

Demand for NSW Intrastate Air Travel

Information Paper

This Paper presents a demand analysis of New South Wales regional and commuter intrastate air services. The main objective of this study was to provide forecasts of patronage to the year 2000 for New South Wales regional and commuter intrastate air services. The results may assist in understanding the demand for intrastate aviation services and help in the evaluation of policy options.

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Information Paper 17

Demand for NSW Intrastate Air Travel



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ISSN 0158-104X

ISBN 0 644 04782 8

Printed in Australia by Union Offset Co. Pty Ltd, Canberra

FOREWORD

This Information Paper contains an analysis of the demand for New South Wales regional and commuter air travel and traffic forecasts. The Paper was prepared in response to an invitation from the Chairman of the Review Committee of New South Wales Air Services, Mr J. G. Riley, and has been formally submitted to that Review.

Research for the Paper was undertaken by Mr M. Streeting of the Financial Assessment Branch, assisted by Mr L. Walker of the Financial Assessment Branch and Mr S. Taylor and Mr M. Flynn of the Economic Assessment Branch. Dr M. Saad of the Economic Assessment Branch supervised the project team.

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Bureau of Transport Economics
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March 1986

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SUMMARY

The main findings of the study are:

Recent trends 1976-77 to 1983-84

- . For the period 1976-77 to 1983-84 total New South Wales intrastate revenue passengers on regional airlines fell by an average annual rate of 3 per cent.
- . Over the same period total New South Wales intrastate revenue passengers on commuter airlines grew at an average annual rate of 9 per cent.
- . Following rationalisation of commuter operations in New South Wales in recent years, the commuter market is now characterised by a small number of operators providing the majority of services.

Elasticities or responses

The estimated elasticities of demand for regional air services indicate that:

- . Patronage on short-haul (less than 400 km) and long-haul (greater than 400 km) routes are sensitive to real air fare changes.
- . On short-haul routes there is relatively greater competition from other modes of transport.
- . Demand on Air New South Wales (ANSW) routes is relatively more sensitive to air fare changes in comparison to East-West Airlines (EWA) routes, possibly indicating that passenger characteristics are different for the two operators.
- . The business travel component would appear to be more important on those routes to larger regional centres than on routes to smaller country towns.
- . Demand for travel to the North Coast area is very responsive to population growth in the region.

For commuter air services, the estimated elasticities reveal that:

- . Patronage on short-haul (less than 200 km) routes is relatively more sensitive to changes in real income and real air fares than patronage on long-haul (greater than 200 km) routes.
- . There is greater potential for competition from alternative transport modes on short-haul routes.

Forecasts

- . A recovery in 1985 is predicted for New South Wales intrastate patronage on regional and commuter air services.
- . Growth in patronage is expected to taper off towards the end of the century, reflecting lower population and real income growth.
- . Overall long term growth in New South Wales intrastate passenger numbers (regional and commuter) is expected to be between 1 and 3 per cent per annum.
- . After 1985, intrastate commuter air services are expected to achieve relatively higher rates of growth than intrastate regional air services under the high growth scenario.

CHAPTER 1 INTRODUCTION

OBJECTIVES OF THE STUDY

This Paper presents a demand analysis of New South Wales regional and commuter intrastate air services. It is part of a larger project being undertaken by the Federal Bureau of Transport Economics (BTE) which will include studies of demand for other air services in Australia. The main objective of this study was to provide forecasts of patronage to the year 2000 for New South Wales regional and commuter intrastate air services.

Flowing from the demand analysis, responses of patronage to changes in various factors such as real income, real air fare and population are estimated. These responses or elasticities are reported according to distance and airline groupings. In addition, individual regional routes were grouped into four sub-markets on the basis of homogeneity with respect to factors such as population and geographical areas. The results may assist in understanding the demand for intrastate aviation services and help in the evaluation of policy options.

OUTLINE OF THE PAPER

Chapter 2 of the Paper reviews trends in the New South Wales regional and commuter air travel market between 1976-77 and 1983-84. A description of the factors that affect demand for air travel is given in Chapter 3 while Chapter 4 provides a summary of the empirical analysis. This is followed by a presentation of forecasts to the year 2000 for regional and commuter air services in Chapter 5.

CHAPTER 2 RECENT TRENDS

This chapter describes the market characteristics of New South Wales intrastate regional and commuter air services.¹

REGIONAL AIR SERVICES

The following section reviews the regional air travel market, including patronage and fares.

Current pattern of services

New South Wales is served by two regional airlines:

- . Air New South Wales (ANSW); and
- . East-West Airlines (EWA).

ANSW is an operating division of Ansett Transport Industries. EWA had a broad spread of shareholders until 1982 when it was acquired by East-West Developments. It was subsequently sold to the commuter airline Skywest and now operates as a Skywest subsidiary.

The two regional airlines generally operate over routes between Sydney and most of the larger regional centres. Table 2.1 indicates the frequency of service and the aircraft type on the routes currently served by these carriers. Scheduled services are conducted under full airline licences.

There is no longer any direct competition between ANSW and EWA on any of the intrastate services and they are not currently subject to any direct competition from commuter operators. The most recent example of competition between a regional and commuter operator was the introduction of the Cudal-Sydney service by Hazelton Airlines in 1979.

1. For the purposes of this Paper intrastate services exclude the Sydney-Canberra and Sydney-Norfolk Island regional routes and the commuter services operated by Norfolk Island Airlines to Lord Howe Island.

This resulted in the sharing of existing traffic rather than the generation of new traffic.

Trends in patronage

Trends in the patronage of intrastate and interstate services operated

TABLE 2.1 NEW SOUTH WALES REGIONAL AIRLINES: INTRASTATE SERVICES, 1 JULY 1985

Airline and route	Aircraft type	Frequency	
		from Sydney (weekly)	to Sydney (weekly)
ANSW			
Sydney-Broken Hill	F27/F28	4	4
Sydney-Casino	F27	21	16
Sydney-Coffs Harbour	F27	18	28
Sydney-Cooma	F27/F28	8	9
Sydney-Coonabarabran ^a	F27	3	3
Sydney-Coonamble ^a	F27	3	3
Sydney-Dubbo	F27/F28	18	18
Sydney-Griffith	F27	10	10
Sydney-Merimbula	F27	9	9
Sydney-Moree	F27	8	8
Sydney-Mudgee ^a	F27	1	1
Sydney-Narrabri ^a	F27	8	8
Sydney-Narrandera ^a	F27	10	10
Sydney-Wagga Wagga	F27	19	19
Sydney-Walgett ^a	F27	3	3
EWA			
Sydney-Albury	F27/F28	22	21
Sydney-Armidale	F27	24	20
Sydney-Glen Innes	F27	7	7
Sydney-Grafton	F27	12	12
Sydney-Inverell	F27	7	7
Sydney-Kempsey	F27	12	12
Sydney-Port Macquarie	F27	19	19
Sydney-Tamworth	F27/F28	31	26
Sydney-Taree	F27	19	19

a. These routes are not included in the empirical analysis in Chapter 4.

Source East-West Airlines and Ansett Airlines timetables 1985.

by the two New South Wales regional airlines have varied considerably between 1976-77 and 1983-84. Table 2.2 illustrates trends in total network patronage over this period.² Total patronage on all services provided by ANSW and EWA increased to 1 008 900 in 1983-84, representing a 19.7 per cent increase on the 1982-83 level. The growth of the two regional airlines reflects the introduction of new routes, particularly interstate services, and renewed growth in the air transport sector generally. The growth in 1983-84 followed four years of decline where total patronage had decreased from 930 900 in 1978-79 to 843 100 in 1982-83.

Trends in each airline's total network patronage have varied significantly. EWA patronage has grown markedly over the last two years to 630 400 passengers in 1983-84. This growth in total EWA patronage is largely a result of the introduction of the Sydney-Melbourne and Sydney-Canberra routes in March and June 1983 respectively. In addition, strong growth was achieved on the Sydney-Brisbane/Coolangatta routes and on routes to Tasmania. ANSW patronage has not grown as strongly as EWA but ANSW recovered from a low of 360 900 passengers in 1982-83 to 378 500 passengers in 1983-84.

The network of intrastate services provided by ANSW has remained relatively constant between 1976-77 and 1983-84. However, EWA has discontinued a number of intrastate services which are now provided by commuter operators.³ Table 2.3 shows trends in the patronage of EWA and ANSW on New South Wales intrastate routes between 1976-77 and 1983-84. Total revenue passengers (that is, passengers paying any fare) declined from a peak of 851 800 in 1978-79 to 617 300 in 1983-84. EWA recorded the larger rate of decline, with an average decrease of 4.4 per cent per annum compared to a 1.8 per cent decrease per annum for ANSW.

Table 2.4 presents trends in intrastate total passenger-kilometres for the two regional airlines between 1976-77 and 1983-84. Over this period, ANSW passenger-kilometres have declined at an average annual rate of 1.5 per cent, while EWA passenger-kilometres have declined at an average annual rate of 5.2 per cent. The average stage length per

2. Total network patronage includes all intrastate and interstate services.

3. In 1982-83 East-West withdrew from the following routes: Sydney-Orange, Sydney-Bathurst, Sydney-Cowra, Sydney-Forbes and Sydney-Parkes. These routes are now operated by East Coast Airlines and Hazelton Airlines.

9 TABLE 2.2 NEW SOUTH WALES REGIONAL AIRLINES: TOTAL NETWORK REVENUE PASSENGERS^a BY AIRLINE, 1976-77 TO 1983-84

Year	Airline					
	ANSW		EWA		Total	
	Number of revenue passengers ('000)	Annual change (per cent)	Number of revenue passengers ('000)	Annual change (per cent)	Number of revenue passengers ('000)	Annual change (per cent)
1976-77	376.3	..	435.7	..	812.0	..
1977-78	395.1	5.0	493.0	13.2	888.1	9.4
1978-79	425.7	7.7	505.1	2.5	930.9	4.8
1979-80	443.5	4.2	476.3	-5.7	919.9	-1.2
1980-81	420.5	-5.2	457.3	-4.0	877.8	-4.6
1981-82	412.6	-1.9	441.0	-3.6	853.6	-2.8
1982-83	360.9	-12.5	482.1	9.3	843.1	-1.2
1983-84	378.5	4.9	630.4	30.8	1 008.9	19.7
Average annual growth rate (per cent)		0.1		5.4		3.2

a. Passengers paying any fare.

.. Not applicable.

Note Prior to 1 July 1982 EWA reported only those passengers paying 25 per cent or more of the standard fare. Statistics are now supplied in accordance with the standard definition.

Source DofA (1985a).

TABLE 2.3 NEW SOUTH WALES REGIONAL AIRLINES: INTRASTATE REVENUE PASSENGERS^a BY AIRLINE, 1976-77 TO 1983-84

Year	Airline						Total	
	ANSW			EWA				
	Number of revenue passengers ('000)	Annual change (per cent)	Market share (per cent)	Number of revenue passengers ('000)	Annual change (per cent)	Market share (per cent)	Number of revenue passengers ('000)	Annual change (per cent)
1976-77	376.3	..	49.0	392.4	..	51.0	768.7	..
1977-78	395.1	5.0	48.0	428.8	9.3	52.0	823.9	7.2
1978-79	425.6	7.7	50.0	426.2	-0.6	50.0	851.8	3.4
1979-80	434.1	2.0	51.6	406.7	-4.6	48.4	840.7	-1.3
1980-81	405.3	-6.6	51.9	376.2	-7.5	48.1	781.5	-7.0
1981-82	392.2	-3.2	54.8	323.6	-14.0	45.2	715.8	-8.4
1982-83	339.7	-13.4	56.2	265.1	-18.1	43.8	604.8	-15.5
1983-84	331.5	-2.4	53.7	285.9	7.8	46.3	617.3	2.1
Average annual growth rate (per cent)		-1.8			-4.4			-3.1

a. Passengers paying any fare.

.. Not applicable.

Note Prior to 1 July 1982 EWA reported only those passengers paying 25 per cent or more of the standard fare. Statistics are now supplied in accordance with the standard definition.

Source BTE estimates.

TABLE 2.4 NEW SOUTH WALES REGIONAL AIRLINES: INTRASTATE REVENUE PASSENGER-KILOMETRES, 1976-77 TO 1983-84

Year	Airline						Total	
	ANSW			EWA				
	Total revenue	Annual	Proportion	Total revenue	Annual	Proportion	Total revenue	Annual
	passenger- kilometres ('000)	change (per cent)	of total (per cent)	passenger- kilometres ('000)	change (per cent)	of total (per cent)	passenger- kilometres ('000)	change (per cent)
1976-77	166 798.8	..	51.0	160 555.0	..	49.0	327 353.8	..
1977-78	171 073.5	2.6	53.3	149 929.0	-6.6	46.7	321 002.5	-1.9
1978-79	183 439.2	7.2	55.0	150 330.6	0.3	45.0	333 769.8	4.0
1979-80	189 096.8	3.1	56.8	143 657.5	-4.4	43.2	332 754.3	-0.3
1980-81	179 103.4	-5.3	56.7	136 539.9	-5.0	43.3	315 643.3	-5.1
1981-82	172 943.4	-3.4	58.8	121 296.8	-11.2	41.2	294 240.2	-6.8
1982-83	152 830.1	-11.6	56.4	117 991.9	-2.7	43.6	270 822.0	-8.0
1983-84	149 562.1	-2.1	57.6	110 241.8	-6.6	42.4	259 803.9	-4.1
Average annual growth rate (per cent)		-1.5			-5.2			-3.2

.. Not applicable.

Source BTE estimates.

passenger for ANSW and EWA in 1983-84 was 452 and 386 kilometres respectively.

Regional fares

Regional airline fares are set according to formulae administered by the Independent Air Fares Committee (IAFC). Prior to the formation of the IAFC in 1982, fare determination was the responsibility of the Federal Department of Transport.⁴

Figure I.1 shows that changes in regional fares have closely followed changes in trunk airline fares over the period 1977 to 1984. Over the entire period, trunk fares have increased by 38.4 per cent and New South Wales regional fares by 30.9 per cent. However, following the IAFC Cost Allocation Review of August 1982 and the subsequent changes to trunk fare determination, trunk fares have increased more in real terms than intrastate New South Wales regional fares. Since the December quarter 1982, trunk fares have increased by 15.8 per cent in real terms while New South Wales regional intrastate fares have increased by only 4.8 per cent in real terms.

COMMUTER AIR SERVICES

This section discusses the structure, patronage and fares of the commuter air travel market.

Commuter services

Commuter operations in Australia began in July 1967 when three operators commenced services. As at 30 June 1985 there were 47 commuter airlines providing services throughout Australia. Commuter operators do not hold full airline licences but generally have supplementary airline licences.⁵ Currently, commuter services in New South Wales are provided by 12 operators. Appendix II contains a summary of the routes flown by these operators.

Although the commuter market has been characterised by rapid growth

4. Appendix I contains a discussion of fare determinations and presents trunk, regional and commuter real fare indexes for the period 1977 to 1984.

5. Commuter airlines initially commenced operation through the granting of exemptions under Air Navigation Regulation (ANR) 203. This system was replaced by supplementary airline licences in February 1983. ANR203 has been retained to allow exemptions from supplementary airline licence operating standards in exceptional circumstances.

over the period 1976-77 to 1983-84, there have been takeovers and mergers as well as the termination of some commuter operations. A smaller number of operators now provide the majority of commuter services. Structural changes over the period include the following:

- . The collapse in 1983 of Jet Charter Airlines, trading as Wings Australia, which operated two major New South Wales commuter airlines, Masling Commuter Services and Clubair. East Coast Airlines is now providing services on the majority of these routes.⁶
- . Avdev ceased operations in April 1984. The majority of Avdev routes were taken over by East Coast Airlines.

Trends in patronage

Table 2.5 indicates that New South Wales intrastate commuter patronage has grown from 186 350 revenue passengers in 1976-77 to 342 844 revenue passengers in 1983-84, representing an average annual growth rate of 9.1 per cent. The growth in the commuter sector exceeds that achieved by the regional operators at both intrastate and network levels over the corresponding period. This was attained despite a decline of 11.8 per cent in 1983-84 after total patronage had peaked at 388 912 revenue passengers in 1982-83.

In 1983-84 the three major operators (East Coast Airlines, Aeropelican Air Services and Hazelton Airlines) accounted for 76.6 per cent of total commuter patronage. A significant development over the eight-year period to 1983-84 has been the declining share of the market held by the minor operators. In 1976-77 minor operators accounted for 27.7 per cent of total commuter patronage. By 1983-84 their share had declined to 14.7 per cent.

A feature of the market has been the rapid growth of East Coast Airlines and Hazelton Airlines. For the four-year period from 1980-81 to 1983-84 Hazelton Airlines and East Coast Airlines have grown at an average annual rate of 29.5 per cent and 76.7 per cent respectively. The growth of these two airlines can be largely attributed to the withdrawal of two major commuter operators and the takeover of routes formerly operated by East-West Airlines.

6. East Coast Airlines became known as Eastern Airlines in September 1985.

TABLE 2.5 NEW SOUTH WALES COMMUTER AIRLINES: INTRASTATE REVENUE PASSENGERS BY AIRLINE, 1976-77 TO 1983-84

Year	<i>Aeropelican</i>		<i>Avdev^a</i>		<i>East Coast^b</i>		<i>Hazelton</i>		<i>Masling^c</i>		<i>Other</i>		<i>Total</i>
	Market		Market		Market		Market		Market		Market		Number
	Number	share	Number	share	Number	share	Number	share	Number	share	Number	share	
1976-77	61 237	32.9	13 891	7.5	..	..	2 939	1.6	56 724	30.4	51 559	27.7	186 350
1977-78	79 274	34.7	13 703	6.0	..	..	3 245	1.4	68 261	29.9	63 742	27.9	228 225
1978-79	86 138	32.1	31 977	11.9	17 678	6.6	3 257	1.2	76 411	28.5	52 487	19.6	267 948
1979-80	97 259	30.9	37 841	12.0	17 691	5.6	11 393	3.6	75 363	23.9	75 214	23.9	314 761
1980-81	98 176	30.6	18 443	5.7	19 506	6.1	24 384	7.6	76 660	23.9	83 870	26.1	321 039
1981-82	115 780	30.8	32 071	8.5	32 894	8.7	39 312	10.5	77 275	20.5	78 738	20.9	376 070
1982-83 ^d	107 444	27.6	37 672	9.7	83 744	21.5	50 751	13.0	53 909	13.9	55 392	14.2	388 912
1983-84 ^d	101 878	29.7	30 049	8.8	107 623	31.4	52 995	15.5	50 299	14.7 ^e	342 844

Average annual

growth rate

(per cent)	7.5	11.7	43.5	51.2	..	-0.4	9.1
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a. Advance Airlines patronage shown for period 1976-77 to 1979-80. Avdev Airlines terminated operations on 26 April 1984.

b. East Coast Airlines was formed by the amalgamation of Air Eastland and New England Airways.

c. Masling Commuter Services ceased operations on 27 March 1983.

d. Provisional figures derived from DoFA preliminary worksheets.

e. Does not include Norfolk Island Airlines services to Lord Howe Island.

.. Not applicable.

Sources BTE estimates. DoFA (1985b).

Commuter fares

Commuter fares, unlike those for regional air services, are not determined by a specific formula, although approval for the setting of fares is required from the IAFC. Estimates of the equivalent flagfall and charge per kilometre components were derived from a sample of commuter routes. These estimates, based on fares in 1984, yielded a flagfall component of \$16.10 with a distance cost of 19 cents per kilometre flown.⁷ The results represent averages and the actual charges vary across routes.

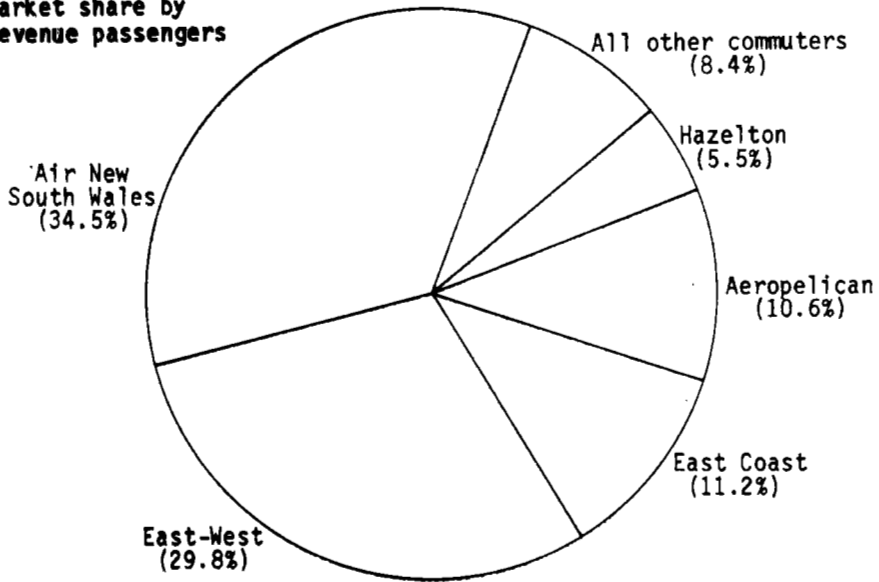
As shown in Figure I.1, for the period 1977 to 1984, short-haul commuter fares increased by 20.8 per cent in real terms and long-haul commuter fares rose by 28.9 per cent in real terms. This reflects the effect of relatively greater competition from other forms of transport on the short-haul routes.

MARKET SHARES OF REGIONAL AND COMMUTER AIRLINES

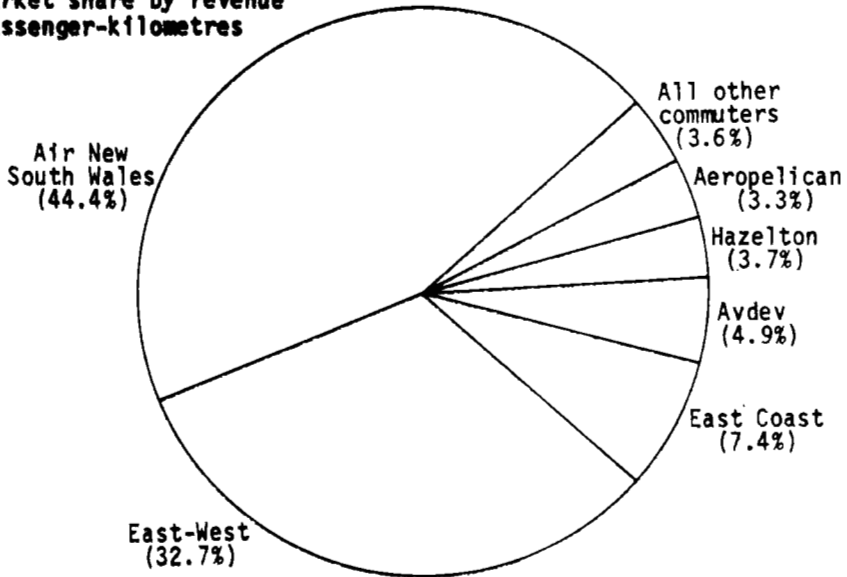
Figure 2.1 illustrates the intrastate market shares of regional and commuter airlines according to total revenue passengers and total revenue passenger-kilometres in 1983-84. Both measures illustrate the dominance of ANSW and EWA and the significant market penetration of the three major commuter operators (East Coast Airlines, Aeropelican Air Services and Hazelton Airlines). These five operators accounted for over 90 per cent of the total intrastate New South Wales air travel market in 1983-84.

7. The ordinary least squares regression technique was used to obtain these estimates. Fare was expressed as a function of distance. The estimated coefficients were all significant at the 95 per cent confidence level and the adjusted coefficient of determination revealed a high explanatory power of the model. These results are similar to those in BTE (1981b) and data supplied by the IAFC for July 1985.

**Market share by
revenue passengers**



**Market share by revenue
passenger-kilometres**



Source BTE estimates.

Figure 2.1-Intrastate market share by airline, 1983-84

CHAPTER 3 FACTORS AFFECTING DEMAND FOR REGIONAL AND COMMUTER AIR SERVICES

There are a number of factors that affect demand for air passenger services (regional or commuter) on a particular route. These include:

- . air fares, relative to the prices of other goods and services which compete with air travel for the consumer's dollar;
- . prices of alternative modes of transport, namely car, coach and train;
- . the quality of service (for example, availability and frequency of service, travel time involved and comfort) provided by air transport relative to other modes; and
- . the socio-demographic characteristics of travellers and the level of economic activity in the route catchment area, measured by, for example, population, disposable incomes, tourism and major developments in mining and power generation.

The following section presents the factors affecting demand in more detail.

RELATIVE COST OF AIR TRAVEL

It is anticipated that there will be an inverse relationship between air fares and the demand for air services.

Ideally air fares should be examined relative to the prices of competing goods. For example, leisure travel by air is competitive with purchases of consumer durables or a non-flying holiday. The substitutes for business air travel are less obvious but some, such as greater use of telecommunications, do exist. Generally, it is impractical to separately identify all competing goods in demand analysis. In this Paper, air fares were deflated by a single broad measure of prices, the Australian Bureau of Statistics (ABS) gross domestic non-farm product deflator. In this way an indication of relative movements of air fares is obtained.

ALTERNATIVE MODES OF TRANSPORT AND ASSOCIATED COSTS

Alternative transport modes are available on all intrastate routes.¹ The use of alternative modes depends, *inter alia*, on differences in travel costs and travel times between modes. Over large distances, the flagfall proportion of an air fare falls. This has the effect of lowering the cost of the air fare per kilometre travelled. Over equivalent distances, costs for car travel can accumulate rapidly for items such as vehicle repairs, meals and accommodation. At the same time, travel time by air does not rise proportionately with distance. This is illustrated in Table 3.1 which presents scheduled times for travel from Sydney to certain country towns and Canberra by plane, rail and car.

Competition between road and air is also influenced by road quality. Substantial road upgradings, particularly under the Australian Bicentennial Road Development Program (ABRD), would be expected to affect competition by reducing car and bus travel times and providing other benefits such as greater comfort and safety.

A further important factor which influences intermodal competition is frequency of service. There is a complex interaction between frequency, cost and choice of time to commence the journey which affects demand for air services.

For the empirical work it was considered that as the car is the dominant competitive mode, an index of petrol price in real terms would provide a reasonable index of the cost of car travel. The cost of coach travel (fares) was included where appropriate with respect to travel on long-haul routes.

INCOME AND POPULATION

It is expected on *a priori* grounds that economic activity, as measured by income levels and population, will have a positive influence on air travel. In the case of traffic from many regional centres to Sydney, a measure of economic activity in the catchment area of the country region would be relevant. However, for holiday resorts which attract traffic from elsewhere, a broader measure of income can be used.

-
1. Results of the National Travel Survey 1977-78 indicate that the car accounted for nearly 84 per cent of all trips, aircraft 6.2 per cent, bus 2.3 per cent and train 2.7 per cent (BTE 1981a).

TABLE 3.1 TRAVEL TIME BY MODE FOR SELECTED REGIONAL ROUTES

Route	Air ^a		Rail ^b		Road		Distance by rail (km)	Distance by car (km)
	Hrs	Mins	Hrs	Mins	Hrs	Mins		
Sydney-Newcastle	1	30	2	06	2	55	168	171
Sydney-Canberra ^c	1	50	4	10	4	30	326	288
Sydney-Dubbo	2	00	6	30	6	00	462	411
Sydney-Port Macquarie	2	00	6	30	5	50	476	412
Sydney-Armidale	2	15	8	00	8	25	579	567
Sydney-Casino	2	40	13	00	11	10	805	740

- a. Scheduled times including access and egress times between city terminal and airport (estimated to be one hour).
- b. In some cases only travel time for XPT services is given.
- c. Included for completeness particularly as the two regional airlines are now providing flights in addition to TAA and Ansett services.

Sources New South Wales Department of Main Roads. Timetables for EWA, ANSW, Aeropelican, East Coast Airlines and the State Rail Authority of New South Wales.

Highly disaggregated measures of economic activity are not readily available, so gross domestic product (GDP) and New South Wales average weekly earnings were used in the analysis. Both measures of income were expressed in real terms.

GDP was used for the regional air traffic market as patronage is responsive to changes in economic activity. New South Wales average weekly earnings, being a more disaggregate measure of income, were found to be more suitable for the analysis of the commuter air traffic market.

Population has been measured on a regional basis in both of the analyses. This variable was based on annual estimated resident population in local government areas (ABS 1983b and 1985a).

LENGTH OF TRIP

It is expected that the responsiveness of travel demand to some of the factors discussed above might be different for short and long trips. For example, the extent of competition between modes depends on the length of the trip.² For the analysis, a split of above and below 400 kilometres was used for regional services and above and below 200 kilometres for commuter services.

PURPOSE OF TRAVEL

The purpose of travel may also affect the responsiveness of travel demand to factors such as price and income. For example, business travel may be less influenced by fare and income levels than non-business travel. However, the information needed to analyse demand by trip purpose as well as on a route basis is not readily available and therefore was not included in the analysis.³

-
2. BTE (1981a) also indicated that the car accounted for over 90 per cent of trips under 200 kilometres and this share declined to 53 per cent for trips over 1000 kilometres. Conversely air accounted for 35 per cent of trips over 1000 kilometres, less than 5 per cent of trips in the 200-400 kilometres range and a negligible share of trips under 200 kilometres.
 3. BTE (1981a) relating to non-urban travel to a destination greater than 100 kilometres away from home revealed some interesting facts. Travel for business purposes amounted to 16 per cent of all trips. Of these business trips, 16 per cent were by air, 64 per cent by car, 18 per cent by other (mainly trucks) and an almost negligible share by bus and train for business purposes. About 40 per cent of air travel was for business purposes. Of the trips for non-business purposes, air's share was 5 per cent or less in each category.

OTHER FACTORS

Tourist accommodation

For major holiday resort centres, an estimate of tourist accommodation in hotels and motels with licenced facilities can be calculated. This is regarded as a reliable indicator of activity in such areas. However, the empirical study did not distinguish between tourist and non-tourist journeys so this factor was not included in the analysis.

Industrial disputes

Although industrial disputes can have a significant temporary impact on patronage, the long term effect on trends in patronage is limited. This fact, combined with the unpredictable nature of most disputes, decreases the usefulness of incorporating industrial stoppages in the empirical demand analysis and consequently this factor was not included in the analysis.

CHAPTER 4 EMPIRICAL ANALYSIS

This chapter presents the demand analysis of New South Wales intrastate regional and commuter air services patronage. Appendix III provides details of the empirical work.

MODELLING CONSIDERATIONS

Samples of regional and commuter routes were selected for the analysis on the basis of continuity of data throughout the study period. The samples represented a large proportion of total routes and reflected the wide variety of characteristics across the routes. The sample of regional routes was divided into distance and airline groupings. In addition, regional routes were grouped into four sub-markets on the basis of geographic and population characteristics. Commuter routes were categorised by distance. Demand equations were estimated for each of these categories by combining or pooling the routes that belonged to each category.

As noted in Chapter 3, it was not possible to include all of the factors considered in the statistical models because of measurement difficulties.

REGIONAL

Model specification

Demand for regional air services (overall patronage) was expressed as depending on the population of the regional centre and the real values for air fare, income and price of alternative (car or coach) transport. In general, seasonal dummy variables were used to capture the effects of seasonal variations in demand.

This specification allowed calculation of the response or elasticity

of patronage to changes in air fare, income, price of substitute transport and population.¹

Sample

Eighteen routes were selected for the sample of NSW regional routes. Table 4.1 lists the sample routes. A comparison of Table 4.1 with Table 2.1 indicates that all of the New South Wales regional routes operated by EWA airlines in 1983-84 were used, whereas a little over one-half of the New South Wales regional routes operated by ANSW were included. However, these routes represented 92 per cent of ANSW intrastate patronage in 1983-84.

The sample contained 96 per cent of total revenue passengers for all New South Wales intrastate regional routes in 1983-84.

Data and estimation procedure

To gain insights into the differences in demand relationships among the routes, separate equations were estimated for the following groups of routes:

- . Distance
 - routes with distances less than 400 km (short-haul)
 - routes with distances greater than 400 km (long-haul).
- . Operator
 - all routes (total)
 - routes operated by ANSW
 - routes operated by EWA.
- . Geographic and population characteristics²
 - routes to major regional centres
 - routes to minor regional centres
 - routes to the Central Coast area
 - routes to the North Coast area.

-
1. The elasticity of patronage (demand) with respect to an explanatory variable measures the percentage change that would occur in patronage in response to a 1 per cent change in the explanatory variable.
 2. The routes contained in each group are presented in Appendix IV.

In each of these classifications, data from the different routes were pooled in order to estimate average relationships between demand for regional air services and the explanatory variables of fare, income, population and price of alternative transport.

TABLE 4.1 REVENUE PASSENGERS FOR SAMPLE OF NEW SOUTH WALES INTRASTATE REGIONAL ROUTES, 1983-84

<i>Airline and routes</i>	<i>Distance (km)</i>	<i>Revenue passengers</i>
EWA		
Sydney-		
Albury	452	54 642
Armidale	381	49 610
Glen Innes	476	5 178
Grafton	497	25 101
Inverell	450	11 010
Kempsey	352	11 055
Port Macquarie	320	36 638
Tamworth	319	71 609
Taree	260	20 970
Total EWA (sample)		285 813
ANSW		
Sydney-		
Broken Hill	932	11 128
Casino	590	48 299
Coffs Harbour	442	58 303
Cooma	330	21 198
Dubbo	309	55 984
Griffith	472	21 564
Merimbula	350	12 962
Moree	509	16 995
Wagga Wagga	367	57 121
Total ANSW (sample)		303 554
Total (sample)		589 367

Source: DofA (1985a).

Regression analysis was used to estimate the demand equations on the basis of quarterly data covering the period between 1977 and 1984.³

Results and discussion

The results of the regression analyses of demand for New South Wales intrastate regional air services are presented in Appendix III. Table 4.2 provides a summary of the elasticities of demand. An elasticity of less than one represents a relatively 'inelastic' response to a change in the variable. For example, in Table 4.2 the elasticity of demand with respect to population on short-haul (less than 400 km) routes is 0.63. This implies that a 10 per cent rise in population, other factors being equal, would lead to a 6.3 per cent rise in demand on the short-haul routes.

The following observations can be made from results in Table 4.2:

- . Demand for air travel on both short-haul (less than 400 km) and long-haul (greater than 400 km) routes is responsive to changes in the real air fare (elasticity of about 1.1).
- . Demand is less responsive to changes in the price of the alternative transport mode than the air fare.
- . Demand is more responsive to the alternative transport price on short routes than on long routes. This indicates that there is greater availability and potential for substitution of transport modes on shorter routes.
- . The demand response with respect to population is less than one on both short-haul and long-haul routes.
- . The demand response with respect to real income is slightly less than one for long-haul routes.
- . The demand response with respect to both income and alternative transport for the larger regional centres is low in comparison to travel to smaller country towns. This indicates that business travel is more important for routes to the larger regional cities.

3. The cross-sectionally correlated and time-wise autoregressive model, described in Kmenta (1971), was used on pooled cross-section time series data. This is a generalised least squares technique which has the advantage over ordinary least squares of more efficient parameter estimates. Sources of data included DofA (1985a), ABS (1983b), ABS (1985a), ABS (1985b), ABS (1985c), ABS (1985d) and ABS (1985e).

TABLE 4.2 ELASTICITIES OF DEMAND FOR NEW SOUTH WALES INTRASTATE REGIONAL AIR SERVICES

Explanatory variable	Distance		Population & geographic characteristics						
	Less than 400 km	Greater than 400 km	Major regional centres	Minor regional centres	Central Coast area	North Coast area	Operator		NSW
							FWA	ANSW	
Real air fare	-1.07	-1.13	-0.92	-1.33	-0.94	-1.83	-0.74	-1.63	-1.14
Real income	0.04	0.90	0.05	1.09	0.34	0.53	0.41	0.73	1.21
Regional population	0.63	0.57	..	..	0.53	2.38	..	0.71	0.01
Real price of alternative transport	0.69	0.30	0.05	0.44	0.24	0.73	..	0.52	0.23

.. Not applicable.

Source BTE estimates.

- . Demand for travel to the North Coast area is very responsive to population growth.
- . The high fare elasticity for travel to the North Coast indicates the potential for further expansion of these routes.
- . Demand on ANSW routes is relatively more sensitive to air fare changes than on EWA routes, possibly indicating that passenger characteristics are different for the two operators.

COMMUTER

Model specification

Demand for commuter air services (overall patronage) was expressed as a function of real commuter air fare, real male average weekly earnings, real price of alternative transport and population of the centre served by the air service.

Sample

Table 4.3 contains the 12 New South Wales commuter routes used in the empirical analysis. The sample contained approximately 50 per cent of all New South Wales commuter revenue passengers in 1983. The sample encompasses a sufficient range of routes, in terms of distance, to be representative of intrastate commuter air travel.

Data and estimation procedure

The sample routes for commuter air services were divided into short-haul (less than 200 km) and long-haul (greater than 200 km) routes. Sources of data and the estimation technique were similar to the work for regional air services. Quarterly time series data from 1977 to 1983 were used to estimate the demand relationships.

Results and discussion

The estimated regression models for New South Wales intrastate commuter air services are reported in Appendix III. Table 4.4 provides a summary of the elasticities of demand for the two distance categories. The following observations can be made from Table 4.4:

- . Demand for air travel on short-haul (less than 200 km) routes is more than twice as responsive to movements in real air fares as demand on long-haul (greater than 200 km) routes. However this result should be treated with caution due to the different characteristics of the catchment areas, such as population, for the individual short-haul routes.

- Demand is very responsive to income on short-haul routes and less responsive on long-haul routes.
- There is some evidence of substitution between modes over shorter routes, reflecting the existence of good quality rail and road networks.

TABLE 4.3 REVENUE PASSENGERS FOR SAMPLE OF NEW SOUTH WALES INTRASTATE COMMUTER ROUTES, 1983

<i>Airline and route</i>	<i>Distance (km)</i>	<i>Revenue passengers</i>
Aeropelican Air Services:		
Sydney - Newcastle (Belmont)	141	105 685
East Coast Airlines:		
Sydney - Newcastle (Williamtown)	110	44 154
Sydney - Young	272	3 679
Sydney - Cootamundra	299	3 013
Sydney - Temora	342	723
Canberra - Newcastle (Williamtown)	371	6 137
Hazelton Air Services:		
Sydney - Moruya	237	3 328
Sydney - Gunnedah	343	5 142
Macknight Airlines:		
Deniliquin - Wagga Wagga	233	3 694
Singleton Air Services:		
Sydney - Cessnock	130	3 781
Sydney - Scone	214	3 391
Western NSW Airlines:		
Canberra - Wagga Wagga	158	1 440
Total (sample)		184 167

Source DofA (1985b).

TABLE 4.4 ELASTICITIES OF DEMAND FOR NEW SOUTH WALES INTRASTATE
COMMUTER AIR SERVICES

<i>Explanatory variables</i>	<i>Distance</i>	
	<i>Less than 200 km</i>	<i>Greater than 200 km</i>
Real air fare	-2.54	-0.59
Real income	2.70	1.25
Regional population	1.20	..
Real price of alternative transport	0.28	..

.. Not applicable.

Source BTE estimates.

CHAPTER 5 FORECASTS

To estimate the likely levels of future travel demand for regional and commuter air services from the empirical relationships discussed in the preceding chapter, it was necessary to project those factors which were found to influence demand. The future values assigned to these explanatory variables were estimated from past data and the projections produced by other organisations such as the Australian Bureau of Statistics (ABS), the National Institute of Economic and Industry Research (NIEIR), the National Institute of Labour Studies and the Department of Resources and Energy.

The forecasts in this chapter for intrastate regional and intrastate commuter air services assume that there is no further transfer of routes from regional to commuter operators. If this assumption does not hold then the forecasts must be interpreted as projections for patronage on those groups of routes currently classified as regional and commuter air services.

SCENARIOS

Values were assigned to the explanatory variables according to two scenarios for the future economic environment. One scenario reflected future events which 'favour' high growth in demand for intrastate aviation services, while the other assumed adverse conditions. The two scenarios established the bounds for high and low growth forecasts respectively.

The scenarios for the major explanatory variables are presented in Table 5.1 and are discussed briefly below.

Fares and cost of car and coach travel

The most significant components of total operating costs of transport enterprises are labour and fuel. In estimating future air and coach fare levels, expected changes in labour and fuel costs were postulated. Assuming costs other than labour and fuel remain constant in real terms, changes in total operating costs were estimated.

Two further assumptions were made in estimating the effect of expected changes in labour and fuel costs on fares. First, it was assumed that towards the latter part of the forecast period operator fleets would become more fuel efficient. Second, it was assumed that short-haul commuter operators would absorb increases in wages through productivity gains because of the greater potential for competition from road and rail on these routes.

TABLE 5.1. PROJECTED GROWTH RATES OF MAJOR EXPLANATORY VARIABLES, 1985 TO 2000

(per cent per annum)

Variable	Scenario	Year ^a			
		1985	1986-90	1991-95	1996-2000
Air fares (real terms)					
Regional	High growth	1.0	1.0	1.0	1.0
	Low growth	1.5	1.3	1.3	1.3
Commuter					
Short routes	High growth	0.0	0.0	0.0	0.0
	Low growth	1.0	0.6	0.6	0.6
Long routes	High growth	1.0	1.0	1.0	1.0
	Low growth	1.5	1.3	1.3	1.3
GDP (real terms)	High growth	4.5	3.0	2.5	2.0
	Low growth	4.0	2.5	2.0	1.5
Average weekly earnings ^b (male)					
(real terms)	High growth	1.0	1.5	1.0	1.0
	Low growth	0.5	0.5	0.5	0.5
NSW population					
Regional centres	High growth	3.0	2.6	2.4	2.2
	Low growth	2.5	2.2	2.0	1.8
State total	High growth	1.6	1.4	1.3	1.2
	Low growth	1.2	1.1	1.0	0.9
Cost of car travel (real terms)	High growth	2.0	1.0	1.0	1.0
	Low growth	1.0	0.0	0.0	0.0
Coach fares (intrastate in real terms)					
	High growth	2.0	1.0	1.0	1.0
	Low growth	1.0	0.0	0.0	0.0

a. Year ending 31 December.

b. Average weekly earnings, as the income component, has a positive effect on air travel expenditure. However, as a factor of airline operating costs, increasing wages have a negative effect on air travel through higher fare levels.

For the cost of car travel it was assumed that there would be a small but constant increase in real terms in the high growth scenario, with no change in the low growth scenario.

Income

The scenarios for income reflect the projections of several of the organisations mentioned above. The longer term outlook is for moderate growth with a gradual tapering off in the 1990s.

Population

The source of total New South Wales population projections to the year 2000 was ABS (1983a). The ABS does not produce regional population projections. However, the study took into account changes in historic trends when estimating forecast values. In both high and low growth scenarios, the assumed values for fertility and mortality rates are similar. However, the main difference is in net migration gains.¹

FORECASTS

Total intrastate revenue passengers on New South Wales regional and commuter air services were forecast from 1985 to 2000 at five-year intervals. The methodology was based upon the demand equations estimated according to distance (presented in Chapter 4) and the scenarios for the explanatory variables in Table 5.1.

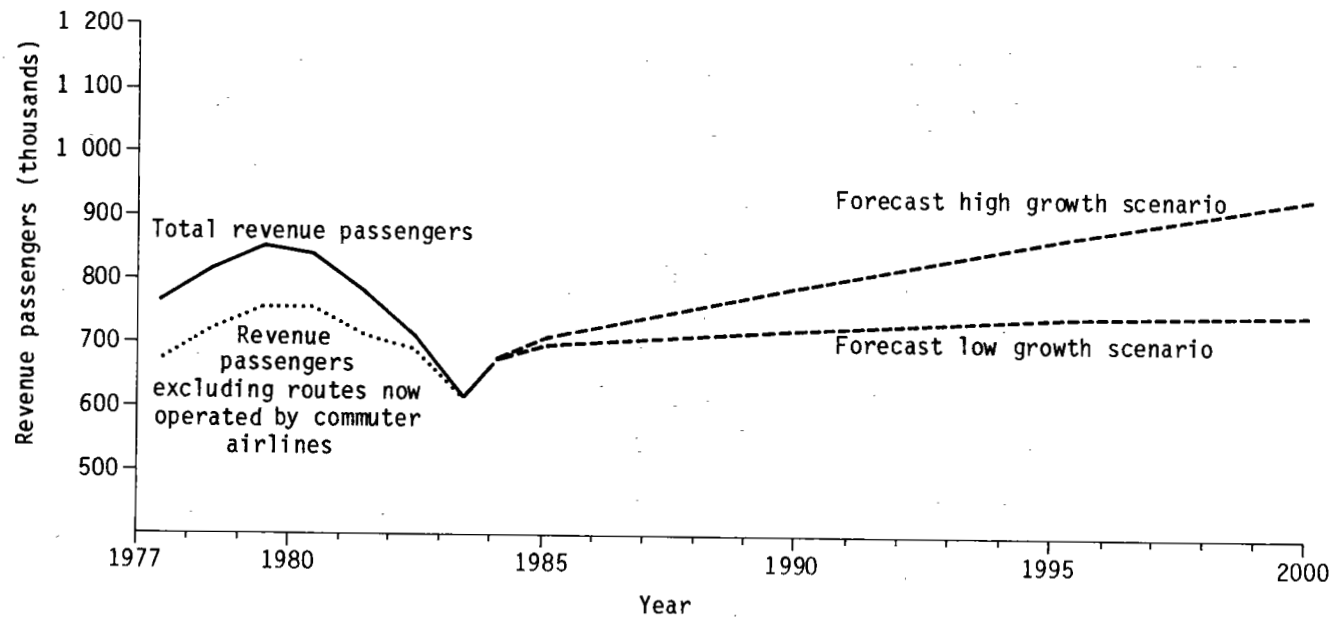
Projections of total revenue passengers were obtained by assuming that the forecast growth rates of the sample were indicative of total patronage.

Regional patronage

Table 5.2 contains forecasts of the average annual growth rates from 1985 to 2000 for revenue passengers on New South Wales intrastate regional air services. Figure 5.1 shows the patronage levels for the forecast period. For 1985, average annual growth in regional patronage is forecast to be between 2 per cent and 4 per cent. The increase in revenue passengers for 1985 is due mainly to the effects of economic recovery.

Once the initial increase in patronage takes place, growth is expected to moderate during the five-year period to 1990 to between 1 and 2 per

1. The high and low growth scenarios correspond to ABS series C and A respectively.



Note Actual revenue passengers, 1977-84.

Source Department of Aviation, Air Transport Statistics; BTE estimates.

Figure 5.1-Total revenue passengers for NSW intrastate regional air services, 1977-2000

TABLE 5.2 FORECAST AVERAGE ANNUAL GROWTH RATES FOR TOTAL REVENUE PASSENGERS ON NEW SOUTH WALES INTRASTATE REGIONAL AIR SERVICES, 1985 TO 2000

(per cent per annum)

Forecast	Year ^a			
	1985	1986-90	1991-95	1996-2000
High	3.7	2.3	2.0	1.6
Low	2.0	0.9	0.6	0.3

a. Year ending 31 December.

Source BTE estimates.

cent per annum. This is due primarily to expected lower rates of economic activity as shown by the GDP growth rates in Table 5.1. These growth rates in patronage are maintained until the mid-1990s and then fall marginally for the remainder of the forecast period to 2000. This results from the combined effects of a further slight fall in GDP and population growth rates.

Overall, the level of patronage on intrastate New South Wales regional air services under the low and high growth scenarios would increase from about 676 000 revenue passengers in 1984 to between 758 900 and 937 000 revenue passengers respectively in the year 2000.

The forecasts of average annual growth rates from 1985 to 2000 according to the four sub-markets are presented in Table 5.3. In regard to these sub-markets, travel to the North Coast area is forecast to grow at the highest rate, between 3 and 7 per cent per annum. Growth for the Central Coast area and minor regional centres is expected to be somewhat less (probably below 2 per cent per annum). Patronage on routes to the major regional centres could remain static or even decline.

Commuter patronage

The forecasts of annual average growth rates from 1985 to 2000 for revenue passengers on New South Wales intrastate commuter air services are given in Table 5.4. Figure 5.2 shows forecasts of the level of patronage for the same period.

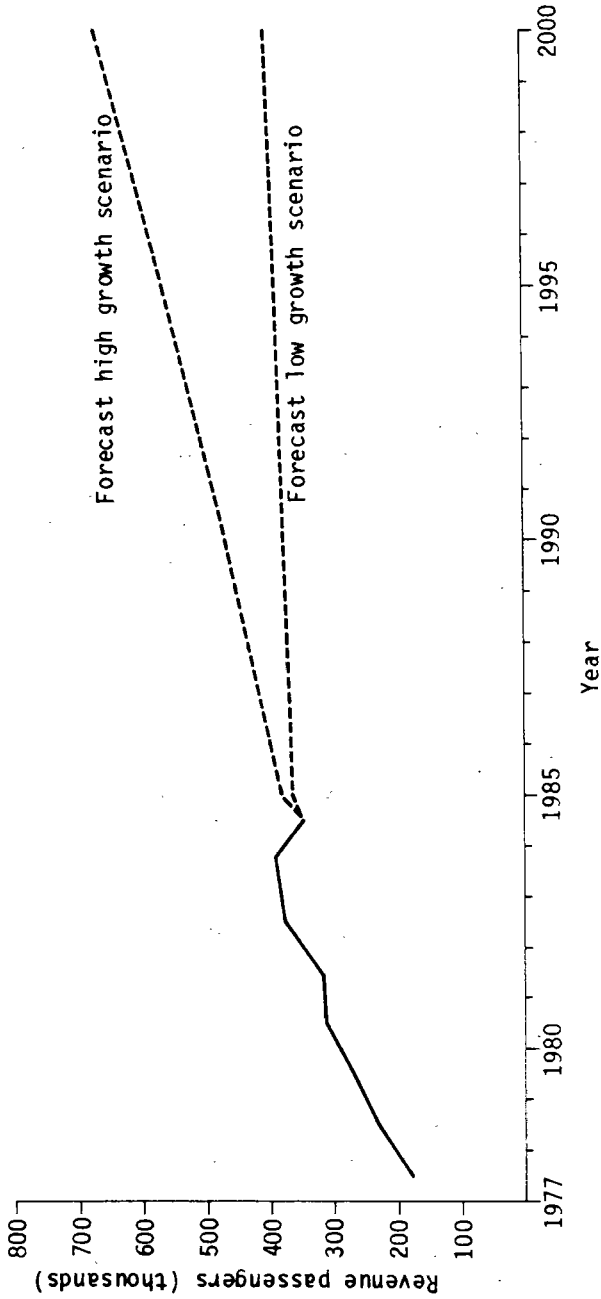
The overall high growth rates in 1985 and for the five-year period to 1990 under the high growth scenario are due partly to the forecast low

TABLE 5.3 FORECAST AVERAGE ANNUAL GROWTH RATES FOR TOTAL REVENUE PASSENGERS ON NEW SOUTH WALES INTRASTATE REGIONAL AIR SERVICES BY SUB-MARKET, 1985 TO 2000
(per cent per annum)

Sub-market	Year ^a							
	1985		1986-90		1991-95		1996-2000	
	Low	High	Low	High	Low	High	Low	High
Major regional centres	-1.12	-0.59	-1.06	-0.72	-1.08	-0.74	-1.11	-0.76
Minor regional centres	2.77	4.44	0.98	2.36	0.44	1.82	-0.09	1.28
Central Coast area	1.49	2.64	0.78	1.68	0.51	1.41	0.24	1.14
North Coast area	6.14	9.41	4.21	6.80	3.46	6.03	2.71	5.27

a. Year ending 31 December.

Source BTE estimates.



Note Actual revenue passengers, 1977-83.

Source Department of Aviation, Air Transport Statistics; BTE estimates.

Figure 5.2-Total revenue passengers for NSW intrastate commuter air services, 1977-2000

TABLE 5.4 FORECAST AVERAGE ANNUAL GROWTH RATES FOR TOTAL REVENUE
PASSENGERS ON NEW SOUTH WALES INTRASTATE COMMUTER AIR
SERVICES, 1985 TO 2000

(per cent per annum)

Forecast	Year ^a			
	1985	1986-90	1991-95	1996-2000
High	3.6	4.5	3.5	3.5
Low	0.2	0.7	0.6	0.6

a. Year ending 31 December.

Source BTE estimates.

real air fare increases for short-haul commuter routes relative to regional and long-haul commuter routes.² Also, commuter air travellers are relatively more sensitive to increases in real income and population (Table 4.4) as opposed to regional air travellers. Therefore, while the forecast increases in real average weekly earnings and population are moderate for the period to 1990, growth in commuter patronage remains relatively high, for the high growth scenario, compared to the regional patronage forecasts detailed in the previous section.³

The lower rates of growth after 1990 are due mainly to lower forecast increases in population and real average weekly earnings.

Overall, patronage on intrastate New South Wales commuter services is forecast to grow from an estimated 360 000 revenue passengers in 1984 to between 396 000 and 655 000 under the low and high growth scenarios respectively.

CONCLUDING REMARKS

Following substantial growth in the 1970s, the number of New South Wales intrastate passengers (regional and commuter) declined in the early 1980s. A recovery is now under way, and over the long term

2. As mentioned in Chapter 4, the short-haul commuter routes between Sydney and Newcastle represent the major share of the commuter air travel market within New South Wales.

3. It should be noted that the relatively high forecast growth rates for commuter versus regional patronage also reflect the effect of a much lower level of patronage for commuter in the base year.

passenger numbers are expected to grow at an annual rate of between 1 and 3 per cent. Commuter patronage is expected to grow faster than patronage of the regional airlines after 1985, under the high growth scenario (much faster if there are further transfers of routes to commuter). Traffic to the North Coast region is likely to grow more rapidly than traffic to other New South Wales regions.

APPENDIX I FARE COMPARISONS

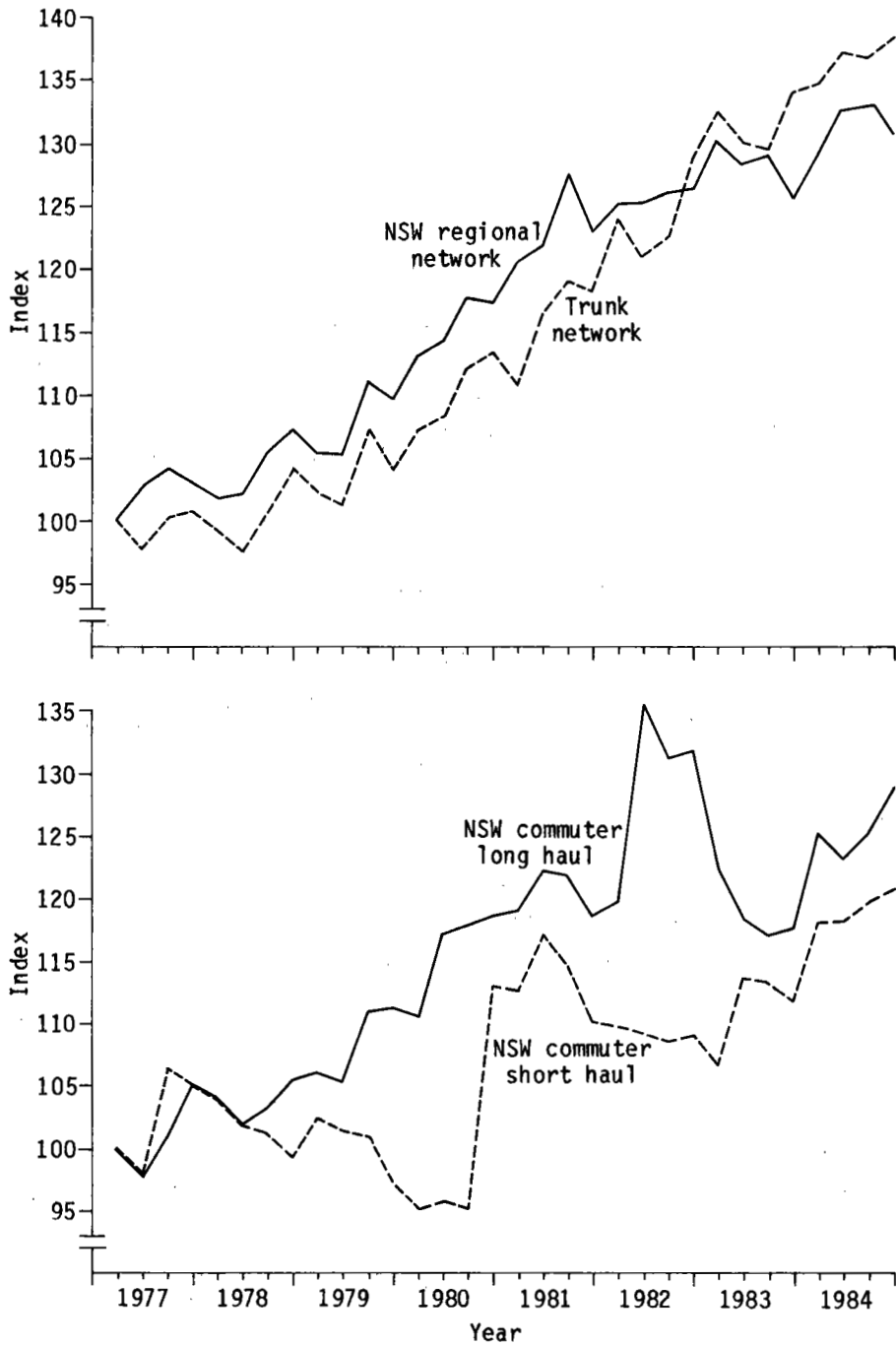
Figure I.1 provides indexes of real economy air fares for trunk airlines and an average total New South Wales regional intrastate index on a quarterly basis from March 1977 to December 1984. A trunk index based on fare determinations was compared with an index derived from a sample of New South Wales intrastate routes identified in Table 2.1, Chapter 2.

It is inappropriate to use a regional index based on fare determinations because the published 'average' fare increase given for each fare determination refers to that determination's effect on the airline's total Australia-wide network. Also, fares on several intrastate routes are now based on F28 formulae. Therefore the network effect of the F27 formulae would not be fully representative of average fare levels at the New South Wales intrastate level.

For reference, Table I.1 presents the EWA F27 formulae and the associated average network increase as a result of fare determinations. Table I.2 contains the same information for ANSW. For the eight-year period 1977 to 1984, the effect of EWA F27 fare determinations has resulted in a 17.6 per cent average total network real fare increase.

Figure I.1 shows that the weighted average total New South Wales regional fare index rose by 30.9 per cent between 1977 and 1984 while trunk airline fares increased by 38.4 per cent. The real fare increase for the EWA sample of nine intrastate routes was 32.0 per cent and for the nine ANSW sample routes, 29.7 per cent, over the same period.

Figure I.1 also provides weighted average real economy fare indexes for New South Wales commuter short-haul and long-haul routes over the same period. For the sample of commuter routes in this Paper, short-haul fares rose by 20.8 per cent and long-haul fares by 28.9 per cent in real terms between 1977 and 1984.



Sources Trunk index based on air fare formulae determinations.
Regional and commuter indexes based on sample of routes.

Figure I.1-Quarterly indexes of real economy air fares, 1977-84

TABLE I.1 EAST-WEST AIRLINES F27 FORMULAE, 1977-84

<i>Date of effect^a</i>	<i>Average percentage increase on East-West Airlines network</i>	<i>Flagfall (\$)</i>	<i>Distance components (cents per kilometre)</i>
1. 4.77	5.5	12.82	5.834
1. 7.77	3.0	12.82	6.250
18. 9.77	3.1	13.22	6.450
13. 7.78	6.0	14.01	6.840
29. 9.78	4.0	14.57	7.114
4. 6.79	10.0	16.00	7.825
1.12.79	5.8	18.00	8.060
18. 1.80	2.6	18.47	8.270
1. 2.80	2.6	19.00	8.488
30. 5.80	3.9	19.75	8.820
4. 8.80	4.0	20.52	9.168
6. 2.81	8.9	22.35	9.980
15. 7.81	5.3	23.50	10.509
11.11.81	3.2	24.25	10.845
27. 1.82 ^b	2.3	24.80	11.094
22. 4.82	4.0	25.80	11.538
25. 8.82	5.2	27.10	12.138
1. 1.83	6.0	28.70	12.866
10.10.83	6.0	30.40	13.638
14. 3.84	2.8	31.20	14.013
20.10.84	0.0	36.67	12.906

a. Dates prior to 27 January 1982 may be date of approval.

b. This was the first fare determination by the IAFCA. All prior determinations were implemented by Department of Transport, Australia.

Source IAFCA approved air fare formulae.

TABLE I.2 AIR NEW SOUTH WALES F27 FORMULAE, 1977-84

<i>Date of effect^a</i>	<i>Average percentage increase on Air New South Wales network</i>	<i>Flagfall (\$)</i>	<i>Distance components (cents per kilometre)</i>
1. 4.77	4.5	10.63	6.282
1. 7.77	3.0	10.95	6.470
18. 9.77	3.5	11.47	6.470
1. 7.78	9.6	12.58	7.096
29. 9.78	5.0	13.21	7.451
14. 6.79	10.0	15.00	8.092
1. 2.80	8.0	17.00	8.570
30. 5.80	5.0	19.75	8.570
2. 9.80	3.3	20.50	8.831
6. 2.81	8.2	22.20	9.554
3. 7.81	7.3	23.80	10.251
21. 1.82	4.8	24.90	10.743
6. 8.82	7.4	26.70	11.538
24.11.82	5.5	28.80	12.052
20. 5.83	4.2	29.70	12.626
1. 7.83	1.2	30.10	12.778
2. 5.84	4.0	33.26	12.830

a. Dates prior to 27 January 1982 may be date of approval.

Source IAFC approved air fare formulae.

APPENDIX II NEW SOUTH WALES INTRASTATE COMMUTER SERVICES

TABLE II.1 NEW SOUTH WALES INTRASTATE SERVICES PROVIDED BY COMMUTER AIRLINES, 1985

<i>Airline</i>	<i>Routes</i>
Aeropelican Air Services	Sydney-Belmont (Newcastle)
Aquatic Airways	Palm Beach-Port Stephens
	Palm Beach-Rose Bay
	Rose Bay-Gosford
East Coast Airlines	Sydney-Cootamundra-Young
	Sydney-Temora-West Wyalong
	Sydney-Cowra
	Sydney-Bathurst
	Sydney-Maitland
	Sydney-Williamtown (Newcastle)
	Sydney-Forbes-Parkes
	Sydney-Cobar-Nyngan
	Sydney-Bourke-Brewarrina
	Newcastle (Williamtown)-Canberra
	Newcastle (Williamtown)-Taree-
	Port Macquarie-Coffs Harbour-
	Grafton-Lismore
	Newcastle (Williamtown)-Tamworth-
	Armidale
Easter Airways	Newcastle (Williamtown)-Wollongong
Hazelton Airlines	Cudal-Sydney
	Cudal-Canberra
	Cudal-Dubbo
	Cudal-Condoblin
	Dubbo-Cudal-Canberra
	Sydney-Quirindi-Gunnedah
	Sydney-Mudgee
	Sydney-Orange
	Sydney-Moruya
Kendell Airlines	Albury-Wagga
	Merimbula-Cooma

TABLE II.1 (Cont.) NEW SOUTH WALES INTRASTATE SERVICES PROVIDED BY
COMMUTER AIRLINES, 1985

<i>Airline</i>	<i>Routes</i>
Macknight Airlines	Deniliquin-Tocumwal-Wagga Deniliquin-Hay-Wagga Deniliquin-Wagga
Norfolk Island Airlines	Lord Howe Island-Newcastle Lord Howe Island-Sydney
Oxley Airlines	Port Macquarie-Lord Howe Island Forster-Port Macquarie- Coffs Harbour Taree-Port Macquarie-Coffs Harbour Casino-Lismore Forster-Sydney
Singleton Air Services	Singleton-Sydney Singleton-Cessnock-Sydney Cessnock-Sydney Scone-Cessnock-Sydney
Waratah Air Services	Tumut-Sydney
Western NSW Airlines	Wagga-Tumut-Canberra Canberra-Albury Canberra-Wagga

Source Australian Aviation (1985).

APPENDIX III REGRESSION ANALYSIS OF NEW SOUTH WALES INTRASTATE REGIONAL AND COMMUTER AIR SERVICES

This appendix provides details of the regression analysis of New South Wales intrastate regional and commuter air services. These are discussed in Chapter 4. Tables III.1, III.2 and III.3 contain the distance, operator and sub-market equations for regional air services. Table III.4 contains the distance equations for commuter air services.

TABLE III.1 ELASTICITIES OF DEMAND FOR NEW SOUTH WALES INTRASTATE REGIONAL AIR SERVICES, DISTANCE CATEGORIES

Distance	Explanatory variables							Constant	\bar{R}^2
	Real air fare	Real income	Regional population	Real price of alternative transport	Seasonal dummy variables				
					S1	S2	S3		
Less than 400 km	-1.07 (-4.24)	0.04 (0.43)	0.63 (9.98)	0.69 (3.69)	-0.01 (-1.96)	0.01 (1.75)	0.01 (3.14)	0.76 (2.01)	0.84
Greater than 400 km	-1.13 (-5.10)	0.90 (2.77)	0.57 (30.82)	0.30 (2.39)	-0.08 (-6.35)	-0.02 (-1.40)	0.02 (2.00)	-2.04 (-1.07)	0.97

Notes 1. When using quarterly time series data, only three seasonal dummy variables are required.
 2. t-values indicating the statistical significance of the estimates are in brackets.

Source BTE estimates.

TABLE III.2 ELASTICITIES OF DEMAND FOR NEW SOUTH WALES INTRASTATE REGIONAL AIR SERVICES, OPERATOR CATEGORIES

Group	Explanatory variables								\bar{R}^2
	Real air fare	Real Income	Regional population	Real price of alternative transport	Seasonal dummy variables			Constant	
					S1	S2	S3		
New South Wales	-1.14 (-4.02)	1.21 (3.03)	0.01 (0.12)	0.23 (2.33)	-0.06 (-3.85)	0.02 (0.97)	0.13 (7.43)	10.18 (7.34)	0.85
EWA	-0.74 (-4.16)	0.41 (1.28)	..	..	-0.003 (-1.15)	0.002 (0.52)	0.01 (2.76)	1.34 (4.48)	0.94
ANSW	-1.63 (-7.42)	0.73 (1.86)	0.71 (8.29)	0.52 (2.89)	-0.09 (-6.76)	0.03 (1.99)	0.03 (1.93)	-2.57 (-1.10)	0.87

.. Not applicable.

Notes 1. When using quarterly time series data, only three seasonal dummy variables are required.

2. t-values indicating the statistical significance of the estimates are in brackets.

Source BTE estimates.

TABLE III.3 ELASTICITIES OF DEMAND FOR NEW SOUTH WALES REGIONAL AIR SERVICES BY SUB-MARKET

Sub-market	Explanatory variables							\bar{R}^2	
	Real air fare	Real Income	Regional population	Real price of alternative transport	Seasonal dummy variables				
					S1	S2	S3		
Major regional centres	-0.92 (-4.00)	0.05 (0.10)	..	0.05 (0.28)	-0.07 (-4.19)	0.02 (0.80)	0.05 (3.15)	8.71 (3.35)	0.69
Minor regional centres	-1.33 (-6.77)	1.09 (3.71)	..	0.44 (6.95)	-0.02 (-0.86)	0.09 (3.91)	0.40 (16.33)	11.16 (12.16)	0.95
Central Coast area	-0.94 (-1.88)	0.34 (0.55)	0.53 (1.19)	0.24 (2.08)	-0.01 (-0.41)	-0.03 (-1.23)	-0.01 (-0.50)	11.92 (16.90)	0.34
North Coast area	-1.83 (-2.57)	0.53 (0.83)	2.38 (2.37)	0.73 (3.63)	-0.10 (-4.95)	0.02 (0.96)	0.03 (1.04)	5.61 (2.99)	0.71
.. Not applicable									

Notes 1. When using quarterly time series data, only three seasonal dummy variables are required.
 2. t-values indicating the statistical significance of the estimates are in brackets.

Source BTE estimates.

TABLE III.4 ELASTICITIES OF DEMAND FOR NEW SOUTH WALES INTRASTATE COMMUTER AIR SERVICES, DISTANCE CATEGORIES^a

Distance	Explanatory variables							Constant	\bar{R}^2
	Real air fare	Real income	Regional population	Real price of alternative transport	Seasonal dummy variables				
					S1	S2	S3		
Less than 200 km	-2.54 (-3.40)	2.70 (1.95)	1.20 (5.26)	0.28 (0.41)	-0.10 (-1.29)	-0.06 (-0.65)	-0.01 (-0.11)	-24.12 (-2.81)	0.92
Greater than 200 km	-0.59 (-2.69)	1.25 (2.27)	..	..	-0.02 (-3.00)	-0.01 (-1.42)	-0.01 (-1.48)	0.32 (0.63)	0.99

a. The equation for short-haul routes is based upon routes with large differences in factors such as population of the catchment areas. Therefore the results should be treated with care.

.. Not applicable.

- Notes
1. When using quarterly time series data, only three seasonal dummy variables are required.
 2. t-values indicating the statistical significance of the estimates are in brackets.
 3. Real income in these equations was real average weekly earnings.

Source BTE estimates.

**APPENDIX IV NEW SOUTH WALES INTRASTATE REGIONAL SUB-MARKETS ACCORDING
TO POPULATION AND GEOGRAPHIC CHARACTERISTICS**

TABLE IV.1 REGIONAL SUB-MARKETS

<i>Group</i>	<i>Route</i>
Routes to major regional centres	Sydney-Albury Sydney-Dubbo Sydney-Tamworth Sydney-Wagga Wagga
Routes to minor regional centres	Sydney-Armidale Sydney-Broken Hill Sydney-Cooma Sydney-Glen Innes Sydney-Griffith Sydney-Inverell Sydney-Merimbula Sydney-Moree
Routes to the Central Coast area	Sydney-Kempsey Sydney-Port Macquarie Sydney-Taree
Routes to the North Coast area	Sydney-Casino Sydney-Coffs Harbour Sydney-Grafton

Source Derived from sample of regional routes used in the empirical analysis.

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ABBREVIATIONS

ABRD	Australian Bicentennial Road Development Program
ABS	Australian Bureau of Statistics
ANR	Air Navigation Regulation
ANSW	Air New South Wales
BTE	Bureau of Transport Economics
DofA	Department of Aviation
EWA	East-West Airlines
GDP	Gross Domestic Product
IAFC	Independent Air Fares Committee
km	Kilometres
NIEIR	National Institute of Economic and Industry Research



Our Reference:

DEMAND FOR NEW SOUTH WALES INTRASTATE AIR TRAVEL

Extended Summary - BTE Information Paper 17

By the end of the century New South Wales regional airlines may carry as many as one million intrastate passengers annually (an increase of 380,000 over 1983-84 passenger numbers). Commuter airlines may carry as many as 650,000 passengers annually (compared with 340,000 passengers in 1983-84).

These are some of the findings contained in the Federal Bureau of Transport Economics' Information Paper 17 which was released today. The Paper was prepared as a submission to the Review Committee of New South Wales Air Services.

Following a period of declining passenger numbers on New South Wales regional intrastate air services, recovery is now underway and the prospects are for long term growth on both regional and commuter services of between 1 and 3 per cent per annum. The rate of growth in passenger numbers is expected to taper off towards the end of the century as a result of lower rates of growth in population and real income. Regional traffic growth to the North Coast is likely to grow more rapidly than traffic to other New South Wales regions.

The eight year period to 1983-84 saw passengers on New South Wales intrastate regional services decline at an average annual rate of 3 per cent, while commuter airline passengers grew at an average rate of 9 per cent over the same period. The BTE analysis suggests that the decline in regional services will be reversed but that intrastate commuter services may continue to experience a relatively higher rate of growth compared with their regional counterpart.

The BTE analysis shows that Air New South Wales carried over 53 per cent of all New South Wales intrastate passengers in 1983-84. It also shows that Air New South Wales passengers on average travelled about 150 kilometres further than passengers using East West Airlines services.

Intrastate commuter operations in New South Wales are dominated by Eastern Airlines (formerly East Coast Airlines), Aeropelican Air Services and Hazelton Airlines. In 1983-84 these three operators accounted for over 75 per cent of total passenger movements.

For the four year period to 1983-84 Hazelton Airlines and Eastern Airlines have expanded their traffic at average annual rates of 29.5 per cent and 76.7 per cent respectively. This growth can be largely attributed to the collapse of other commuter operators and the takeover of routes formerly operated by East West Airlines.

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