An Economic and Social Assessment of Australian Nationalís Passenger Services

Report

This report presents an assessment of the financial, economic, social and environmental benefits and costs of the closure or continued operation of each of the Australian National Railway Commission's passenger services.

Subject
Series
Date
A to Z
Search
Results
Print
Exit
GO BACK

REPORT 67

AN ECONOMIC AND SOCIAL ASSESSMENT OF AUSTRALIAN NATIONAL'S PASSENGER SERVICES

Bureau of Transport and Communications Economics

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FOREWORD

The Bureau of Transport and Communications Economics has undertaken this study in order to assess the financial, economic, social and environmental benefits and costs of the closure or continued operation of each of the Australian National Railway Commission's passenger services.

The report was prepared by Dr Godfrey Lubulwa and Mr Tony Carmody. The assistance and cooperation of the management and staff of Australian National were invaluable in enabling the study to be completed on time.

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Research Manager

Bureau of Transport and Communications Economics
January 1991

CONTENTS

FIGURES

TABLES

ABSTRACT

This report presents an assessment of the financial, economic, social and environmental benefits and costs of the closure or continued operation of each of the Australian National Railway Commission's passenger services.

All the continued operations scenarios for the intrastate passenger services suggest that by 1993–94 the shortfall of revenue on long run avoidable costs would be almost double the 1988–89 shortfall.

The continued operations scenarios for the interstate passenger services suggest that some cost savings can be achieved by 1993–94. The estimates point to these savings being enough to lead, by 1993–94, to an average cost recovery on a long run avoidable cost basis of 68 per cent on Australian National's interstate passenger services.

A qualitative analysis suggests that implementation of the multimodal concessions scenario would have favourable financial impacts only if Australian National had increased flexibility to vary the level and frequency of its passenger services.

Complete closure of Australian National's intrastate services would be financially advantageous to both Australian National and the bus industry. Complete closure of Australian National's interstate services would result in a loss to the organisation of about $1.04 million per annum on a long run avoidable cost basis. The bus and air transport industries would gain financially. Australian National's passengers would no longer benefit from their first choice of mode.

The results for total closure invariably suggest that the economic benefits exceed the costs of closure. The net impact of closing individual passenger services varies depending on the assumptions made.

The social impacts of closure of Australian National's passenger services include impacts on railway employees: about 950 workers would be likely to lose their jobs if all Australian National passenger services were closed.

The impact on the environment is favourable if one assumes that there is year-round excess capacity on the substitute non-rail modes. If there is no excess capacity on the substitute modes closure of Australian National's services would lead to a net increase in pollution.

SUMMARY

In May 1990 the Bureau of Transport and Communications Economics was requested to undertake an assessment of the benefits and costs of the closure or continued operation of each of the Australian National Railway Commission's passenger services. The Bureau examined two sets of scenarios for these passenger services. One set of scenarios — the continued operations scenarios — assumed that Australian National continues to provide both intrastate and interstate passenger services in the foreseeable future. The other set of scenarios assumed that Australian National closes various parts of its passenger services.

THE CONTINUED OPERATIONS SCENARIOS

The base case (status quo) scenario

In the base case (status quo) scenario it is assumed that Australian National continues to provide all its intrastate and interstate passenger services. In order to do so it must replace its current set of railcars providing intrastate services with new ones. The financial assessment of the intrastate services indicates that by 1993–94 the increase in the costs to Australian National would exceed by $3.22 million the rise in revenue, leading to a doubling of the intrastate deficit on a long run avoidable cost basis.

In order to provide its interstate passenger services Australian National borrows what it needs to replace or refurbish its capital assets. The scenario allows for possible growth in revenue and for all feasible cost reductions. The net financial impact on interstate services by 1993–94 is positive. The scenario-induced increases in costs to Australian National are less than the projected increases in revenue. Thus it is estimated that by 1993–94 the deficit of the interstate passenger business segment will have decreased by $7.0 million on a long run avoidable cost basis, compared with the 1988–89 level of $24 million.

The base case (through-running Sydney–Perth) scenario

The through-running Sydney–Perth scenario assumes that Australian National has complete managerial control of the Sydney–Perth corridor in the provision of passenger services. Financial analysis of this scenario indicates that, in addition

to the deficit reduction impacts of the base case (status quo) scenario, corridor management might generate additional positive net savings of $3.2 million per annum.

The base case (multimodal concessions) scenario

The *multimodal concessions* scenario assumes that eligible travellers on other modes have access to concessions available to users of Australian National passenger services. The Bureau concluded that the financial impact of this scenario would be favourable, both to the Commonwealth and to Australian National, only if Australian National had greater flexibility than is allowed in the base case (status quo) scenario.

THE CLOSURE SCENARIOS

The set of closure scenarios comprises three options:

- the closure of individual services;
- the closure of the interstate services;
- the closure of the intrastate services.

In assessing the closure scenarios, three aspects were examined:

- the financial impacts of closure on Australian National;
- the economic impacts of closure on the rest of the community;
- the social and environmental impacts.

The Bureau's analysis shows that if passenger services were closed Australian National would not immediately save all passenger costs. It would take about five years to adjust and save all the direct costs associated with passenger services. Thus in the short run Australian National's freight operations are likely to become less profitable. This result is dependent on the assumption that, if passenger services are closed, Australian National would rely on natural attrition to reduce its labour force. If one assumes that under the closure scenario all the workers employed in Australian National's passenger business segment are retrenched, the cost of the redundancy packages would have to be met, although Australian National would save all the passenger-related long run avoidable costs immediately.

The economic assessment estimated the impacts of closure on the rest of the community. Many of the impacts are associated with the cost of using alternative modes to perform the passenger task currently performed by Australian National.

The extent of the additional costs of using other modes to provide the passenger services that Australian National currently provides depends on whether there would be enough capacity on the substitute modes to transport Australian National's passengers. The additional costs were estimated under three analyses — a core analysis and two sensitivity analyses:

- The core analysis assumed that there is excess capacity all year round on all substitute modes. It also assumed that the demand for travel by passengers shifting from Australian National is uniformly distributed over time.
- The first sensitivity analysis assumed that there is excess capacity in the off-peak period and that during the peak period it would be necessary to acquire additional vehicles.
- The second sensitivity analysis maintained the assumption of uniform distribution of travel demand but assumed that there is no excess capacity throughout the year on the substitute modes.

The table below summarises the net benefit of closure under these analyses.

THE NET BENEFITS OR COSTS FROM THE CLOSURE OF AUSTRALIAN NATIONAL'S PASSENGER SERVICES
($ million per annum)

	Net benefits		
Service closed	*Excess capacity all year*	*No excess capacity peak period*	*No excess capacity all year*
Indian Pacific	11.4	8.2	4.2
Trans Australian	6.9	5.1	3.0
Ghan	5.6	4.8	3.3
Overland	0.3	–2.5	–5.4
Blue Lake	0.5	0.5	0.5
Iron Triangle	0.9	0.5	–0.1
Silver City	1.2	0.6	–0.2
All passenger services[a]	25.1	15.3	3.5

a. The net benefit includes benefits obtained only if there is full closure of passenger services. It also includes the cost of services to isolated communities.

Sources AN (1989a, 1990), ABS (1989), BTCE (1988a), BTE (1985), Australian Airlines and bus company timetables.

The benefits exceed costs in most of the closure scenarios analysed. The exceptions are the *Overland* service under the no excess capacity peak period and no excess capacity all year analyses and the *Iron Triangle* and *Silver City* services under the no excess capacity analysis. The explanation for this result with the *Overland* lies in the large air and bus operating costs required to provide

a substitute service. The provision of additional air transport is especially costly. In the case of the other two services, a relatively small saving on long run avoidable costs by Australian National, compared with bus operating costs, explains why the result is negative. The *Blue Lake* shows benefits exceeding costs for all analyses. The reason is that the number of buses is the same in each case. The load factors vary, but neither frequency of service nor capacity varies. Where there is excess capacity in the non-rail modes to cater for displaced rail passengers, there is a considerable reduction in the costs of closure. This is shown by comparing the first net benefit figure of $25.1 million with the third figure of $3.5 million, which assumes no excess capacity.

In a number of cases the largest component on the benefits side is the avoidable cost saved by Australian National. The sale of rolling stock and equipment is also important. Thus, while the size of costs associated with closure are considerable, the extent of benefits is driven by long run avoidable cost.

The actual net impact of closure lies somewhere between the estimated excess capacity analysis and the no excess capacity analysis. The total net benefit lies between $3.5 million and $25.1 million.

The most important social impact of closure would be the 950 workers made redundant. Most of these redundancies would be in Adelaide.

The emission of carbon dioxide, which is a greenhouse gas, is of importance because of its global effect. The other gases (such as carbon monoxide) are not as important in a non-urban context. Only the closure scenario that assumes excess capacity throughout the year produces a reduction in carbon dioxide emissions. Excess capacity off-peak results in a slight increase and no excess capacity results in a considerable increase. However, all of these amounts represent only a fraction of a per cent of total national emissions from transport.

CHAPTER 1 OVERVIEW

The purpose of this study is to identify the financial, economic, social and environmental impacts of a number of scenarios for the Australian National Railway Commission's passenger services.

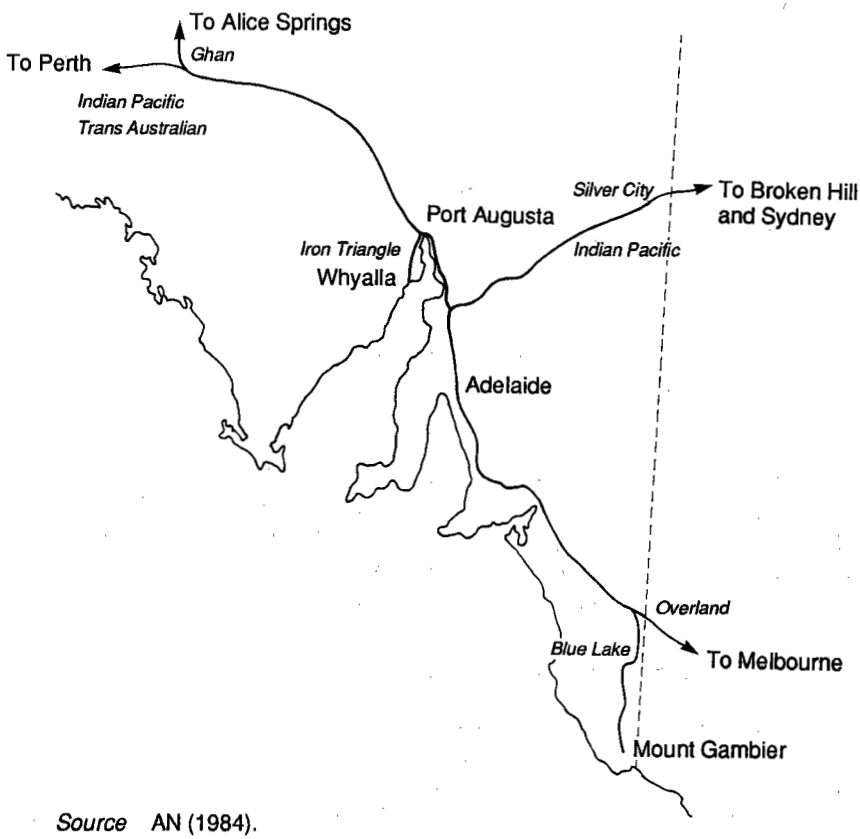
This chapter has two objectives. First, it describes the passenger services provided by Australian National, including in this description the extent to which the services are used by the community, the types of fares and services passengers can choose and the attributes of passengers. Second, the chapter outlines the scope of the analysis and the scenarios examined.

THE AUSTRALIAN NATIONAL PASSENGER NETWORK

Australian National's passenger services use the same rail network as its freight services. In the case of the *Indian Pacific* and the *Trans Australian,* operations and management are the joint responsibility of Australian National (AN), the State Rail Authority of New South Wales (SRA) and Westrail (WR). The *Overland* is the joint responsibility of Australian National and the State Transport Authority of Victoria (V/Line). In 1988–89 Australian National's passenger services were as follows:

Name of service	*Corridor serviced*	*Management responsibility*
Ghan	Adelaide–Alice Springs	AN
Indian Pacific	Sydney–Adelaide–Perth	AN, SRA, WR
Trans Australian	Adelaide–Perth	AN, WR
Overland	Adelaide–Melbourne	AN, V/Line
Blue Lake	Adelaide–Mount Gambier	AN
Silver City	Adelaide–Broken Hill	AN
Iron Triangle	Adelaide–Whyalla	AN

The country rail services — that is, the *Blue Lake,* the *Silver City* and the *Iron Triangle* — are conducted by Bluebird diesel multiple units (DMUs) and Budd railcars. Passenger motor cars are carried by the motorail service to Alice



Source AN (1984).

Figure 1.1 Australian National's passenger network

Springs, Perth and Melbourne. Figure 1.1 shows the passenger services provided by Australian National.

PASSENGER SERVICE UTILISATION

Table 1.1 shows the annual total of passenger journeys by service available.

Among the interstate services, the *Overland* has the largest number of annual passenger journeys, followed by the *Indian Pacific,* the *Trans Australian* and the *Ghan.* There are, however, major differences between these services. For example, the *Overland* is a daily service and is marketed as a long distance travel service between Melbourne and Adelaide. The other trains, particularly the *Ghan*, are marketed as offering holidays rather than simply travel between two locations.

TABLE 1.1 TOTAL AUSTRALIAN NATIONAL PASSENGER JOURNEYS, BY SERVICE
('000 passenger journeys)

Service	*1988–89*	*1987–88*	*1986–87*	*1985–86*	*1984–85*
Interstate					
Ghan	29.6	26.7	27.2	29.4	31.7
Indian Pacific[a]	43.8	..	..	..	..
Trans Australian[a]	30.1	69.4	68.4	65.0	60.5
Overland	171.4	173.2	156.8	157.0	154.4
Alice[b]		3.1	5.9	7.6	8.4
Intrastate					
Blue Lake[c]	34.3	na	na	na	na
Silver City[c]	16.8	na	na	na	na
Iron Triangle[c]	24.3	na	na	na	na
Total	75.4	80.1	70.4	63.2	55.1
Total	350.3	352.5	328.7	322.2	310.1

a. Passenger journeys for the *Indian Pacific* and the *Trans Australian* are combined for the years 1984–85 to 1987–88.
b. This service ceased in December 1987.
c. Data not separately available for 1984–85 to 1987–88.
.. Not applicable.
na Not available.

Sources Australian National, AN (1989a).

FARES AND SERVICES

In October 1989 there were four types of fares available to the general public on the *Indian Pacific,* the *Trans Australian,* the *Ghan* and the *Overland.* These were Adult, Child/Student/Pensioner, Adult Caper (advance purchase subject to conditions) and Eligible Pensioner Free Trip. Return fares were double the price of single fares.

For the journey from Adelaide to Perth, fares on the *Indian Pacific* and the *Trans Australian* are the same for equivalent classes of booking. The only apparent difference in the services is that the *Indian Pacific* provides for travel from Sydney to Perth via Adelaide, whereas the *Trans Australian* departs from Adelaide.

Table 1.2 shows the class or type of service provided by Australian National on interstate routes. The motorail services enable the rail traveller to carry a motor vehicle plus a caravan or trailer, as part of the train journey.

There are five interstate services provided weekly from the Australian National's Adelaide terminal to Perth, either by the *Indian Pacific* or the *Trans Australian.* Three of these are *Indian Pacific* services originating in Sydney. There are five services from Perth each week. Three trainsets are used by the *Indian Pacific* and two by the *Trans Australian.* The *Overland* provides a service every day between Adelaide and Melbourne and thus uses two trainsets. The *Ghan*

TABLE 1.2 CLASS AND FREQUENCY OF AUSTRALIAN NATIONAL PASSENGER SERVICES AVAILABLE ON INTERSTATE ROUTES

Train details	Ghan	Indian Pacific	Trans Australian	Overland
Frequency (each way)	1 per week	3 per week	2 per week	7 per week
Class or type				
First sleeper	Yes	Yes	Yes	Yes
Economy sleeper	No	Yes	Yes	No
First coach	No	No	No	Yes
Coach car	Yes	Yes	Yes	No
Economy coach	No	Yes	No	Yes
Motorail	Yes	Yes	Yes	Yes

Source AN (1989b).

provides a weekly two-way service between Adelaide and Alice Springs off-peak, and two two-way services per week during peak periods. This requires only one trainset.

The intrastate or country services comprise the three DMU or railcar services, which are the only remaining rail passenger services to the country areas of South Australia. One of these services is from Adelaide to Broken Hill.

The frequency of Australian National's intrastate passenger services is as follows:

- *Blue Lake* — seven times a week (that is, two-way service each day, Sunday to Thursday and two two-way services on Friday;
- *Silver City* — three times a week;
- *Iron Triangle* — three times a week.

THE ATTRIBUTES OF PASSENGERS

A Railways of Australia survey conducted on the *Indian Pacific* in May 1989 revealed the following attributes of the surveyed travellers.

Sex

Seven hundred and twenty-four travellers were surveyed. Of these, 388 (54 per cent) were female and 315 (44 per cent) were male. Twenty-one travellers (2 per cent) did not respond.

Weekly personal income

Table 1.3 summarises the distribution of travellers according to their stated personal income.

TABLE 1.3 THE DISTRIBUTION, BY WEEKLY PERSONAL INCOME, OF TRAVELLERS ON THE *INDIAN PACIFIC*, MAY 1989

Weekly gross personal income	*Number of travellers*	*Percentage of travellers*
No response	136	18.8
Less than $115	109	15.1
$116–230	157	21.7
$231–421	106	14.6
$422–613	105	14.5
$614 or more	111	15.3
Total	724	100

Note Income includes pension received. The median income of respondents was about $320, which compares with the Australian median of $442.

Source Railways of Australia (1989).

TABLE 1.4 THE DISTRIBUTION, BY AGE, OF TRAVELLERS ON THE *INDIAN PACIFIC*, MAY 1989

Age group	*Number of travellers*	*Percentage of travellers*
No response	32	4.4
Under 16	1	0.1
16–24	40	5.5
25–34	79	10.9
35–44	80	11.0
45–59	174	24.0
60–64	82	11.3
65 and over	236	32.6
Total	724	100

Source Railways of Australia (1989).

Age

Table 1.4 shows that over 40 per cent of travellers on the *Indian Pacific* are over 60 years of age.

Occupation

Table 1.5 shows the distribution, by stated occupation, of travellers on the *Indian Pacific*. It shows that retired persons represent a large proportion of the passengers. The income distribution and age profile shown in tables 1.3 and 1.4 are consistent with this finding.

TABLE 1.5 OCCUPATIONS OF TRAVELLERS ON THE *INDIAN PACIFIC*, MAY 1989

Occupation	*Number of travellers*	*Percentage of travellers*
No response	32	4.4
Executive or manager	94	13.0
Self-employed	34	4.7
Clerical	54	7.5
Rural property owner	1	0.1
Service, tradesperson	27	3.8
Rural manual worker	7	1.0
Home duties	113	15.6
Rail employee	19	2.6
Student	22	3.0
Retired	266	36.7
Other	55	7.6
Total	724	100

Source Railways of Australia (1989).

TABLE 1.6 THE COUNTRY OF USUAL RESIDENCE FOR TRAVELLERS ON THE *INDIAN PACIFIC*, MAY 1989

Country of usual residence	*Number of travellers*	*Percentage of travellers*
No response	84	11.6
Australia	539	74.4
United States	31	4.3
New Zealand	22	3.0
United Kingdom	21	2.9
Canada	8	1.1
Other	19	2.6
Total	724	100

Note 'Other' comprises Denmark (1), Finland (2), Ireland (1), Japan (2), The Netherlands (1), Norway (1), Sweden (2), Switzerland (4), West Germany (5).

Source Railways of Australia (1989).

Usual country of residence

Table 1.6 shows that at least 14 per cent of travellers on the *Indian Pacific* are non-residents. It appears that a large proportion of non-resident travellers are overseas tourists.

TABLE 1.7 PURPOSE OF JOURNEY OF TRAVELLERS ON THE *INDIAN PACIFIC*, MAY 1989

Purpose of journey	*Number of travellers*	*Percentage of travellers*
No response	20	2.8
Visiting friends	248	34.3
Holiday	333	46.0
Business	37	5.1
Convention	19	2.6
Education	13	1.8
To or from work	9	1.2
Other	45	6.2
Total	724	100

Source Railways of Australia (1989).

Purpose of travel

Table 1.7 summarises the purpose of travel of passengers on the *Indian Pacific*. Holiday travel accounts for the largest single group of passengers. For at least 80 per cent of the sample, use of this service is a leisure activity.

THE SCOPE OF THE STUDY

In order to carry out the study, the BTCE developed two sets of scenarios: a set of continued operations scenarios and a set of closure scenarios.

The continued operations scenarios

The base case (status quo) scenario
The status quo scenario made the following assumptions:

- Australian National continues to provide the intrastate and interstate passenger services that it provided in 1988–89;
- Australian National replaces the worn out railcars with new railcars needed for the intrastate service.

The base case (through-running Sydney–Perth) scenario
The through-running Sydney–Perth scenario is identical to the status quo scenario in terms of intrastate and interstate passenger services provided by Australian National. It differs from the base case (status quo) in that it assumes that Australian National is granted rights to operate and manage the *Indian Pacific* all the way from Sydney to Perth and to do the same for the *Trans Australian* from Adelaide to Perth. It explores the benefits associated with a single system of management of the Sydney–Perth corridor, in contrast with the current multisystem arrangements.

The base case (multimodal concessions) scenario
The draft terms of reference requested the Bureau to examine the scope for substituting broadly defined concessions for existing rail concessions for pensioners and other beneficiaries, particularly in relation to the regional services in South Australia (including the service to Broken Hill).

The closure scenarios

The closure scenarios look at nine possible closures of Australian National's passenger services:

- close the *Blue Lake* (to Mount Gambier)
- close the *Silver City* (to Broken Hill)
- close the *Iron Triangle* (to Whyalla)
- close all the intrastate services
- close the *Ghan* (Adelaide–Alice Springs)
- close the *Indian Pacific* (Sydney–Adelaide–Perth)
- close the *Trans Australian* (Adelaide–Perth)
- close the *Overland* (Adelaide–Melbourne)
- close all passenger services.

Where closure refers to only one service, the costing and impacts of closure assume that Australian National continues to provide all the other passenger services, intrastate and interstate.

CHAPTER 2 THE FINANCIAL IMPACTS

This chapter has two objectives:

- to estimate the financial consequences of the scenarios listed at the end of chapter 1;
- to identify those who would gain and those who would lose from continued operation or closure of each service.

THE CONTINUED OPERATIONS SCENARIOS

The analysis of the continued operations scenarios used 1988–89 as the base year and it considered those cost savings realisable and investment expenditures to be incurred before 1993–94. This choice of a five-year horizon was adopted in order to ensure interscenario comparability.

The base case (status quo) scenario: intrastate

The base case (status quo) scenario assumes that Australian National makes arrangements to continue providing its intrastate passenger services for the foreseeable future. This scenario requires Australian National to buy new railcars to replace its current fleet. It is estimated that a new railcar, with a capacity of 50 seats and a life of 35 years, costs $2.3 million. The base case (status quo) scenario for the intrastate services requires the following:

- for the *Blue Lake*, five new railcars, at a total cost of $11.5 million;
- for the *Silver City* and the *Iron Triangle*, five new railcars to be shared between the two services, at a total cost of $11.5 million.

The major financial impact of this scenario is that the intrastate passenger services would incur higher interest and capital charges but would have major reductions in the maintenance costs charged to them. The Commonwealth's outlays would increase, but the increases would be offset to a minor extent by the increase in revenue that Australian National would realise. Australian National estimates that patronage and revenues for the intrastate services are likely to rise by 30 per cent in the first year following the acquisition of the new railcars, and by a further 10 per cent per annum in the following two years. This higher level of patronage plateaus and is then maintained from the fourth year. The increase in patronage is not likely to be associated with increased passenger

TABLE 2.1 RAILCAR UTILISATION FOR AUSTRALIAN NATIONAL'S INTRASTATE PASSENGER SERVICES, 1988–89

Service	Seats available (number)	Seats occupied (number)	Occupancy rate (per cent)
Blue Lake	77 436	34 302	44
Iron Triangle	50 512	25 028	50
Silver City	32 616	16 906	52

Note The capacities for the *Silver City* and the *Blue Lake* are based on the Bluebird railcars, with a seating capacity of 52 per car. The capacity for the *Iron Triangle* is based on the Budd railcars, with a seating capacity of 44 per car.

Source Australian National (pers. comm. 1990).

capacity because of the existing levels of excess capacity in the intrastate rail passenger market.

Table 2.1 shows railcar utilisation for Australian National's intrastate passenger services.

Table 2.2 shows that under the base case (status quo) scenario the overall impact is for all the intrastate services to become more unprofitable.

The base case (status quo) scenario: interstate

Higher capital costs
Australian National has said that the base case (status quo) scenario for interstate services would be associated with major investment requirements. Much of the expenditure is necessary, particularly the acquisition of new or the refurbishment of old rolling stock. These expenditures would increase costs, as a result of higher interest costs.

Higher revenues
The above-mentioned investment expenditure is likely to increase revenue because Australian National expects that new rolling stock will improve the quality of service and attract more passengers. For example, it estimates that by 1993–94 the revenues from interstate services would be as shown in table 2.3.

The growth in revenue from the Sydney–Adelaide–Perth corridor reflects to some extent the impact on patronage of Australian National's repositioning strategy in that corridor's travel market. The estimated increase in revenue is expected to result from increases in patronage over time and some increase in fares associated with improved quality of service.

TABLE 2.2 THE FINANCIAL IMPACTS OF THE BASE CASE (STATUS QUO) (1993–94) INTRASTATE SERVICES SCENARIO COMPARED WITH THE BASE CASE (STATUS QUO) (1988–89)

($ million per annum)

Variable	Blue Lake	Silver City	Iron Triangle	*Total*
Revenue (1988–89)	0.76	0.37	0.40	1.53
LRAC (1988–89)	2.24	1.47	0.97	4.68
Deficit (1988–89)	–1.48	–1.1	–0.57	–3.15
Scenario impacts by 1993–94				
Interest costs in 1988–89	0.0	0.0	0.0	0.0
Interest costs in 1993–94	2.03	1.01	1.02	4.06
Change in capital and interest costs	+2.03	+1.01	+1.02	+4.06
Maintenance costs in 1988–89	1.20	0.80	0.44	2.44
Maintenance costs in 1993–94	1.04	0.79	0.35	2.18
Change in maintenance costs	–0.16	–0.01	–0.09	–0.26
Revenue in 1988–89	0.76	0.37	0.40	1.53
Revenue in 1993–94	0.91	0.54	0.56	2.01
Change in revenue (1993–94)	+0.15	+0.17	+0.16	+0.48
Annual cost savings by 1993–94	–1.87	–1.00	–0.93	–3.80
Net impact (1993–94)	–1.72	–0.83	–0.77	–3.29

LRAC Long run avoidable costs.

Note The net impact (1993–94) assumes that, with exception of those listed under 'scenario impacts' all other costs and revenues do not change. The net impacts can be interpreted as status quo (1993–94) minus status quo (1988–89). The net impact is calculated by adding the change in revenue to the cost savings per annum.

Source BTCE estimates based on data from Australian National.

TABLE 2.3 AUSTRALIAN NATIONAL'S REVENUES FROM INTERSTATE PASSENGER SERVICES

($ million per annum)

Service	*Actual revenue 1988–89*	*Estimated revenue 1993–94*
Ghan	5.8	8.6
Indian Pacific	12.0	15.3
Trans Australian	6.5	10.2
Overland	4.8	5.9

Source AN (pers. comm. 1990).

Feasible cost reductions

Australian National expects to achieve cost reductions in the following significant areas relevant to its provision of long distance passenger services:

- *Removal of guards from passenger trains.* This is estimated to lead to a reduction of $1 million per annum in costs currently attributed to passenger services.
- *On-time running.* The implementation of the AUSTRAC radio communication system is likely to lead to better operating procedures and estimated cost savings of $1 million per annum.

TABLE 2.4 THE FINANCIAL IMPACTS OF THE BASE CASE (STATUS QUO) (1993–94) INTERSTATE SERVICES SCENARIO COMPARED WITH THE BASE CASE (STATUS QUO) (1988–89)

($ million per annum)

Variable	Ghan	Indian Pacific	Trans Australian	Overland	*Total*
Revenue (1988–89)	5.8	12.0	6.5	4.8	29.1
LRAC (1988–89)	9.0	23.4	12.3	7.7	52.4
Deficit (1988–89)	–3.2	–11.4	–5.8	–2.9	–23.3
Scenario impacts by 1993–94					
Capital and interest costs in 1988–89	0.5	1.3	0.6	0.3	2.7
Capital and interest costs in 1993–94	0.9	2.4	1.2	0.6	5.1
Change in capital and interest costs (on $16 million loan)	+0.4	+1.1	+0.6	+0.3	+2.4
Revenue in 1988–89	5.8	12.0	6.5	4.8	29.1
Revenue in 1993–94	7.3	12.9	7.7	5.0	32.9
Change in revenue	+1.5	+0.9	+1.2	+0.2	+3.8
Annual cost savings by 1993–94	+1.7	+1.8	+0.9	+0.4	+4.8
Net annual impact by 1993–94	+2.8	+1.6	+2.4	+0.3	+7.1

LRAC Long run avoidable cost.

Note The net impact is obtained by adding the cost savings to the change in revenue and the change in capital and interest costs.

Source BTCE estimates based on data from Australian National.

- *Motorail double-deckers for all trains.* This is already under way for the *Ghan.* The impact of this arrangement is likely to reduce by $0.5 million per annum the track costs chargeable to passenger services because the number of wagons needed is reduced.
- *Computerised reservation and ticketing.* This improvement is estimated to require 18 months to two years to implement. A computer-based system will reduce overtime and other labour costs by about $0.5 million per annum.
- *On-train labour savings.* Rationalisation of labour use could result in a saving of $0.75 million per annum in labour costs. The achievement of this requires negotiations with railway unions.
- *Rationalisation of crews and crew cars on the* Ghan. This involves the removal of diner facilities for coach class travellers, substituting a cafeteria, and the reduction in the number of on-train crew cars. These changes would generate savings of $1 million per annum in crew costs for the *Ghan.*

Table 2.4 summarises the impacts associated with this scenario. In all cases the deficit on long run avoidable cost drops, but only marginally for the *Overland.* The relatively smaller reduction in the deficit for the *Overland* is due to the relatively slight rise in revenue and small cost savings for this service in the planning period.

The base case (through-running Sydney–Perth) scenario

Implicit in the base case (through-running Sydney–Perth) scenario is that, with the shift of corridor management powers to Australian National, two major improvements will be possible:

- upgrading of the *Indian Pacific* service, to convert it into the Sydney–Adelaide–Perth equivalent of the *Ghan* service on the Adelaide–Alice Springs corridor;
- rationalisation of current facilities and practices, including
  - performing heavy maintenance and providoring in one central location (in Adelaide or by contract in Sydney and Perth),
  - one pool of maintenance personnel working instead of the current three pools arrangement,
  - through-working locomotive and on-train crews, and
  - introduction of better, uniform control procedures for on-train provision.

The rationalisation of current facilities and practices at Perth and Sydney and the conversion of Adelaide into the repair and providoring centre for Australian National's passenger services requires a lump sum investment of $2 million. The savings are restricted to the two east–west services. These savings are summarised in table 2.5; they are additional to those detailed in table 2.4.

As table 2.5 shows, the scenario has a positive impact of $3.2 million per annum. Other things being equal, this can be equated with a favourable impact on the Commonwealth's outflows on account of Australian National passenger services.

TABLE 2.5 THE FINANCIAL IMPACTS OF THE BASE CASE (THROUGH-RUNNING SYDNEY–PERTH) IN 1993–94 COMPARED WITH THE BASE CASE (STATUS QUO) (1988–89)

($ million per annum)

Area of impact	*Savings*
Heavy maintenance at Adelaide	3.0
Improved stock control	0.5
Capital and interest	–0.3
Total impact	3.2

Note Only cost savings to be realised and investment expenditure to be incurred before 1993–94 are included.

Source BTCE estimates based on data from Australian National.

To the extent that this scenario reduces the total cost of providing passenger services on the Sydney–Adelaide–Perth corridor, there might be benefits accruing to the State Rail Authority of New South Wales (SRA) and Westrail. However, the overall impacts are difficult to determine. Australian National and the other systems currently reimburse each other the costs of technicians, fuel, car cleaning, laundry, conductors, porters, catering and maintenance.

The base case (through-running Sydney–Perth) scenario eliminates the need for intersystem reimbursement. Furthermore, under the current arrangements, the SRA and Westrail share with Australian National some of the costs of Australian National's passenger services on a train-kilometre basis. This scenario would end these sharing arrangements. Australian National may have to pay for the running rights over the other systems' networks. On the other hand, it would no longer have to share the revenues from its passenger services, so its total revenue would increase.

Australian National employees located at Port Pirie and Port Augusta might incur relocation expenses if they have to move residence as a result of streamlining the maintenance and providoring arrangements but, although the extent of this is difficult to estimate, the expense would almost certainly be less than $3.2 million per annum.

The base case (multimodal concessions) scenario

The base case (multimodal concessions) scenario assumes that the concessions available to rail travellers are also available to eligible travellers using other modes. This scenario is likely to have impacts on the following variables:

- fares on modes competing with rail (bus and air);
- patronage on Australian National's passenger services and on competing modes;
- the cost recovery levels of Australian National's passenger services;
- government expenditure.

TABLE 2.6 A COMPARISON OF FULL AND CONCESSION FARES FOR BUS AND RAIL (ECONOMY)

($, May 1990)

Route	*Bus full*	*Bus concession*	*Rail full*	*Rail concession*
Sydney–Adelaide	109	81[a]	85	63
Adelaide–Perth	160	126[a]	140	110
Adelaide–Melbourne	59	45[a]	35	26
Adelaide–Alice Springs	135	96[a]	110	78
Adelaide–Mount Gambier	36	24[b]	27	17
Adelaide–Whyalla	25	17[b]	26	14
Adelaide–Broken Hill	34	23[b]	33	20

a. There are no bus concession fares on interstate routes. The interstate bus concession fare is estimated as the product of the bus full fare and the rail concession fare divided by the rail full fare.
b. Intrastate bus concession fares are two-thirds of intrastate bus full fares.

Source Bus companies and Australian National timetables.

Multimodal concession fares

At present the rail concession fares on all the routes serviced by Australian National are less than the full bus fares. Table 2.6 shows the actual intrastate concession fares and the estimated interstate concession fare levels if bus travellers were to have access to the same concessions as rail travellers.

Economy class (coach) rail travellers

The major impact of this scenario would be to make bus travel more attractive to the concession economy class (coach) rail travellers. (This is the form of rail travel comparable to bus.) In all but one instance in table 2.6, economy rail travel is cheaper than bus travel. If one takes into account the fact that bus travel is faster, combined with the reduction in intermodal fare differentials, it is quite likely that some rail concession travellers would switch from rail to bus travel. The magnitude of the shift is difficult to determine in the absence of knowledge of the elasticity of demand with respect to fares and to travel time for this segment of the market.

Rail sleeper class travellers

There are two rail sleeper class concession fares on interstate routes serviced by Australian National: a first class sleeper concession fare, and an economy sleeper concession fare.

Australian Airlines recently introduced concession economy return air fares for those travellers who are over 60 years of age. These concessions are not available on one-way air tickets. Air and rail fares are shown in table 2.7.

TABLE 2.7 CONCESSION AIR AND RAIL FARES FOR FIRST CLASS AND ECONOMY SLEEPERS
($)

Route	Concession (return)		
	First sleeper rail October 1989	Economy sleeper rail October 1989	Economy class air 1990[a]
Sydney–Adelaide	362	282	350
Adelaide–Perth	642	482	511
Sydney–Perth	1 004	764	729
Adelaide–Melbourne	155	..	250
Adelaide–Alice Springs	393	..	384

a. These fares are for Australian Airlines travellers who are over 60 years old.
.. Not applicable.

Note The shorter trip length and differences in type of rail service on the Adelaide–Melbourne route are responsible for rail fares being less than air fares on this route.

Sources Australian National, Australian Airlines timetable.

The concession air fares provided by Australian Airlines are approximately 60 per cent of the full economy air fares. Introducing concessions for air travellers comparable to those available to rail travellers would increase the attractiveness of shifting away from rail.

Multimodal concessions and their impact on Australian National

While no computations have been done for this scenario, it is very unlikely that it would have favourable effects on Australian National. For a no-impact outcome it would be necessary for rail concession passengers' own fare elasticities and cross-fare elasticities to be zero. If Australian National's response under this scenario is to maintain current fare structures, patronage would be lost to other modes, with consequent impacts on revenue and cost recovery levels. In the past, Australian National has attempted to minimise the fare differentials between it and its competitors. Following this strategy would minimise the switch from rail to other modes but it would be associated with reduced earnings per concession rail passenger.

Multimodal concessions and government

For this scenario to generate financial gains to the Commonwealth government several actions might be necessary:

- Multimodal concessions might have to be combined with increased flexibility for Australian National to vary the level and frequency of its passenger services. Lack of flexibility on Australian National's part to adjust the

resources devoted to this segment would increase its deficit and lower its cost recovery level.

- The subsidy to eligible travellers should be paid directly to the traveller and not to the firm providing the subsidised travel service. This would ensure that the funding for concession travel does not translate into subsidies to firms supplying the service.
- The subsidy might have to be paid directly to eligible travellers, after a concession journey has been made.

THE CLOSURE SCENARIOS

The individual groups and interested parties that would be financially affected by the Australian National passenger closure scenarios are classified under the following major headings:

- Australian National;
- other railway systems;
- bus transport industry;
- airline industry;
- governments (Commonwealth and State);
- Australian National's patrons.

Australian National

Closure of its passenger services would result in four kinds of impacts on Australian National:

- benefits from asset disposal;
- costs avoided;
- revenue lost;
- revenue supplement forgone.

The benefits from asset disposal
There would be gains (net of disposal costs) associated with the release and sale of those resources with alternative uses which are now devoted to passenger services. The following resources are involved: buildings and land improvements, rolling stock, and plant and equipment.

Buildings and land improvements. Australian National owns a considerable number of stations that it uses in connection with passenger services. Some 29 of these are used for scheduled train stops. The most important in terms of value of assets constructed for use by passenger services are the Adelaide rail passenger terminal at Mile End, Alice Springs station and Whyalla station.

Although the total book value of these buildings is estimated at $5.6 million, none of the buildings can be converted into cash by Australian National: the stations would still be required for the freight business. The Adelaide passenger terminal

TABLE 2.8 ESTIMATED SCRAP VALUES OF AUSTRALIAN NATIONAL'S PASSENGER ASSETS RELEASED UNDER THE CLOSURE SCENARIOS, 1988–89
($'000)

Closure	*Value*
Ghan	62.3
Indian Pacific	186.5
Trans Australian	187.7
Overland	132.4
Blue Lake	27.5
Silver City	36.5
Iron Triangle	7.0
All intrastate (South Australia)	71.0
All passenger services	639.9
Rolling stock pool (sell if total closure)	67.7

Source Estimates by Australian National (pers. comm. 1990).

would revert to the South Australian government. Thus these values have been excluded from the assessment of the financial impacts on Australian National.

Rolling stock. Australian National provided an inventory of its rolling stock fleet, by type of rolling stock, year of purchase, and the service on which it is used. While for analytical purposes rolling stock is assigned uniquely to a particular service, there is some sharing of cars between the services. For example, Australian National (AN 1986a) stated: 'The *Ghan* uses rolling stock from the *Trans* pool, which was established in the middle-late 1960s and early 1970s'.

Table 2.8 shows the estimated scrap value of Australian National's passenger assets, relevant to the closure scenarios.

Plant and equipment. The major items of plant and equipment are the signalling and communication equipment that are required for passenger services but are unnecessary for Australian National's freight business. It is difficult to establish a value for this equipment because of the diversity of its components. The resale value is estimated to be negligible compared with the value of other assets released.

Cost avoided

There is a need for estimation or approximation of costs when analysing traffics such as Australian National's passenger services, which not only share resources among themselves but also share resources with a traffic such as Australian

National freight, which has attributes that differ from those of passenger services. There are two particular problems:

- apart from a few areas, it is impossible to measure precisely the contribution of passenger services to Australian National's total costs;
- while some causal factors that give rise to the various cost elements are understood, this understanding is not complete.

In order to estimate the avoidable costs of a service it is necessary to consider joint costs, common costs and direct costs.

Joint costs. 'Joint costs' refers to the cost of providing two or more services where the cost of production can only be separated in an arbitrary way. The proportion of these joint costs cannot be altered in favour of, or away from, a given joint service component at the discretion of management. Corporate overheads are joint costs. The provision of passenger services by Australian National makes use of signalling and main line track which must be available even if Australian National provided no passenger services. In fact, these joint costs occur across rail systems. The SRA, Westrail and V/Line provide infrastructure and some operating support for Australian National.

Joint costs have no true separation since they cannot be separated conceptually or physically despite the possibility of attributing them to separate rail activities. There are many ways to separate joint costs but none of them can be established as the correct way. The only true value for joint costs is the unseparated value.

One way of looking at the joint costs problem is to ask two questions:

- Is there a dominant task performed by the firm providing the community service obligation?
- Is that dominant task self-funding?

If such a dominant task exists then that task determines completely the major infrastructure required by the firm. In the context of this study, the dominant task for Australian National is freight. It has to perform its freight task, whether passenger community service obligations (CSOs) exist or not. Thus Australian National freight determines the infrastructure required and, in the absence of CSOs, Australian National freight has to cover fully these infrastructure costs. In the dominant task case, Treasury (1990) argues:

> ...it would be inappropriate to allocate joint infrastructure capital costs to the passenger service. If government imposed a CSO on the passenger service then allocating part of the infrastructure costs to that service would inappropriately increase the estimated cost of the CSO.

Common costs. Australian National's provision of passenger services involves common costs that are shared over more than one service on the basis of management decisions. For example, train crew and locomotive costs are common unless permanently assigned to a specific task or service. They can be reasonably traced through to individual activities using, say, hours devoted to a task. Similarly, terminal staffing is a common cost if the terminal is shared by

both passengers and freight. The proportion of these shared costs may be altered in favour of, or away from, a given passenger or freight service at the discretion of management, in response to a change in demand or to introduce an improvement in operations. Australian National's passenger trains and freight trains interact but this interaction cannot be modelled in a fixed and rigid way. In principle, though, as pointed out, common costs can be separated and uniquely attributed to that service or activity which tends to use more or less of the relevant resources.

Direct costs. The direct costs for the provision of a particular service comprise on-train and off-train costs. 'On-train costs' refers to the on-board costs of operating a train. 'Off-train' refers to the costs incurred within the rail network to ensure that a particular train provides its assigned service. The following list provides an indication of the direct costs: drivers/observers, technicians, conductors, caterers, fuel, laundry, providoring, marshalling.

Avoidable costs. The avoidable costs of a given service, as used in the closure scenarios, are those costs that would no longer be incurred if the service ceased operating. The avoidable costs of Australian National's passenger services are approximated by the sum of the direct and common costs attributable to passenger services.

Australian National currently relies on a program of voluntary redundancy in adjusting its labour force. This policy of no retrenchment of workers may limit the extent to which costs would be avoided in the short run. All expenditures, except corporate overheads and infrastructure charges, that are attributed to passenger services would be avoided in the long run; that is, about five years after the year of closure.

Costing Australian National's passenger and travel operations. The Bureau considered various approaches to the problem of calculating the costs of Australian National's passenger and travel agency operations in a way that properly reflects its intrastate and interstate passenger tasks. The emphasis was on determining the 1988–89 financial costs of Australian National's passenger and travel agency operations. The year 1988–89 was selected because it provided the most recent year for which the estimation of revenues and costs has been completed by Australian National.

Australian National's costing of its passenger and travel agency services. The costs of Australian National's passenger services depend on the resources that those services use. The indicators of the resources used by Australian National's passenger services are summarised in tables 2.9 and 2.10. The higher the levels of the indicators in these tables, the higher the amounts of resources used. For example there is a direct relationship between gross tonne-kilometres (GTK) performed and the utilisation of the following resources: locomotive fuel, car cleaning and car washing, on-train crew, booking office costs, track maintenance resources, terminal costs, passenger administration and support costs.

TABLE 2.9 INDICATORS OF RESOURCES USED BY AUSTRALIAN NATIONAL'S INTERSTATE PASSENGER SERVICES, 1988–89
('000)

Resource	Ghan	Indian Pacific	Trans Australian	Overland	*Total*
Gross tonne-kilometres	314 110	850 494	423 586	206 360	1 794 550
Locomotive-kilometres	481	1 600	808	428	3 317
Locomotive-hours	7	24	12	7	50
Vehicle-kilometres motorail	33	18	16	29	96
Vehicle-kilometres all	5 978	14 430	7 368	3 058	30 834
Train-kilometres	233	793	406	214	1 646
Train-hours excluding railcars	3.615	13.164	5.913	3.725	26.417

Source AN (pers. comm. 1990).

TABLE 2.10 INDICATORS OF RESOURCES USED BY AUSTRALIAN NATIONAL'S INTRASTATE PASSENGER SERVICES, 1988–89
('000)

Resource	Blue Lake	Silver City	Iron Triangle	*Other trains*	*Total*
Gross tonne-kilometres	32 402	20 041	12 054	23 990	88 487
Railcar-kilometres	574	378	213	50	1 215
Locomotive-kilometres	..	..	..	23	23
Locomotive-hours	..	..	..	0.562	0.562
Vehicle-kilometres motorail	..	..	..	0.015	0.015
Vehicle-kilometres all	..	..	..	250	250
Train-kilometres	285	145	122	76	628
Train-hours including railcars	2.200	1.700	1.500	1.398	6.798
Train-hours excluding railcars				1.398	1.398

.. Not applicable.

Source AN (pers. comm. 1990).

TABLE 2.11 LONG RUN AVOIDABLE COSTS SAVED AND COSTS PASSED ON TO FREIGHT: WITHOUT RETRENCHMENT

($ million per annum)

Scenario	*Year after closure*	*LRAC saved (1)*	*LRAC attributable to passenger (2)*	*LRAC to freight (3)*	*Total LRAC (4)*
Close all intrastate	First	0.6	0.8	3.2	4.6[a]
	Third	1.7	0.6	2.3	4.6[a]
	Fifth	4.6	0.0	0.0	4.6[a]
Close all passenger	First	8.3	..	47.1	55.4[b]
	Third	28.7	..	26.7	55.4[b]
	Fifth	55.4	..	0.0	55.4[b]

a. Intrastate LRAC total excluding $0.1 million per annum of depreciation and interest.
b. Interstate and intrastate LRAC total excluding $2.8 million per annum of depreciation and interest.
.. Not applicable: under complete closure there is no passenger business segment.
LRAC Long run avoidable costs.

Note The sum of columns 2 and 3 gives the passenger LRAC not saved in a given period. Columns 1, 2 and 3 add to column 4.

Source BTCE estimates based on data from Australian National.

Similarly, locomotive-kilometres and hours performed are directly related to locomotive maintenance and locomotive cleaning. Vehicle-kilometres travelled influence the wagon maintenance costs, the extent to which train technicians are used, and the costs of maintaining brake vans and other passenger vehicles. These indicators of resource utilisation are used to estimate unit costs for Australian National's resources devoted to the provision of passenger services. The estimated unit costs are then used in calculating the long run avoidable costs of individual passenger services.

Avoidable costs in the short run without retrenchment. Table 2.11 shows the extent to which passenger-attributed costs are avoidable in the short run. Thus, table 2.11 shows, if Australian National had implemented the closure scenarios at the start of the 1988–89 financial year:

- the long run avoidable costs that would have been saved by Australian National;
- the residual long run avoidable costs that would be attributable to the remaining passenger and freight traffics in the short run when passenger services are closed;
- the passenger long run avoidable costs that would be borne by the Australian National freight segment in the short run.

Estimates have been developed for three periods: the ends of the first, third and fifth years following the closure of the passenger services.

The residual costs are shown in columns 2 and 3 of table 2.11. The following conclusions can be drawn from the table:

- In the very short run Australian National saves a very small proportion of its passenger long run avoidable costs.
- If the intrastate passenger services are closed, Australian National estimates indicate that the organisation needs five years before it can save all the passenger-related costs. This result depends, though, on the assumption that Australian National does not retrench its passenger segment employees even after these services are closed.
- Under complete closure of Australian National passenger services, and a policy of no retrenchment of labour, Australian National freight would have to bear a proportion of the passenger costs that would not be shed in the short run.

The most important implication of table 2.11 is that, in the short run, closure of passenger services, in an environment in which Australian National does not retrench surplus labour, is likely to affect the profitability of Australian National's freight segment.

Furthermore, if CSOs are funded on a long run avoidable cost basis, Australian National freight would need to cover all the joint infrastructure costs and overheads that are currently split between passenger and freight services. In 1988–89 Australian National passenger services contributed $9.4 million to the joint infrastructure and overhead costs. Under the dominant task principle discussed earlier, Australian National freight is likely to bear these infrastructure costs even in the long run. These infrastructure costs alone exceed the profit that the Australian National freight business segment made in 1988–89.

Table 2.12 summarises the long term impact on Australian National; that is, five years after the closure of its passenger services. On financial grounds Australian

TABLE 2.12 LONG RUN IMPACTS OF PASSENGER SERVICES CLOSURE ON AUSTRALIAN NATIONAL: WITHOUT RETRENCHMENT
($ million)

Scenarios	*Forgo revenue (per annum)*	*Forgo revenue supplement (per annum)*	*Asset disposal (once)*	*LRAC avoided (per annum)*	*Net impact from year 5 (per annum)*
Close all intrastate	–1.53	–0.40	0.07	+4.6	+2.74
Close all passenger	–30.63	–31.2 (–26.45)	+0.64	+55.4	–5.79 (–1.04)

Note The net impact in parenthesis is the impact on Australian National if long run avoidable cost is used to calculate the revenue supplement for passenger services.

Source BTCE estimates based on data from Australian National.

National is better off if it closes the intrastate services. By closing all the passenger services, it loses more than it gains. This result is dependent on how the revenue supplement is calculated.

Avoidable costs in the short run with retrenchment. The financial impacts shown in table 2.12 were estimated under the assumption that even if passenger services are closed Australian National would persist with its policy of no retrenchment of labour. Thus it is assumed that the 950 workers currently employed in Australian National's passenger segment would leave Australian National over a period of about five years as a result of natural attrition and the voluntary redundancy packages. If the passenger services were to be closed, it is likely that Australian National might need to retrench, rather than just redeploy, some of the workers employed in the passenger business segment. This would mean that while Australian National could incur separation or compulsory redundancy pay-outs, all its passenger long run avoidable costs could be saved within one year of closure. Experience suggests that the average redundancy cost to Australian National per worker is about $12 000. It has no experience

TABLE 2.13 RESIDUAL LONG RUN PASSENGER COSTS OF COMPLETE CLOSURE OF ALL AUSTRALIAN NATIONAL PASSENGER SERVICES: WITH AND WITHOUT RETRENCHMENT
($ million per annum)

Year after closure	*No retrenchment: annual LRAC incurred (1)*	*Retrenchment: annual redundancy payout (2)*
First	47.1[a]	11.40
Second	36.9[a]	0.00
Third	26.7[a]	0.0
Fourth	13.3[a]	0.00
Fifth	0.0[a]	0.0
Total cost	124.00[a]	11.40

a. Interstate and intrastate LRAC total excluding $2.8 million of depreciation and interest.

LRAC Long run avoidable costs.

Note The figure for the first year in column 2 is calculated as the number of workers affected (950) times $12 000 per worker. The pay-out figure under a regime of compulsory redundancy might be different from the cost per worker used in column 2. The figures for the first, third and fifth years following closure in column 1 are AN's estimated savings of long run avoidable costs. The figures for the second and fourth year were estimated by the BTCE.

Source BTCE estimates based on data from Australian National.

with compulsory redundancy, but the costs to it of retrenchment are not likely to be less than the average of $12 000 per redundant worker currently incurred under a voluntary redundancy regime.

Table 2.13 compares the costs of closing all Australian National's passenger services without retrenching the passenger segment workers with the costs that would apply if on closure Australian National did retrench them. Table 2.13 suggests that if Australian National's passenger services were to be closed, then the lower financial cost strategy, as shown in column 2, would be one where Australian National retrenches the workers employed in its passenger business segment in the first year of closuré.

Revenue lost and the revenue supplement forgone
Table 2.12 shows revenue forgone per annum as $30.63 million and the revenue supplement forgone as $31.2 million. The figure for the revenue supplement was obtained from Australian National's annual report for the 1988–89 financial year and was based on fully distributed costs. If long run avoidable costs are used the revenue supplement of $57.08 million can be obtained by adding these costs in tables 2.2 and 2.4. The amount forgone is $26.45 million per annum. It is obtained by subtracting the revenue in these tables. The net loss to Australian National as a result of closing all these services would be $1.04 million per annum.

OTHER RAILWAY SYSTEMS

Closure of each of Australia National's interstate passenger services would have financial implications for other railway systems in Australia. The financial impacts on these systems would involve costs avoided and revenues forgone.

Costs incurred and revenue earned from the operation of intersystem passenger services are currently apportioned on a track-kilometre basis, as shown in table 2.14.

TABLE 2.14 RAILWAY SYSTEM SHARE OF COSTS AND REVENUE ASSOCIATED WITH AUSTRALIAN NATIONAL PASSENGERS, 1989
(per cent)

Service	*V/Line*	*SRA*	*AN*	*Westrail*	*Total*
Indian Pacific	..	28.4	55.0	16.6	100.0
Trans Australian	..	..	75.4	24.6	100.0
Overland	59.7	..	40.3	..	100.0

.. Not applicable.

Source AN (1985, p. 12).

TABLE 2.15 LONG RUN FINANCIAL IMPACTS OF CLOSURE ON OTHER SYSTEMS
($ million per annum)

Service	*V/Line*	*SRA*	*Westrail*
Indian Pacific			
Costs avoided	..	14.7	8.6
Revenue forgone	..	6.2	3.6
Deficit saved	..	8.5	5.0
Trans Australian			
Costs avoided	..	..	2.8
Revenue forgone	..	..	2.1
Deficit saved	..	..	0.7
Overland			
Costs avoided	13.2	..	..
Revenue forgone	7.1	..	..
Deficit saved	6.1	..	..

.. Not applicable.

Note Costs avoided are based on fully distributed costs.

Source BTCE estimates based on data from Australian National.

Table 2.15 shows the estimated financial impacts on other railway systems. In estimating these impacts, it is assumed that the relevant shared costs are the fully distributed costs. In all cases the estimated system contribution to the fully distributed costs exceeds the revenue forgone. Thus the closure scenario would lead to savings in the deficits that the systems would have had to underwrite.

There would be other impacts, too, among them the following:

- impact on the labour forces of the relevant railway systems — closure of some of Australian National's passenger services might mean some labour force reductions;
- to the extent that Australian National's passenger services contribute to mobility in the relevant States, there might be a need to commit financial resources to provide substitute rail services in those States.

These other financial impacts are difficult to estimate because the requisite data are not readily available.

OTHER MODES OF TRANSPORT

If Australian National's passenger services were closed the impact on other modes would depend on the number of passengers that would shift from rail to those modes. Table 2.16 summarises the assumed pattern in the shift of Australian National's passengers to air, bus and car travel. The study assumed

TABLE 2.16 AUSTRALIAN NATIONAL'S PASSENGERS LIKELY TO SHIFT TO OTHER MODES

Service	*Air*	*Bus*	*Car*	*Total*
Indian Pacific (Sydney–Perth)				
Peak	7 876	6 486	..	..
Off-peak	9 650	9 426	..	..
Total	17 526	15 912	10 318	43 756
Trans Australian (Adelaide–Perth)				
Peak	4 728	5 952	..	..
Off-peak	5 068	8 182	..	..
Total	9 796	14 134	6 144	30 074
Ghan (Adelaide–Alice Springs)				
Peak	4 207	4 829	..	..
Off-peak	7 921	7 939	..	..
Total	12 128	12 768	4 676	29 572
Overland (Adelaide–Melbourne)				
Peak	19 863	53 260	..	..
Off-peak	25 320	63 188	..	..
Total	45 183	116 448	9 768	171 399
Blue Lake (Adelaide–Mount Gambier)				
Peak	..	14 642	..	..
Off-peak	..	19 660	..	..
Total	..	34 302	..	34 302
Iron Triangle (Adelaide–Whyalla)				
Peak	..	10 853	..	..
Off-peak	..	13 465	..	..
Total	..	24 318	..	24 318
Silver City (Adelaide–Broken Hill)				
Peak	..	7 449	..	..
Off-peak	..	9 380	..	..
Total	..	16 829	..	16 829

.. Not applicable.

Source BTCE estimates based on data from Australian National.

that all Australian National's motorail travellers — that is, those rail passengers who took their cars with them on their rail trips — would shift to car travel. It also assumed that all the passengers who travelled in first or economy class sleepers in 1988–89 would shift to air travel. Similarly, all Australian National's coach class, that is, 'sit up' class, would change to bus travel.

Table 2.16 also shows a split between peak and off-peak travel. This split is based on data supplied by Australian National, which suggest a peak period of

141 days and an off-peak period of 224 days. The peak period figures are the total numbers of Australian National's passengers who travelled during the peak period in 1988–89; the off-peak figures are similarly defined. In 1988–89 the majority of passengers travelled during the off-peak period.

In the study no attempt was made to split car travellers into peak and off-peak, because the numbers of car travellers were relatively small and the occupancy rate for cars does not vary over the year. The information about peak and off-peak travel was more important for the other modes of transport. Assuming that the peak period for Australian National coincides with the peak periods for the bus and air transport industries, one would require additional bus and aircraft capacity in order to meet the increased demand for travel that would be created if Australian National passenger services were closed. The following analyses were carried out:

- *A core analysis, which assumes that there would be excess capacity in the bus and air transport industries all year round.* Australian National's passengers would then be transferred to the bus and air sectors without there being a need for major additional capital expenditure. The principal assumption in this analysis is that the demand for travel by passengers shifting from Australian National would be uniformly distributed throughout the year. This is equivalent to assuming that an equal number of former Australian National patrons desire to travel each day of the year.

- *A first sensitivity analysis, which assumes that during the peak period there would not be any excess capacity in the bus and air transport industries.* Thus for 141 days of peak period travel one would require additional buses and aircraft. In the 224 days of off-peak travel the existing fleet of buses and aircraft would be adequate to transport the passengers shifting from rail. Implicit in this sensitivity analysis is the assumption that as passengers shift from Australian National to the other modes, their demand for travel by other modes is not uniformly distributed throughout the year. Thus more people would travel per day in the peak period than during the off-peak period.

- *A second sensitivity analysis, which assumes that there is no excess capacity all year round and so in order to transport Australian National's passengers additional capital would be required.* It is also assumed that the demand for travel by passengers shifting from Australian National would be uniformly distributed throughout the year. This is equivalent to assuming that an equal number of former Australian National patrons desire to travel each day of the year.

The bus transport sector

Financially, the closure of Australian National's passenger services is likely to affect the bus companies themselves and employees in those companies.

TABLE 2.17 FINANCIAL OUTCOME FOR THE BUS INDUSTRY UNDER THE THREE ANALYSES

($ million per annum)

Closure	*Revenue impacts (1)*	*Added cost year-round excess capacity (2)*	*Added cost off-peak excess capacity (3)*	*Added cost year-round no excess capacity (4)*
Ghan	1.7	0.0	0.3	0.8
Indian Pacific	4.3	0.0	1.4	3.2
Trans Australian	2.3	0.0	0.9	2.1
Overland	6.9	1.3	2.6	3.5
Blue Lake	1.2	1.1[a]	1.1[a]	1.1[a]
Silver City	0.6	0.0	0.6	1.3[b]
Iron Triangle	0.6	0.0	0.5	1.0
All intrastate	2.4	1.1	2.2	3.4
All AN passenger	17.6	2.4	7.4	13.0

a. Because one bus cannot carry all the additional passengers, the *Blue Lake* service requires two additional buses under the three analyses. The second bus has an occupancy rate of only 35 per cent under the excess capacity analysis.
b. Of the three intrastate services, the one to Broken Hill has the highest number of bus-kilometres.

Source BTCE estimates based on data from Australian National.

The bus companies

Tables 2.17 summarises the impact of the closure of Australian National passenger services on the bus industry in Australia. The bus revenue impacts are approximated by the product of the number of rail passengers likely to transfer to bus travel and the bus fare on the relevant route. The estimates of financial costs are based on appendix I. The major costs are capital costs and operating costs. Capital costs increase where it is necessary to acquire additional buses. Additional buses then lead to increased operating costs. Table 2.17 shows that under the three analyses the bus industry stands to gain financially if Australian National's passenger services are closed.

Higher financial gains exist in the core analysis, where year-round excess capacity in the bus industry means that bus companies can adjust to the closure of Australian National's services by increasing load factors on their existing fleets. The bus cost impacts under the year-round excess capacity analysis are given

in column 2 of table 2.17. Under this analysis the existing fleet of buses is adequate to transport those Australian National's travellers likely to shift to bus travel. Thus, apart from the *Overland* and *Blue Lake* services, no additional buses are required. Consequently, bus costs rise only for those two services.

The net financial impact for the off-peak excess capacity analysis is given by the difference between column 1 and column 3 in table 2.17.

Column 4 in table 2.17 gives the additional costs that would be incurred by bus companies under the analysis where year round there is no excess capacity in the bus industry. The revenue impacts do not change. Taking differences between columns 4 and 1 shows that even under this analysis on most routes, bus companies' revenues would increase by more than their increase in costs. The exceptions are the intrastate routes — Adelaide to Broken Hill and Adelaide to Whyalla — where the additional costs would exceed the additional revenue accruing to the bus companies.

The following conclusions can be drawn from table 2.17:

- Even when one explicitly recognises the differences in the demand for travel between the peak and off-peak periods, closure of Australian National's interstate passenger services would increase the interstate bus companies' costs by less than it would increase their revenues.
- Closure of the *Blue Lake* would lead to a net financial gain of about $0.1 million per annum, irrespective of what one assumed about the availability of seats in the peak and off-peak travel periods.
- The bus service replacing the *Silver City* would break even, if there is excess capacity. If there is no excess capacity all year round the replacement bus service would incur a deficit of about $0.7 million per annum.
- The replacement bus service for the *Iron Triangle* would generate a financial surplus under the assumption of off-peak excess capacity. A financial loss of about $0.4 million per annum would be made under the no excess capacity all year round analysis.
- Bus companies transporting passengers transferring from Australian National's intrastate rail services would therefore break even, if they had a period during the year with excess capacity in the industry.
- The added cost to the bus companies (shown in table 2.17) ranges from $2.4 million to $13.0 million per annum. The total revenue outcome is $17.6 million. The bus companies would therefore make a financial surplus of between $14.6 and $15.2 million per annum.

Bus employees

The most likely outcome is that the road sector responds to the closure of Australian National's passenger services by acquiring new buses to cater for the rise in peak period demand for travel and by increasing load factors on its existing bus fleets during the off-peak period. If the current fleet of buses is used to capacity and the bus sector responds to closure of Australian National's passenger services by acquiring more buses, a total of 24 new buses would be

required, which implies the creation of about 48 new jobs. The scenarios where single services are closed have much smaller labour force impacts.

Air transport industry

The impact of closing Australian National passenger services on the airline industry would depend on two principal factors:

- The routes serviced by Australian National and whether air transport is a feasible alternative on these routes. Air transport is assumed not to be a feasible alternative on the intrastate corridors.
- The aircraft load factors on Australian National's corridors. Table 2.18 shows that the supply of airline capacity exceeds the demand by Australian National passengers shifting to air travel on most of the corridors relevant to this study.

The figures in table 2.18 are based on annual averages, but during the peak period capacity on the existing fleet might not be adequate to cater for Australian National's passengers shifting to air. Even if adequate capacity were available, it might be available at times that are inconvenient for some Australian National passengers.

The core analysis assumed that there is excess capacity all year round. Under this analysis the air transport industry responds to the closure of Australian National's passenger services by increasing aircraft load factors along Australian National's corridors, as shown in table 2.19.

Higher load factors are associated with higher aircraft operating costs in the BTCE Aerocost model (BTCE 1990a). The additional operating costs under the

TABLE 2.18 SEATS AVAILABLE AND SEATS REQUIRED ON FLIGHTS ALONG CORRIDORS SERVICED BY AUSTRALIAN NATIONAL, 1989

Corridor	*Seats available*	*Seats required*
Sydney–Perth	124 424	17 526
Adelaide–Perth	109 007	9 796
Adelaide–Alice Springs	71 665	12 128
Adelaide–Melbourne	341 420	45 183

Note 'Seats available' refers to the excess capacity on each route; 'seats required' refers to the number of Australian National passengers likely to shift to air.

Source DOTAC (1990).

TABLE 2.19 1988–89 AIR LOAD FACTORS COMPARED WITH AIR LOAD FACTORS IF AUSTRALIAN NATIONAL IS CLOSED

(per cent)

Route	*Load factors in 1988–89*	*Load factors if AN is closed*
Adelaide–Alice Springs	85.5	91.3
Adelaide–Melbourne	78.5	82.8
Adelaide–Perth	82.1	85.2
Perth–Sydney	82.3	87.2

Source DOTAC (1990) and BTCE estimates.

TABLE 2.20 FINANCIAL IMPACTS ON THE AIR TRANSPORT SECTOR UNDER THE THREE ANALYSES

($ million per annum)

Closure	*Revenue impacts (1)*	*Added cost year-round excess capacity (2)*	*Added cost off-peak excess capacity (3)*	*Added cost year-round no excess capacity (4)*
Ghan	6.5	..	..	..
Capital cost	..	0.00	0.19	0.55
Operating cost	..	0.02	0.35	0.97
Indian Pacific	17.9	..	..	..
Capital cost	..	0.00	0.70	1.56
Operating cost	..	0.08	1.55	2.44
Trans Australian	7.0	..	..	..
Capital cost	..	0.00	0.32	0.67
Operating cost	..	0.05	0.56	1.10
Overland	15.8	..	..	..
Capital cost	..	0.00	0.30	0.69
Operating cost	..	0.05	1.25	2.77
All AN interstate	47.2	..	..	..
Capital cost	..	0.00	1.51	3.47
Operating cost	..	0.20	3.71	7.28

.. Not applicable.

Note The revenue impact is equal to the economy air fare times the number of Australian National passengers shifting to air.

Source BTCE estimates derived from BTCE (1990a).

year-round excess capacity analysis are shown in column 2 of table 2.20. For that column it is assumed there is excess capacity on all the corridors of interest and so capital expenditure is zero. For columns 3 and 4, annualised capital costs are given since additional aircraft capacity is required. The figures in column 3 of table 2.20 correspond to the sensitivity analysis in which it is assumed that during the peak period there would be no excess capacity. The capital costs are zero in the off-peak period in this analysis since it is assumed that there is excess capacity during that time. Thus the annualised capital costs in column 3 of table 2.20 are all associated with peak period air travel. Operating costs in column 3 of the table are the off-peak and peak costs. The off-peak period accounts for less than 5 per cent of total operating costs.

Column 4 in table 2.20 shows the capital and operating costs under the sensitivity analysis in which all year round there is no excess capacity on the existing fleet of aircraft. These costs are computed using BTCE information (BTCE 1990a), under the assumption that the additional aircraft would be operated at approximately the same load factors as were observed along Australian National's corridors in the base year, 1988–89.

In the three analyses the additional revenue accruing to the air transport sector would exceed the costs that would be borne by the industry as a result of the closure of Australian National's passenger services.

GOVERNMENTS

The closure of Australian National's passenger services would have a number of consequences for governments, both Commonwealth and State.

Revenue impacts: Commonwealth government

Commonwealth revenue will decline as a result of the loss of the excise and customs duties on fuel and materials currently payable by Australian National.

Commonwealth revenue would increase as a result of increases in the fleet of road vehicles, which in turn leads to increases in customs and sales taxes on new buses and parts imported into Australia and in excise and customs duties on fuel and increases in sales tax on tyres and other parts.

Revenue impacts: State governments

In terms of the revenue impacts on State governments, closure of Australian National's passenger services will affect four States: South Australia, New South Wales, Western Australia and Victoria. The revenue impacts will include increases in State general receipts through additional charges and taxes levied on the bus sector. These are stamp duty and State fuel franchise fees.

TABLE 2.21 THE IMPACTS ON GOVERNMENTS OF THE CLOSURE OF ALL AUSTRALIAN NATIONAL PASSENGER SERVICES, ASSUMING EXCESS CAPACITY ONLY IN THE OFF-PEAK PERIOD
($ million per annum)

Impact	*Commonwealth*	*South Australia*	*NSW*	*Western Australia*	*Victoria*
AN taxes	–2.15	..	..	..	..
Customs and sales tax	0.40	..	..	..	..
Fuel excise etc.[a]	1.20	..	..	..	..
Fuel franchise etc.[b]	..	0.93	0.02	0.03	0.01
Deficit funding avoided	4.90	..	8.50	5.00	6.10
CSO supplement saved	31.20	..	..	..	..
Net impact	35.55	0.93	8.52	5.03	6.11

a. Increase in road tax revenue less rail tax revenue lost.
b. Increase in road tax revenue.
.. Not applicable.

Source BTCE estimates based on data from Australian National.

Expenditure consequences

The major expenditure consequence for both the Commonwealth government and the four State governments would be the reduction to zero of the subsidy needed to cover all Australian National passenger services. The Commonwealth would have an initial reduction in subsidy funding in the first year of closure. As noted in relation to the costing of Australian National's passenger and travel agency operations, some of the costs currently attributed to passenger services would take about five years to reduce to zero, while all the infrastructure costs charged to Australian National passenger services in 1988–89 would pass on to its freight arm on closure of the passenger services. These residual costs would exist only under the assumption of no retrenchment of surplus labour.

Table 2.21 summarises the overall impacts on Commonwealth and State governments for the analyses where there is excess capacity in the off-peak period but additional vehicles are required in the peak period.

AUSTRALIAN NATIONAL'S PATRONS

All the closure scenarios involve a shift from a slower mode, rail, to faster modes, bus and air. While this would normally be considered an improvement, it is not considered a major benefit for Australian National's patrons because the majority

are on holidays when they travel with Australian National. The time savings thus made by shifting from rail to other modes do not translate into a financial benefit.

In many cases the shift from rail to other modes implies a shift to slightly more expensive modes. The increase in cost is often very small and would be insignificant if, upon the closure of Australian National's passenger services, concession travel were introduced on the remaining modes.

The change from rail to bus travel involves a marked loss of comfort.

THE NET FINANCIAL IMPACT

Table 2.22 summarises the net financial impact on the major participants of the total closure of Australian National's passenger services.

TABLE 2.22 THE NET FINANCIAL IMPACT ON THE MAJOR PARTICIPANTS OF THE TOTAL CLOSURE OF AUSTRALIAN NATIONAL'S PASSENGER SERVICES
($ million)

Participant	*Net gain or loss*
Australian National	–1.04
Other rail systems	20.30
Bus industry	10.20
Airline industry	41.98
Governments	56.14
Total net impact	127.58

Source BTCE estimates.

Governments and the airline industry are the major beneficiaries of the closure scenarios. The total net benefit of $127.58 million has been arrived at by taking the most likely financial impact, as given by the results of the analysis that assumes off-peak excess capacity.

CHAPTER 3 THE ECONOMIC ASSESSMENT

This chapter examines the resource implications for society of adopting the closure scenarios. The first section outlines the methodology used. It is followed by the results of the benefit–cost analysis, in which interstate and intrastate passenger services are considered separately. The net impact of total closure, as well as of the closure of each service is presented.

METHODOLOGY

The economic assessment involves a comparison of the benefits and costs resulting from adopting each of the scenarios, as defined. The viewpoint taken in comparing the benefits and costs is their net impact upon society as a whole. Each scenario would release rail resources for other purposes, and resources would not have to be spent in the future on rail passenger services. This cost would be replaced by the cost of providing for the carriage, using other transport modes, of people who would otherwise have used rail.

The assessment of the economic benefits and costs proceeds in two categories: those costs that can be quantified in monetary terms and those that cannot be so quantified.

The environmental effects of shifts to alternative modes of transport are difficult to quantify in monetary terms; they are dealt with separately in chapter 4. The employment impacts can be estimated but not necessarily costed. The economic benefits and costs examined are detailed in table 3.1.

In order to evaluate the closure scenarios an estimate of the excess capacity on alternative transport modes has been made. The sensitivity of the net impact of year-round excess capacity, obtained by the benefit–cost analysis, is then tested with the introduction of the assumption that there is no excess capacity in the other modes. The effect on the results of no excess capacity during the period of peak demand for rail travel is also tested. The analytical results provide for an evaluation of the possible impacts of rail closures.

Rail cost savings

Each of the changes to rail services results in a release of resources from the rail passenger sector of the economy. The capital, labour resources and materials

TABLE 3.1 ECONOMIC BENEFITS AND COSTS ASSESSED FOR THE CLOSURE SCENARIOS

Benefits	*Costs*
Release of rail capital: rolling stock, plant and equipment, buildings, land	Capital requirements for other modes: additional buses, additional aeroplanes
Saving of long run avoidable costs on rail passenger services	Road vehicle operating costs: labour, fuel, tyres, maintenance and repairs, insurance, administration
	Road maintenance
Rail accidents avoided	Road accidents incurred
	Air accidents incurred
	Accommodation costs

can be made available in the long run for other purposes. Some of the capital in the form of locomotives and machinery can be used elsewhere in the railway industry. Other capital resources that can only be used for the provision of passenger travel could be diverted to other passenger services throughout the country or exported. Capital that is approaching the end of its useful life, as is the case with the railcars used by Australian National for its intrastate services, has only scrap value. Because passenger services use railway lines that primarily carry freight, the capital invested in the provision of track would not be affected. Resources are valued using the concept of opportunity cost.

Termination of services results in a major saving of the operating costs of those services. Immediate savings would be incurred in the case of fuel, maintenance of locomotives and carriages and associated resources used in support of those services. Labour would be saved in the long run as workers were redeployed to other areas, both rail and non-rail, or retired.

It is noted in chapter 2 that under closure without retrenchments of labour, Australian National would achieve a saving in long run avoidable cost over five years. The discounted sum at 8 per cent per annum of long run avoidable cost over five years is included as a benefit in the calculation of benefits and costs.

Other rail-related impacts

The termination of rail passenger services would result in the avoidance of accidents associated with those services. This saving must be compared with the cost of increased accidents in alternative modes of transport.

It is assumed that the transfer of passengers to road would bring about additional accidents. There have been only a few minor accidents associated with domestic

non-commuter air services over the last twenty years. Therefore in this report the increase in the cost of accidents varies with the number of rail passengers diverted to road.

The saving in terms of train fatalities avoided has been calculated by using an estimate of 0.042 fatalities per million passenger-kilometres for the *Iron Triangle* service and zero for the other services. This is because the only fatalities on Australian National services in the last five years occurred on the *Iron Triangle* service, in February 1988, when a train driver and passenger were killed as a result of a collision with a semi-trailer. A figure of 0.042 injuries per million passenger-kilometres has been used. (The fact that the two figures are the same is coincidental.) Both figures were derived from accident data provided by Australian National (pers. comm. 1990). The cost of a fatality is assumed to be $500 000 and of an injury $14 367 (BTCE 1988b).

The total cost of fatalities associated with travel by bus has been calculated by assuming that all non-sleeper passengers would transfer to buses if Australian National's rail services were not available. BTCE (1990b) estimates of 0.03 fatalities and 0.3 injuries per 100 million passenger-kilometres have been used. Passenger-kilometres by bus have been used to obtain a total cost estimate of accidents resulting from rail passengers transferring to buses.

The cost of road accidents has been calculated by assuming that train passengers using the motorail service would transfer to road and use their own motor vehicles. BTCE (1990b) estimates of 1.01 fatalities and 10.1 injuries per 100 million passenger-kilometres were used in the calculations. The cost of property damage only accidents is also based on a BTCE estimate.

Road sector impacts

The road sector will be affected by potential rail passengers, faced with the closure of rail services, transferring to road as an alternative means of travel. The new costs will result from an increased demand in bus bookings and the use of private cars. The former may require additional investment in buses. There may also be an increase in operating costs to provide for these additional passengers.

The road sector impacts are estimated under three analyses. The core analysis assumes that there is excess capacity on the bus services already available on all of the routes being examined. The number of buses required for the excess capacity analysis is calculated by estimating the difference between the number of vacant seats currently available on the routes affected and the number of potentially displaced rail travellers. These residual passengers are then allocated to buses with an average seating capacity of forty-four. From estimates generated by BTE (1985), it is assumed that the average load factor for long distance buses is 77 per cent. This leaves approximately ten spare seats. Displaced rail travellers transferring to buses comprise seated train passengers and all railcar passengers. The number of additional buses is shown in appendix table I.2. The first sensitivity analysis assumes that, while there may be excess

analysis assumes that, while there may be excess capacity in the off-peak period, there is no excess capacity during the peak period. The second sensitivity analysis assumes that there is no excess capacity all year round.

The number of buses required for the no excess capacity analysis depends upon the number of bus passengers, the bus load factor, the number of days the bus journey takes according to the published timetables, the number of days in the period considered, and the capacity of a bus.

The need for additional buses of a specific capacity has been discussed. This specific bus capacity has been chosen for the analysis because all of the services are long distance. The annualised capital cost of a new bus is estimated to be $67 681, which includes both interest payments and repayments of the principal on new long distance coaches. The current cost of a Mercedes-Benz coach is $270 000–337 000: a price of $302 500 was assumed.

Once the number of additional buses is known the additional operating cost can be calculated. The operating cost of additional buses has been calculated using the World Bank (1988) model. It is estimated that the bus operating cost is $1.40 per bus-kilometre. The road maintenance cost has been calculated by multiplying new bus-kilometres by the figure for road track cost for buses estimated by the Inter-State Commission (1990). This is 6.1 cents per bus-kilometre.

Air transport impacts

Department of Transport and Communications (DOTAC 1990) estimates suggest that the passenger capacity currently available on comparable airline routes is sufficient to meet demand from displaced rail travellers. There would be no need to invest in more aircraft. This is taken as one assumption; another analysis is done on the assumption that additional aircraft would be required to transport the extra passengers. The additional cost of aircraft and extra passengers is calculated using the BTCE Aerocost model (1990a). This provides operating and capital costs for aircraft currently in use by airlines in Australia. These costs are estimated per hour, and displaced rail passengers travelling by air are costed by using passenger numbers and hours of flight time required. It is assumed that there would be no demand from motorail travellers for local commuter flights.

Accommodation costs

Those rail passengers transferring to air or car travel are faced with the cost of additional accommodation and meals at the end of and possibly during their journey. The cost of meals is included in the train fare. It is assumed that they would pay for motel accommodation and meals equivalent to those provided on-board train.

This is a reasonable assumption if it is also assumed that many east–west passengers regard their rail journey as part of their holiday and do not reduce the duration of their holiday if they transfer to car or air. These calculations have

been applied to car and air travellers. The cost for air travellers is obtained by multiplying the number of nights for sleeper passengers of on-train sleeper accommodation by $140 per head per night, which is an average figure for capital city meals and lodging. A non-urban figure of $80 is used for motorists.

Congestion costs

It is unlikely that there would be measurable congestion costs resulting from changes to rail services. There may be some impact from increased bus traffic passing through local communities. This cost is probably not significant, and there may be the added benefit of increased services demanded in local communities by bus operators and passengers.

Labour market impacts

Closure of Australian National's passenger services may result in the redeployment or redundancy of rail workers providing those services. Australian National (pers. comm. 1990) has provided an estimate of the impact of the closure of the passenger service on employment by location. These locations are Kalgoorlie, Alice Springs, Port Augusta, Port Pirie, Adelaide, Murray Bridge and Mount Gambier. This effect has not been quantified as an economic impact but is discussed in chapter 4.

Other economic impacts

Other impacts include the effect on Australia's import bill if the modal shift necessitated the importation of road vehicles or aircraft as well as fuel. There may also be an offsetting effect because closure of Australian National's passenger services may lead to a reduction in the importation of railway locomotives, rolling stock and rail motors, or parts associated with their construction.

Impacts on isolated communities

If both the *Indian Pacific* and the *Trans Australian* services were closed, people living and working along or in the vicinity of the trans-Australia railway line between Port Augusta and Kalgoorlie would be deprived of the quality of travel provided by those services. The only other service is the *Tea and Sugar* train, which operates weekly. This region is a considerable distance from the national highway. The scenarios used in the analysis rule out the introduction of a new rail passenger service. The impact on these communities has been calculated by assuming that there would be three bus services provided each week to each of these communities, connecting them to Port Augusta and Kalgoorlie as well as interconnecting them. This involves considerable distances, particularly if each community is to be connected to the other, since the connecting roads are circuitous. Hence, it has been assumed that there would be four buses operating, each over a distance equal to that between Port Augusta and Kalgoorlie. The

costs are then worked out in the same way as for the other additional bus services on the interstate and intrastate corridors.

THE BENEFIT–COST RESULTS

The benefit–cost results show the annual economic impact of closing each of the Australian National passenger services. The net impact is shown in tables 3.2 to 3.8. If the costs exceed the benefits then the net impact is shown as a negative figure. The results for closure of the interstate services are presented first, followed by those for the intrastate services. Similarly, the results for the no excess capacity analysis follow those for excess capacity.

Closure of individual interstate services with excess capacity available

Tables 3.2 and 3.3 show the economic impact of the closure of individual services and of the full closure of Australian National's interstate passenger services. Table 3.2 is based on the assumption that there is excess capacity throughout the year in the non-rail transport modes. Table 3.3 takes into account peak and off-peak periods and assumes that there is no excess capacity in the peak period.

Tables 3.2 and 3.3 show that the benefits from closure of the *Indian Pacific, Trans Australian* and *Ghan* services exceed the costs for both the excess capacity all year round and the excess capacity off-peak only analyses. The major category of benefit is that of the long run costs avoided. Total benefits per annum are $20.4 million for the *Indian Pacific*, $10.1 million for the *Trans Australian*, and $7.3 million for the *Ghan*. The greatest costs generated by closure result from the transfer of the cost of accommodation from on-board train: these are $5.3 million, $1.8 million and $1.1 million per annum for the *Indian Pacific*, the *Trans Australian* and the *Ghan* respectively. The reason that the costs of alternative transport by air and bus are low in both tables 3.2 and 3.3 is that excess capacity for air and bus services absorbs rail passengers. The other large cost is the operating cost of private motor cars. The total costs of closure are $8.9 million, $3.2 million and $1.6 million for the three respective services for year-round excess capacity, shown in table 3.2. When it is assumed that there is off-peak excess capacity, these costs are $12.1 million, $5.0 million and $2.5 million respectively. Net benefits per annum are $11.4 million, $6.9 million and $5.6 million respectively for year-round excess capacity and $8.2 million, $5.1 million and $4.8 respectively for excess capacity off-peak.

In table 3.2 the net impact from closure of the *Overland* shows benefits exceeding costs under the year-round excess capacity analysis. As with the other services the major category of benefit is the saving on long run avoidable costs. The greatest cost generated by closure is the additional accommodation cost of $2.9 million resulting from the transfer of passengers from travel by train. The total costs per annum are $4.9 million in table 3.2 (excess capacity year round) and $7.7 million (excess capacity off-peak only) in table 3.3.

Closure of the *Overland* is also associated with the need for additional bus services in both cases because there is insufficient excess capacity on the Adelaide–Melbourne route. Apart from the capital cost of extra buses, there are

TABLE 3.2 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S INTERSTATE PASSENGER SERVICES: EXCESS CAPACITY ON NON-RAIL MODES

($'000 per annum)

Economic impact	Indian Pacific	Trans Australian	Ghan	Overland	*Total closure*
Benefit					
Rail					
Accidents	114.2	48.2	27.7	80.4	270.5
LRAC	20 052.8	9 880.2	7 173.3	4 993.1	42 099.4
Asset sales	187.0	187.7	62.3	132.4	569.4
Other assets					67.7
Total benefit	20 354.0	10 116.1	7 263.3	5 205.9	43 007.0
Cost					
Bus					
Accidents	13.1	7.3	3.7	16.3	40.4
PDO	6.6	3.6	1.9	8.1	20.2
Capital[a]	0.0	0.0	0.0	203.0	203.0
Operating cost[a]	0.0	0.0	0.0	1 113.0	1 113.0
Road maintenance[a]	0.0	0.0	0.0	48.5	48.5
Air					
Operating cost	82.6	50.9	20.4	55.0	208.9
Car					
Accidents	286.9	106.8	46.5	46.1	486.3
PDO	4.3	1.6	0.7	0.7	7.3
Operating cost	3 178.1	1 183.3	514.4	510.6	5 386.4
Road maintenance	1.1	0.4	0.2	0.2	1.9
Accommodation					
Air	3 680.5	1 371.4	849.0	2 485.1	8 386.0
Car	1 650.9	491.5	187.0	390.7	2 720.1
Isolated communities[b]					1 909.9
Total cost	8 904.1	3 216.8	1 623.8	4 877.3	20 531.9
Net benefit	11 449.9	6 899.3	5 639.5	328.6	22 475.1

a. Only the *Overland* service needs additional buses to provide for displaced passengers.
b. The economic impact applies only in the case of total closure.
LRAC Long run avoidable costs.
PDO Property damage only.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timetables.

the additional operating costs and the road maintenance costs of these buses. There is a net benefit of $0.3 million per annum if the *Overland* is closed under the year-round excess capacity analysis. There is a net cost of $2.5 million if the *Overland* is closed under the off-peak excess capacity analysis.

TABLE 3.3 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S INTERSTATE PASSENGER SERVICES: EXCESS CAPACITY OFF-PEAK ON NON-RAIL MODES

($'000 per annum)

Economic impact	Indian Pacific	Trans Australian	Ghan	Overland	*Total closure*
Benefit					
Total benefit	20 354.0	10 116.1	7 263.3	5 205.9	43 007.0
Cost					
Bus					
Accidents	13.1	7.3	3.7	16.3	40.4
PDO	6.6	3.6	1.9	8.1	20.2
Capital[a]	270.7	203.0	67.7	676.8	1 218.2
Operating cost[a]	1 148.9	720.1	274.2	1 888.5	4 031.7
Road maintenance[a]	50.1	31.4	11.9	82.3	175.7
Car					
Accidents	286.9	106.8	46.5	46.1	486.3
PDO	4.3	1.6	0.7	0.7	7.3
Operating cost	3 178.1	1 183.3	514.4	510.6	5 386.4
Road maintenance	1.1	0.4	0.2	0.2	1.9
Air					
Capital	699.8	322.3	191.2	303.6	1 516.9
Operating cost					
peak	1 094.7	530.5	338.0	1 218.8	3 182.0
off-peak	50.7	31.3	12.5	33.7	128.2
Accommodation					
Air	3 680.5	1 371.4	849.0	2 485.1	8 385.9
Car	1 650.9	491.5	187.0	390.7	2 720.1
Isolated communities[b]					1 909.9
Total cost	12 136.4	5 004.5	2 498.9	7 661.5	29 211.1
Net benefit	8 217.6	5 111.6	4 764.4	–2 455.6	13 795.9

a. Only the *Overland* service needs additional buses to provide for displaced passengers.
b. The economic impact applies only in the case of total closure.
PDO Property damage only.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timetables.

Closure of individual intrastate services with excess capacity available

Tables 3.4 and 3.5 show the economic impact of the closure of Australian National's individual services as well as all intrastate services. They are based on the assumptions already discussed.

Tables 3.4 and 3.5 show that the benefits of closing the *Blue Lake* service to Mount Gambier exceed the costs. Benefits come from accident reduction and savings in long run avoidable costs. The main cost items are the need for two additional buses and accident costs. The capital cost of providing these buses is $135 400 on an annualised basis. The operating cost is $996 500 per annum and the road maintenance cost is $43 400. The net benefits in both cases are $0.5 million per annum. This is because the same number of buses are required for peak and off-peak travel.

Tables 3.4 and 3.5 show that the benefits of closing the *Iron Triangle* service exceed the costs. The net benefits per annum are $0.9 million and $0.5 million,

TABLE 3.4 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S INTRASTATE PASSENGER SERVICES: EXCESS CAPACITY ON NON-RAIL MODES

($'000 per annum)

Economic impact	Blue Lake	Iron Triangle	Silver City	*Total closure*
Benefit				
Rail				
Accidents	10.1	203.8	5.7	219.6
LRAC	1 646.4	740.2	1 121.8	3 508.4
Asset sales	27.5	7.0	36.5	71.0
Total benefit	1 684.0	951.0	1 164.0	3 799.0
Cost				
Bus				
Accidents	3.1	1.9	1.7	6.7
PDO	1.5	1.0	0.8	3.3
Capital	135.4	0.0	0.0	135.4
Operating cost	996.5	0.0	0.0	996.5
Road maintenance	43.4	0.0	0.0	43.4
Total cost	1 179.9	2.9	2.5	1 185.3
Net benefit	504.1	948.1	1 161.5	2 613.7

LRAC Long run avoidable costs.
PDO Property damage only.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timetables.

TABLE 3.5 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S INTRASTATE PASSENGER SERVICES: EXCESS CAPACITY OFF-PEAK ON NON-RAIL MODES

($'000 per annum)

Economic impact	Blue Lake	Iron Triangle	Silver City	*Total closure*
Benefit				
Total benefit	1 684.0	951.0	1 164.0	3 799.0
Cost				
Bus				
Accidents	3.1	1.9	1.7	6.7
PDO	1.5	1.0	0.8	3.3
Capital	135.4	135.4	135.4	406.2
Operating cost	996.5	341.3	446.5	1 784.3
Road maintenance	43.4	14.9	19.5	77.8
Total cost	1 179.9	494.5	603.9	2 278.3
Net benefit	504.1	456.5	560.1	1 520.7

PDO Property damage only.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timetables.

for the year-round and off-peak only excess capacity analyses respectively. The net benefit drops in the second analysis because the peak demand requires two additional buses.

Closing the *Silver City* service to Broken Hill also results in the benefits exceeding the costs. The annual net benefits are $1.2 million and $0.6 million under the year-round excess capacity and the off-peak excess capacity analyses respectively.

The closure of all intrastate services with excess capacity available

The benefits of closing all the intrastate services exceed the costs. The major saving is the avoidable cost of the services. Tables 3.4 and 3.5 show that total net benefits per annum from closure of all intrastate services are $2.6 million if there is excess capacity all year round and $1.5 million if excess capacity is available off-peak only.

Total closure of intrastate and interstate services with excess capacity available

The impact of full closure of all passenger services results in benefits exceeding costs. The distribution of benefits is the same as for the individual services. The total saving in long run avoidable costs is $45.6 million per annum. Total benefits

are $46.8 million per annum. These amounts are obtained by adding the totals in tables 3.2 and 3.4.

There is an additional cost associated with isolated communities. The additional cost associated with the closure of both the *Indian Pacific* and the *Trans Australian* services is the need for continued access for the isolated communities located on the railway line between Port Augusta and Kalgoorlie. Many of the members of these communities are Australian National employees. It is understood that their work would continue in providing the Australian National freight service across the Nullarbor. The need to provide an alternative bus service has been included as a cost of full closure.

The benefits of closing all the Australian National services exceed the costs. They include the proceeds from the sale of rolling stock, which amounts to $640 400 as scrap value. The net benefits per annum are obtained by adding the total net benefits in tables 3.2 and 3.4 to give $25.1 million for excess capacity all year round and those in tables 3.3 and 3.5 to give $15.3 million for excess capacity off-peak.

Closure of individual interstate services with no excess capacity available

Table 3.6 shows the impact of closure on the interstate passenger services if it is assumed that the alternative modes of transport do not have excess capacity.

The net impact for closure of the *Indian Pacific,* the *Trans Australian* and the *Ghan* services is one of benefits exceeding costs. The assumption of no excess capacity affects only costs, not benefits. The major changes result from the need for additional buses and aircraft. The annual net benefits are $4.2 million, $3.0 million and $3.3 million for the *Indian Pacific*, the *Trans Australian* and the *Ghan* respectively.

Table 3.6 shows the costs of closure of the *Overland* exceeding the benefits. Apart from the capital cost of extra buses, there is the operating cost of these buses and the road maintenance cost. This, combined with the need for extra aircraft, means that the benefit of $5.2 million is exceeded by the cost of $10.6 million per annum, yielding a net cost of $5.4 million per annum.

Closure of individual intrastate services with no excess capacity available

Table 3.7 shows the economic impact of the closure of Australian National's intrastate services as well as individual intrastate services when it is assumed that there is no excess capacity available to absorb displaced rail travellers.

If there is no excess capacity all year round the benefits of closing the *Blue Lake* service exceed the costs. The costs are related to the need for two additional buses. The additional capital, operating and road maintenance costs are shown in table 3.7. The net benefit is $0.5 million per annum.

TABLE 3.6 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S INTERSTATE PASSENGER SERVICES: NO EXCESS CAPACITY ON NON-RAIL MODES

($'000 per annum)

Economic impact	Indian Pacific	Trans Australian	Ghan	Overland	*Total closure*
Benefit					
Total benefit	20 354.0	10 116.1	7 263.3	5 205.9	43 007.0
Cost					
Bus					
Accidents	13.1	7.3	3.7	16.3	40.4
PDO	6.6	3.6	1.9	8.1	20.2
Capital	270.7	203.0	67.7	541.4	1 082.8
Operating cost	2 974.2	1 916.3	709.8	2 967.9	8 568.2
Road maintenance	129.6	83.5	30.9	129.3	373.3
Accommodation					
Air	3 680.5	1 371.4	849.0	2 485.1	8 386.0
Car	1 650.9	491.5	187.0	390.7	2 720.1
Air					
Capital	1 557.3	667.9	551.2	691.5	3 467.9
Operating cost	2 436.1	1 099.2	974.3	2 772.4	7 282.0
Car					
Accidents	287.0	106.8	46.5	46.1	486.4
PDO	4.3	1.6	0.7	1.0	7.6
Operating cost	3 178.1	1 183.3	514.4	510.6	5 386.4
Road maintenance	1.1	0.4	0.2	0.2	1.9
Isolated communities[a]					1 909.9
Total cost	16 189.5	7 135.8	3 937.3	10 560.6	39 733.1
Net benefit	4 164.5	2 980.3	3 326.0	–5 354.7	3 273.9

a. The economic impact applies only in the case of total closure.
PDO Property damage only.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timetable.

The costs of closing the *Iron Triangle* service exceed the benefits when there is no excess capacity all year round. The two categories of benefits are savings of avoidable costs and accidents. Because it is assumed that there is no excess capacity on the bus service to Whyalla, two additional buses are needed. The net cost is $109 400.

The costs of closing the *Silver City* service exceed the benefits. Two additional buses are required. The net cost is $180 300.

TABLE 3.7 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S INTRASTATE PASSENGER SERVICES: NO EXCESS CAPACITY ON NON-RAIL MODES

($'000 per annum)

Economic impact	Blue Lake	Iron Triangle	Silver City	*Total closure*
Benefit				
Rail				
Accidents	10.1	204.4	5.7	220.2
LRAC	1 646.4	740.2	1 121.8	3 508.4
Asset sales	27.5	7.0	36.5	71.0
Total benefit	1 684.0	951.6	1 164.0	3 799.6
Cost				
Bus				
Accidents	3.1	1.9	1.7	6.7
PDO	1.5	1.0	0.9	3.4
Capital	135.4	135.4	135.4	406.2
Operating cost	996.5	883.6	1 155.9	3 036.0
Road maintenance	43.4	38.5	50.4	132.3
Total cost	1 179.9	1 060.4	1 344.3	3 584.6
Net benefit	504.1	–108.8	–180.3	215.0

LRAC Long run avoidable costs.
PDO Property damage only.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timetables.

The closure of all intrastate services with no excess capacity available

Under the assumption of no excess capacity on alternative modes, the benefits of closing all the intrastate services exceed the costs by $215 000. The major benefit is the saving of the avoidable costs of the rail passenger services. The main cost items relate to the need for additional buses on each route.

Total closure of intrastate and interstate services with no excess capacity available

The net impact of full closure of all passenger services is that benefits exceed costs. The net benefit is $3.5 million per annum.

The additional costs associated with the closure of both the *Indian Pacific* and the *Trans Australian* services is the need for continued access for the isolated communities located on the railway line between Port Augusta and Kalgoorlie.

Closure with fewer people travelling

If it is assumed that a number of people choose to travel no longer as a result of rail closure, the impact on the closure scenarios is to reduce the costs. Any costs associated with passenger numbers, such as the need for additional buses and aircraft, would be reduced. The costs associated with accidents are reduced. Overall, the benefits of closure would increase.

This phenomenon presents a problem in that the benefit–cost methodology does not take account of non-travellers. Not travelling may be a social benefit or a cost, depending on the way in which the individual is affected.

SUMMARY

Table 3.8 summarises the net benefits or costs from the closure of Australian National's passenger services.

The benefits exceed costs in most of the closure scenarios analysed. The exceptions are the *Overland* service and two intrastate services — the *Iron Triangle* and the *Silver City*. This applies in the case of the *Overland* service with no excess capacity peak period and year-round no excess capacity. The

TABLE 3.8 THE ECONOMIC IMPACT OF CLOSURE OF AUSTRALIAN NATIONAL'S PASSENGER SERVICES: SUMMARY

($'000 per annum)

	Net benefit		
Service	*Excess capacity*	*No excess capacity peak period*	*No excess capacity*
Indian Pacific	11 449.9	8 217.6	4 164.5
Trans Australian	6 899.3	5 111.6	2 980.3
Ghan	5 639.5	4 764.4	3 326.0
Overland	328.6	–2 455.6	–5 354.7
Blue Lake	504.1	504.1	504.1
Iron Triangle	948.1	456.5	–108.8
Silver City	1 161.5	560.1	–180.3
All passenger services[a]	25 086.3	15 316.5	3 487.7

a. The net benefit includes benefits that are obtained only if there is full closure of all the passenger services. It also includes the cost of services to isolated communities.

Sources AN (1989a), AN (pers. comm. 1990), BTE (1985), ABS (1989), BTCE (1988a), Australian Airlines and bus company timitables.

explanation for this lies with the large air and bus operating costs required to provide a substitute service. The provision of additional air transport is especially costly with large passenger numbers over a relatively short distance.

Costs exceed benefits for the *Iron Triangle* and the *Silver City* services with no excess capacity. A relatively small long run avoidable cost, compared with bus operating costs, explains this.

Where there is excess capacity in the other modes to cater for displaced rail passengers there is a considerable reduction in the costs of closure. This is shown by comparing the first net benefit figure of $25.1 million with the third figure of $3.5 million, which assumes no excess capacity.

The sale of rolling stock and equipment is also important. Thus, while the costs associated with closure are great, the magnitude of benefits is driven by long run avoidable cost.

The two sensitivity analyses tested whether the introduction of no excess capacity at the period of peak demand for Australian National's passenger services and for the whole year would alter the benefit–cost results. The results obtained reflect the added cost of providing new transport capacity. Even with no excess capacity, many Australian National passenger services still benefit from closure. The results shown in table 3.8 suggest that the actual impact of the full closure of Australian National's passenger services lies somewhere between $25.1 million and $3.5 million.

CHAPTER 4 THE SOCIAL AND ENVIRONMENTAL IMPACTS

This chapter examines the social and environmental impacts resulting from the closure scenarios. The first section deals with the social impacts and the second with the environmental impacts.

THE SOCIAL IMPACTS

A number of impacts of a social nature would result from closure of the Australian National passenger services: one of these is the impact on communities; another is that on employees.

The closure of Australian National passenger services would have two particular effects on the communities along the routes of travel:

- The volume of bus and air traffic would increase slightly and would lead to an increase in noise and air pollution. However, the increase in the number of buses and aircraft is not likely to be large, so these impacts are likely to be small, even in peak periods of travel.
- Another important factor is the effect that the closure of the trans-Australia services would have on isolated communities. If a suitable bus service were provided, travel times would be considerably longer than those associated with rail travel because there are no comparable direct road links.

A considerable number of rail workers would probably become redundant if the closure scenarios were implemented. This would have an effect upon the smaller communities where these workers are concentrated — Broken Hill, Port Pirie, Port Augusta and Kalgoorlie. The impact would not be as apparent in Adelaide because it is a major city. These impacts are shown in table 4.1.

The largest number of redundancies would occur in Adelaide. Outside Adelaide, the community most affected would be Port Augusta, where 126 workers would become redundant.

The impact of unemployment on individual communities may require the introduction of additional services to assist the unemployed and their families. If these people move away from their communities, some public and private sector services may no longer be provided to those communities. Many of these services depend upon community size for their viability. There can be a flow-on

TABLE 4.1 THE IMPACT ON EMPLOYMENT OF CLOSURE OF AUSTRALIAN NATIONAL'S PASSENGER SERVICES

Location	*Number of redundancies*
Adelaide	684
Port Pirie	104
Port Augusta	126
Kalgoorlie	4
Alice Springs	19
Mount Gambier	1
Murray Bridge	12
Total	950

Source AN (pers. comm. 1990), BTCE (1990b).

effect to the rest of the community, as has been documented in local government studies by the Victorian Department of Agriculture and Rural Affairs (DAR 1988). Apart from Port Augusta, however, these effects are likely to be quantitatively insignificant.

The closure of Australian National's passenger services would also affect the towns at which the passenger trains currently stop, particularly if the stop lasts some time. The effect, which is initially an economic one, could be estimated if the expenditure of train passengers on local services were known. For example, the operators of coach tours that meet the trans-Australia services would no longer benefit from train stops. The loss of this revenue would have a flow-on effect in the community. Again, though, the impacts are likely to be small in absolute terms.

THE ENVIRONMENTAL IMPACTS

The environmental impacts of rail closures can be estimated by comparing the pollution caused by the various modes of transport involved in the closure scenarios. Because the passenger services traverse mainly rural areas it is assumed that noise pollution is not a problem. The number of additional buses passing through country towns daily would increase. However, compared with normal through traffic the proportion would be small. There would be less than one additional aircraft a day from capital city airports.

The effects of closure vary according to the results of the excess capacity and the no excess capacity analyses. There would be a decrease in pollution with excess capacity and an increase with no excess capacity. Joules are used as the measure of energy output, and grams of carbon dioxide are used as a comparative measure for pollution. Carbon dioxide is also a greenhouse gas.

TABLE 4.2 ENERGY REQUIRED, BY MODE, FOR THE AUSTRALIAN NATIONAL CLOSURE SCENARIOS: EXCESS CAPACITY ON NON-RAIL MODES
(terajoules per annum)

Service	*Rail*	*Bus*	*Car*	*Air*	*Air-conditioning*
Indian Pacific	141.3	0.0	89.8	0.1	2.5
Trans Australian	70.4	0.0	33.4	0.1	0.8
Ghan	52.2	0.0	14.5	0.1	0.5
Overland	34.4	9.9	14.4	0.1	1.3
Nullarbor	0.0	14.0	0.0	0.0	0.0
Blue Lake	5.3	4.3	0.0	0.0	0.0
Iron Triangle	1.9	0.0	0.0	0.0	0.0
Silver City	3.4	0.0	0.0	0.0	0.0
Total	308.9	28.2	152.1	0.4	5.1
Total rail	308.9				
Total other modes and air-conditioning	185.8				
Net impact	–123.1				

Note The entries under 'rail' refer to energy no longer required under the closure scenarios.

Source ABARE (1989).

TABLE 4.3 ENERGY REQUIRED, BY MODE, FOR THE AUSTRALIAN NATIONAL CLOSURE SCENARIOS: EXCESS CAPACITY OFF-PEAK ON NON-RAIL MODES
(terajoules per annum)

Service	*Rail*	*Bus*	*Car*	*Air*	*Air-conditioning*
Indian Pacific	141.3	10.2	89.8	37.1	2.5
Trans Australian	70.4	6.4	33.2	15.1	0.8
Ghan	52.2	2.4	14.5	8.6	0.5
Overland	34.4	16.8	14.4	54.9	1.2
Nullarbor	0.0	14.0	0.0	0.0	0.0
Blue Lake	5.3	8.9	0.0	0.0	0.0
Iron Triangle	1.9	3.0	0.0	0.0	0.0
Silver City	3.4	4.0	0.0	0.0	0.0
Total	308.9	65.7	151.9	115.7	5.0
Total rail	308.9				
Total other modes and air-conditiioning	338.3				
Net impact	+29.4				

Note The entries under 'rail' refer to energy no longer required under the closure scenarios.

Source ABARE (1989).

TABLE 4.4 ENERGY REQUIRED, BY MODE, FOR THE AUSTRALIAN NATIONAL CLOSURE SCENARIOS: NO EXCESS CAPACITY ON NON-RAIL MODES
(terajoules per annum)

Service	*Rail*	*Bus*	*Car*	*Air*	*Air-conditioning*
Indian Pacific	141.3	26.5	89.8	78.9	2.5
Trans Australian	70.4	17.1	33.4	29.6	0.8
Ghan	52.2	6.3	14.5	24.0	0.5
Overland	34.4	26.4	14.4	77.0	1.3
Nullarbor	0.0	14.0	0.0	0.0	0.0
Blue Lake	5.3	8.9	0.0	0.0	0.0
Iron Triangle	1.9	7.9	0.0	0.0	0.0
Silver City	3.4	10.3	0.0	0.0	0.0
Total	308.9	117.4	152.1	209.5	5.1
Total rail	308.9				
Total other modes and air-conditioning	484.1				
Net impact	+175.2				

Note The entries under 'rail' refer to energy no longer required under the closure scenarios.

Sources ABARE (1989).

TABLE 4.5 GREENHOUSE EFFECT, BY MODE, FOR THE AUSTRALIAN NATIONAL CLOSURE SCENARIOS: EXCESS CAPACITY ON NON-RAIL MODES
(kilotonnes CO_2 per annum)

Service	*Rail*	*Bus*	*Car*	*Air*	*Air-conditioning*
Indian Pacific	10.4	0.0	6.4	0.0	0.2
Trans Australian	5.2	0.0	2.4	0.0	0.1
Ghan	3.9	0.0	1.0	0.0	0.1
Overland	2.5	0.7	1.0	0.0	0.5
Nullarbor	0.0	1.0	0.0	0.0	0.0
Blue Lake	0.4	0.3	0.0	0.0	0.0
Iron Triangle	0.1	0.0	0.0	0.0	0.0
Silver City	0.3	0.0	0.0	0.0	0.0
Total	22.8	2.0	10.8	0.0	0.9
Total rail	22.8				
Total other modes and air-conditioning	13.7				
Net impact	–9.1				

Note The entries under 'rail' refer to kilotonnes of CO_2 per annum no longer emitted.

Source BTCE (1990b).

Because the no excess capacity analysis requires new vehicles to be substituted for rail passenger transport, the net impact differs from the excess capacity analysis, for which there is a smaller number of additional vehicles. This difference has been measured by estimating the volume of additional fuel used in each mode. This volume can be converted into joules and then into grams of carbon dioxide. The conversion tables (ABARE 1989, BTCE 1990c) take account of the differences in output between the various modes of transport. It should also be noted that improvements in fuel efficiency by rail may affect the future net impact. The ABARE tables, however, do not allow for the comparison of specific vehicles.

Tables 4.2 and 4.3 provide estimates of the energy required, by mode, for the excess capacity analyses.

Table 4.2 shows that under the assumption of excess capacity on other modes there would be a net saving of 123.2 terajoules of energy required, resulting from the total closure of Australian National's passenger services. This amount is arrived at by using the ABARE (1989) estimates of joules per litre of fuel consumed by mode of transport. Table 4.3 shows that, under the assumption of off-peak excess capacity, the increase of energy required was 29.4 terajoules.

Table 4.4 provides an estimate of energy required by mode for the year-round no excess capacity analysis.

The net impact of no excess capacity would be an increase of 175.2 terajoules in the energy requirements. This is brought about by the additional buses and aircraft needed for this scenario.

Tables 4.5 and 4.6 compare the carbon dioxide emissions of the four transport modes under the excess capacity analysis.

The net impact upon the release of carbon dioxide of the closure of the Australian National passenger services with the excess capacity analysis would be a decrease of 9.1 kilotonnes. Under the assumption of off-peak excess capacity, closure of the services would result in an increase of 1.7 kilotonnes. In the latter case, this is the result of the introduction of additional buses and aircraft to accommodate peak demand.

Table 4.7 shows the carbon dioxide emissions for the no excess capacity analysis of the closure scenarios.

The net impact of the no excess capacity scenario is an increase of 12.2 kilotonnes per annum in the emission of carbon dioxide. In 1987–88, 67 million tonnes of carbon dioxide were emitted by domestic transport in Australia. The total amount estimated as having been emitted by the Australian National passenger services in 1988–89 was 22 800 tonnes, or about 0.034 per cent of total emissions in 1987–88. Year-round excess capacity would reduce the emissions to 0.020 per cent; off-peak excess capacity would increase them to 0.036 per cent of total emissions. No excess capacity would increase emissions to 0.052 per cent of total national emissions.

TABLE 4.6 GREENHOUSE EFFECT, BY MODE, FOR THE AUSTRALIAN NATIONAL CLOSURE SCENARIOS: EXCESS CAPACITY OFF-PEAK ON NON-RAIL MODES

(kilotonnes CO_2 per annum)

Service	*Rail*	*Bus*	*Car*	*Air*	*Air-conditioning*
Indian Pacific	10.4	0.7	6.4	2.6	0.2
Trans Australian	5.2	0.5	2.4	1.0	0.1
Ghan	3.9	0.2	1.0	0.6	0.1
Overland	2.5	1.2	1.1	3.8	0.5
Nullarbor	0.0	1.0	0.0	0.0	0.0
Blue Lake	0.4	0.6	0.0	0.0	0.0
Iron Triangle	0.1	0.2	0.0	0.0	0.0
Silver City	0.3	0.3	0.0	0.0	0.0
Total	22.8	4.7	10.9	8.0	0.9
Total rail	22.8				
Total other modes and air-conditioning	24.5				
Net impact	+1.7				

Note The entries under 'rail' refer to kilotonnes of CO_2 per annum no longer emitted.

Source BTCE (1990b).

TABLE 4.7 GREENHOUSE EFFECT, BY, MODE FOR THE AUSTRALIAN NATIONAL CLOSURE SCENARIOS: NO EXCESS CAPACITY ON NON-RAIL MODES

(kilotonnes CO_2 per annum)

Service	*Rail*	*Bus*	*Car*	*Air*	*Air-conditioning*
Indian Pacific	10.4	1.9	6.4	5.6	0.2
Trans Australian	5.2	1.2	2.4	2.1	0.1
Ghan	3.9	0.5	1.0	1.7	0.1
Overland	2.5	1.9	1.0	5.4	0.5
Nullarbor	0.0	1.0	0.0	0.0	0.0
Blue Lake	0.4	0.6	0.0	0.0	0.0
Iron Triangle	0.1	0.6	0.0	0.0	0.0
Silver City	0.3	0.8	0.0	0.0	0.0
Total	22.8	8.5	10.8	14.8	0.9
Total rail	22.8				
Total other modes and air-conditioning	35.0				
Net impact	+12.2				

Note The entries under 'rail' refer to kilotonnes of CO_2 per annum no longer emitted.

Source BTCE (1990b).

The emission of greenhouse gases is a global problem and is therefore important in the scenario results. The results indicate that only the closure scenario that assumes excess capacity throughout the year produces a reduction in carbon dioxide emission. Excess capacity off-peak results in a slight increase and no excess capacity results in a considerable increase in carbon dioxide emission.

SUMMARY

This chapter examines those impacts of the closure of the Australian National passenger services that are difficult to value in terms of benefit–cost analysis. The impact of redundancy is a cost, as is its impact on local communities. It is unlikely that these costs would offset the net benefits derived from the analysis. With excess capacity on non-rail modes, there is a benefit in reduced pollution. However, with no excess capacity either peak or all year round, pollution is a cost. This is because the aircraft and buses required for these scenarios add considerably to emissions.

CHAPTER 5 CONCLUDING REMARKS

All the continued operations scenarios for Australian National's intrastate passenger services suggested that by 1993–94 the shortfall of revenue on long run avoidable costs would be almost double the 1988–89 shortfall. This result takes into account the reduction in maintenance costs, the increase in interest payments, and the growth in patronage that are likely to be associated with Australian National's acquisition of new railcars for its intrastate passenger services.

The continued operations scenarios for the interstate services suggested that some cost savings can be achieved by 1993–94. These savings would be sufficient to lead to cost recovery levels in 1993–94, on a long run avoidable cost basis, of 95 per cent for the *Ghan*, 56 per cent for the *Indian Pacific*, 72 per cent for the *Trans Australian* and 66 per cent for the *Overland*. These figures are equivalent to an average cost recovery on a long run avoidable cost basis of 68 per cent on Australian National's interstate passenger services.

In chapter 3 the benefit–cost analysis was used to estimate the net economic impacts of the closure of Australian National's passenger services. The results for total closure invariably suggested that the economic benefits exceeded the costs of closure. Closure of individual interstate passenger services is likely to generate net economic benefits on all corridors except Adelaide–Melbourne, irrespective of what one assumes about the availability of capacity on the non-rail modes of transport. Closing the *Overland* is likely to lead to a net economic cost if it is assumed that there is no excess capacity on the substitute non-rail modes during the peak period.

If there is excess capacity on the non-rail modes on the intrastate passenger corridors, closure of those services, individually or in total, would generate net economic benefits. Net economic benefits are associated with closure of the *Blue Lake* even when there is no excess capacity on the non-rail substitute modes. In the case of the *Silver City* and the *Iron Triangle*, if there is no excess capacity on the existing fleet of buses during the peak period closure would generate net economic costs.

The social impacts of closure of Australian National's passenger services include impacts on railway employees and local communities. Closure of the passenger services would affect about 950 workers.

The impact on the environment is favourable if one assumes that there is year-round excess capacity on the substitute non-rail modes. If there is no excess capacity on the substitute modes closure of Australian National's services would lead to a net increase in pollution.

APPENDIX I THE BASIS FOR ESTIMATING THE IMPACTS ON THE BUS INDUSTRY

On closure of Australian National's passenger services alternative modes would be required to transport the passengers that would have used those services. The purpose of this appendix is to estimate the impact of the closure of Australian National's passenger services on the bus industry in Australia.

DAILY BUS SERVICES ON AUSTRALIAN NATIONAL'S CORRIDORS

Table I.1 shows the extent of competition from the bus industry on the corridors where Australian National provides rail passenger services. Each one of the interstate corridors that Australian National services has at least six two-way bus services. Similarly, each one of the intrastate corridors has at least two two-way bus services.

Buses required

Industry sources indicate that on the interstate and intrastate corridors the bus load factors range from 60 to 80 per cent. Estimates were made for this report under core and sensitivity analyses, each with a corresponding set of assumptions about the capacity of the bus industry to cope with the increase in the demand for bus travel resulting from closure of Australian National's passenger services.

The core analysis assumed that there would be excess capacity in the bus transport industry all year round. Australian National's passengers would then be transferred to bus without requiring major additional capital expenditure. The major assumption made in this analysis is that the demand for travel by passengers shifting from Australian National would be uniformly distributed throughout the year.

The first sensitivity analysis assumed that during the peak period there would not be any spare capacity in the buses serving the corridors. Thus for 141 days of peak period travel additional buses would be required. In the 224 days of off-peak travel the existing fleet of buses would be adequate to transport the passengers shifting from rail. Implicit in this sensitivity analysis is the assumption that the demand for travel by passengers shifting from Australian National is not uniform

TABLE I.1 BUS COMPETITION ON THE CORRIDORS SERVICED BY AUSTRALIAN NATIONAL, MAY 1990[a]

Corridor	*Deluxe*	*Pioneer*	*Stateliner*	*Greyhound*	*Bus Australia*	*Mount Gambier*	*Trans-City*	*Firefly*	*Total*
Perth–Adelaide	3	1	0	1	1	0	0	0	6
Adelaide–Perth	3	1	0	1	1	0	0	0	6
Adelaide–Alice Springs	1	1	1	2	1	0	0	0	6
Alice Springs–Adelaide	1	1	1	2	1	0	0	0	6
Adelaide–Melbourne	3	2	0	3	1	0	1	1	11
Melbourne–Adelaide	3	2	0	3	1	0	1	1	11
Sydney–Adelaide	4	4	0	3	1	0	1	1	14
Adelaide–Sydney	4	4	0	3	1	0	1	0	13
Adelaide–Whyalla	0	0	6	1	0	0	0	0	7
Whyalla–Adelaide	0	0	6	1	0	0	0	0	7
Adelaide–Mount Gambier	1	0	0	0	0	1	0	0	2
Mount Gambier–Adelaide	1	0	0	0	0	1	0	0	2
Adelaide–Broken Hill	0	1	2	1	0	0	0	0	4
Broken Hill–Adelaide	0	1	2	1	0	0	0	0	4

a. One-way daily bus services provided.

Source Information provided by bus companies.

TABLE I.2 THE NUMBER OF ADDITIONAL BUSES REQUIRED UNDER THE THREE ANALYSES

Rail service closures	*Excess capacity year-round*	*No excess capacity peak period*	*No excess capacity year-round*
Ghan	0.0	1.0	1.0
Indian Pacific	0.0	4.0	4.0
Trans Australian	0.0	3.0	3.0
Overland	3.0	10.0	8.0
Blue Lake	2.0[a]	2.0[a]	2.0[a]
Silver City	0.0	2.0	2.0[b]
Iron Triangle	0.0	2.0	2.0
All intrastate	2.0	6.0	6.0
All AN passenger	5.0	24.0	22.0

a. Because of indivisibility, the *Blue Lake* service requires the same number of additional buses under the three analyses.
b. Of the three intrastate services, the bus replacement service to Broken Hill involves the highest number of bus-kilometres.

Sources AN (1989a, pers. comm. 1990), BTE (1985), BTCE (1988a), Australian Airlines and bus company timetables.

throughout the year. Thus more people would travel per day of the peak period than during the off-peak period.

The second sensitivity analysis assumed that there is no excess capacity all year round and so in order to transport Australian National's passengers additional capital expenditure would be necessary.

Table I.2 shows the number of buses that would be required under the three analyses.

In the cases where there is excess capacity and the bus companies absorb those Australian National travellers changing to bus travel by increasing load factors on the existing fleet of buses, the analysis:

- determines the extent of the existing excess capacity in terms of available empty seats in the bus industry along the relevant corridor;
- compares the estimated excess capacity with the number of passengers likely to shift from Australian National on closure;
- if the available capacity in the bus industry is inadequate to meet the additional demand from Australian National passengers shifting to bus travel, the number of additional buses is estimated by taking the number by which Australian National travellers exceed the available empty seats on a corridor, dividing it by 224 (the number of days in the off-peak period) to find the average daily number of travellers, then dividing by the capacity of the bus, and adjusting for the distance a bus can reasonably travel in a given day relative to the travel distance on the corridor.

TABLE I.3 SPECIFICATION OF BUSES USED TO SUBSTITUTE FOR AUSTRALIAN NATIONAL'S PASSENGER SERVICES

Attribute	*Specification*
Engine type	Diesel
Type	Mercedes-Benz
Capacity	44
Age at purchase	0
Purchase price (including tax)	$270 000–337 000
Annualised cost	$67 7000
Resale value	25 per cent
Life of vehicle	5 years
Average speed	90 km/h

Source BTCE estimates.

Generally, in cases where additional buses are required irrespective of time of travel, the number of additional buses is assumed to depend upon the following factors:

- the number of Australian National's passengers changing to bus travel;
- the capacity of the bus, assumed to be 44 seats;
- the occupancy rates for buses;
- the travel time along the bus route;
- the distance travelled per day, which is dependent on the speed of travel.

Bus costs

Table I.3 gives the specifications of the vehicle that is assumed to substitute for Australian National's passenger services.

APPENDIX II AIRCRAFT OPERATIONS: COSTS

Estimation of the costs associated with Australian National's passengers transferring to air travel involved seven steps.

First, the number of Australian National passengers transferring to air travel was estimated by assuming that all the displaced first class and economy class sleeper passengers who did not use the motorail service transferred to the air mode.

Second, it was assumed that use would be made of Boeing 737–400 aircraft or, in the case of the Adelaide–Melbourne journey, the McDonnell Douglas Airbus A300–B4. These aircraft were chosen because of their capacity and range.

Third, the average aircraft load factors along Australian National's routes were ascertained; these load factors were used to estimate the number of seats available during the off-peak period. For all Australian National's off-peak interstate passengers there were enough air seats.

Fourth, the number of Australian National passengers travelling during the off-peak period was transferred to the existing fleet of aircraft. This had the impact of increasing load factors for the routes in question. The BTCE Aerocost model (BTCE 1990a) was then used to calculate the additional costs associated with the increase in load factors as a result of the closure of Australian National's passenger services.

Fifth, for those Australian National passengers transferring to air travel during the peak period, it was assumed that there was no excess capacity in the air transport industry. Additional aircraft had to be supplied to transport these peak period travellers.

Sixth, the capital and operating costs of providing peak period air transport were estimated using the Aerocost model. The hours of flight were calculated by using the published flying times for those services corresponding to the Australian National rail passenger services. The aircraft type, the load factors for the various routes in 1988–89, the base year, and the corresponding distances were used in the Aerocost model to generate the cost estimates for a single trip on each of the routes. The Aerocost model provides operating and capital costs per hour of operation: these costs were calculated for routes comparable to each of the

TABLE II.1 A BREAKDOWN OF THE CAPITAL AND OPERATING COSTS FOR THE BOEING 737–400 AND THE McDONNELL DOUGLAS AIRBUS A300–B4

	Boeing 737–400		*Airbus A300–B4*	
Cost category	*$/km*	*$/h*	*$/km*	*$/h*
Capital	4.22	2 318.0	3.78	2 464.0
Fuel	1.02	558.0	2.75	1 674.0
Maintenance	1.82	1 000.0	2.61	1 700.0
Crew costs	1.04	570.0	1.56	1 020.0
Government charges	2.30	1 263.0	4.77	3 111.0
Other	2.16	1 187.0	3.24	2 115.0
Total	12.56	6 896.0	18.71	12 084.0

Source BTCE (1990a).

interstate rail passenger services. Table II.1 gives the costs for the Boeing 737–400 and the McDonnell Douglas Airbus A300–B4 with 70 per cent load factors.

Finally, the number of aircraft trips was estimated by dividing the number of aircraft passengers by the number of seats on the particular aircraft and correcting for the load factor. That is to say:

$$\text{Aircraft trips} = \text{AP/CAPC} \times \text{LF}$$

where AP is the number of aircraft passengers, CAPC is the seating capacity of the particular aircraft and LF is the load factor of that aircraft.

The capital cost is calculated as:

$$\text{Capital cost} = \text{CAP} \times \text{HRS} \times \text{TRPS}$$

where CAP is the capital cost per hour, HRS is the number of hours for one trip and TRPS is the number of trips.

The operating cost is calculated as:

$$\text{Operating cost} = \text{HRS} \times \text{OPC} \times \text{TRPS}$$

where HRS is the number of hours for a trip, OPC is the operating cost per hour, and TRPS is the number of trips.

REFERENCES

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ABS	Australian Bureau of Statistics
AN	Australian National Railways Commission
ARRDO	Australian Railway Research and Development Organisation
BRB	British Railways Board
BTE	Bureau of Transport Economics
BTCE	Bureau of Transport and Communications Economics
DAR	Department of Agriculture and Rural Affairs
DOTAC	Department of Transport and Communications

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ABBREVIATIONS

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
AN	Australian National Railways Commission
ARRDO	Australian Railway Research and Development Organisation
BRB	British Railways Board
BTE	Bureau of Transport Economics
BTCE	Bureau of Transport and Communications Economics
CSO	community service obligation
DAR	Department of Agriculture and Rural Affairs
DMU	diesel multiple unit
DOTAC	Department of Transport and Communications
GTK	gross tonne-kilometre
LRAC	long run avoidable costs
PDO	property damage only
SRA	State Rail Authority of New South Wales
V/Line	State Transport Authority of Victoria (now Public Transport Corporation)
WR	Westrail