship at the University of Wollongong. It is based on a lecture to the Illawarra Regional Advisory Council in April 1977 which was originally published in mimeograph form by the Department of Economics, University of Wollongong, in association with the Council. The Centre is grateful to Professor K.A. Blakey, Chairman of the Department of Economics at the University of Wollongong, for suggesting that the paper be published as one of the Centre's Occasional Papers.

Mr Dodgson is a Lecturer in Economics at the University of Liverpool, and with Richard Pryke is the author of *The Rail Problem* (Martin Robertson, London, 1975).

R.L. Mathews
Director

March 1979

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February 1979 J.S. Dodgson

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Director

THE ECONOMICS OF AUSTRALIAN RAILWAY DEFICITS

This paper considers the present problem of deficits on Australian Government Railways,[1] the extent to which these losses are justified, and the availability of policies to reduce and contain them. The first section outlines the pattern of deficit levels, and sets out recent trends in traffic, rates, fares, costs and productivity. In the second section we discuss the case for railway subsidies. We conclude that it is unlikely that present loss levels are justified by the benefits railways provide. Consequently, in the final section, action to reduce the deficits and ensure better value for money from Australian railway services is examined. Finally, the fourth section considers the justification for setting up a national railway system in Australia.

I THE CURRENT SITUATION

Although financial losses incurred by Australian Government Railways have been rising rapidly, comparison of the situation between different systems is hampered by the use of different accounting conventions for the replacement of capital assets. In this section we propose to show deficits on a comparable basis. Published figures of railway working losses differ in their treatment of depreciation. Provision for renewals of rolling stock, plant and machinery on New South Wales railways takes the form of a cash transfer to the Treasury, and most of this provision for renewals is included in working expenses. In Victoria, depreciation is estimated, but only a nominal amount is actually provided. There is also a nominal contribution to the Railways Renewals and Replacement Fund; this also is included in working expenses. In Queensland, the Railways Department does not depreciate its assets, but it writes off the value of assets which are condemned or disposed of. These sums are not, however, included in working

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[1] Throughout this paper Australian Government Railways are taken to include the six State systems (New South Wales Public Transport Commission (NSW PTC), Victorian Railways (VR), Queensland Railways (QR), South Australian Railways (SAR), Western Australian Government Railways (WAGR) and Tasmanian Railways (TR)) plus Commonwealth Railways (CR). Commonwealth Railways (now part of Australian National Railways (ANR)) consisted of the Trans-Australian Railway, Central Australia Railway, ACT Railway and the now-closed North Australia Railway. TR and the non-urban section of SAR are now also part of ANR.

expenses. In contrast, working expenses of SAR included depreciation of wasting assets, plus some relatively small allowance for depreciation of workshop machinery which is included in rolling

Table I

(a) WORKING DEFICITS, EXCLUDING DEPRECIATION, CURRENT PRICES
$ million

	NSW PTC*	VR[x]	QR	SAR[x]	WAGR[x]	TR	CR	ALL SYSTEMS
1965-66	+ 19.58	- 1.49	+ 0.05	- 1.86	+ 7.51	- 0.95	+3.08	+ 25.92
1966-67	+ 33.57	+ 1.05	+ 3.57	- 2.05	+ 8.84	- 1.12	+2.46	+ 46.32
1967-68	+ 33.94	- 5.78	+ 6.58	- 4.82	+10.02	- 1.52	+3.80	+ 42.22
1968-69	+ 27.26	- 10.71	+11.03	- 4.03	+ 5.99	- 1.51	+3.97	+ 32.00
1969-70	+ 35.58	- 13.51	+12.30	- 3.71	+ 8.68	- 1.47	+4.11	+ 41.98
1970-71	+ 14.50	- 20.41	+ 5.01	- 6.14	+ 8.74	- 3.42	+3.53	+ 1.81
1971-72	+ 7.72	- 26.04	+ 5.04	- 8.81	+ 7.86	- 3.60	+1.98	- 15.85
1972-73	- 36.92	- 44.29	+ 4.36	-14.39	+ 4.18	- 4.18	+1.56	- 89.68
1973-74	- 78.03	- 72.99	-12.26	-18.22	+ 6.14	- 6.79	-2.09	-184.24
1974-75	-114.39	-113.45	-44.24	-29.33	+ 6.49	-10.34	-9.18	-314.44
1975-76	-144.06	-124.65	-35.17					
1976-77	-204.64							

(b) WORKING DEFICITS, EXCLUDING DEPRECIATION, 1975-76 PURCHASING POWER[#]
$ million

	NSW PTC*	VR[x]	QR	SAR[x]	WAGR[x]	TR	CR	ALL SYSTEMS
1965-66	+ 38.86	- 2.96	+ 0.10	- 3.69	+14.90	- 1.89	+ 6.11	+ 51.44
1966-67	+ 64.89	+ 2.03	+ 6.90	- 3.96	+17.09	- 2.16	+ 4.76	+ 89.54
1967-68	+ 63.51	- 10.82	+12.31	- 9.01	+18.75	- 2.84	+ 7.11	+ 79.00
1968-69	+ 49.71	- 19.53	+20.11	- 7.35	+10.92	- 2.75	+ 7.24	+ 58.36
1969-70	+ 62.87	- 23.87	+21.73	- 6.56	+15.34	- 2.60	+ 7.26	+ 74.17
1970-71	+ 24.46	- 34.43	+ 8.45	-10.36	+14.74	- 5.77	+ 5.95	+ 3.05
1971-72	+ 12.19	- 41.12	+ 7.96	-13.91	+12.41	- 5.69	+ 3.13	- 25.03
1972-73	- 54.98	- 65.96	+ 6.49	-21.43	+ 6.22	- 6.22	+ 2.32	-133.56
1973-74	-102.88	- 96.24	-16.17	-24.02	+ 8.10	- 8.95	- 2.76	-242.92
1974-75	-129.22	-128.16	-49.98	-33.13	+ 7.33	-11.68	-10.37	-355.21
1975-76	-144.06	-124.65	-35.17					
1976-77	-178.34							

Notes and sources for Table I

Notes

* Railway section only

x Excludes losses on road motor services

\# The conversion to 1975-76 purchasing power has been made by reference to the six-State capital city average of the Consumer Price Index.

Sources

NSW PTC Total earnings, less working expenses, excluding provision for renewals; *NSW Yearbook* 1972 to 1974; information from ABS, NSW Office.

VR Total earnings less working expenses. ABS *Transport and Communication (TC)* 1965-66 to 1971-72; ABS *Rail Bus and Air Transport (RBAT)* 1972-73 to 1975-76.

QR Total earnings less working expenses. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76.

SAR Total earnings, less working expenses, excluding depreciation of wasting assets and additional depreciation. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1974-75; South Australian Railways Commissioner *Annual Report* 1965-66 to 1974-75.

WAGR Total earnings, less working expenses excluding depreciation, minus, for 1974-75 and 1975-76, working loss excluding depreciation on Perth suburban services. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76; Western Australian Government Railways *Annual Report* 1966 to 1976; Metropolitan (Perth) Transport Trust *Annual Report* 1975 and 1976.

TR Total earnings, less working expenses excluding railway expenditure; depreciation. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1974-75; The Transport Commission *Report* 1965-66 to 1974-75.

CR Total earnings, less working expenses excluding depreciation and obsolescence. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1974-75; Commonwealth Railways *Annual Report* 1965-66 to 1973-74; Australian National Railways Commission *Report on the operations of the Commonwealth Railways* 1974-75.

stock maintenance costs. Similarly, the other three systems, WAGR, TR and CR, also include depreciation provisions in their published working expenses.

Table I shows working losses for the different systems, but depreciation provisions have, where relevant, been subtracted from working expenses. Table I(a) shows these working losses at current prices and Table I(b) at constant 1975-76 purchasing power. (Here and henceforth current prices have been converted to 1975-76 purchasing power by using the index of the average of consumer prices in the six State capitals.[2]) Thus, Table I(b) shows that, in real terms, NSW PTC earned a surplus on working account up to 1971-72, but thereafter the loss rose rapidly; VR only earned a surplus in 1966-67, and the working loss rose continuously in real terms up to 1974-75, with some slight improvement in 1975-76; QR were in surplus up to 1972-73, and have been in deficit since; SAR and TR have always been in deficit in the period covered by the Table, whereas WAGR have always been in surplus; and, finally, CR were in surplus up to 1972-73. Overall, a surplus on working account, excluding all capital charges, was earned up to 1970-71, with rapidly rising losses after that date. By 1974-75 the working losses totalled $355 million at 1975-76 purchasing power.

Table I makes no allowance for the use of capital assets. As with depreciation provisions, treatment of capital charges varies from system to system. Interest is charged on all State systems, but not on CR. Other treatment of capital charges is described below:

(a) NSW PTC. The original capital cost of abandoned assets is written off against the sinking fund reserve, to which a contribution is made each year for loan redemption. Some statements of the accounts also include a separate item for loan management and loan flotation expenses; in alternative statements this item is split between the provision for renewals, interest and exchange, and the sinking fund.

(b) VR. There is a small annual contribution to the National Debt Sinking Fund.

(c) QR. The cost of condemned assets written off (and referred to above) is included as an expense. So, too, are interest and redemption charges incurred in connection with special loans for the construction of new lines, plus interest, redemption and depreciation charges relating to the standard gauge line from Brisbane to the New South Wales border.

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2 ABS *Quarterly Summary of Australian Statistics*, Consumer price index.

(d) SAR. A charge was made for interest and repayment under the Railway Standardisation and Railway Equipment Agreements. Under these Agreements, South Australia had to repay 30 per per cent of the amounts provided by the Commonwealth, over a 50-year period.

(e) WAGR. No additional charges are made for capital. A small item was included in WAGR's accounts from 1973-74 to 1975-76 to allow for the effects of Australian currency changes on the charges incurred in connection with WAGR's takeover of the assets of the Midland Railway Company.

(f) TR. No additional charges were made for capital.

(g) CR. No capital charges apart from depreciation were made.

Because of these very different treatments of capital charges, published accounts cannot be used to compare the full economic costs of railway losses on different systems. However, an alternative approach is to estimate a 'resource deficit' by adding to the working loss the sums incurred on capital expenditure in each system. This yields an estimate of the total annual value of resources which Australian railways divert from the rest of the Australian economy but which are not covered by revenue from railway users. Of course, capital assets do not wear out in the year of their construction, but provide benefits for a number of years. Nevertheless, if investment is fairly constant from year to year, then the calculated resource deficit may give a reasonable guide to actual use of resources in a given year. In practice, investment levels on particular systems have fluctuated from year to year. For example, capital expenditure was high on WAGR in the 1960s because of standard gauge construction, and on QR in the 1970s because of the development of facilities for mineral traffic. Capital expenditure in the NSW PTC was higher in the 1970s than before, partly because of construction of the Eastern Suburbs Railway, which accounted for about one-quarter of the NSW PTC's non-bus investment between 1971-72 and 1975-76.

Despite the different timing of new construction in different systems, year-to-year changes in the real value of total railway investment have been small. Between 1965-66 and 1970-71 capital expenditure at 1975-76 purchasing power on all systems only fluctuated within a range between $225 million and $235 million per annum. Thereafter, the range was wider though still not particularly so; capital expenditure totalled $244 million in 1971-72, $222 million in 1972-73, $192 million in 1973-74, and $257 million in 1974-75. It is therefore felt that the resource deficit figures in Table II, and particularly the final columns in the two sections of the Table, do give a reasonable guide to the total economic costs of the Government railway sector in Australia which

Table II

(a) RESOURCE DEFICITS, CURRENT PRICES
$ million

	NSW PTC*	VR[x]	QR	SAR[x]	WAGR[x]	TR	CR	ALL SYSTEMS
1965-66	- 5.2	- 19.0	-19.0	-14.0	-25.8	- 2.3	- 5.7	- 91.0
1966-67	+ 7.9	- 16.7	-21.0	-13.6	-20.0	- 2.1	- 8.3	- 73.8
1967-68	+ 8.5	- 23.4	-18.8	-16.7	-18.1	- 2.7	-12.3	- 83.5
1968-69	- 6.6	- 28.7	- 9.7	-18.2	-20.3	- 2.9	- 5.5	- 91.9
1969-70	+ 1.3	- 31.4	-14.5	-23.3	-13.0	- 2.5	- 6.5	- 89.9
1970-71	- 21.2	- 37.9	-34.8	-15.5	-10.5	- 4.6	- 9.8	-134.3
1971-72	- 38.7	- 46.0	-35.2	-16.9	- 7.7	-10.9	-15.1	-170.5
1972-73	- 89.5	- 69.6	-23.1	-19.3	-12.3	-16.3	- 9.0	-239.1
1973-74	-124.5	-107.9	-45.0	-25.5	- 5.3	-11.8	- 9.6	-329.6
1974-75	-193.1	-170.3	-92.4	-39.3	- 9.7	-14.4	-22.6	-541.8

(b) RESOURCE DEFICITS, 1975-76 PURCHASING POWER
$ million

	NSW PTC*	VR[x]	QR	SAR[x]	WAGR[x]	TR	CR	ALL SYSTEMS
1965-66	- 10.3	- 37.7	- 37.7	-27.8	-51.2	- 4.6	-11.3	-180.6
1966-67	+ 15.3	- 32.3	- 40.6	-26.3	-38.7	- 4.1	-16.0	-142.7
1967-68	+ 15.9	- 43.8	- 35.2	-31.2	-33.9	- 5.1	-23.0	-156.2
1968-69	- 12.0	- 52.3	- 17.7	-33.2	-37.0	- 5.3	-10.0	-167.6
1969-70	+ 2.3	- 55.5	- 25.6	-41.2	-23.0	- 4.4	-11.5	-158.8
1970-71	- 35.8	- 63.9	- 58.7	-26.1	-17.7	- 7.8	-16.5	-226.5
1971-72	- 61.1	- 72.6	- 55.6	-26.7	-12.2	-17.2	-23.8	-269.3
1972-73	-133.3	-103.6	- 34.4	-28.7	-18.3	-24.3	-13.4	-356.0
1973-74	-164.2	-142.3	- 59.3	-33.6	- 7.0	-15.6	-12.7	-434.7
1974-75	-218.2	-192.4	-104.4	-44.4	-11.0	-16.3	-25.5	-612.2

Notes and sources for Table II

Notes

Resource deficit equals working deficit, excluding depreciation, less expenditure on new fixed assets.

* Railway section only

x Excludes losses on road motor services

Sources

As for Table I; and also ABS *Public Authority Finance - State and Local Authorities* 1974-75.

are not covered by revenue from rail users. Thus, the total resource deficits at constant 1975-76 purchasing power fluctuated between $143 million and $181 million between 1965-66 and 1969-70. Thereafter, the resource deficits rose to $227 million in 1970-71, $269 million in 1971-72, $356 million in 1972-73, $435 million in 1973-74, and $612 million in 1974-75. To place these resource deficits in perspective, the figure in 1974-75 was equal to 0.9 per cent of Australian Gross Domestic Product and to 2.4 per cent of total public expenditure, including transfer payments, by all Australian public authorities (Federal, State and local).

We turn now from the size of the deficits to the underlying factors causing them to rise. Freight is a much more important source of revenue for Australian railways than are passengers. In 1975-76 the proportion of total revenue accounted for by freight ranged from 93 per cent on TR and 91 per cent on QR to 55 per cent on VR. In contrast, the proportion of passenger to total revenue ranged from 3 per cent on TR to 21 per cent on NSW PTC and 32 per cent on VR. It appears that passenger traffic has in the past been much less profitable than freight traffic. It has been suggested that at the beginning of the 1970s Australian passenger services were losing very roughly $150 million at 1975-76 purchasing power.[3] These losses were often covered by profits on freight operations. However, the rapidly-growing deficits have eliminated the scope for such cross-subsidisation. For example, using an inevitably arbitrary allocation of fixed costs, the NSW PTC estimated the working loss on their freight business at $52 million in 1975-76, while the working losses on suburban passenger services were calculated to be $41 million and those on country passenger services to be $56 million.[4] As recently as 1971-72 the working *surplus* on freight was estimated at $48 million at 1975-76 purchasing power.

The trend of freight carrying on Australian railways has been upward. Table III shows an index of tonne-kilometres of freight hauled by the different systems between 1965-66 and 1975-76. Between 1965-66 and 1975-76 traffic on all systems combined grew by 71 per cent; on QR by 209 per cent; on WAGR by 172 per cent; on CR by 81 per cent; on SAR by 38 per cent; on TR by 25 per cent; and on NSW PTC by 22 per cent. On VR over this whole period there was a 6 per cent decline in freight carryings.

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3 G.R. Webb "The rail passenger problem in Australia", *Australian Quarterly*, March 1972, p. 4.

4 Public Transport Commission of New South Wales, *Annual Report 1976*, pp. 4-5.

TABLE III

FREIGHT, TONNE-KILOMETRES HAULED
1965-66 = 100

	NSW PTC	VR	QR	SAR	WAGR	TR	CR	ALL SYSTEMS
1965-66	100	100	100	100	100	100	100	100
1966-67	106.37	97.38	100.08	98.68	121.87	104.23	104.29	104.33
1967-68	113.13	89.28	109.96	90.87	153.97	103.35	121.66	111.10
1968-69	115.42	95.65	130.74	107.26	149.47	103.35	138.00	118.91
1969-70	125.74	102.40	155.35	126.47	171.35	105.38	148.91	132.81
1970-71	129.34	106.49	165.65	131.71	203.57	83.07	145.46	139.64
1971-72	123.04	100.33	192.90	129.20	206.56	91.53	139.32	140.74
1972-73	115.94	97.28	232.54	129.63	220.84	113.61	152.71	147.27
1973-74	123.44	96.09	239.94	143.08	248.18	149.91	175.67	156.95
1974-75	125.43	95.02	278.51	143.39	255.37	147.42	173.97	165.05
1975-76	122.35	94.41	308.54	137.65	272.14	125.03	181.03	170.69

Sources

ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76

However these generally increasing carryings have been hauled at rates which in real terms have been steadily declining. Table IV shows for each system an index of revenue carried per tonne-kilometre, converted to 1975-76 purchasing power. This shows the substantial decline in real revenue per tonne-kilometre on each system. Overall, real revenue per tonne-kilometre on all systems combined in 1975-76 was only 58 per cent of the rate earned in 1965-66. Hence, although total freight traffic increased by 71 per cent over this period, total freight revenue at constant purchasing power actually fell by 0.4 per cent. Moreover, between 1969-70 and 1974-75 freight revenue at constant purchasing power fell by 13 per cent, even though traffic hauled rose by 24 per cent over the same period.

There are several reasons why real revenue per tonne might fall. First, if average length of haul increases, average rates per tonne may fall because fixed terminal costs represent a smaller proportion of total costs. However, average length of haul has not changed markedly on the different systems, with the exception of CR, where average haul rose from 476km in 1965-66 to 686km in 1975-76. But for all systems combined, average haul lay between 286km and 291km in the 1969-70 to 1974-75 period when real rates were falling most rapidly. Secondly, if average train load increases, cost per

TABLE IV

FREIGHT REVENUE PER TONNE-KILOMETRE, 1975-76 PURCHASING POWER
1965-66 = 100

	NSW	VR	QR	SAR	WAGR	TR	CR	ALL SYSTEMS
1965-66	100	100	100	100	100	100	100	100
1966-67	99.86	103.08	101.55	102.39	90.73	102.45	99.70	99.85
1967-68	97.18	99.16	96.12	97.47	74.99	100.24	97.18	94.29
1968-69	93.40	91.66	87.34	90.16	70.71	102.98	95.92	88.72
1969-70	90.09	87.26	76.06	83.03	67.12	97.39	94.98	83.48
1970-71	84.26	83.83	69.09	78.11	58.69	97.07	95.92	77.43
1971-72	82.53	83.18	63.38	75.05	57.17	87.27	93.41	74.57
1972-73	76.23	77.80	55.30	67.41	49.44	73.57	85.86	66.62
1973-74	66.47	69.64	50.98	61.13	48.34	56.39	78.31	60.26
1974-75	64.10	70.13	46.53	63.34	51.65	52.91	75.17	58.51
1975-76	62.89	69.86	47.26	58.57	53.51	55.77	79.08	58.38

Sources

ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76

tonne will fall and, if rates follow costs, then a reduction in rates will be justified. Average train load on all systems combined has indeed grown continuously in every year covered by Table IV, from 233 tonnes in 1965-66 to 300 tonnes in 1970-71 and 392 tonnes in 1975-76. Thirdly, a change in traffic mix towards bulk commodities with lower handling costs would justify a reduction in rates. Coal traffic accounted for a stable 30-32 per cent of total tonnage on all systems combined between 1965-66 and 1971-72. Thereafter, the proportion rose to 35 per cent in 1972-73 and 1973-74, and 38 per cent in 1974-75 and 1975-76. This increase was largely, though not completely, accounted for by the growth of coal traffic in Queensland. Other mineral tonnage increased from 9 per cent of the total in 1965-66 to 17 per cent in 1970-71, and has since remained a constant proportion of total tonnage on all systems combined.

Although there have been some factors which might be expected to lead to a reduction in freight rates through a reduction in operating costs, the mere fact that deficits have risen so rapidly indicates that cost reductions can by no means fully explain the reductions in real revenue per tonne. In practice, traffics have often been accepted at unprofitable rates and rates have not been

increased in money terms to keep pace with inflation, either because of management decision or because of Government interference. In Queensland, freight rates (except those for export coal which are covered by escalation clauses) were not increased between 1966 and November 1975, and many rates were actually reduced in money terms over this nine-year period.[5] In Western Australia, WAGR were only permitted to raise gazetted rail freight charges five times between 1951 and 1974, in 1953, 1960, 1965, 1973 and 1974. However, in 1974 it was agreed with the State Government that gazetted rail charges could be indexed to the Perth consumer price index, and increased on 1st July of each year.[6] In Tasmania, long-term contracts which were unprofitable from the start have been entered into for bulk freight traffics.[7] Moreover, some of those, for woodchip logs, have also involved escalation clauses which cover less than half the increase in rail costs.

Total passenger traffic has been declining. In 1975-76 320 million suburban rail journeys were made in Australia. Of these 50 per cent were in the Sydney area, 33 per cent in Melbourne, 10 per cent in Brisbane, 4 per cent in Adelaide and 3 per cent in Perth. Traffic on the Sydney network, which includes interurban journeys to the Blue Mountains and Wyong-Gosford areas plus a relatively small number of journeys in Newcastle, fell sharply from 196 million journeys in 1970-71 to 174 million in 1971-72. There was then another sharp fall between 1974-75 to 1975-76, from 171 million journeys to 162 million.[8] Traffic on the Melbourne system has also declined. Over 140 million journeys were made in each year in the 1960s, with a peak of 148 million in 1963-64. However, traffic was down to 131 million journeys in 1972-73, 113 million in 1974-75, and 105 million in 1975-76. On the smaller networks there was a continuous increase in passengers carried in the Brisbane area between 1965-66 and 1974-75, some decline in Adelaide, and relative stability in Perth. Suburban services in Hobart were withdrawn completely in December 1974.

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5 Queensland Railways, *Report of the Commissioner for Railways for the year ended 30th June 1974*, pp. 2-3.

6 P.R. Grimwood and J. Georgiades "Corporate planning in action: application to freight rate strategy", *Australian Transport Research Forum* 1976.

7 *Tasmanian Railways*, Australian Government Publishing Service, Canberra, 1977, pp. 23-25.

8 Information from NSW PTC.

There has been a similar pattern of decline on country passenger services. Between 1965-66 and 1975-76 the number of passenger journeys made on country services fell by 33 per cent in Queensland; by 24 per cent in South Australia; by 16 per cent in Western Australia; and by 36 per cent in Tasmania and on Commonwealth Railways. In New South Wales, the State with the largest number of country passenger journeys, full comparable statistics are not available, but between 1970-71 and 1974-75 country passenger journeys declined by 38 per cent. There was a further decline of 9 per cent between 1974-75 and 1975-76, and a provisionally estimated increase of 14 per cent between 1975-76 and 1976-77 as a result of the 20 per cent fare reductions which took place in June 1976.[9] In Victoria, a continuous decline was arrested in 1971-72, so that by 1975-76 the number of country passengerjourneys made was 3 per cent above their 1965-66 level.

Table V shows indices of passenger fares on suburban services and Table VI shows indices of country and interstate fares. Because New South Wales and Queensland do not collect statistics of passenger kilometres, the indices for these States have been constructed from published fare schedules. They are a less satisfactory guide to the average fares actually paid than are the figures for VR, SAR, TR and CR, which are based on average fare per passenger kilometre. Figures of passenger kilometres are also not available for Perth suburban services, and the index of fares on these services is based on average fare per journey; because of the small size of the system there is unlikely to have been any substantial change in average journey length. The Tables show that passenger fare levels in the different States have fluctuated in real terms with no general trend evident across the whole country. Thus in 1975-76 fare levels in some States were higher in real terms than they had been in 1965-66, while in other States real fares were lower than in 1965-66. Overall, however, the declining passenger traffic has led to declining total revenue at constant purchasing power. Hence, revenue from all passenger services at constant purchasing power fell by 18 per cent between 1969-70 and 1975-76.

The net effect of the changes in traffic and price levels has been that total Australian railway revenue at 1975-76 purchasing power rose from $942 million in 1965-66 to $1,034 million in 1969-70. Thereafter, real revenue declined to $911 million in 1973-74, with a slight increase to $914 million in 1974-75. While revenue rose initially over this ten year period, and then fell back, total working expenses (including depreciation provisions) at constant 1975-76 purchasing power have risen continuously, from $910 million

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9 *Ibid.*

TABLE V

INDICES OF SUBURBAN PASSENGER FARES, 1975-76 PURCHASING POWER
1965-66 = 100

	NSW PTC	VR	QR	SAR	WAGR	TR
1965-66	100	100	100	100	100	100
1966-67	105.27	108.67	113.64	105.59	112.31	105.59
1967-68	104.44	107.14	110.00	105.59	113.90	102.10
1968-69	109.53	105.10	107.21	111.17	113.71	97.90
1969-70	108.63	108.16	103.87	112.29	119.98	100.00
1970-71	103.70	100.00	99.16	112.85	118.92	100.00
1971-72	145.91	111.22	108.31	117.32	112.21	113.99
1972-73	137.60	105.10	102.14	110.06	108.88	113.29
1973-74	121.84	109.69	90.44	108.38	112.31	121.68
1974-75	113.08	96.43	77.48	108.38	118.24	113.29
1975-76	112.44	102.04	n.a.	97.21	103.81	-

Sources

NSW PTC and QR. Estimated from fare schedules. ABS *NSW Statistical Register; Trade Transport and Communications* 1971-72; Information from ABS, NSW Office, and QR.

VR, SAR and TR. Revenue per passenger kilometre. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76.

WAGR. Revenue per passenger journey. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1973-74; Metropolitan (Perth) Transport Trust *Annual Report* 1974-75 and 1975-76.

in 1965-66 to $1,295 million in 1974-75. Between 1974-75 and 1975-76 working expenses rose by a further $11 million though revenue recovered by $26 million to $940 million.

The most important component of costs is labour costs, which account for about 60-80 per cent of total working expenses on all the different systems. Table VII shows an index of real earnings per employee at 1975-76 purchasing power on the different systems. In addition, the final column shows the index of real earnings per employed male unit for all industry groups in Australia. As can be seen from this Table, earnings of railway employees increased at about the same rate as average earnings between 1965-66 and 1971-72. Thereafter, railway earnings increased much more rapidly than average earnings. Hence, between 1971-72 and 1974-75 railway

TABLE VI

INDICES OF COUNTRY AND INTERSTATE PASSENGER FARES,
1975-76 PURCHASING POWER
1965-66 = 100

	NSW PTC	VR	QR	SAR	WAGR	TR	CR
1965-66	100	100	100	100	100	100	100
1966-67	99.69	102.56	110.38	102.80	101.12	78.71	99.12
1967-68	97.17	102.99	106.85	105.14	102.61	92.90	106.58
1968-69	96.87	101.28	104.14	99.53	100.00	91.61	103.95
1969-70	94.47	98.72	100.90	98.13	112.69	92.26	134.21
1970-71	90.17	92.31	96.32	96.26	103.73	80.65	101.32
1971-72	147.63	100.43	105.21	109.81	98.88	87.74	115.79
1972-73	139.21	99.15	99.21	100.93	93.28	84.52	117.54
1973-74	123.29	91.45	87.85	90.65	89.55	77.42	106.58
1974-75	109.34	81.62	75.26	88.32	91.79	80.00	110.09
1975-76	110.14	85.89	82.61	94.39	98.51	81.94	129.83
1976-77			79.20				

Sources

NSW PTC and QR. Estimated from fare schedules. ABS *NSW Statistical Register; Trade Transport and Communications* 1971-72. Information from ABS, NSW Office, and QR.

VR, SAR, WAGR, TR and CR. Revenue per passenger kilometre. ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76.

workers' earnings in *real* terms increased by 31.6 per cent, while average earnings increased by only 14.0 per cent. If railway earnings had instead increased at the national average rate over this period, the total 1974-75 railway deficit would have been just under $100 million less than it actually was. Between 1974-75 and 1975-76 railway workers' real earnings fell by 1.2 per cent, while average earnings rose by 1.2 per cent, in real terms, so that there was some relatively small catching up to the more rapid growth of railway workers' earnings.

Increases in real earnings are inevitable in an economy with growing per capita national income, and only present a problem if they are not matched by productivity improvements. However, productivity growth on most Australian systems has not been very rapid. Table VIII shows an index of output per employee on each

TABLE VII

WAGES AND SALARIES PER EMPLOYEE, 1975-76 PURCHASING POWER
1965-66 = 100

	NSW PTC	VR	QR	SAR	WAGR	TR	CR	ALL SYSTEMS	ALL INDUSTRIES
1965-66	100	100	100	100	100	100	100	100	100
1966-67	103.08	101.33	101.24	101.86	105.81	104.71	99.51	102.37	103.72
1967-68	119.86	102.52	103.90	102.42	109.22	105.90	100.30	109.63	106.04
1968-69	112.26	106.81	106.05	106.62	111.47	112.82	106.91	109.24	111.07
1969-70	118.04	113.62	112.40	112.87	120.65	110.46	118.63	115.77	116.64
1970-71	128.39	119.35	130.17	120.98	129.07	119.52	118.23	125.68	123.75
1971-72	130.26	119.64	134.13	122.33	129.88	121.08	113.32	127.23	127.07
1972-73	139.43	131.08	143.40	132.76	135.64	134.72	120.69	136.83	130.77
1973-74	158.24	145.87	159.54	148.43	149.21	154.39	139.04	153.53	134.62
1974-75	167.42	157.66	181.66	165.24	166.23	169.82	153.00	167.49	144.85
1975-76	163.42	157.86	181.43	161.10	163.07	186.29	143.26	165.48	146.65

Notes

Railway figures exclude workers on, and payments for, capital work, except for VR. The 'all industries' index is derived from average weekly earnings per employed male unit.

Sources

ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76; ABS *Quarterly Summary of Australian Statistics*.

system between 1965-66 and 1975-76.[10] There is a clear contrast between the substantial productivity growth on WAGR and QR, which have carried rapidly increasing freight traffic, and the much lower growth on all other systems. Over the whole period from 1965-66 to

10 Output is measured by (a) freight tonne-kilometres (b) number of suburban passenger journeys (c) number of country passenger journeys. The relative weights given to these output measures on each system are equal to the average proportion of revenue earned by these three categories of traffic on each system in 1962-63 and 1974-75.

1975-76, average annual compound labour productivity growth has been:

Victorian Railways	0.2% per annum
Commonwealth Railways	1.8% per annum
NSW PTC	2.6% per annum
Tasmanian Railways	3.1% per annum
SAR	3.5% per annum
WAGR	11.9% per annum
Queensland Railways	12.3% per annum

TABLE VIII

OUTPUT PER EMPLOYEE
1965-66 = 100

	NSW PTC	VR	QR	SAR	WAGR	TR	CR
1965-66	100	100	100	100	100	100	100
1966-67	106.14	99.72	103.56	97.78	119.80	100.48	95.94
1967-68	111.71	93.92	117.02	92.03	153.90	99.10	103.01
1968-69	114.34	98.70	141.14	105.14	151.77	103.20	106.47
1969-70	125.16	106.44	168.54	125.28	179.17	105.09	114.06
1970-71	129.29	110.34	183.71	129.44	219.53	87.15	106.72
1971-72	120.36	105.61	211.95	125.36	229.61	99.17	97.80
1972-73	115.81	103.94	255.34	128.23	252.43	122.95	106.76
1973-74	126.58	102.46	264.87	145.33	287.70	158.01	120.94
1974-75	131.29	100.04	293.63	146.02	287.96	154.46	113.14
1975-76	129.39	101.62	317.84	140.91	306.95	136.04	119.36

Sources

ABS *TC* 1965-66 to 1971-72; ABS *RBAT* 1972-73 to 1975-76

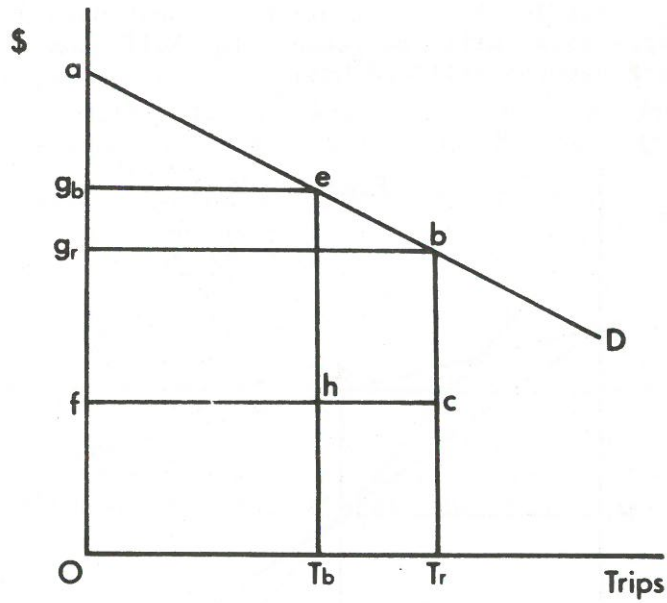
In this section we have seen the rapid growth in railway deficits in Australia in the 1970s. The major reasons for these growing losses appear to be: the relatively poor productivity performance of some systems; the rapid increase in real earnings per employee relative to earnings in other industries; and the declining total revenue in real terms arising from the falling revenue per tonne-kilometre of freight carried and from the loss of passenger traffic. Worldwide, very few railway systems are actually profitable. Nevertheless, railway deficits represent a drain on resources which might have better alternative uses elsewhere in the

economy. It is therefore important to consider the justification for railway subsidies, and to ensure that the resources a country directs into its railway sector are being used as efficiently as possible.

II THE JUSTIFICATION FOR RAILWAY SUBSIDIES

The traditional justification for railway subsidies has been the claim that railways are a declining cost industry. Hence, the benefits which rail travellers gain from rail services when the optimal level of rail services are provided, that is when prices equal marginal costs, exceed the total costs of providing these services, even though the railway operates at a loss.

Figure 2



In terms of the simplified economic model in Figure 1, when output equals q_o and price equals p_o, total benefits equal area $Oabq_o$ and total costs equal area $Ocdq_o$. Net benefits therefore equal area p_oab, the consumer surplus benefit, less area p_ocdb, the financial loss. (If all costs are variable, net benefits also equal the area eab.)

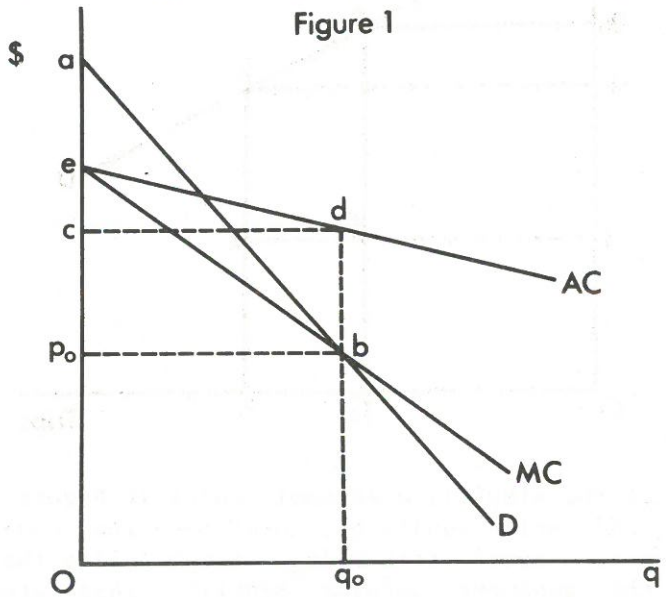
In addition, railway losses may be justified if railways provide benefits to, or reduce costs of, non-rail users. For example, rail transport may reduce costs of urban traffic congestion, or reduce noise or other forms of environmental disamenity. Further, railways might (or might not) have desirable effects on income distribution.

We consider these justifications for subsidy in detail for passenger and freight transport in turn.

First, benefits to users of rail passenger services may exceed the costs of providing these services if rail is a decreasing cost industry. The amounts that rail users would be prepared to pay for their rail service will be limited by the availability of alternative modes and by their willingness to travel at all. Thus, if a rail service could be replaced by an alternative bus service, then the consumer benefits of the rail service for those travellers who would be prepared to travel by bus will be equal to the difference between the generalised cost, which includes both money (fare) and time costs, of the rail and bus modes. Those who would prefer not to travel at all rather than go by bus must place a lower valuation on their journeys. Assuming a linear demand curve, this group's average loss will be equal to half the difference in generalised cost between rail and bus.

Measurement of these benefits is illustrated in Figure 2, which shows the demand curve D for travel between two points.

Figure 1



Assume that initially a rail service is operated at a fare per trip of Of, and that the generalised cost of a trip is Og_r. Thus fg_r measures the time cost of a rail trip, and OT_r trips by rail will be made. Gross consumer benefits from the rail service equal area $OabT_r$. Net benefits will be equal to these gross benefits less real resource costs, which comprise time costs, area fg_rbc, and avoidable railway operating costs, which are not shown on the diagram and which we denote as C_r. Hence, net benefits of the rail service, N_r, equal

$$N_r = g_r\,ab + OfcT_r - C_r$$

If the rail service were withdrawn and an alternative bus service operated at the same fares, time costs per trip by bus would equal fg_b, generalised cost by bus would equal Og_b, and OT_b trips would be made by bus. The net benefits of the bus service, N_b, would equal

$$N_b = g_b ae + Ofh\ T_b - C_b$$

where C_b denotes the operating costs of the bus service. Hence the net benefit of retaining the rail service is

$$N_r - N_b = g_r g_b eb + T_b hcT_r - C_r + C_b$$

where $g_r g_b eb$ is the consumer surplus loss to travellers if the rail service were withdrawn and $T_b hcT_r$ is the loss of revenue to public transport operators in the event of closure. The consumer surplus and revenue loss benefits for retaining the rail service are positive because we have assumed that an alternative bus service would provide a slower service. However, in some cases in Australia alternative bus services might be faster than the existing rail service, and if this improvement in service quality were not counterbalanced by, say, a lower standard of comfort, then both the consumer surplus and public transport revenue benefits of retaining the rail service would be negative.

In practice, measurement of consumer surplus changes can allow for any differences in fares charged by different modes. Also in practice, some former rail travellers will transfer to cars. The loss to these former rail travellers can be measured by the difference between the generalised cost of their trip by rail and that by car.

The second reason why rail passenger subsidies may be justified is that if roads in the area served by a rail service are congested, then closure of the railway would impose increased time and operating costs on existing road users. These increased congestion costs can therefore be counted as a further benefit for retaining the rail service. However, it is worth noting that this is a second-best policy, since existing use of urban roads is already sub-optimal because road users impose costs on themselves and on other members of the community which exceed the benefits they themselves derive from their trip. The answer would be the limitation of car use in urban areas, either through parking charges or through some more sophisticated form of road pricing such as supplementary licensing.[11] This would divert some car users onto public

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[11] H.M. Kolsen, D.C. Ferguson, and G.E. Docwra, *Road user charges : theories and possibilities*, Bureau of Transport Economics, Australian Government Publishing Service, Canberra, 1975.

transport and, in turn, this might be expected to reduce the public transport deficit.

A third reason why rail subsidies could be justified is if the resources used have no alternative uses. Thus, if railway assets have no value other than their scrap price, economic efficiency is best furthered by treating capital charges on these assets as a sunk cost. As long as current avoidable operating costs are covered by revenue and any other social benefits from the rail service, then continuation is justified until the capital assets need replacing. In addition, *if* closure of a rail service would lead to a *net* increase in the level of unemployment in the economy, then the cost of employing the railway workers who would be displaced is not a real cost to society, since the economy is not forgoing any other goods or services which might otherwise have been produced. Consequently, the wage costs of those railway workers who would be unemployed if the service were withdrawn can be counted as zero.

Fourthly, closure of rail services might have undesirable effects on income distribution if rail users are less well-off than the rest of the community. While withdrawal of public transport services might reduce the mobility of the young, the old, the infirm and the poor, who do not have access to a private car, this argument needs to be treated with some care since in large urban areas a relatively high propòrtion of rail passenger expenditure seems to be accounted for by middle-income groups who can afford to live some way from their place of work. Evidence on the income distribution of rail users in Australia is detailed in Appendix A.

With the exception of income distribution arguments, the technique of cost-benefit analysis can be used to quantify most of the costs and benefits of retaining rail passenger services. This technique has been used fairly extensively in Britain, where a number of studies of different services have found that, in general, retention of rural services cannot be justified on social grounds, whereas retention of many urban services is desirable despite the losses made.[12] This conclusion largely arises because of the much greater traffic volumes on these lines than on those in country areas. When traffic volumes are low, bus services can provide a much cheaper service.

Many country passenger services in Australia have been eliminated, though the pattern varies from State to State. In New South Wales, country passenger train kilometres were very stable between 1965-66 and 1972-73. Since then many services have been

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12 See J.S. Dodgson, "Cost-benefit analysis, government policy, and the British railway network", *Transportation*, June 1977, pp. 149-170.

replaced by buses, and by 1975-76 train kilometres were 37 per cent below their 1972-73 level.

In Victoria, the Board of Inquiry into the Victorian Land Transport System proposed in its 1971 Report that many country passenger services should be withdrawn.[13] However, many of the loss-making services identified remain in operation, and country passenger train kilometres in the 1970s have actually risen rather than fallen.

In Queensland, the number of train kilometres worked on country passenger services has fallen more or less continuously over the last ten years, with a 35 per cent decline in the total between 1965-66 and 1975-76.

In 1968 the South Australian Government announced a programme of passenger service withdrawals. Some services were closed and between 1967-68 and 1969-70 country passenger train kilometres declined by 38 per cent. Since then there has been a relatively small increase in country passenger train kilometres, even though the 1973 Lees Committee on SAR identified further candidates for closure.[14]

In Western Australia most narrow-gauge passenger services have been withdrawn and replaced by railway-owned buses. By 1977 the only country passenger services operated were a daily train to Bunbury and a thrice-weekly train to Albany, plus two daily standard gauge trains, one to Kalgoorlie and the other to the Eastern States. Because of the train withdrawals, country passenger train kilometres fell by 25 per cent between 1972-73 and 1975-76.

Tasmanian country passenger train kilometres have also declined in the 1970s. By 1977 the only passenger services in the State were the daily Tasman Limited between Hobart and Wynyard, and a fortnightly railcar between Hobart and Parattah. Furthermore, the recent report on Tasmanian Railways has advocated withdrawal of both of these services on cost-benefit grounds.[15]

Finally, there has been some small decline in passenger train kilometres on the Commonwealth system in the 1970s, although the

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13 *Report of the Board of Inquiry into the Victorian Land Transport System*, Melbourne, 1971.

14 *The Operations of the South Australian Railways*, Adelaide, 1973.

15 *Tasmanian Railways, op. cit.*, pp. 48-51.

major component of this system's services, the Transcontinental trains, appear to be relatively profitable.

In total, Australian country passenger train kilometres declined by 25 per cent between 1965-66 and 1975-76. Nevertheless, it appears that there is still likely to be scope for closure of many more services on cost-benefit grounds, particularly in those States, New South Wales, Victoria and Queensland, which have the denser networks of routes. For example, the NSW PTC has estimated that in 1975-76 the average cost of each country and interstate passenger was $27.35, whereas average revenue per journey was only $8.26.[16] It is very unlikely that this enormous gap between revenue and costs could be justified by social benefits from the services.

Railway Freight Services

A desirable objective of freight transport policy might be to minimise the costs to society, where these costs include those borne by the shipper, of providing freight transport for which there is an effective demand, that is a demand for which the shipper is prepared to pay. Account also needs to be taken of service standards: speed, reliability, freedom from loss or damage, etc. Usually transport users might be expected to choose that mode which best suits their own needs. However, there are several reasons why this choice might not be optimal for society as a whole. First, if road users do not pay through the taxation system the full costs of providing and maintaining the road network, then there is a subsidy to road users. Moreover, even though road users as a whole may pay enough to cover road track costs, particular classes of users may not pay in tax sufficient to cover the marginal track costs that their journeys impose.[17] This suggests that some subsidies for rail freight operation might be justified to redress the balance. However, this is a second-best policy, and it would be more desirable to increase taxes on road hauliers so that they cover track costs.

Secondly, road hauliers might impose significant external costs, such as noise, pollution, accidents, vibrations and visual intrusion, on the rest of society. Again, subsidies for rail freight services might correct the balance and reduce the amount of

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16 Public Transport Commission of NSW, *Annual Report 1976*, p. 4.

17 Commonwealth Bureau of Roads, *Roads in Australia 1975*, Appendix 2.

road traffic. But this argument also needs to be treated with caution. Transfer of traffic to rail is only one of the possible ways to reduce the environmental costs of road haulage, and it is possible that it is less cost-effective than other measures. These other measures include the setting of maximum noise and pollution emissions from vehicles; the construction of new roads to by-pass environmentally sensitive areas; the routing of trucks away from city and town centres; compensation to residents to cover the costs of soundproofing; improved road maintenance standards; and so on.[18] The expenditure on rail subsidies and resultant improvement in the environment therefore needs to be compared with alternative methods of achieving environmental improvements. Furthermore, rather than subsidise rail, it might be more efficient to increase taxes on road hauliers so that taxes covered both track costs and external costs.

A third reason why shippers may not make the optimal choice of mode from society's point of view is that their choice may be constrained by Government regulations. Road/rail competition continues to be regulated in some Australian States, so that often a less-efficient mode has to be used. Very often it appears that the main objective of the regulations has been to protect the Government-owned railway systems from competition from a more efficient mode.[19] This will clearly increase total costs, andit is hard to see much economic justification for such a system. As J.C. Nelson has concluded, the deregulation that has occurred so far in Australia has had a desirable impact both in reducing road and rail rates and in improving quality of service.[20] Moreover,it is clear that regulation of road haulage has not prevented Australian railway systems from making deficits on their freight business in the 1970s.

Provided that the prices which shippers pay for their freight transport cover all the costs, including external costs, incurred in providing the transport, it seems much more sensible to let them make their own decisions as to which mode of transport best suits their own needs. This implies that road haulage taxes should as far as is practicable cover track and external costs, and that rail

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18 See R.W.S. Pryke and J.S. Dodgson, *The Rail Problem*, Martin Robertson, London, 1975.

19 H.M. Kolsen, *The economics and control of road-rail competition*, Sydney University Press, Sydney, 1968, pp. 132, 142, 146.

20 J.C. Nelson, "The economic effects of transport deregulation in Australia", *Transportation Journal*, Winter 1976, pp. 48-71.

rates should be related to the marginal costs of transporting goods by rail. If this is done, then there might still be a case for rail subsidies if rail is a declining cost industry. However, the need for subsidies can be reduced if the railway discriminates in the rates it charges for different traffics.[21] Furthermore, evidence as to whether railways are decreasing cost industries is rather mixed, and the behaviour of average costs when output changes depends on which inputs are varied. Keeler has investigated the costs of 51 American railroads and concluded that, because of excess track capacity, there are economies of traffic density for most systems.[22] However, if such excess track capacity were to be eliminated so that the railroads were operating efficiently, then it appears that there would be constant returns to scale with respect to firm size.

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21 For a detailed discussion of optimal railway pricing policy see S. Joy, "Pricing and investment in railway freight services", *Journal of Transport Economics and Policy*, September 1971.

22 T.E. Keeler, "Railroad costs, returns to scale, and excess capacity", *Review of Economics and Statistics*, 1974, pp. 201-208.

III REDUCING THE DEFICITS

Labour Costs

It would appear from the preceding discussion that it is unlikely that the present levels of railway losses can be justified by the social benefits which railways create. Any attempt to consider methods of reducing railway losses must pay particular attention to the major element of costs, labour costs.

Total employment on Australian rail systems has been falling only slowly, from 124,500 in 1965-66 to 111,751 in 1975-76. This represents an annual average rate of decline of only 1.1 per cent. The question must therefore be asked as to whether manpower could be reduced much more rapidly in the future.

There are a number of possible ways of reducing manpower. For example, in most cases there is no need for diesel or electric locomotives to carry a driver's assistant, or 'fireman', and in a number of countries such as Holland, France, Austria, Switzerland and partly in Great Britain these unnecessary workers have been dispensed with. In addition, on fully braked freight trains there is no need for a guard's van to be attached to the end of the train. The guard can then travel in the locomotive as he does in Britain and be available to assist the driver in an emergency. In fact, it is possible for trains to be one-man operated with just a driver and neither a guard nor a fireman. This happens on Dutch freight trains. Moreover, the US Task Force on Railway Productivity estimated in its 1973 report that 30 per cent of American freight trains could operate with only a driver.[23] There is also little need for guards on many commuter trains, and moves are being made in Britain to introduce one-man operation of sliding door stock.

With passenger traffic it is possible to reduce the number of staff engaged in the issue, checking and collection of tickets. On country and interstate services which stop infrequently tickets can be checked on the train by the guard, and there is no need to man barriers at stations or to carry a conductor as well as a guard. On many lightly used services tickets can be both issued and checked on the train by the guard, provided only that there are connections between carriages. It would be necessary to pay higher wages to compensate the guard for his extra duties, but there would be a

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23 Task Force on Railroad Productivity, *Improving railroad productivity*, National Commission on Productivity, Washington DC, 1973.

saving achieved by leaving all but the busiest stations as unstaffed halts. On suburban networks there are longer-run possibilities for the introduction of automatic fare collection systems, which again reduce the staff required at stations.

Much railway freight traffic, particularly small consignments not carried in full trainloads, might be better off handled by road. For example, the Board of Inquiry into the Victorian Land Transport System discovered that high-rated general merchandise traffic carried between Melbourne and Ballarat and Bendigo was unprofitable for the Victorian Railways.[24] More recently the Committee of Inquiry into the Tasmanian Rail System has stressed the high labour costs of non-bulk freight traffic, and has recommended rationalisation, and the abandonment of traffics whose rail costs cannot be made competitive with those by road.[25] This type of abandonment of unprofitable freight traffic would reduce labour requirements in the most labour-intensive part of the freight business, namely staff involved in handling goods at freight terminals, particularly those where throughput is small, and those involved in shunting.

Staff involved in maintaining locomotives, wagons and coaches might be reduced through time with more modern methods of working. In addition, a close look needs to be taken at the justification for retaining coaches and wagons which are only used very infrequently. Track maintenance staff can be reduced with the introduction of modern track maintenance vehicles, such as tamping machines, or through closure of little used routes.

Signalling staff might be cut by introduction of expensive Centralised Traffic Control (CTC) signalling systems; by more modest replacement of some semaphore signals and their signalboxes by colour light signals; or, on lightly used lines, by the closure of signalboxes and their replace-ment with the electric staff or train order method of working. Finally, it might be possible to reduce the numbers of overhead, administrative, staff.

All these posibilities need to be investigated in detail. Of course, manpower reductions are always a sensitive issue, but a reduction in the railway workforce need not involve widespread redundancies. The age distribution of railway employees is such that there is a relatively high proportion of older workers who will be due for retirement,[26] and this is one of the reasons why

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24 *Report of the Board of Inquiry into the Victorian Land Transport System, op. cit.*

25 *Tasmanian Railways, op. cit.*, pp. 52-54.

26 *Australian Transport*, July 1976, p. 62.

natural wastage on the railways tends to be reasonably high. For example, annual labour turnover on TR has been calculated at about 10 per cent of total staff on the basis of experience in 1975 and 1976.[27]

Investment Appraisal

A second area for action is in investment appraisal. It is important that all projected capital projects be subjected to a full economic appraisal using discounted cash flow techniques. This is just as relevant for replacement of existing equipment as it is for schemes for new services, since there is a danger that ageing equipment might be replaced because it is life-expired even though retention of the services on which it is used cannot be justified on social grounds. Thus, VRs 1975-76 Report argues in favour of a 30 per cent increase in future total investment over the 1976-77 level, so as to permit replacement of obsolete rolling stock and other equipment. However, there is no apparent consideration of the justification for retaining the various services for which this capital equipment would be required, and it is recommended that capital expenditure should be increased *before* road haulage regulations are liberalised.[28] Such a policy would be wastefulif the increased competition which then followed proved that some of the rail services on which capital had been expended would be better provided by road.

There is evidence, too, of low rates of return from major new railway investment schemes. Webb has criticized the gauge standardisation programme, and has noted how economic evaluations were not made of the inter-capital projects and how alternative solutions such as bogie exchange did not receive sufficient attention.[29] In addition, comparisons have not been made of returns from this type of investment and other alternative railway schemes. This conclusion has been reinforced by the 1977 Federal report on the proposal to construct a new line from Adelaide to Crystal Brook, which found that there was *no* economic justification for providing

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27 *Tasmanian Railways, op. cit.*, p. 121.

28 Victorian Railways, *Vicrail Board Report 1975-76*, pp. 1, 2, 8.

29 G.R. Webb, "Rail standardisation; unplanned, badly designed and costly", *Royal Australian Planning Institute Journal*, July/October 1976, pp. 39-40.

a standard gauge link to Adelaide.[30] In addition, the Report concluded that such a link, if desired on political grounds, could be provided much more cheaply by converting existing broad gauge lines than by building an entirely new line as had been proposed in the 1974 Adelaide to Crystal Brook Railway Act.

Insufficient attention also appears to have been paid to the relative returns from urban rail transport investments. In New South Wales a Board of Review into the Eastern Suburbs Railway project concluded that the line should be reduced in length from the original plans because of its high capital costs (estimated in November 1976 at $164 million for the truncated scheme) and forecasts of low traffic volumes. By contrast, there are railway investment schemes which would yield good rates of return. The Bureau of Transport Economics has investigated possible upgradings of the Sydney-Melbourne route, and concluded that construction of additional crossing loops in Victoria, and lengthening of loops and installing CTC signalling on the Albury-Junee section in New South Wales, would yield financial rates of return in excess of 30 per cent.[31] In conclusion, although it has sometimes been alleged that Australian railways have suffered from shortages of new capital, there is evidence to suggest that the capital that has been made available has not been used as effectively as it might have been.

Pricing

The third major policy necessary to reduce railway losses is in the field of pricing. Unless there are very good social reasons, prices should as far as possible be related to costs. In particular, this implies that freight charges should be increased at least as fast as the rate of increase of railway costs, except where there are reductions in the costs of handling individual traffics, and that rates should not be held down artificially through management decision or political pressure. A policy of ensuring that rail freight rates do not lie below available costs is now official policy in a number of countries, including Britain and Canada. According to a detailed study of the Canadian experience, the rail freight pricing system that has developed since the 1967 National Transportation Act freed Canadian National Railways (CNR) and Canadian Pacific Railways (CPR) from most regulation of freight rates has improved the performance of the

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30 *Adelaide - Crystal Brook Railway Gauge Standardisation Project*, Australian Government Publishing Service, Canberra, 1977.

31 Bureau of Transport Economics, *Mainline upgrading : evaluation of a range of options for the Melbourne-Sydney rail link*, Australian Government Publishing Service, Canberra, 1975.

transport system by sharpening competition and by permitting the railways to concentrate on those traffics which they are best able to handle.[32]

Relating charges to costs avoids the inefficiencies caused through cross-subsidisation. Such cross-subsidisation appears to be common policy on many Australian railways. Detailed information is not available for most systems, but QR publish an annual breakdown of the costs and revenue of their different geographical sections. This showed that in 1975-76 revenue only covered working expenses on the Rockhampton and Mackay sections of the Central Division and on the Townsville section of the Northern Division. Losses were made on all five sections of the Southern Division (where, overall, working expenses were twice as great as earnings), on the Emerald Section of the Central Division, on the Cairns section of the Northern Division, and on the separate Innisfail and Mourilyan Tramways and Normanton-Croydon line.[33] It appears that profits on mineral traffic have been used to subsidise losses elsewhere, and that the large overall gain in QR's productivity may hide relatively little improvement in the productivity of handling traditional traffics.

Rationalisation

Where charges cannot be increased to bear a closer relationship to costs, we have already argued that there is a strong case for rationalisation of services, both in the country passenger and the non-bulk freight sectors. As Joy has noted, Australia has been relatively slow, compared with many other countries, in rationalising its rail sector to adapt to changing conditions.[34] Such rationalisation, the fourth of the major areas for action, can permit the railways to concentrate on the types of business where their advantages over other modes are strongest.

The prerequisite for all such actions to reduce the railway losses is a political decision at both Federal and State level that

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32 T. Heaver and J.C. Nelson, *Railway pricing under commercial freedom : the Canadian experience*, Centre for Transportation Studies, Vancouver, 1977.

33 Queensland Railways, *Report of the Commissioner for Railways for the year ended 30 June 1976.*

34 S. Joy, *The need and prospects for rationalisation of Australia's railways*, Paper presented to Australian Transport Industries Advisory Council, 1977.

some priority needs to be given to this objective. Once this has been decided, railway managements need to be set clear objectives, and then be left free from day-to-day political interference to achieve them. In particular, there is a need for long-term planning, perhaps on the lines of WAGR's corporate plans, so that managements can get a clear view of what is to be achieved over, say, a five-year period. Such a corporate plan, agreed in advance with the relevant Government, requires forecasts of traffic, of revenue, of the scope for manpower reductions, and of trends in per unit labour, fuel, and other costs. These forecasts can in turn provide the basis of a manpower plan and of an investment plan which seeks to achieve the most efficient allocation of the limited investment funds between the different sectors of the railways' business.

For services such as city commuter routes, which Governments believe should be retained on social grounds, separate grants might be paid to the railways to cover the losses on such lines. However, such a system needs to be closely controlled. The British experience offers a salutory warning here. Under the 1968 Transport Act, separate grants were to be paid for each 'unremunerative but socially necessary' rail passenger service. The rest of the network (freight plus express passenger services) was to operate profitably. However, a failure to control costs on the system, together with some unforeseen traffic losses, led to a failure to meet this objective, and the separate grant system was largely abandoned at the end of 1974, and replaced by a block grant for all passenger services. Although the separate grants were only supposed to be paid for services which were thought to generate enough social benefits to cover their costs, the Government in practice refused to sanction withdrawal of many services whose revenue and social benefits fell well short of avoidable costs. One further problem was that grants were paid on the basis of services' losses, rather than on the basis of the benefits they generated, so that the railways had little incentive to reduce operating costs. There is a danger that a system of specific grants might be introduced in Australia simply as a way of reducing the apparent extent of the railway deficits, but without any attempt to ensure that the grants are used to support services which give value-for-money or that they make a contribution to solving the underlying problems of the railways.

IV THE CASE FOR A NATIONAL RAILWAY SYSTEM

The last section of this paper considers the contribution which the setting up of a national railway system might make to a solution of the problems of Australian railways. We consider first the Federal Labor Government's justification for offering to take over responsibility for the State railway systems in 1972.

According to Prime Minister Gough Whitlam, 'the case for a national railways system is unanswerable'.[35] In his paper on the case for a national railway system from which this quotation is taken, Whitlam placed great stress on the unifying influence of transcontinental railways in other continental countries. By contrast, Australian rail systems tended to concentrate each State's trade on that State's capital city. This may be true, but the pattern of Australian transport development was probably determined much more by the sparse and locally concentrated population patterns than by the structure of the rail systems. Furthermore, it is extremely unlikely that, in the age of motor and air transport, a national rail system could reverse these historic trends to any significant extent.

More detailed explanations of the reason for the proposed take-over have been given by C.K. Jones, who as Labor Minister of Transport, suggested three main reasons why a national system would be desirable.[36] The first of these is to facilitate increased capital expenditure, particularly for bulk freight traffic and for urban passenger services. The second is to achieve a necessary rationalisation of rail services and reduction in labour costs. The third is to solve the organisational problems and resulting waste of scarce resources which are involved in the existence of a number of independent rail systems.

These last, organisational, benefits have been discussed in detail by Dr S. Joy.[37] Joy notes that operation of a national system would provide a number of benefits, namely: more efficient utilisation of locomotives, with through-running and transfer of

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35 E.G. Whitlam, "A case for a national railway system", *Australian Transport*, June 1975, pp. 19-21.

36 C.K. Jones, "Towards a prosperous Australian railway", *Railway Gazette International*, January 1975, pp. 18-22.

37 S. Joy, *op. cit.*

engines to cater for seasonal demands; use of a common freight wagon pool; elimination of the need to plan operation of routes subject to the constraint that railway ownership changes at State boundaries; avoidance of rates that favour flows to and from State capitals rather than interstate flows; optimisation of traffic flows over alternative routes, particularly between Sydney and Adelaide; rationalisation and specialisation of workshops; and better allocation of capital. However, Joy has also noted that these benefits could also be achieved through better co-operation between the existing systems, and that there is evidence, particularly from the United States of America that very large systems become difficult to manage. Furthermore, changes in organisation themselves divert management effort from more important tasks; as one British railway manager has noted, 'when you reorganise, you bleed'.[38]

The benefits of increased capital expenditure might also be achieved without major reorganisation. For example, the Federal Government has already provided funds for capital expenditure by the States in urban public transport facilities. C.K. Jones argued that this policy was not optimal, because the States could not provide the management and design ability for necessary urban rail projects, and provision of Commonwealth funds to the States would not ensure that the money was well spent.[39] As we have argued above, many recent rail investment projects in Australia can be criticised, although management and design skills seem more likely to reside in State rail systems with a long experience of operating urban passenger railways than in Federal Government organisations without such experience. What *is* clearly needed is an independent assessment, perhaps by the Bureau of Transport Economics, of the prospective return from projects before Commonwealth funds are committed. Funds provided to the States could then be tied to particular justified projects, without existence of a national railway administration being either necessary (or sufficient) for achieving rational allocation of railway capital expenditure resources. Whatever the administrative arrangements, the possibility still exists that each State will demand that the Federal Government finances what that State regards as a 'fair share' of Australian railway investment within its boundaries, irrespective of the relative merits of investment projects in the different States.

As we have argued in section III of this paper, the major needs for Australian railways are rationalisation of services and

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38 G. Fiennes, *I tried to run a railway*, Ian Allan, London, 1967.

39 C.K. Jones, *op. cit.*

reduction of manpower costs. The possibility that, as C.K. Jones argued, creation of a national railway system would permit this must therefore be considered. As Joy has commented, the critical question with regard to a national system is whether such an organisation is more likely than are separate State systems to tackle the real underlying problems.[40] First signs from the creation of ANR gave some hope that this would be so. Following the change of government in 1975, the Federal Government commissioned the report on TR which proposed substantial rationalisation of that State's rail system.[41] Furthermore, the ANR's General Manager has stated that the non-urban section of SAR, which was finally transferred to ANR control on 1 March 1978, could be operated with fewer staff, and that many passenger and livestock services should be withdrawn.

However, these proposed rationalisations will inevitably arouse opposition in the States affected. The South Australian Agreement indeed provides as follows: 'Any proposals involving closure of lines, reductions in effectively demanded services, or reductions in level of employment at railway workshops, shall not be implemented without prior agreement of the State.'

'In general, rates and charges on the system to be transferred will be maintained by the Australian Government at levels not less favourable to the State than those levels generally applying on other State railway systems, but where present rates and charges have established a relative advantage to the State, these advantages will not be diminished.' The corresponding agreement with Tasmania does not go so far, but says: 'The Australian Government will agree to consult with the Tasmanian Government, at the request of that Government, on matters concerning the operation of the railways that are considered to be of concern to Tasmania.'[42] In any case, the States may well be able to exert political pressure on the Federal Government to defer manpower and service cuts. The States will have an incentive to do so, because they do not directly bear the burden of the ANR's financial losses. In addition, the effectiveness with which the States would resist rationalisation might be expected to be greater in the more populous States if their State rail systems were also to be absorbed into ANR.

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40 S. Joy, *op. cit.*

41 *Tasmanian Railways, op. cit.*

42 Reported by Centre for Research on Federal Financial Relations, *1975 Report and Review of Fiscal Federalism in Australia*, Canberra, 1976, p. 66.

In summary, there is a real possibility that transfer of operations from State systems to ANR would involve the Federal Government in expensive compensation to State Governments, but that the State governments would still be able to exert political pressure on the Commonwealth to retain unprofitable rail services and employ unnecessary workers. By contrast, if the States which still retain responsibility for their rail systems (New South Wales, Victoria, Queensland and Western Australia) continue to do so, then there may be more incentive to tackle the rail losses which represent, at least in Victoria and New South Wales, such a high proportion of those State's budgets.

APPENDIX A

EXPENDITURE ON RAIL TRAVEL BY INCOME GROUP

Information on the income distribution of rail users in Australia is available from the ABS's 1974-75 Household Expenditure Survey. Bulletin 4 of this Survey provides data on expenditure on rail services classified by income of households.[43] These data relate to the six State capitals and Canberra. The relevant data for considering the impact of rail subsidies are those for the cities with commuter services: Sydney, Melbourne, Brisbane, Adelaide and Perth. Although expenditure on country and suburban passenger services is not distinguished separately, a high proportion of rail expenditure by residents of each of these five cities will relate to expenditure on each particular city's commuter network.

Expenditure on rail travel can be compared with expenditure on other forms of transport, namely bus and tram travel and the purchase and running of motor vehicles, and with expenditure on all goods and services. Table IX shows the proportions which different household income groups accounted for of rail, bus/tram, car, and total expenditure in 1974-75 in each of the five cities. Thus, for example, the Table shows that the poorest 15.3 per cent of households in Sydney accounted for 2.1 per cent of total expenditure on rail travel, 6.7 per cent of total expenditure on bus travel, 3.1 per cent of total expenditure on car travel, and 5.7 per cent of total expenditure on all goods and services.

One measure of the extent to which a good or service is consumed more by better-off or less well-off households is the Gini coefficient.[44] For each commodity group, cumulative percentages of expenditure are plotted against cumulative percentages of households. If all households accounted for an equal proportion of expenditure on the commodity, then the resultant curve would be a straight 45° line running from the bottom left-hand to the top right-hand corner of the graph. However, it is likely that richer

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43 Australian Bureau of Statistics, *Household Expenditure Survey 1974-75. Bulletin 4 : Expenditure Classified by Income of Household*, Canberra, 1977.

44 For an outline of Gini coefficients and their limitations see A.B. Atkinson, *The Economics of Inequality*, Oxford University Press, Oxford, 1975, pp. 45-47.

Table IX

INCOME DISTRIBUTION OF EXPENDITURE ON TRANSPORT AND ON ALL GOODS AND SERVICES, 1974-75
per cent cumulative

AREA	HOUSEHOLDS	EXPENDITURE ON RAIL	BUS/TRAM	CAR	ALL GOODS AND SERVICES
Sydney	15.3	2.1	6.7	3.1	5.7
	31.9	13.4	20.8	14.6	17.6
	53.5	34.5	38.0	34.8	37.3
	72.7	58.8	60.0	55.4	57.7
	87.6	77.8	79.9	77.9	77.6
	100.0	100.0	100.0	100.0	100.0
Melbourne	13.8	2.5	5.6	3.5	5.3
	30.4	14.6	20.7	14.1	17.4
	52.4	27.7	37.6	33.1	37.3
	72.2	51.3	59.4	55.7	58.2
	87.3	78.5	80.6	77.0	76.9
	100.0	100.0	100.0	100.0	100.0
Brisbane	16.6	4.7	7.1	3.7	7.1
	36.9	15.1	26.8	17.1	22.4
	59.3	38.1	49.6	36.3	43.6
	77.1	56.8	70.9	60.1	64.1
	89.1	85.4	85.9	75.9	80.3
	100.0	100.0	100.0	100.0	100.0
Adelaide	16.7	3.3	5.8	5.9	7.0
	35.4	13.0	23.0	18.9	22.5
	58.9	40.5	49.0	41.2	45.8
	77.7	56.4	68.9	65.4	67.0
	90.3	90.0	86.2	81.3	83.4
	100.0	100.0	100.0	100.0	100.0
Perth	15.2	4.6	5.6	4.8	7.0
	35.5	16.7	26.4	17.2	21.3
	58.2	50.5	44.1	38.4	42.4
	78.9	64.4	69.2	64.5	66.2
	91.5	89.9	86.8	83.3	82.8
	100.0	100.0	100.0	100.0	100.0

households will account for a higher proportion of total expenditure than poorer households, so that the curve will lie below and to the right of the 45° line. The Gini coefficient is equal to the ratio of the area between this plotted curve and the 45° line, and the whole area below the 45° line. Hence, the Gini coefficient will equal zero when a good is consumed equally by all households and unity when all of the good is consumed entirely by the richest household.

Gini coefficients calculated from the data in Table IX are shown in Table X. These indicate that in all five cities less well-off income groups account for *proportionately* more of total expenditure on bus and tram travel than they do of total expenditure on all goods and services. However, less well-off groups account

Table X

INCOME DISTRIBUTION OF EXPENDITURE ON TRANSPORT AND ON ALL GOODS AND SERVICES 1974-75, GINI COEFFICIENTS

	RAIL	BUS/TRAM	CAR	ALL GOODS AND SERVICES
Sydney	0.2642	0.1972	0.2669	0.2299
Melbourne	0.2959	0.1874	0.2614	0.2174
Brisbane	0.2912	0.1434	0.3057	0.2195
Adelaide	0.2883	0.1693	0.2414	0.1933
Perth	0.2042	0.1774	0.2672	0.2199

for proportionately *less* of total expenditure on rail travel than they do of total expenditure on all goods and services, in all cities except Perth. Furthermore, the better-off groups account for *proportionately* more of total expenditure on rail travel than they do of total expenditure on car travel in Melbourne and Adelaide, though not in Sydney, Brisbane and Perth. Consequently, if one were to rank the three modes of travel in the order in which expenditure on them came relatively more from *lower* income groups the order would be:

Sydney;	Bus	Rail	Car
Melbourne;	Bus/tram	Car	Rail
Brisbane;	Bus	Rail	Car
Adelaide;	Bus/tram	Car	Rail
Perth;	Bus	Rail	Car

Note also that the difference between the income distribution pattern of users of the two public transport modes, rail and bus/tram, is greatest in Brisbane, followed by Adelaide and Melbourne, and least in Perth, with the pattern in Sydney lying in between those in the other cities.

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