## BTE Publication Summary

# Factors Affecting Demand for International Travel to and from Australia

## **Occasional Paper**

This Occasional Paper reports on an analysis of the factors affecting the demand for international air travel. This analysis serves as a basis for forecasting the response of demand to changes in key policy variables, in particular fares and some aspects of the level of service. The implications for demand for travel to and from Australia of several alternative fare service packages are presented.







#### BUREAU OF TRANSPORT ECONOMICS

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#### FACTORS AFFECTING DEMAND FOR INTERNATIONAL TRAVEL TO AND FROM AUSTRALIA

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#### FOREWORD

On 11 October 1977, the Minister for Transport, the Honourable P.J. Nixon, announced that a review of Australia's International Civil Aviation Policy (ICAP) was to be undertaken. An ICAP Review Steering Committee was set up within the Department of Transport to carry out the review. The Committee asked the Bureau of Transport Economics to undertake a quantitative analysis of demand for international air travel under a variety of assumptions. The results of the analysis are contained in this Occasional Paper.

The study was undertaken in the Economic Evaluation Branch of the BTE. R.O. McAndrew and S. Watt assisted A.B. Smith and J.N. Toms in the study.

The BTE acknowledges the cooperation of QANTAS Airways Ltd during this study, especially in allowing the BTE to undertake surveys on its flights.

(W.P. Egan) Assistant Director Transport Resources Investigation

Bureau of Transport Economics Canberra February 1978

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#### SUMMARY

This Occasional Paper reports on an analysis of the factors affecting the demand for international air travel. This analysis serves as a basis for forecasting the response of demand to changes in key policy variables, in particular fares and some aspects of the level of service. The implications for demand for travel to and from Australia of several alternative fare/service packages are presented.

The analysis can also be used to assist in forecasting the effect on demand of exogenous variables such as income growth or growth in overseas trade. This is a subsidiary purpose, however, and the estimated demand relationships are not suitable for producing long-term forecasts.

An increasingly important part of the marketing strategy of international airlines has been provision of a range of tickets with various conditions attached and selling at different prices. The study included a survey of attitudes of international travellers on the Australia-United Kingdom route. The aim of the survey was to evaluate in monetary terms travellers' perceptions of various conditions on their travel. The survey results are reported in detail in this Paper. This information was used as an input into a broader econometric analysis of the response of demand to a range of factors. This latter analysis uses data covering travel to and from 7 overseas countries over a period of 13 years.

The conclusions of the analysis are summarised by the forecast of responses of demand to several marketing strategies. Clearly, the accuracy of the predictions of responses to these strategies is conditioned by the accuracy of the analysis itself. In particular, the limited nature of the in-flight survey conducted by the BTE should be noted. However, the responses which are summarised below should serve at the very least as a useful planning guide.

A 15 per cent cut in fares for all tickets from Australia to all destinations is estimated to increase the demand for overseas leisure travel by Australians by about 25 per cent. Provided the 15 per cent cut applied <u>only</u> to travel to and from Australia, the demand for leisure travel to Australia would increase

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by about 30 per cent. The effect of the same policy on business travel, which is a much smaller market than leisure travel, would be to increase business trips by Australians by about 22 per cent, and business trips by visitors to Australia by about 17 per cent. There would be a significant increase in overall airline revenue following such a general fare reduction.

Turning to an examination of the Australia-UK route, a 15 per cent fare cut for all tickets on this route <u>alone</u> would increase travel between Australia and the UK by about 19 per cent. The implications for overall airline revenue would be small. A 15 per cent cut in the Advanced Purchase Excursion Fare (APEF), which is currently the cheapest on the Australia-UK route and used almost entirely by leisure travellers, would increase demand for this ticket by about 65 per cent and overall travel on the route would rise by about 9 per cent. There would be considerable changes in the distribution of ticket types. Despite the higher overall demand, the airlines would lose a small amount of revenue from this strategy due to substantial conversion of travel from higher-priced tickets.

Finally, the implications of replacing the APEF ticket on the Australia-UK route with another (hypothetical) ticket having different but generally more acceptable conditions are examined. This new ticket is defined as a one-way ticket with no restrictions on trip duration and no advance purchasing requirements. Although travellers are assured of a flight in any particular week, they are not able to choose the exact day of travel. Nor are they free to make stopovers en route to the UK. This ticket would take up more than half of the total demand on the route. If it was sold at the same price as the current APEF ticket, its introduction would increase total demand by about 11 per cent. If its price was 15 per cent below the current APEF price, demand would increase by about 25 per cent over the existing market. Although they would clearly change the distribution of ticket types, the revenue implications of either of these strategies would be slight.

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#### CHAPTER 1 - INTRODUCTION

#### ORIGINS AND SCOPE OF THE STUDY

On 11 October 1977, the Minister for Transport, the Honourable P.J. Nixon, announced that a review of Australia's International Civil Aviation Policy (ICAP) was to be undertaken. A study group was set up within the Department of Transport to carry out the review. Subsequently, the study group outlined a number of specific tasks which needed to be undertaken in support of the review. One of these tasks was a quantitative analysis of demand for international travel into and out of Australia. Of particular relevance to the review was estimation of the effect on demand of alternative fare structures and associated conditions of travel<sup>(1)</sup>.

The Bureau of Transport Economics (BTE) agreed to undertake a study of demand and to complete it by the end of January 1977. This would allow ample time for the results to be incorporated into the overall review, which was due for completion on 31 March 1977.

This Occasional Paper is the outcome of that commitment. It presents an analysis of demand for overseas travel by Australians and travel to Australia by overseas residents. Business and leisure travel are both examined, although the leisure market is treated in rather more detail.

The principal aim of the study is to provide a means for forecasting the effect on demand of various alternative packages of fares and conditions. This involves:

- . Measuring the response of demand to changes in fare levels;
- . Assessing the inconvenience to travellers of various conditions on their freedom of movement and the consequent impact of these conditions on demand.
- Conditions of travel include limits on the duration of a trip, requirements for early booking, constraints on times of departure and so on.

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A useful by-product is the measurement of the influence of other major determinants, such as income and trade flows, on demand.

#### STRUCTURE OF THE STUDY

Before any assessment of the potential effects of revised fare structures can be made, it is important to examine the nature of the existing market. Chapter 2 of this Paper describes the market in terms of trip purpose and origins and destinations of overseas travel. Marketing developments on the Australia-United Kingdom route are briefly discussed. In particular, attention is given to the successive introduction of a range of reduced economy or low-fare tickets with various conditions attached.

Restrictions on travel are inconvenient to travellers in varying degrees and they are prepared to pay something in order to be free of them. The purpose of Chapter 3 is to put values on various restrictions using an analysis of an attitudinal survey<sup>(1)</sup> and also from an examination of the revealed preference of travellers for various ticket types. Owing to the tight time constraints on the study, this analysis is restricted to the Australia-United Kingdom route.

Chapter 4 estimates statistical models relating demand for travel over time and between origins and destinations to measurable determinants such as income and fare levels. The chief results are estimates of average fare elasticities of demand for business and leisure travel.

Results dealing with the valuation of service factors and the fare elasticities are summarised in Chapter 5, and the impacts on demand of various alternative fare/service packages are estimated. Full details of the inflight survey conducted in support of the study are given in Appendix I, while detailed specifications of the econometric demand models are given in Appendix II.

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<sup>(1)</sup> Carried out by the BTE specifically in support of this particular project. The generous and extensive assistance of QANTAS Airways Ltd is acknowledged.

#### CHAPTER 2 - THE MARKET

#### PATTERNS OF DEMAND

International air travel is an important and rapidly increasing activity. To understand the factors behind its demand it is useful to examine various components of the overall market. Overseas travel can be categorised in a number of ways and at various levels of disaggregation. Classifications by trip duration, purpose and origin/destination are of particular interest here. The data are taken from the Australian Bureau of Statistics bulletins, <u>Overseas</u> <u>Arrivals and Departures</u>, which are published quarterly and are based on questionnaires filled in by all persons arriving in or departing from Australia.

In Table 2.1, short-term movements in 1976 are shown. Short-term movements are those by travellers whose actual or intended period of stay or absence is less than 12 months. It is clear from the table that short-term movements dominate the market, accounting for over 90% of all movements. Australian residents make nearly twice as many trips overseas as overseas residents make to Australia.

	Nur	mber	Percent
Permanent Movements	85	050	3
Long-Term Movements - Australian Residents - Overseas Visitors	128 43	401 943	4 1
Short-Term Movements - Australian Residents - Overseas Visitors	1 942 1 044	064 336	60 32
Total Arrivals and Departures	3 243	794	100

TABLE 2.1 - OVERSEAS ARRIVALS AND DEPARTURES - TOTAL MOVEMENTS 1976<sup>(a)</sup>

(a) A movement is an arrival or departure.

Source: Australian Bureau of Statistics, Overseas Arrivals and Departures, several bulletins.

Tables 2.2 and 2.3 classify short-term travel by purpose and origin/destination. Instead of total movements, departures by Australian residents and arrivals by overseas residents are shown. The destination of Australians is the country in which they spend the most time. Business travel includes attending conventions and accompanying a business traveller. These latter categories are only a small proportion of the business market. The 'Other' purpose category includes employment, education and travellers in transit (in Table 2.3).

New Zealand, UK and USA are the most common destinations of Australians. These countries are also the most important source of visitors to Australia. Holidaying is easily the most important reason for travel, followed by visiting relatives and then business. If visiting relatives and holiday travel are designated as leisure travel, the tables indicate that the volume of leisure travel is about 5 times the volume of business travel.

Overseas air travel has been growing very rapidly for many years, but the growth has been far from uniform across the markets. Table 2.4 illustrates the growth in leisure and business sectors on the Australia-UK route between 1970 and 1976. Leisure travel grew much more rapidly than business travel, and this is in fact generally the case on other routes. Leisure travel is more responsive to aggressive marketing techniques and also to general economic growth.

#### TICKET TYPES

From the consumer's point of view, international air travel has a number of characteristics which are important and about which decisions must be made. In addition to deciding to make an overseas trip the consumer must also decide where to go, when to travel and how long to be away. Often these factors are constrained by the purpose of the journey and the range of alternatives can be severely limited. An obvious example would be a business trip for a week's conference in London. On the other hand, many holiday travellers would perceive a range of possible options about where, when and how to travel, and would be influenced by the nature of the services provided by airlines in making their final choice.

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	Visi Rela	iting atives <sup>(b)</sup>	Ho1:	iday	Bus	iness	Oth	ner	Tot	tal
UK	50	661	90	957	16	878	10	255	168	751
US	9	837	46	760	21	698	7	629	85	924
Japan		576	11	014	5	072	1	498	18	160
NZ	33	167	142	965	21	484	14	194	211	810
Germany	6	830	5	756	2	687	1	339	16	612
Italy	16	083	15	442	2	222	2	842	36	589
Malaysia	2	494	12	145	3	062	2	284	19	985
Singapore	1	675	31	980	6	538	2	745	42	938
Other	59	829	228	502	47	694	37	007	373	032
Total	181	152	585	521	127	335	79	793	973	801
Percent	18.	.6	60	.1	13	.1	8.	. 2	100	.0

TABLE 2.2 - SHORT-TERM TRAVEL - DEPARTURES BY AUSTRALIAN RESIDENTS BY PURPOSE OF JOURNEY AND COUNTRY OF STAY, 1976<sup>(a)</sup>

(a) The table includes departures by both air and sea. However, sea represents a very small proportion of the total.

(b) This is ABS nomenclature. In general practice, the equivalent classification is 'visiting friends or relatives' (VFR). The difference is minor.

Source: Australian Bureau of Statistics, op.cit.

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	Visiting Relatives <sup>(b)</sup>	Holiday	Business	Other	Total
	30.075	11 855	11 412	11 519	73 860
	10 971	76 066	17 628	11 162	75 600
Janan	881	12 267	7 472	6 239	26 859
NZ	34 217	54 321	21 404	38 165	148 107
Germany	3 745	4 081	2 391	2 121	12 338
Italy	3 793	1 815	1 128	1 771	8 507
Malaysia	2 118	3 119	926	4 037	10 200
Singapore	1 615	3 460	2 373	1 797	9 245
Other	41 068	53 677	24 295	48 027	167 067
Total	137 343	180 661	89 029	124 837	531 870
Percent	25.8	34.0	16.7	23.5	100.0

TABLE 2.3 - SHORT-TERM TRAVEL - ARRIVALS BY OVERSEAS VISITORS BY PURPOSEOF JOURNEY AND COUNTRY OF RESIDENCE, 1976

(a) The table includes arrivals by both air and sea. However, sea represents a very small proportion of the total.

(b) This is ABS nomenclature. In general practice, the equivalent classification is 'visiting friends or relatives' (VFR). The difference is minor.

Source: Australian Bureau of Statistics, op.cit.

	Oversea: Austra	Overseas Arrivals by UK Residents					
	Leisure	Business	Other	Leisure	Business	Other	
	24 890 <sup>(a)</sup> 135 027	6 770 <sup>(a)</sup> 16 878	1 290 10 255	16 340 48 813	9 190 11 412	8 600 11 518	
Average Annual Growth Rate 1970-1976 (%)	33	16	41	20	4	5	

TABLE 2.4 - SHORT-TERM TRAVEL - GROWTH ON THE AUSTRALIA-UK ROUTE

BETWEEN 1970 AND 1976 BY PURPOSE

(a) Adjusted for ultimate destination. Before 1974, the ABS definition of destination was the first port of disembarkation.

(b) ABS statistics for 1976 aggregate travel by sea and air. An approximate adjustment has been made to leisure travel to exclude travel by sea. All business travel is assumed to be by air.

Source: Australian Bureau of Statistics: op.cit.

For many years, the airlines offered only First-Class and Economy-Class tickets which allowed the traveller a high degree of flexibility in relation to the duration of travel and where journeys could be broken. If the traveller was going to the UK, he could stop off for an indefinite period at a number of places en route if he wished. Over the last decade, the scheduled airlines have increased the range of tickets available, particularly on the Australia-UK route. The new tickets are much cheaper than the full economy ticket, but impose various conditions or restrictions on the trip. Reduced economy fares were introduced by QANTAS on the UK route in the late 1960's, but these catered for very limited markets (people under 26 years of age and affinity groups). In February 1972, a cheap return fare (referred to as the Excursion Fare or the YE180<sup>(1)</sup>) for the UK route went on sale. An Australian using this ticket was limited to a minimum stay of 45 days in the UK and a maximum

The designation YE180, and the later references to YOX and YE270 relate to QANTAS nomenclature for the Australia-UK route. Other airlines offer similar packages, depending on the route.

time away from Australia of 180 days. There were also restrictions on the number of stopovers en route and each stopover involved extra cost. In April 1972 a Special One-Way fare on the UK route (called YOX) became available. This was more expensive than the YE 180 and no stopovers were permitted, but there were no restrictions on the date of the return leg of the journey.

In April 1977, the conditions of the UK Excursion fare were changed to a minimum stay of 21 days and a maximum trip duration of 270 days. This was referred to as the YE270 fare. At the same time, an entirely new return fare, called APEF, went on sale. APEF is cheaper than the Excursion fare. It has the same length-of-stay restrictions as the Excursion. No stopovers are allowed with APEF (compared with one in each direction with the Excursion) and bookings and payment for the ticket must be made 90 days in advance of departure from home. The price of both APEF and Excursion tickets varies with both the month of departure and the month of the return home. Various other routes in addition to the Australia-UK route have low fare packages with similar types of conditions to those discussed above, although differing in details. These will not be discussed here, but they have been taken into account in the demand analysis reported later.

The appearance in recent years of these new fare packages allowed the scheduled airlines to meet competition from charter services operating mainly between Europe and the Far East. At the same time they are an effective mechanism for segmenting the market and applying price discrimination between the segments. For this purpose, the market segments are defined according to the desirability or acceptability of certain journey characteristics including trip durations, numbers of destinations and pre-booking requirements. Some travellers may put a very high value on the freedom to stay only a short time at their destination and the freedom to book only a few days before departing. They may also be reasonably unresponsive to changes in the fare level. It is clearly to the airlines' advantage to charge these people a relatively high fare. On the other hand, another group of potential travellers may not be unduly inconvenienced by a restriction on the length of stay at their destination, by a prohibition of stopovers en route, or by a pre-booking requirement, but their decision to make the trip may be strongly influenced

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by the fare level. By charging this group a relatively low fare the airlines can generate a high level of demand and revenue. It is also true that some of the restrictions embodied in the special fares enable the airlines to reduce costs by assisting them to plan for higher load factors.

Information covering the major airlines indicates that the special low-fare tickets are dominating the market on the UK route. The APEF tickets account for about 34% of the total market, while the Excursion tickets account for about 31%. The Special One-Way tickets account for about 21% of the market. The Full Economy and First-Class fares together take up about 13%. There are small numbers of sales related to other fare schemes such as group inclusive tours.

#### CHAPTER 3 - VALUATION OF NON-PRICE SERVICE FACTORS

#### ANALYSIS OF MARKET DATA BY TICKET TYPE AND PURPOSE

There are many aspects of the level of service provided by airlines to travellers. They can be broadly described by in-flight comfort, frequency of service and flexibility of travel arrangements. This Paper is mainly concerned with the last category which includes stopovers, trip duration and booking procedures.

It is possible to get an indication of the value people put on service factors by looking at their preferences for tickets with various combinations of conditions. Table 3.1 gives the range of tickets generally available to the public on the UK route, including both the prices of the tickets and the associated conditions.

Ticket Type	Return Price	Conditions				
	~(\$A)					
First-Class	2 946	Full flexibility				
Full Economy	1 880	Full flexibility				
Special One-Way	1 390	No stopovers allowed				
Excursion	1 000 to 1 300	Two stopovers; minimum stay 3 weeks; maximum time away from home 9 months				
APEF	850 to 1 150	No stopovers; minimum stay 3 weeks; maximum time 9 months; payment 3 months in advance; ticket valid for specific departure and return flights				

TABLE 3.1 - TICKETS USED ON THE AUSTRALIA-UK ROUTE - 1977

Source: QANTAS Advertising Pamphlets.

When a person buys a particular ticket he reveals some information about the monetary value he puts on combinations of conditions. For example, if he buys a YE270 ticket he is prepared to pay at least \$150 in order to avoid booking 3 months in advance or for the option of 2 stopovers, or for both of these advantages.

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Valuations of the conditions will vary widely from individual to individual (this being partly responsible for the availability of a range of tickets) but a correlation of valuations with trip purpose could be expected. This is borne out from an examination of the distribution of ticket types for different travel purposes.

Ticket Type	VFR	Holiday	Business	Other
· · · · · · · · · · · · · · · · · · ·		-		
First-Class	1	2	17	0
Full Economy	6	8	19	13
Special One-Way	8	12	17	60
Excursion	33	33	32	20
APEF	50	44	11	5
Other	2	1	4	2
Total	100	100	100	100

TABLE	3.2	-	DIST	RIBUTIO	N OF	TICK	ΞT	TYPES	ON	THE	AUSTRAL	IA-UK	ROUTE
			FOR	VARIOUS	PUR	POSES	-	DECEMB	BER	1977	7 (%)		

<u>Source</u>: BTE in-flight survey (discussed later) and information on total ticket sales.

Comparisons of in-flight surveys with total numbers of tickets sold and other information show that survey results tend to substantially overstate the proportions of people travelling on Full Economy tickets. A number of people holding low-cost tickets do not appear to be aware of the type of tickets which they are holding, and believe they have the Full Economy ticket. For Table 3.2, adjustments to the BTE survey results have been made to account for this effect as far as possible. It is felt that because of this problem, and because of the small size of the survey, the figures given in Table 3.2 should be regarded as indicative only.

A significant part of the business market is probably not very responsive to fares. According to Tables 3.1 and 3.2, nearly a fifth of business travellers  $^{(1)}$  is prepared to pay at least \$1 066, or a premium of 57%

<sup>(1)</sup> This category includes family members accompanying business travellers These family members are frequently not travelling on a First-Class ticket. If they are excluded, the proportion travelling First-Class is somewhat greater.

over the Full Economy fare, for the extra comforts provided by First-Class travellers. Apparently a further fifth of the business market is prepared to pay at least \$490 (a premium of 35% over the Special One-Way fare) for the freedom of making stopovers. Even higher premiums are paid to avoid the minimum stay restriction of 21 days. Most business trips are of short duration. In March 1977, 64% of Australian businessmen travelling overseas (to all destinations) indicated that their intended length of stay was less than 3 weeks<sup>(1)</sup>.

These observations of the business market accord with a priori expectations. Business trip arrangements (including duration and stopovers) are usually determined by various constraints specified by the tasks which the trip is expected to accomplish. A high value is placed on these arrangements and in many cases on the comfort of travel.

A more active trade-off between conditions and money is expected in the leisure travel market. The decisions about if, when, where and for how long to travel are generally more flexible. Referring again to Table 3.2, VFR and holiday travel have fairly similar distributions between tickets. First-Class travel is almost negligible for travellers in these categories. The proportion travelling Full Economy is also small. Relatively few travel on the Special One-Way ticket, presumably because restrictions on trip duration are generally not regarded as particularly inconvenient. Over 70% of leisure travellers purchase Excursion or APEF tickets.

Excursion ticket holders may or may not take up their option of having stopovers. They must pay an extra \$75 for each stopover. Excursion ticket holders who do not make stopovers are prepared to pay at least \$150, or a premium of 15% above the APEF, in order to avoid paying 3 months in advance and to have booking flexibility. If in addition they stopover once somewhere between Australia and the UK they are prepared

 Australian Bureau of Statistics, <u>Overseas Arrivals and Departures</u>, March Quarter 1977.

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to pay at least \$225 (22.5% premium) for both the stopover and the booking flexibility. For two stopovers their minimum valuation is \$300 (30%). Information on the number of people actually making stopovers is not available, but a BTE in-flight survey (discussed later) indicates that Excursion ticket holders tend to put a higher value on booking flexibility than stopovers.

APEF ticket holders obviously put lower values on stopovers and booking flexibility than Excursion travellers. They would not be prepared to pay as much as \$150 to avoid booking in advance, nor as much as \$225 for a stopover as well as booking flexibility.

#### ANALYSIS OF SURVEY OF TRAVELLERS

In late December 1977 and early January 1978, the BTE, with the cooperation of QANTAS, carried out a small in-flight survey of travellers on the Australia-UK route. The primary purpose of the survey was to obtain information on the attitudes of travellers to conditions of travel. Analysis of the responses has thrown some light on the values travellers place on conditions and also on their response to different fare levels.

Full details of the survey and the questionnaire form are provided in Appendix I. However, the results are summarised here. The first four questions refer to trip origin, destination and purpose, and ticket type. Only travellers with origins and destinations in UK or Australia are analysed. A total of 771 responses was available for analysis. Most of these were VFR travellers, which is not surprising given the timing of the survey (which in turn was constrained by the timetable of the ICAP review). However, a useful number of holiday travellers were in the sample. Table 3.3 shows the crossclassification of travellers by purpose and ticket type.

Question 5 of the survey questionnaire provides information on the fare elasticities of Special One-Way, Excursion and APEF travellers. This will be examined in the next chapter.

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Ticket Type	VFR	Holiday	Business	Other <sup>(a)</sup>	Total
First-Class	4	3	8	0	15
Full Economy	69	32	19	12	132
Special One-Way	42	22	8	26	98
Excursion	143	52	12	7	214
APEF	218	68	4	2	292
Other	14	3	2	1	20
Total	490	180	53	48	771

TABLE	3.	3	 NUMBERS	OF	RESPONI	DENTS	BY	TICKET	TYPE	AND	TRIP	PURPOSE	-	BTE
			SUDVEV	ים	CEMPED	1077	ΤO	TANHADY	1078	2				,

(a) Mostly migration and education.

Questions 6, 7 and 8 asked Special One-Way, Excursion and APEF travellers what percentage increase in fare they would be prepared to pay in order to obtain all the benefits of the Full Economy ticket. That is, they asked people to value the conditions associated with their tickets. There is always the possibility of bias when asking people to put values on attributes or characteristics of a product. In the case of air travel, a better service at lower cost is clearly desirable. Travellers were asked to choose between their conditions and fare increases of 30%, 20% and 10% in turn. It was hoped that by presenting specific choices and starting with the highest valuation, bias in the responses would be minimised.

Answers to these questions were classified by purpose and ticket type. However, only the VFR and Holiday categories contained significant numbers of observations. These groups were similar both in their responses to questions 6, 7 and 8 and in the distribution of their purchases among the various tickets. Therefore, all purposes are aggregated for the analysis of these questions.

Table 3.4 records the ranges of fare increases which respondents regard as equivalent to the conditions associated with their tickets. For example, 102 of the Excursion ticket holders said they would not be prepared to pay 10% extra to be free from all restrictions on trip duration and stopovers.

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'About 10%' refers to respondents who were unsure about whether they would pay an extra 10% to be free of the conditions, but who said they would not pay 20% more (cf. Table I.9 in Appendix I). 'Between 10% and 20%' refers to those who said they would pay an extra 10% but not an extra 20%. Respondents who were either inconsistent or unsure for more than one of the options were not included.

Equivale fare inc	ent creases	Special One-Way	Excursion	APEF	Total	
>	30%	3	9	11	23	
About	30%	0	1	1	2	
Between	20% and 30%	4	5	11	20	
About	20%	1	1	1	3	
Between	10% and 20%	23	47	66	136	
About	10%	2	13	30	45	
<	10%	41	102	119	262	
Total		74	178	239	491	

TABLE	3.4	-	DISTRIBUT	<b>FION</b>	OF THE	VAI	LUATION	i OF	CONDITIONS	5 BORN	E BY	SPEC	IAL
			LOW-FARE	TRAV	ELLERS	IN	TERMS	OF	EQUIVALENT	FARE	INCRI	EASES	(a)

(a) Figures presented are numbers of respondents.

In order to calculate average valuations for the conditions of a particular ticket by the holders of the ticket, it was necessary to assume that the average fare variation equivalents for the 7 categories of Table 3.4 were 35%, 30%, 25%, 20%, 15%, 10% and 5%. The results of the calculations are shown in Table 3.5. These results were obtained by weighting the percentages given above by the numbers of travellers nominating each valuation.

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#### TABLE 3.5 - AVERAGE VALUATIONS OF CONDITIONS BY SPECIAL LOW-FARE

TICKET HOLDERS

Ticket Type	Conditions	Average Equivalent Fare Increase
Special One-Way	No stopovers	10.7%
Excursion	Two stopovers; trip duration	10.3%
APEF	No stopovers; trip duration; advance payment; ticket valid for specific departure and return flights	10.9%

The last question (Question 9) on the BTE survey form was aimed at finding out how travellers regarded individual factors rather than combinations of factors. Respondents were asked to indicate in a qualitative fashion how inconvenient they find, or would find, various conditions. All Australia-UK travellers, irrespective of the ticket they had purchased for their current trip, were requested to answer the question. Some of the conditions do not currently apply to any of the tickets used on this route. This proved to be the most difficult part of the questionnaire for people to interpret and answer consistently. It became apparent during the analysis of the responses that many people did not interpret some conditions in the way which was anticipated. Since these could be generally identified, they could be removed from the sample. In Appendix I there is a detailed discussion of the problems and the criteria used in selecting the sample on which to base conclusions.

Table 3.6 shows the average level of inconvenience of 7 separate selected travel conditions as perceived by travellers categorized by trip purpose and ticket type. The values range from zero, where everyone regards the restriction as not inconvenient, to a maximum of 4, where everyone regards it as unacceptable. The average values for the different cells are based on varying sample sizes, as indicated in Appendix I.

Overall, the month of travel was the most important factor to travellers. Of the other conditions, lack of freedom to choose the exact day to travel, having to make firm bookings (in advance) for specific departure and return flights, and payment three months in advance were seen as the most inconvenient.

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The differences observed between ticket types is predictable. For example, stopovers are obviously not particularly important to One-Way and APEF travellers, in comparison with the other conditions. Payment in advance is clearly not a severe problem to APEF travellers. Minimum stay restrictions are a problem for One-Way and Full Economy passengers.

There is reasonable uniformity of response between VFR and holiday travellers. Figures for business travellers are not shown in Table 3.6 because of the small sample size. However, a comparison with the values for travellers in the leisure markets bears out a priori expectations that all conditions except restrictions on maximum trip duration and the maximum allowance of 2 stopovers are less acceptable to business travellers.

The figures in Table 3.6 are based on arbitrary scales. However, taking the analysis of questions 6, 7, 8 and 9 together, it is possible to draw some conclusions about average valuations of groups of travellers for individual conditions and various combinations of conditions. The valuations can be expressed in terms of equivalent percentage fare changes or dollars. As a cross-check against the reliability of the responses, the valuations of certain combinations of conditions can be compared with the upper and lower limits, discussed earlier, as revealed by the choices by travellers of various ticket types.

Responses to questions 6, 7 and 8 by Excursion travellers show that restriction to 2 stopovers (one each way) and restriction to a minimum trip duration of 3 weeks or a maximum one of 9 months is equivalent to a fare increase of 10.3% (or about \$129). From question 9, the average relative values for the individual conditions allow transformation into a monetary equivalent for any condition (or set of conditions) by simple pro-rata. However, this involves a basic assumption. It must be assumed that the scale of zero to 4 represents the same monetary value for each condition. Thus, the <u>relative</u> monetary value for a proposed condition can be compared to the relative monetary value of an existing condition for which an <u>absolute</u> monetary value is known. This will yield an absolute monetary value for the proposed condition. However, absolute monetary values have only been obtained for existing sets of conditions (as above). Nevertheless, the

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relative value of a set of conditions (whether proposed or existing) can be determined by adding the relative values of the individual conditions comprising the set. An absolute value for such a set of conditions can then be determined in the same way as for an individual condition.

Referring to Table 3.6, the average level of inconvenience to Excursion travellers of their conditions is 0.35 + 1.09 + 0.37 = 1.81 units on an arbitrary scale. On the same scale, the average level of inconvenience of having to pay 3 months in advance of departure is 2.39 units. Taking these as relative monetary values, Excursion travellers on average put a cost on prepayment of  $\frac{2.39}{1.81} \times 10.3 = 13.5$  per cent of their current fare or about \$169. Similar calculations can be done for other conditions.

APEF travellers would be prepared to pay an extra 10.9% to be free of their conditions of travel. From Table 3.6, these conditions combined are represented by 0.65 + 1.09 + 1.69 + 0.47 + 1.44 = 5.34 units of inconvenience. It is important to recognise that there may be an element of double counting by the addition of values for prepayment and booking on specific departure and return flights. It is possible that some travellers may not see these as separate conditions. In fact, the assumption of separability between these conditions does not turn out to be very significant in its effects. The average valuations of individual conditions by APEF travellers are calculated in the same way as for Excursion travellers. Thus, payment 3 months in advance is equivalent to a fare increase of  $\frac{1.09}{5.34} \times 10.9 = 2.2\%$  (about \$25).

Similar calculations can be repeated for travellers using the Special One-Way fare.

Table 3.7 shows the valuations of selected individual travel conditions for Excursion, APEF and One-Way ticket holders.

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Ticket Type	No Stopovers Allowed	Two Stopovers Allowed (one in each direction)	Payment 3 Months in Advance	Not Free to Choose Exact Day of Travel	Minimum Stay of 3 Weeks	Maximum Stay of 9 Months	Ticket Valid Only for Specific Departure and Return Flights	Unable to get a Seat in December or January
				VFR TRAVEL				
Full Economy	1.3	1.1	1.9	2.8	2.2	0.2	2.3	3.1
Special One-Way	1.1	0.4	2.6	2.8	1.6	0.6	2.4	3.2
Excursion	1.1	0.3	2.4	2.8	1.2	0.4	2.3	3.1
АРЕЕ	0.6	0.2	1.0	2.5	1.7	0.5	1.3	3.0
Total <sup>(b)</sup>	0.9	0.4	1.7	2.6	1.6	0.4	1.9	3.0
			I	OLIDAY TRAVEL				
Full Economy	1.7	0.4	2.1	2.8	2.2	0.9	2.4	3.6
Special One-Way	0.7	0.4	1.9	2.0	1.4	0.1	2.6	2.9
Excursion	1.2	0.3	2.2	2.6	1.1	0.2	2.1	3.5
APEF	0.6	0.2	1.4	3.1	1.7	0.5	1.8	3.6
Total <sup>(b)</sup>	1.1	0.4	1.9	2.8	1.6	0.4	2.1	3.5
10041	21 - 01			ALL TRAVEL				
Full Economy	1.3	0.8	2.2	2.8	2.3	0.4	2.5	3.2
Special One-Way	0.8	0.3	2.6	2.5	1.9	0.3	2.4	2.9
Excursion	1.1	0.4	2.4	2.7	1.1	0.4	2.3	3.2
APEF	0.6	0.2	1.1	2.7	1.7	0.5	1.4	3.2
Total <sup>(b)</sup>	1.0	0.4	1.9	2.7	1.6	0.4	2.1	3.2

TABLE 3.6 - LEVELS OF INCONVENIENCE<sup>(a)</sup> OF SELECTED CONDITIONS PERCEIVED BY TRAVELLERS

(a) Based on a scale on which 0 implies negligible inconvenience and 4 implies unacceptability. Note that only selected conditions are tabulated here. Full details are given in Appendix I.

(b) Includes ticket types other than those listed.

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Condition	Specia1	One-Way	Excu	rsion	APEF		
	°,	\$	0	\$	9 <sub>0</sub>	\$	
No stopovers allowed	10.7	149	6.5	81	1.3	15	
2 stopovers allowed	3.8	54	2.0	25	0.4	5	
Payment 3 months in advance	36.0	500	13.5	169	2.2	25	
Not free to choose exact day of travel	35.4	492	15.6	195	5.4	60	
Minimum stay of 3 weeks	26.8	372	6.2	78	3.4	38	
Maximum stay of 9 months	3.8	53	.2.1	26	1.0	11	
Ticket valid only for specific departure and return flights	34.3	477	13.2	165	2.9	32	

TABLE	3.7	-	VALUATIONS	OF	SELECTED	CONDITIONS	IN	TERMS	OF	EQUIVALENT
			FARE INCRE	ASES	5					

The estimates contained in the table indicate that Excursion travellers put much higher values on conditions than APEF travellers. Travellers on the Special One-Way ticket have still higher values. It is possible to apply some checks to these values against limiting values implied by the analysis of actual purchases of tickets with their associated conditions.

According to Table 3.7, Excursion travellers put values of \$169, \$165 and \$56 on the freedom to avoid prepayment, to have flexibility of choice of departure and return flights and to make two stopovers. The \$56 is the difference between the price they place on not being able to make any stopovers and the price of not being able to make more than two stopovers (one in each direction). Thus, in total, Excursion travellers value the avoidance of the extra conditions that would be imposed on them by the APEF ticket at about \$390. Of course, for some of these travellers the value would be much less and for others probably much more. The values for excursion travellers who make two stops must exceed \$300 or else they would have purchased the APEF ticket. For those who make one or no stops the values must exceed \$225 and \$150 respectively. Thus the valuations obtained from the responses of Excursion travellers to questions 6, 7, 8 and 9 are not inconsistent with their choice of ticket. The gaps between the average valuation and the limiting values seem rather large. Although it is possible that the valuations of the conditions by Excursion travellers have been overestimated, another explanation may be that respondents did not see advance payment and firm bookings on specific departure and return flights as independent conditions.

Turning to APEF travellers the estimate of the average value of prepayment and specific flights and the option of two stopovers is \$62. Again some travellers will value these more and some less. All APEF travellers <u>must</u> value them below \$150. Special One-Way travellers value the freedom from restrictions on trip duration at \$425 and freedom to make 2 stopovers at \$54. If they purchased the Excursion ticket they would lose trip duration restrictions but gain the option of stopovers and the estimate of the net cost they attach to this alternative is \$371. This exceeds the saving in fare of about \$140 and hence is in accord with their decision to buy the One-Way ticket.

#### CHAPTER 4 - ESTIMATION OF FARE AND SERVICE ELASTICITIES

It was noted in Chapter 2 that international air travel has been growing rapidly, and it follows that demand must be responding strongly to some favourable developments in its underlying determinants. The range of factors affecting demand is undoubtedly very large, but it is sufficient to focus only on the major ones in order to get a satisfactory explanation of movements in demand. This is particularly so in this study where the primary objective is to identify the responsiveness of demand to changes in fares and service levels (as defined earlier).

The most important factors influencing demand include personal or household income levels, air fares, exchange rates, numbers of migrants, and trade flows. As discussed in Chapter 2, the overseas air travel market can be segmented in several ways, and some factors will be relevant in some of the market segments but not in others. Even where a factor, such as fares, is expected to be important in all segments, the degree of its influence on demand will vary.

The demand analysis in this chapter will be limited to short-term travel (less than twelve months). The major segmentation will be the distinction between business and leisure travel but a further distinction between Australians going overseas and overseas visitors to Australia will be made  $^{(1)}$ .

#### LEISURE TRAVEL

#### Specification of the Demand Model

The propensity of individuals to take holidays overseas is affected by their income, the price of the trip, the level of service associated with the trip, and the prices of other goods and services available for their consumption. International travel is expensive and is generally regarded as a luxury. This suggests that demand for it would be sensitive to income growth and fare changes. That is, the income and fare elasticities of demand are expected to be relatively high.

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The model specifications are in some ways developments of and complementary to preliminary work done by M.D. Fitzpatrick and T.M. Grant in the BTE study of Sydney Region Aviation Forecasts.

Most other goods and services will be competing with air travel in an individual's budget, and a positive relationship between their prices and overseas travel demand is expected. However, in some cases a service is complementary (for example, accommodation) and an inverse relationship would be expected.

The exchange rate between the currencies of two countries can influence travel demand between them in two ways. First it can influence the level of fares. But it also influences the purchasing power of visitors. If the UK pound devalues with respect to the Australian dollar, then goods and services in the UK, including accommodation costs, will become cheaper for Australians with a budget defined in Australian dollars. This should encourage travel to the UK by Australians.

Visiting relatives is an important part of leisure travel. It is likely that the proportion of the Australian population born overseas will generate travel both by overseas relatives to Australia and by new settlers visiting their country of birth. The number of residents of an overseas country born in Australia could also generate travel.

Consideration of all these factors led to the specification of a general demand relationship. This general relationship can apply to travel by residents of Australia to an overseas country, or to travel by residents of an overseas country to Australia. The relationship can be summarised by:

	DP	= f(Y, F, E, MA, MO) (4)	4.1)
where	DP	is per capita demand for travel to an overseas country,	
	Y	is real disposable income per capita in the country of rest	idence,
	F	is the equivalent real fare in the country of residence,	
	Е	is the exchange rate between Australia and the overseas cour	ntry,
	MA	is the proportion of the Australian population born in the overseas country,	
and	MO	is the number of Australian-born permanent residents in the	

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overseas country.

The relationship assumes a population elasticity of one. If, for example, the Australian population increased by 20 per cent, the demand for overseas travel by Australians is assumed to increase by 20 per cent, all other factors remaining constant. The destination distribution of travel by Australians would remain unchanged.

The fare variable is a weighted sum of the various ticket types (i.e. First-Class, Full Economy and low-cost fares). The level of service is not included as a separate variable, but changes in it have been incorporated into the fare variable using the equivalent fare changes derived in Chapter 3.

Income and fares are deflated by the consumer price index, and this is the only way in which the prices of other goods and services enter the demand relationship. If money income and the general price of goods and services increase by a fixed percentage but nominal fares remain constant, then F (measured in real terms) will fall with a consequent increase in demand.

It is important to be clear on the interpretation and significance of the 'equivalent fare' (F). For a given ticket, it consists of the sum of the actual fare paid (called M) and the monetary equivalent of certain conditions attached to the ticket (called S).

The equivalent fare is analogous to the concept of generalised cost frequently used in the analysis of travel demand. However, S represents only those aspects of the level of service which are of particular relevance to this study. It includes booking constraints and restrictions on stopovers and trip duration, but not factors relating to in-flight comfort. Perceptions of S (and therefore F) for different tickets vary greatly between individuals. It is this variation which creates the demand for a range of tickets with different combinations of fares and conditions. For the purposes of demand estimation, the value of S used for a particular ticket is that estimated for the users of that ticket. In the case of Full Economy and First-Class tickets, S is zero because conditions of this type are not imposed on these tickets. It is quite low (about 10% of F) for the low-cost tickets because users of these tickets tend to put low values on the conditions imposed. The fare elasticities estimated in this study (and usually referred to simply as fare elasticities) relate to the equivalent fare, F, rather than the actual fare, M. The precise relationship between the two elasticities is easily determined. The formula for the elasticity  $(e_{p})$  with respect to F can be derived from equation 4.1 as follows:

$$\mathbf{e}_{\mathbf{F}} = \frac{\partial DP}{\partial F} \frac{F}{DP} = \mathbf{f}' \frac{M}{DP} + \mathbf{f}' \frac{S}{DP}$$
(4.2)

where  $f' = \frac{\partial DP}{\partial F} = \frac{\partial DP}{\partial M} = \frac{\partial DP}{\partial S}$ (4.3)

The elasticity  $(e_M)$  with respect to the actual fare M is given by:

$$\mathbf{e}_{\mathbf{M}} = \mathbf{f'} \frac{\mathbf{M}}{\mathbf{DP}} = \mathbf{e}_{\mathbf{F}} - \mathbf{f'} \frac{\mathbf{F}}{\mathbf{DP}} \frac{\mathbf{S}}{\mathbf{F}} = \frac{\mathbf{M}}{\mathbf{F}} \mathbf{e}_{\mathbf{F}}$$
(4.4)

Thus the elasticity with respect to the actual fare is equal to the elasticity with respect to the equivalent fare multiplied by the proportion of the equivalent fare accounted for by the actual fare. As shown above, this proportion is generally quite high, and  $e_{M}$  will usually be only a little smaller than e<sub>v</sub>.

Statistical estimation of the demand relationships using econometric techniques was undertaken in order to derive quantitative estimates of the various demand elasticities. The travel data used are based on the information in the Australian Bureau of Statistics publications, Overseas Arrivals and Departures. Data for the independent variables were extracted from numerous ABS bulletins and statistical publications of the United Nations, International Monetary Fund and the Organisation for Economic Cooperation and Development. Information on fares was gathered from unpublished sources.

Separate regression equations were estimated for Australians travelling overseas and overseas visitors travelling to Australia. In each case, variations in demand per capita across origin/destination pairs over time were explained in one equation. The overseas countries included in the regressions were UK, New Zealand, United States, Germany, Italy, Japan and Malaysia and Singapore (combined). The time period covered was March quarter 1964 to March quarter 1977. The approach adopted involved pooling time-series

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and cross-sectional data<sup>(1)</sup>. This increases the degrees of freedom of the analysis by providing many more observations. A further advantage over the more usual time-series approach is that variation between origin/destination pairs reduces multi-collinearity<sup>(2)</sup> between the independent variables and therefore increases the statistical significance of the coefficient estimates.

In addition to the explanatory variables discussed earlier, 'dummy' variables were included in the equations to allow for seasonal fluctuations or variations between origin/destination pairs due to factors which could not be represented directly. The only role of these variables is to provide a better overall explanation of demand and therefore a higher probability that the coefficients of the major explanatory variables have been correctly estimated.

Various mathematical relationships between the explanatory variables and demand are possible. The reported results are based on a multiplicative (or double log) relationship implying constant demand elasticities over time:

	DP	= a x <sup>b</sup>	(4.5)
or	ln DP	= a' + b ln X	(4.6)
where	X	represents the independent variables,	
	a,a'	are constants, with a' = ln a,	
and	b	is the elasticity of demand with respect to X.	

This formulation overcomes a problem which can occur when there is a wide variation in demand per capita between origin/destination pairs in the one equation. The alternative linear and log-linear formulations can force unreasonably large differences in elasticities between O-D pairs.

(2) Multi-collinearity is a problem caused by the fact that different explanatory variables tend to move together. This makes it difficult to separate the independent effects. The problem occurs in many ways, but joint movement over time is most common.

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<sup>(1)</sup> Time-series analysis involves observing variations in demand over time, and comparing these with variations in explanatory variables. Crosssectional analysis involves relating differences in demand between different origin/destination pairs to differences in explanatory variables for those pairs, at a particular time. The 'pooled' approach combines both techniques.

The statistical results were generally better for the multiplicative formulation than for linear or log-linear forms. However, the results cannot be used unmodified for forecasting a long way into the future, because the elasticities can be expected to decline in the long term as the market gradually approaches saturation and growth in demand levels off.

## Results of Statistical Estimation - Leisure Travel

Real income, equivalent real fares, an index of the exchange rate, and the proportion of the Australian population born in the relevant overseas country all proved to be significant determinants of demand in the pooled time-series/ cross-section regressions. The details of the equations including the estimated coefficients and their levels of significance are given in Appendix II. The proportion of the total variation in demand per capita explained by the independent variables is high in both equations<sup>(1)</sup>.

The equation for Australians travelling overseas produces an equivalent fare elasticity of -1.8 and an income elasticity of 2.4. These are of course average values. There are many sub-markets, defined for example by destination or socio-economic characteristics of travellers or a further refinement of trip purpose, across which there are likely to be considerable variations in elasticities.

The average equivalent real fares paid by Australians travelling overseas to the seven countries in the study have declined at about 7 per cent per annum over the period 1964 to 1977, allowing for the changes in fare structures over this period. This implies a contribution to growth in demand of about 12.5 per cent per annum (equal to  $-1.8 \times -7$  per cent per annum). Real incomes of Australians grew at about 3.7 per cent per annum over this period, suggesting a contribution to the growth in demand of about 8.5 per cent per annum (equal to 2.4  $\times$  3.7 per cent per annum). The sum of these contributions is 21 per cent per annum which is slightly higher than the actual average growth in demand of about 19.5 per cent per annum. Moreover, this latter figure would probably include a small amount of growth due to some growth in the proportion of the Australian population born overseas.

<sup>(1)</sup> In the equation for Australians travelling overseas, the dependent variable is demand per head of the Australian population; in the equation for visitors to Australia, the dependent variable is demand per head of population in the overseas country.

These considerations indicate that either the fare elasticity or the income elasticity or both could be slightly overestimated. There are reasons for believing that the problem could lie with the fare elasticity. Fares will influence an individual's decisions about whether or not to travel and where to go. Thus a low fare to a destination will not only generate extra overseas trips but also divert some trips from other destinations. The fare elasticity estimated from the pooled time-series/cross-section equation will tend to incorporate both of these responses.

Evidence to be considered later suggests that the generation component is much more important than the destination choice component. Nevertheless, the latter is significant, and the evidence mentioned above suggests that it represents probably about 20 per cent of the estimated elasticity. In explaining average growth in demand over time only the generation component is relevant. An estimate of -1.4 or -1.5 (20 per cent in magnitude below -1.8) would result in a contribution to growth in demand of about 10 per cent per annum. This would bring the sum of the contributions of fares and income down to about 18.5 per cent per annum, which appears consistent with the expectations alluded to earlier.

In addition to the pooled regression, separate regressions for Australians travelling to the seven individual countries were estimated and these are also reported in Appendix II (Table II.2). The exchange rate index and migrant variables were included where they were relevant and statistically significant. The fare and income elasticity coefficients always had the correct signs and were significant but their values varied greatly from country to country (about average values of -1.7 and 2.0 respectively). Some of this variation no doubt reflects genuine differences in market responses (for example, differences in the maturity of markets). However, time-series analysis in a context of substantial trends is typically subject to multicollinearity problems and coefficient estimates are likely to be somewhat unstable.

It was more difficult to model demand for travel to Australia by overseas residents using the pooled time-series/cross-section approach. The construction of the independent variables was more complicated. The incomes and fares perceived by individuals in their own currencies had to be converted to a common unit of measurement using an exchange rate index. Also, the

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demand behaviour of individuals could be expected to vary significantly from country to country. This was accounted for by the use of dummy variables which allowed the income elasticities for different countries to take different values. The estimated equation (reported in Appendix II) produced an average fare elasticity of -1.8 and a range of income elasticities from 1.1 to 2.6 (average 2.1). As in the case of travel by Australians, the average fare elasticity probably includes an element of destination switching.

Equations for the demand from individual countries were also estimated (Table II.4) using time-series data only. Again there was substantial variation in the elasticity estimates about average values of -1.2 and 2.8 for fares and income respectively.

## Fare Elasticities from the Survey of Travellers

Question 5 of the survey discussed in Chapter 3 and Appendix I asks travellers on low-fare tickets whether they would have still made the trip or gone to another overseas destination if none of the reduced economy tickets on the Australia-UK route had been available. Tables in Appendix I tabulate the responses to this question. Excluding those who would have postponed the trip until they could afford it, 26 per cent of the respondents to this question would not have travelled overseas and a further 8 per cent would have gone to another destination.

Since the changes in fares on which the responses are based are known, it is possible to calculate fare elasticities for travellers on the various low-fare tickets. The following formula is used:

$$b = \frac{\ln D_2 - \ln D_1}{\ln F_2 - \ln F_1}$$
(4.7)

where  $F_1$  is the current fare,  $F_2$  is the new fare, D<sub>1</sub> is the current demand,

> $D_{2}$ is the new demand,

is an estimate of the fare elasticity, as before. and b

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The definition is called an arc elasticity and corresponds to the point elasticity of the multiplicative form of the demand function.

In calculating the fare elasticity, it is necessary to allow for the fact that there is a service improvement if a traveller had made the trip on Full Economy instead of one of the reduced economy tickets. Accordingly, the nominal fare changes faced by travellers were modified to remove the effects of changes in service by using the fare equivalents for the conditions (derived in Chapter 3) corresponding to the various ticket types.

Table 4.1 shows the elasticities for various categories of travellers. The elasticities are measured to include the response of those who decide not to travel (generation aspect) and those who go to another destination. On average, the elasticities are lower in magnitude than the average figure of -1.7 for all destinations estimated in the preceding section. This is in accord with the lower estimate from the time-series equation for the UK route (-1.2 for Australians travelling to the UK). A lower value can be expected on the relatively mature UK route.

	Special One-Way	Excursion	APEF	Total <sup>(a)</sup>
VFR	-3.7	-1.5	-0.8	-1.1
Holiday	-1.1	-1.6	-1.2	-1.3
All trip purposes	-2.3	-1.5	-0.9	-1.2

TABLE 4.1 - EQUIVALENT FARE ELASTICITIES ON THE AUSTRALIA-UK ROUTE CALCULATED FROM SURVEY DATA

(a) Weighted average of values for the three ticket types.

The estimates in Table 4.1 are based on the assumption that all respondents who indicated they would postpone their trip would in fact not redirect expenditure into other goods or services, but would take the trip as soon as they had saved the extra money required for the Full Economy fare. It also assumes that they were not postponing their trip on the expectation that a lower fare would eventually become available. The phrasing of Question 5 attempted to rule out these interpretations. If these assumptions are not correct, the estimates in Table 4.1 will understate the elasticities. If, for example, half of those who indicated postponement would not in fact have bought the full economy ticket, the average overall elasticity would be estimated at about -2.0.

Measures of elasticity which include only the response of going to another destination are shown in Table 4.2. These figures indicate the degree to which demand for travel between Australia and the UK would change, through travellers choosing other destinations if fares were increased. Overall this response accounts for about 20 per cent of the total response of demand to a fare change.

	Special One-Way	Excursion	APEF	Total <sup>(a)</sup>
VFR	-0.39	-0.12	-0.14	-0.15
Holiday	-0.24	-0.78	-0.53	-0.70
All trip purposes	-0.24	-0.26	-0.22	-0.24

TABLE 4.2 - DESTINATION CHOICE ELASTICITIES ON THE AUSTRALIA-UK ROUTE

(a) Weighted average of values for the three ticket types.

## BUSINESS TRAVEL

The business market is much smaller than the leisure market. Although its growth has been very substantial, it has nevertheless been well below the growth in leisure travel. In some senses, this market is quite different to the leisure market, and different behavioural relationships must be employed. Therefore, a behavioural hypothesis has been established to explain total demand, rather than demand by individuals (which would lead to a formulation in terms of demand per capita). The hypothesis and its application are described briefly below.

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Total demand for business travel between two countries is expected to be influenced by the volume of trade between the countries. For the purposes of this analysis, this has been measured by the sum of exports to and imports from Australia to the overseas country. The exports and imports are measured in real terms. As with leisure travel, the level of fares in real terms is expected to influence demand. No other factors were investigated, but the effects of unidentified factors were accounted for in the regression analysis by including dummy variables and a time trend.

The approach taken for the statistical analysis was similar to that used for the leisure market. Pooled time-series/cross-section regressions with double log formulations were estimated using a similar time period<sup>(1)</sup> and the same seven countries. Separate equations were estimated for Australians travelling overseas and overseas visitors to Australia.

### Results of Statistical Estimation - Business Travel

The equations are reported in detail in Appendix II. The coefficients of the trade and fares variables had the appropriate signs and were strongly significant in both equations. A fare elasticity of about -1.2 was estimated for Australians travelling overseas on business, and about -1.0 for business visitors to Australia. The exogenous growth rate<sup>(2)</sup>, measured by the coefficient of the time variable, was much greater for Australians than for overseas residents.

Table 4.3 shows the estimates of the elasticities of demand with respect to fares and trade and the approximate contributions of changes in these factors to growth in demand for business travel.

(1) The time period finished at the September quarter 1975 in the analysis of business travel.

(2) That is, growth which is not explained by the variables included in the analysis.

		Australians Travelling Overseas	Overseas Visitors to Australia
FARES	Elasticity	-1.2	-1.0
	Average growth rate (% pa)	-4.0	-5.0
	Contribution to growth <sup>(a)</sup> in demand (% pa)	4.9	4.8
TRADE	Elasticity	0.8	0.8
	Average growth rate (% pa)	4.6	4.6
	Contribution to growth <sup>(a)</sup> in demand (% pa)	3.8	3.6
Exogen	nous growth rate (% pa)	6.0	3.2

TABLE 4.3 - IMPACT OF CHANGES IN FARES AND TRADE FLOWS ON BUSINESS DEMAND -1964 TO 1975

(a) Discrepancies between elasticities, growth rates and growth in demand are due to rounding.

The sums of the average contributions to growth in demand according to the estimated elasticities and the estimated exogenous growth rates are 14.7 per cent per annum, and 11.5 per cent per annum for Australians travelling overseas and overseas visitors respectively. These are very close to the actual average growth rates of demand of 14.4 per cent per annum and 11.0 per cent per annum.

It should be noted that conditions of the type dealt with under leisure travel were less relevant to business travel in the study periods since business travellers generally chose ticket types to which these conditions did not apply. Therefore, the 'equivalent fare' concept is less important in this case. However, there is increasing evidence of business travel on low-cost fares, and the situation may well change in the future.

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#### CHAPTER 5 - CONCLUSIONS

## REVIEW OF METHODS AND RESULTS

Information on international travel flows to and from Australia allows the market to be disaggregated into segments categorised by purpose and origin/ destination. The predominance of leisure travel is an obvious feature of the data. An examination of the distribution of tickets on the Australia-UK route showed that travellers in the leisure market are more willing than others to submit to various conditions related to booking procedures, stop-overs and trip duration if it means travelling at reduced cost. Low-cost tickets now represent a much larger proportion of the market (in terms of numbers of tickets sold) than First-Class and Full Economy tickets. Much of the analysis of this study is directed at leisure travellers using low-cost tickets.

From a survey of travellers on the Australia-UK route, valuations of various conditions of travel in terms of equivalent fare increases were derived for low-cost travellers (Special One-Way, Excursion and APEF ticket holders). The values, some of which are reported in Table 3.7, vary greatly between conditions. Lack of freedom to choose the exact day of travel, payment three months in advance and tickets valid only for specific departure and return flights are the three conditions which travellers are prepared to pay most to avoid. These are followed by restriction to a minimum stay of three weeks and complete disallowance of stopovers.

There is also a great variation between groups of travellers regarding the amount which would be paid to avoid any particular condition. As would be expected, APEF travellers are only prepared to pay small amounts to avoid conditions, their highest valuation being \$70 (or about 6 per cent of their fare) for inability to choose the exact day of travel. Excursion travellers are far more resistant to this condition (as they are to other conditions) and would be prepared to pay \$258 (or 21 per cent of their fare) to avoid it. Special One-Way travellers put even higher values on conditions than do Excursion travellers. For example, they would be prepared to pay about \$500 to avoid payment three months in advance, and a similar amount to avoid the

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inability to choose the exact day of travel. Although specific valuations for First-Class and Full Economy travellers are not reported, it can be unequivocally stated that they would be much higher again than those for Special One-Way travellers. The figures derived in this study are consistent with the observed behaviour of travellers when choosing between existing ticket types with various sets of conditions.

These valuations of conditions allow estimates of equivalent fares for various tickets. The equivalent fare includes both the actual fare paid for the ticket and the average monetary equivalent of the conditions attached to the ticket as valued by the users of the ticket. The similarities with the commonly-used concept of generalised cost<sup>(1)</sup> are clear, but only a limited range of non-price service factors is included. Equivalent fares, as defined above, are the same as actual fares paid in the case of travellers buying First-Class or Full Economy tickets, because none of the relevant conditions apply to these tickets. Equivalent fares. Because most business travel is on First-Class or Full Economy tickets, the concept of the equivalent fare as employed here is not significant for the business market.

Equivalent fare elasticities (usually referred to in this Paper simply as fare elasticities) have been estimated from econometric demand equations in which variations in demand, both over time and between origin/destination pairs, are compared with variations in several explanatory variables. For the leisure market, the average fare elasticity of demand for air travel both by Australians to overseas destinations and by overseas residents travelling to Australia has been estimated at -1.8. This elasticity relates to an 'average' overseas destination or origin, and incorporates both generation of travel (substitution between international travel and other goods and services) and destination switching. The elasticities for particular destinations vary considerably. Evidence discussed in Chapter 4 suggests

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A useful discussion of generalised cost is given in P.T. McIntosh and D.A. Quarmby, 'Generalised Costs and the Estimation of Movement Costs and Benefits in Transport Planning', Highway Research Record No. 383, 1972.

that the fare elasticity for the Australia-UK route is somewhat lower in magnitude than the figure given above, and is possibly as low as -1.2. This route is relatively mature compared with other Australia-based international routes (although not more so than the Australia-NZ route) and this would be a major factor contributing to a relatively low elasticity. Elasticities on other routes have been estimated by time-series regressions which are reported in Appendix II. However, in most cases little confidence can be placed in these estimates for individual routes.

If the destination-switching aspect of demand response is excluded from the elasticity measure, then it is estimated that the average elasticity for Australians travelling overseas would fall to about -1.5. This elasticity can be used to measure the total response of overseas travel by Australians to an 'across-the-board' fare change (a constant percentage change in fares to all destinations and for all ticket types) after suitable allowance for the values placed on particular ticket conditions.

The study has not attempted to make precise estimates of cross-elasticities between ticket types. The demand for a range of ticket types is generated by the wide variation in perceptions of the monetary equivalents of conditions across individuals. One method of obtaining cross-elasticities between tickets would be to measure the distributions of the valuations of sets of conditions associated with the various tickets. For any given set of prices, the relative demands for the tickets could then be predicted.

In this study, estimates have been made of the average valuations placed on sets of ticket conditions by three groups of travellers. These groups are the current users of Special One-Way, Excursion and APEF tickets. Thus, limited information about the distributions required for predicting ticket shares has been obtained. With this information, appropriate approximate demand patterns for tickets with different fares and sets of conditions can be derived. Equivalent fare elasticities can then be applied to forecast new demand.

## IMPACT ON DEMAND OF ALTERNATIVE FARE-SERVICE PACKAGES

The information summarised earlier in this Chapter can clearly be used to derive the impact of a great range of alternative fare-service packages. This Paper was written at a time when many proposals and counter-proposals were being advanced for international aviation as it affects Australia. In terms of assessing potential impacts on demand, the BTE's approach has been to examine general examples of potential fare structure changes, rather than to concentrate on particular proposals. However, the general examples given below show the methods which can be used to analyse other alternatives.

The implications of three types of changes to current fare structures are considered. The first is a simple percentage fare reduction for all types of tickets. The second is a reduction in the APEF fare on the UK route. The third is replacement of the APEF ticket with a ticket with a different set of conditions. The results of calculations of demand based on these three alterations to the existing fare structure are interesting enough in themselves. However, their main value lies in their use as examples of the methods by which the elasticity and condition valuation estimates derived in this Paper can be used.

## Across-the-Board Fare Reductions

On the assumption that the leisure market consists mostly of low-cost tickets with conditions attached, a 15 per cent cut in actual fares charged for tickets amounts to an effective overall reduction of 13.6 per cent in the equivalent fares for this market. Using an elasticity of  $-1.5^{(1)}$ , a 15 per cent cut in fares for all tickets from Australia to <u>all</u> destinations would generate a growth of 25 per cent in total demand for international leisure travel by Australians. Provided the 15 per cent fare cut applied <u>only</u> to

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It should be noted that the elasticities derived in earlier parts of this Paper are <u>arc</u> elasticities. In order to use these elasticities to calculate demand responses, it is necessary to use an analytical technique which essentially involves developing the inverse of Equation 4.7 in Chapter 4.

travel to and from Australia<sup>(1)</sup>, demand for leisure travel to Australia would increase by about 30 per cent (using the appropriate elasticity of -1.8 for overseas residents visiting Australia).

In the case of business travel, the percentage cut in the equivalent fare is virtually identical to the percentage cut in the actual fares paid. The effect of a 15 per cent across-the-board cut would be to increase business trips by Australians by about 22 per cent (based on an elasticity of about -1.2) and trips by business visitors to Australia by 17 per cent (based on an elasticity of about -1.0).

A 15 per cent cut in fares to the UK <u>alone</u> would increase leisure travel between Australia and the UK by 19 per cent<sup>(2)</sup>, on the basis of the estimated elasticity of -1.2. Business travel between the two countries would probably increase by the percentages indicated in the previous paragraph.

An across-the-board reduction of fares in the ways described above would result in only marginal variations to the proportions of travellers using each of the current ticket types. The net effects on airline revenues would depend on the particular circumstances of the reduction. A 15 per cent cut in fares to the UK alone (the last case examined) would only have a small effect. The other strategies examined would lead to substantial revenue increases.

## Reduction in the APEF Fare on the Australia-UK Route

If the APEF fare on the Australia-UK route is reduced, new travellers will be attracted and travellers who would have purchased other tickets (in particular the Excursion ticket) will purchase APEF tickets instead. Again, the actual fare reduction examined is 15 per cent.

<sup>(1)</sup> Quite a different picture would emerge in the case of, say, a world-wide reduction in fares. In such a case, destination-switching in favour of Australia would not occur, although the general level of overseas visitors to Australia would rise. Since the elasticity estimates used here have been derived on the basis of the changes to fares to Australia only, different results would be expected in reaction to general changes.

<sup>(2)</sup> The difference between this case and the immediately preceding analysis of business travel is due to the effect of the equivalent fare concept for leisure travel.

A 15 per cent reduction in the APEF fare would increase the gap between APEF and Excursion fares by about \$150 to \$375 (on average). This would raise the level by which Excursion travellers must value the freedom to make stopovers, avoid pre-purchasing and retain booking flexibility rather than accept the lower APEF fare. Excursion travellers who make one stopover would (under the new circumstances) have to value freedom from the restrictions imposed by the APEF ticket by more than \$375. The <u>average</u> valuation of these restrictions (estimated from the responses of travellers currently using the Excursion ticket) under the current pricing structure is \$390, which is close to the above figure. On the assumption that the distribution of the valuations by Excursion travellers about this average figure is approximately symmetrical, it could therefore be expected that nearly half of the current Excursion travellers would switch to the new lower-price APEF ticket. There would be very little switching from other ticket types.

The best information on the current overall market split suggests that 34 per cent of travellers hold APEF tickets and 31 per cent hold Excursion tickets on the Australia-UK route. The switching assumptions just discussed would change this to about 47 per cent holding APEF tickets and 18 per cent holding Excursion tickets, before considering new<sup>(1)</sup> travellers.

On the assumption of an elasticity of -1.2 for generated leisure travel on the Australia-UK route, a 15 per cent fare cut for APEF tickets would increase the APEF market by a further 19 per cent<sup>(2)</sup>. This increase would come from potential APEF travellers confronted with a 15 per cent actual fare cut and potential Excursion travellers faced with an equivalent fare cut of around 11 per cent<sup>(3)</sup> of the existing equivalent APEF fare if they are prepared

- (1) This is a hypothetical distribution, since the proportions would be changed by the simultaneous rise in new demand for APEF tickets. The switching proportion used to derive conversion from Excursion to APEF tickets is slightly less than 50 per cent, to allow for the slight difference between the valuation figures of \$390 and \$375.
- (2) Again, a cut of 15 per cent in the <u>actual</u> fare paid by APEF travellers or potential travellers is rather less in equivalent fare terms. In fact, the equivalent fare decrease is around 13.5 per cent.
- (3) It is assumed that the potential markets for Excursion and APEF tickets are in similar proportions to those seen in the current markets.

to accept APEF conditions. The overall new demand for APEF tickets would be in the vicinity of 1.7 times the original demand (of which the major increase would come from converted Excursion travellers). The effect on the total market would be an increase in demand of about 9 per cent.

In this case, substantial changes would occur in the proportions of Excursion and APEF travellers. In the new (and expanded) market, 17 per cent of travellers would use Excursion tickets (compared with the current level of 51 per cent). The proportion of APEF travellers would be 51 per cent (currently 34 per cent). This substantial shift in ticketing patterns would clearly be significant in determining airline revenues. The net effect of this particular strategy is likely to be a small drop in revenue.

## Replacement for the APEF Ticket on the Australia-UK Route

The final alternative involves the implications of a hypothetical replacement for the APEF ticket on the Australia-UK route. The replacement would have a different set of conditions. The new ticket is similar in some respects to the Special One-Way in that it does not allow stopovers, imposes no restrictions on trip duration and does not require payment in advance. However, it has the characteristic that travellers are not able to choose the exact day of travel (but are assured of a flight sometime during a particular week). In effect, this is the type of ticket which could be associated with some forms of 'regular charter' services.

Information from Table 3.7 indicates that, in total, the conditions on this ticket are less onerous than those on the existing APEF ticket to most travellers currently using either Special One-Way, Excursion or APEF tickets. However, they are more onerous than the Excursion ticket. If the new ticket was sold at the same price as the existing APEF ticket, it would attract new travellers, almost all travellers currently using APEF tickets, and many travellers currently using the Special One-Way and Excursion tickets.

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The average amount which current Excursion travellers would be prepared to pay to avoid the conditions of the new ticket is only about  $$150^{(1)}$ . This is about \$240 less than the corresponding amount which they would be prepared to pay to avoid the conditions on the APEF ticket. It is much less than the lower limit necessary for them to choose Excursion (on the assumption that an Excursion traveller makes one stopover). It can therefore be expected that over half of the current Excursion travellers would swing over to the new ticket. Probably nearly half of the current Special One-Way travellers would switch to the new ticket is not very much more than the extra fare necessary to be free of them.

If the price of the new ticket is the same as the current APEF ticket, the percentage reduction in the equivalent fare faced by potential travellers is the greatest for those who (under the current circumstances) are potential One-Way ticket holders, and least for those who are currently potential APEF travellers. The generated travel from all three sources as a result of the replacement of APEF with the new ticket at the same price would result in an increase in the total Australia-UK market of about 11 per cent. The new ticket would account for about 67 per cent of the overall expanded market. Travellers on Special One-Way tickets would decline from the present 20 per cent of the market to about 10 per cent of the new market. The decline in Excursion tickets would be from about 31 per cent to about 10 per cent.

If the price of the new tickets was 15 per cent below the current APEF price, an increase of about 25 per cent over the existing total market could occur, with about 75 per cent of the Australia-UK market being taken up by the new ticket.

The implications for overall revenue of these strategies are minor.

(1) Allowance has been made for the benefit accruing from the new ticket's freedom from restrictions on trip duration.

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## APPENDIX I SURVEY OF ATTITUDES OF INTERNATIONAL TRAVELLERS

## BACKGROUND TO THE SURVEY

A limited survey was conducted as part of the BTE's contribution to the International Civil Aviation Policy (ICAP) Review. Essentially, the survey was mounted to identify the degree of inconvenience caused to travellers by a variety of conditions which may be placed on tickets. A further major aim of this survey was to estimate approximate values which could be placed on the imposition or removal of ticket conditions. Due to the very tight time-scale for the whole study, the survey was developed and implemented in considerable haste. Therefore, it did not benefit from the usual procedures such as widespread consultation on design, pilot testing and comprehensive sample selection. This situation was exacerbated by the fact that the survey had to be mounted immediately prior to Christmas, with consequent problems with printing and other logistic aspects.

The desired end result of the survey was the ability to develop 'equivalent' fares, which would reflect both the actual fare paid and the notional cost associated with any particular set of conditions. By first assessing the value placed on conditions imposed on current tickets, the fare variable in a demand estimation or forecasting process can be adjusted to account for the change in service levels on the introduction of a new fare package. This allows the fare variable in each category to reflect the change in fare structure at constant service levels.

A copy of the questionnaire used in the survey is shown in Figures I.1 and I.2. A detailed discussion of some of the major questions is given in Chapter 3.

#### DETAILS OF THE SURVEY

The survey was conducted on QANTAS flights on the Australia-UK route over the period 17 December 1977 to 14 January 1978 on either day-time or evening sectors which had long flight times. The Flight Service Director (FSD) on

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(Original Size 200mm x 140mm)

Other



4.

## BUREAU OF TRANSPORT ECONOMICS

## SURVEY OF ATTITUDES OF INTERNATIONAL TRAVELLERS

The aim of this survey is to assess the acceptability of various conditions associated with low cost fares and we would appreciate your assistance in this task. Most of the questions can be answered by placing a tick in the appropriate box. They will only take a few minutes of your time. Your answers will be treated as confidential.

1. Which country do you live in?

	United	Kingdom	
--	--------	---------	--

2. Which country is, or was, your main destination away from home on this trip?

United Kingdom Australia Other

If you answered 'Other' to either question 1 or question 2, you do not need to answer any further questions, and we thank you for your co-operation. Otherwise, please proceed to question 3.

🗌 Australia

#### 3. What is, or was, the main purpose for your entire trip?

Usiting friends and relatives	
Holiday (including working holiday)	
Business (including conference attendance, accompanying business traveller)	
Migrating	
Other (please state)	
On which of the following fare types are you travelling?	
Special one-way fares with no stopovers	
The Advance Purchase return fare (APEF) which requires payment in full 90 days before travelling and which does not permit stopovers	
☐ The special return fare with a minimum stay of 21 days and maximum stay of 180/270 days and allowing 2 stopovers at extra cost	
The full economy fare which has no restrictions	
	Please
	question 9 only
Uther (please specify)	

5. If none of these special fares had been available, what do you think you would have done?

Bought a full economy ticket (costing \$A1880 or £UK1028 return)

Gone to another overseas destination

Postponed the overseas trip (until you could afford the full economy fare)

Not travelled overseas

PLEASE TURN OVER

## Figure I.1 - SURVEY QUESTIONNAIRE (SIDE A)

T Yes	,					
f your answer to question 6 is	No' or 'Unsu	re', would	l you have	preferred a	full econo	my
ticket costing 20 per cent mon	e (a fifth more	)?		Π		
L Yes			,		ure	£
f your answers to questions 6 conomy ticket costing 10 per	cent more (a	tenth mo	sure would re}?	i you nave j	preterred a	TUN
Yes				🗌 Uns	ure	
Could you please indicate how for this trip (bearing in mind t the five boxes for each conditi	v inconvenient hat avoiding a ion.	you find, condition	, or would f n involves e	find, the fo xtra cost).	llowing con Please tick	ditions one of
		Not Inconvenient	Slightly Inconvenient	Fairly Inconvenient	Very Inconvenient	Not Acceptable
lo stopovers allowed (a stopo f more than 24 hours)	ver is a stay			Д		
_imited to one stopover in bo	th directions		Ļ	1		
lirections	bth					
ayment 3 months in advance of fare not refundable)	(25 per cent					
ayment 1 month in advance of fare not refundable)	(25 per cent					
lot free to choose the exact o ut only able to nominate the vithin which you wish to dep	lay of travel week art					
Restriction to a minimum stay lestination of 21 days	y at your					
Restriction to a minimum stay lays	/ of 45					
Restriction of a maximum sta lays	y of 180					
Restriction of a maximum sta lays	y of 270					Ľ
licket valid only for a specific	c departure				. 🗆	
Ficket valid only for a specific light and a specific return flig	c departure Jht					
Jnable to get a seat during De out seats available in January	ecember					
Jnable to get a seat in Decem January but seats available in November or February	ber or					Ľ

- ---

THANK YOU FOR YOUR CO-OPERATION

## Figure 1.2 - SURVEY QUESTIONNAIRE (SIDE B)

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each flight announced the sponsor of the survey<sup>(1)</sup> and its objectives, and stated that the form would be handed to each passenger and would be collected later. The flight staff then distributed the forms. After some time the FSD announced that the forms would be collected in five minutes.

A total of 1052 survey forms was distributed. Detailed information was only required from passengers who lived in the United Kingdom and whose main destination was Australia and from those who lived in Australia with their main destination being the United Kingdom. A total of 221 passengers responded 'Other' to either the question on their home country (Question 1) or the question on their main destination (Question 2), and hence were ineligible to answer further questions. A further 60 completed forms were of little or no use, although the passengers were eligible. This left a sample of 771 usable forms<sup>(2)</sup> (73 per cent of the total issued). Full response details for each flight surveyed are given in Table I.1.

The pre-Christmas flights were heavily booked, with two flights between Australia and the United Kingdom providing 43 per cent of the usable responses.

## ANALYSIS OF THE SURVEY

The major analysis of the survey data is summarised in Chapter 3. The objective of this section is to discuss the criteria chosen to select the observations included in the analysis, and to present additional data for background information.

## Purpose and Ticket Type by Country of Origin (Questions 3 and 4)

Tables I.2 and I.3 give a segmented analysis for the purpose and ticket type cross-classification (Questions 3 and 4, respectively) for passengers living in Australia and the United Kingdom respectively. Passengers living in Australia accounted for 69 per cent of all travellers in the sample. This compares well with 1976 travel patterns when 70 per cent of short-term

<sup>(1)</sup> The survey was conducted under the BTE's name. Involvement with the ICAP Review was not indicated.

<sup>(2)</sup> A form was deemed usable if it provided information on both the purpose and fare type.

	QF1	QF2	QF2	QF3	QF4	QF5	QF8
Day and date	Sat 17/12	Sat 31/12	Sun 1/1	Sat 14/1	Sun 18/12	Fri 13/1	Sat 31/12
Link surveyed	Syd-Sing	Bah-Sing	Bah-Sing	Bah-Sing	Pth-Bom	Pth-Bom	Lon-Bom
Number issued	233	81	84	187	181	174	113
Number responding 'Other' to Q.1 or Q.2(a)	48	20	44	43	18	26	22
Number of little or no use	10	7	8	4	8	14	10
Number usable	175	54	32	140	155	134	81

TABLE I.1 - SUMMARY OF RESPONSES BY FLIGHT SURVEYED

(a) This test was used to exclude travellers who were not required for the analysis.

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movements between UK and Australia were by Australians<sup>(1)</sup>. Only minor differences occurred between travellers from the two countries regarding ticket types. Of the UK passengers, 3 per cent travelled First-Class and 20 per cent Full Economy, compared with 1 per cent and 16 per cent respectively for Australians. The major noteworthy difference was Excursion travel at 23 per cent for UK passengers and 30 per cent for Australian passengers.

	First- Class	Full Economy	Special One-Way	Excursion	APEF	Other	Total
		Number	of Respon	dents			
VFR	2	49	33	96	129	12	321
Holiday	1	29	20	49	65	3	167
Business	4	3	3	8	4	1	23
Other	0	3	8	6	1	1	19
Total	7	84	64	159	199	17	530
		Percentage	e of Respo	ndents <sup>(a)</sup>			
VFR	0.4	9.2	6.2	18.1	24.3	2.3	60.6
Holiday	0.2	5.5	3.8	9.2	12.3	0.6	31.5
Business	0.8	0.6	0.6	1.5	0.8	0.2	4.3
Other	0.0	0.6	1.5	1.1	0.2	0.2	3.6
Total	1.3	15.8	12.1	30.0	37.5	3.2	100.0

TABLE I.2 - PURPOSE OF JOURNEY BY TYPE OF TICKET - AUSTRALIANS VISITING UNITED KINGDOM

(a) Rounding errors sometimes prevent columns or rows adding exactly
 to give totals.

 See Tables 2.2 and 2.3, which refer to short-term movements only. However, permanent movements account for only 3 per cent of travel (Table 2.1), and hence do not distort the results significantly.

	First- Class	Full Econor	Special ny One-Way	Excursion	APEF	Other	Total
		Numb	ber of Resp	ondents			
VFR	2	20	9	47	89	2	169
Holiday	2	3	2	3	3	0	13
Business	4	16	5	4	0	1	30
Other	0	9	18	1	1	0	29
Total	8	48	34	55	93	3	241
		Perce	entage of R	$espondents^{(a)}$			
VFR	0.8	8.3	3.7	19.5	36.9	0.8	70.1
Holiday	0.8	1.2	0.8	1.2	1.2	0.0	5.4
Business	1.7	6.6	2.1	1.7	0.0	0.4	12.4
Other	0.0	3.7	7.5	0.4	0.4	0.0	12.0
Total	3.3	19.9	14.1	22.8	38.6	1.2	100.0

## TABLE I.3 - PURPOSE OF JOURNEY BY TYPE OF TICKET - UNITED KINGDOM RESIDENTS VISITING AUSTRALIA

(a) Rounding errors sometimes prevent all columns or rows adding exactly to give totals.

The distribution of journey purpose for the journey differed more markedly between UK and Australian passengers. For holiday travel, Australian passengers recorded the higher figure of about 30 per cent compared with 5 per cent for UK passengers. Business passengers accounted for 12 per cent of UK travel but only 4 per cent of Australian travel. Comparisons with Tables 2.2 and 2.3 emphasise the seasonal nature of these distributions.

## Alternative to Travelling on Low-Cost Fares (Question 5)

The data collected from Question 5 (relating to alternatives if low-cost fares had not been available) allow measurement of fare elasticities by observing responses of travellers to alternative fare packages. The results also allow a comparison of the destination conversion and generation effects of fare changes. Results are reported in Chapter 3 for each fare type.

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A response to this Question was not considered for tabulation if more than one of the four listed responses was made, or if no response or an unlisted response was given. From a sample size of 771 usable forms, 167 respondents were not required to answer Question 5 because of the particular ticket types on which they were travelling. A further 31 responses to this Question were found to be unusable, leaving 573 observations. Results are given in Table I.4 for VFR passengers, Table I.5 for holiday passengers and Table I.6 for all passengers.

Alternative	Special One-Way (number) (%)		Êxcu	Excursion		APEF (number) (%)		otal
			(number) (%)		(numl			er) (%)
Travelled Full Economy	13	32.5	37	26.6	59	28.6	109	28.3
Visited another overseas destination	3	7.5	5	3.6	12	5.8	20	5.2
Postponed the trip	6	15.0	51	36.7	90	43.8	147	38.2
Not travelled overseas	18	45.0	46	33.1	45	21.8	109	28.3
Total	40	100.0	139	100.0	206	100.0	385	100.0

TABLE I.4 - PROPOSED ALTERNATIVE TO TRAVELLING ON A LOW-COST FARE -VFR TRAVELLERS

Alternative	Sp On	Special One-Way		Excursion		APEF		tal
	(numb	er) (%)	(numb	er) (%)	(numb	er) (%)	(numb	er) (%)
Travelled Full Economy	11	52.3	17	33.3	20	29.4	48	34.3
Visited another overseas destination	1	4.8	11	21.6	14	20.6	26	18.6
Postponed the trip	6	28.6	14	27.5	20	29.4	40	28.5
Not travelled overseas	3	14.3	9	17.6	14	20.6	26	18.6
Total	21	100.0	51	100.0	68	100.0	140	100.0

# TABLE I.5 - PROPOSED ALTERNATIVE TO TRAVELLING ON A LOW-COST FARE - HOLIDAY TRAVELLERS

## TABLE I.6 - PROPOSED ALTERNATIVE TO TRAVELLING ON A LOW-COST FARE -

ALL TRAVELLERS'	a
-----------------	---

Alternative	Sp On	Special One-Way		Excursion		APEF		tal
	(numb	er) (%)	(number) (%)		(numb	(number) (%)		er) (%)
Travelled Full Economy	37	43.6	63	30.3	80	28.5	180	31.5
Visited another overseas destination	4	4.7	16	7.7	26	9.3	46	8.0
Postponed the trip	17	20.0	69	33.2	113	40.4	199	34.7
Not travelled overseas	27	31.8	60	28.8	61	21.8	148	25.8
Total	85	100.0	208	100.0	280	100.0	573	100.0

(a) Includes categories other than VFR and holiday travellers.

As might be expected, flexibility in the choice of destination is much less for VFR passengers than for holiday passengers. Only 5 per cent of VFR passengers said they would visit another overseas destination if cheap fares to the UK were not available, whereas 19 per cent of holiday travellers indicated that they would convert destinations. These were the only two purposes for which people said they would switch destinations. The 5 per cent of VFR passengers who said they would switch destinations are assumed to be combining a holiday with their visit. Almost 40 per cent of VFR passengers said they would postpone their trip until they could afford the Full Economy fare, whilst 28 per cent said they would travel Full Economy immediately and a further 28 per cent said they would not travel overseas.

Of holiday travellers, 29 per cent indicated that they would postpone the trip, and 34 per cent indicated that they would travel at the same time, but on a Full Economy ticket. Thus, holiday travellers are more reluctant than VFR travellers to postpone their trips, but the overall response of demand for travel to the UK is similar for both trip purposes.

In aggregate, travelling on a Full Economy ticket and postponing the trip attracted similar proportions of 31 per cent and 35 per cent respectively. A quarter of the passengers responding to this question said they would not travel overseas and 8 per cent said they would visit another destination.

## Conditions and Equivalent Fare Increases (Questions 6 to 8)

Questions 6 to 8 asked the passengers to value the conditions under which they were travelling by stating in percentage terms the additional fares they would be prepared to pay to avoid these conditions. Respondents were able to choose between 30 per cent, 20 per cent and 10 per cent.

In analysing this question it was necessary to omit four categories of respondents:

- . those ineligible to answer on the basis of their ticket type (167 respondents);
- those eligible to answer but who did not answer the questions
   (43 respondents);

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- those who were uncertain in their answers (59 respondents);
- . those who were inconsistent in their answers (11 respondents).

The first two categories are self-explanatory. Respondents were classified as uncertain (and not providing sufficient information) if they answered 'unsure' to two or more of the questions. Twenty-two respondents answered 'unsure' to all three questions, 29 answered 'unsure' to both questions 6 and 7, and 8 answered 'unsure' to both questions 7 and 8. Responses were adjudged inconsistent if the answer to question 6 was 'unsure' and the answer to either question 7 or question 8 was 'no' (9 respondents) or if the answer to question 7 was 'unsure' and the answer to question 8 was 'no' (2 respondents). After omitting any such responses, 491 usable returns remained.

Fare increases which low-fare VFR, low-fare holiday and all low-fare passengers were prepared to pay are given in Tables I.7, I.8 and I.9 respectively. Although responses differ by type of fare, little variation is evident between purposes. The aggregate responses of all low-fare passengers is represented in graphical form in Figure I.3.

% of fare paid	Special One-Way	Excursion	APEF	Total
'Yes' to 30%	2	6	9	17
'Unsure' at 30% 'Yes' to 20%	0	· 1	1	2
'No' to 30% 'Yes' to 20%	0	4	8	12
'Unsure' at 20% 'Yes' to 10%	0	1	1	2
'No' to 20% 'Yes' to 10%	9	27	47	83
'Unsure' at 10%	1	12	23	36
'No' to 10%	23	68	83	174
Total	35	119	172	326

TABLE I.7 - FARE INCREASE WHICH LOW-FARE TRAVELLERS ARE PREPARED TO PAY TO AVOID CONDITIONS - VFR TRAVELLERS

% of fares paid	Special One-Way	Excursion	APEF	Total	
'Yes' to 30%	0	2	2	4	
'Unsure' at 30% 'Yes' to 20%	0	0	0	0	
'No' to 30% 'Yes' to 20%	3	1	2	6	
'Unsure' at 20% 'Yes' to 10%	0	0	0	0	
'No' to 20% 'Yes' to 10%	8	13	18	39	
'Unsure' at 10%	0	1	7	8	
'No' to 10%	6	26	33	65	
Total	17	43	62	122	

## TABLE I.8 - FARE INCREASE WHICH LOW-FARE TRAVELLERS ARE PREPARED TO PAY TO AVOID CONDITIONS - HOLIDAY TRAVELLERS

## TABLE 1.9 - FARE INCREASE WHICH LOW-FARE TRAVELLERS ARE PREPARED TO PAY TO AVOID CONDITIONS - ALL TRAVELLERS<sup>(a)</sup>

		•		
% of fare paid	Special One-Way	Excursion	APEF	Total
'Yes' to 30%	3	9	11	23
'Unsure' at 30% 'Yes' to 20%	0	1	1	2
'No' to 30% 'Yes' to 20%	4	5	11	20
'Unsure' at 20% 'Yes' to 10%	1	1 ;	1	3
'No' to 20% 'Yes' to 10%	23	47	66	136
'Unsure' at 10%	2	13	30	45
'No' to 10%	41 1	.02	119	262
Total	74 1	.78	239	491

(a) Includes categories other than VFR and Holiday travellers.



Figure 1.3 - FARE INCREASE WHICH ALL LOW-FARE PASSENGERS ARE PREPARED TO PAY TO AVOID THE CONDITIONS ON THEIR TICKETS

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## Average Levels of Inconvenience (Question 9)

The data from Question 9 provide information to assess the relative inconvenience of fourteen conditions which might be placed on tickets.

The great majority of detectable errors and inconsistencies occurred within responses to this question. Most of the inconsistencies may be attributed to either a lack of understanding of the condition specified or misinterpretation of the two extreme levels of inconvenience ('not inconvenient' and 'not acceptable')<sup>(1)</sup>. In its analysis of the survey, the BTE incorporated comprehensive tests on the consistency of responses to this question.

The first group of tests was designed to highlight inconsistencies between responses to various conditions in Question 9. Results of this first group of tests are summarised in Table I.10. The first test in this group applied to the first three conditions in Question 9. 'No stopovers allowed' (condition 1 on the questionnaire)<sup>(2)</sup> should be at least as inconvenient as 'limited to one stopover' (condition 2) which, in turn, should be at least as inconvenient as 'limited to two stopovers' (condition 3). A total of 133 respondents was inconsistent in some way for these three conditions. Of the 133, 50 per cent responded 'not inconvenient' for no stopovers. This may be attributed to a misinterpretation of 'not inconvenient'. Alternatively, it could have resulted from failure to recognise the <u>optional</u> nature of stopovers.

The second test in the first group identified 38 respondents who listed condition 4 ('payment three months in advance') as being less restrictive than condition 5 ('payment one month in advance'). The next test identified 184 respondents who felt that 'restriction to a minimum stay of 21 days' (condition 7) was more restrictive than 'restriction to a minimum stay of

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For the purposes of numerical analysis, the levels of inconvenience were represented as zero ('not inconvenient') to 4 ('not acceptable').

<sup>(2)</sup> For exact details of the questions, reference should be made to the reverse side of the questionnaire (Figure I.2).

45 days' (condition 8). The main cause for this error appears to be a misinterpretation of the 'minimum 45 days' question, which seems to have been answered as if it read 'a maximum of 45 days'.

Test	Fest Applied <sup>(a)</sup>						Number of Inconsistent Responses					
1.	Cond	1	\$	Cond 2	≻ Cond	3		13	33			
2.	Cond	4	\$	Cond 5				3	38			
3.	Cond	7	\$	Cond 8				18	34			
4.	Cond	9	\$	Cond 10				3	33			
5.	Cond	11	\$	Cond 12				4	15			
6.	Cond	13	\$	Cond 14				3	37			

TABLE I.10 - TESTS FOR INCONSISTENT RESPONSES WITHIN QUESTION 9

(a) See text for explanation of tests. These tests are formulated here in the positive sense. That is, the response 'passed' the test if it satisfied the stated condition.

The fourth test identified 33 respondents who felt that 'restriction to a maximum stay of 180 days' (condition 9) was less restrictive than 'restriction to a maximum stay of 270 days' (condition 10). The fifth test examined the responses for condition 11 ('ticket valid for a specific departure flight') and condition 12 ('ticket valid for a specific departure flight and return flight'). A total of 45 people indicated that condition 11 was more restrictive than condition 12. The last test identified 37 respondents who felt that being 'unable to obtain a seat during December' (condition 13) was more inconvenient than being 'unable to obtain a seat in December or January' (condition 14).

The second group of tests examined the type of fare being used (Question 4) and the respondents' answers to the conditions relating to conditions actually associated with their fare type. If a passenger listed a condition under which they are actually travelling as 'not acceptable' this could be regarded as answering inconsistently. Results of this group of tests appear in Table I.11.

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Ticket type	Conditions on ticket, at least one of which was stated as 'Not Acceptable'	Inconsistent responses
Special One-Way	No stopovers	8
Excursion	Limited to one stopover in each direction	71
	Minimum stay 21 days	
	Maximum stay 270 days	
APEF	No stopovers	151
	Payment 3 months in advance	
	Minimum stay 21 days	
	Maximum stay 270 days	
	Ticket valid for specific departure and specific return flight	

TABLE I.11 - TESTS FOR INCONSISTENT RESPONSES BETWEEN TICKET TYPE AND LEVELS OF INCONVENIENCE STATED FOR CONDITIONS

One more test was undertaken. If a minimum of 21 days (condition 7) was considered 'inconvenient', then a maximum of 270 days (condition 10) should generally be 'not inconvenient'. The reverse of this should also be true. If a maximum of 270 days is 'inconvenient' then a minimum of 21 days should generally be 'not inconvenient'. It is estimated that about 25% of responses to these two conditions were inconsistent in this sense.

Based on the above groups of tests, several selection stages were involved in analysing errors in assessments of average levels of inconvenience. However, the major results of this part of the survey were compiled after editing the data to the following degree:

. in terms of the first group of tests outlined above, all responses were accepted, except those which were actually inconsistent. Thus, if a respondent replied inconsistently to (say) condition 1, 2 and 3, his

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responses to those conditions were rejected<sup>(1)</sup>. However, his responses to other conditions were accepted (unless they were later rejected under subsequent tests);

- . inconsistencies between the actual ticket type and responses to conditions in Question 9 were ignored, and the responses were accepted in full;
- . responses indicating inconsistency between conditions 7 and 10 were rejected only in regard to these two conditions.

It was assumed that a respondent who provided inconsistent information misinterpreted only those conditions which were inconsistent, and that other conditions which were satisfactorily answered provided usable information. Respondents classifying conditions as not acceptable in the second group of tests were assumed to be stating that the condition was extremely inconvenient, although they were still prepared to accept it in lieu of a higher fare.

Average levels of inconvenience calculated from data edited to this extent are presented in Tables I.12 to I.14 for VFR travellers, holiday travellers and all travellers, respectively. This information forms the basis for calculating values for fare packages (see Chapter 3).

The numbers of respondents providing satisfactory assessments of each condition are given in Tables I.15 to I.17 for VFR, holiday and all travellers, respectively. An indication of the reliability of the results may be obtained from these tables. For example, the total number of respondents travelling First-Class is not sufficient for their responses to be reliable. The same is probably true for 'other' fare types. The wide variation in numbers of respondents between conditions is a result of the tests imposed.

Other editing procedures were also used, but the results are not reported in detail. These additional procedures were stricter, and generally had the effect of lowering the average levels of inconvenience. They did not significantly alter the relative levels of inconvenience between conditions.

<sup>(1)</sup> An exception was made in the case of a minimum stay of 21 days, which was included since the cause of the problem was believed to be the misinterpretation of the 'minimum stay of 45 days' condition. In cases of inconsistency between these two, only the latter was rejected.

	First- Class	Full Economy	Special One-Way	Excur- sion	APEF	Other	Total
No stopovers allowed	0.67	1.28	1.09	1.06	0.65	1.25	0.92
Limited to one stopover in each direction	0.00	1.06	0.38	0.34	0.23	0.63	0.39
Limited to two stopovers in each direction	0.00	0.81	0.15	0.15	0.20	0.50	0.27
Payment 3 months in advance	3.33	1.88	2.62	2.38	0.97	1.25	1.68
Payment 1 month in advance	1.67	1.34	1.62	1.62	0.41	1.14	1.04
Not free to choose exact day of travel	2.00	2.76	2.76	2.76	2.51	2.30	2.63
Minimum stay of 21 days	2.00	2.19	1.63	1.20	1.65	2.00	1.60
Minimum stay of 45 days	0.00	2.54	3.25	2.68	2.59	2.17	2,66
Maximum stay of 180 days	0.00	1.22	2.31	1.27	1.11	0.44	1.25
Maximum stay of 270 days	0.00	0.22	0.65	0.40	0.47	0.00	0.41
Specific departure flight	2.33	2.11	1.70	1.85	1.04	2.50	1.53
Specific departure and return flight	2.33	2.31	2.38	2.32	1.29	3.00	1.88
Unable to get a seat in December	1.67	2.77	2.77	2.65	2.62	2.78	2.65
Unable to get a seat in December or January	2.00	3.08	3.23	3.10	2.97	2.89	3.04

TABLE I.12 - AVERAGE LEVEL OF INCONVENIENCE MEASURED FOR EACH CONDITION - VFR TRAVELLERS

	First- Class	Full Economy	Special One-Way	Excur- sion	APEF	Other	Total
		<u></u>			· · · · · ·		
No stopovers allowed	4.00	1.65	0.67	1.24	0.65	1.00	1.07
Limited to one stopover in each direction	4.00	0.44	0.39	0.33	0.22	0.00	0.39
Limited to two stopovers in each direction	2.00	0.17	0.33	0.10	0.06	0.00	0.17
Payment 3 months in advance	4.00	2.14	1.91	2.22	1.43	2.67	1.91
Payment 1 month in advance	2.00	0.93	0.76	1.49	0.69	0.33	0.99
Not free to choose exact day of travel	1.33	2.84	2.00	2.62	3.12	4.00	2.77
Minimum stay of 21 days	4.00	2.21	1.43	1.10	1.75	2.50	1.58
Minimum stay of 45 days	2.67	2.96	2.81	2.75	3.02	4.00	2.91
Maximum stay of 180 days	4.00	2.37	1.55	1.14	1.45	1.33	1.55
Maximum stay of 270 days	0.00	0.86	0.14	0.23	0.52	0.00	0.40
Specific departure flight	4.00	2.21	2.05	1.62	1.35	1.33	1.70
Specific departure and return flight	4.00	2.43	2.60	2.08	1.75	1.67	2.10
Unable to get a seat in December	2.67	3.38	2.19	3.04	3.23	4.00	3.07
Unable to get a seat in December or January	2.67	3.62	2.86	3.46	3.63	4.00	3.47

TABLE I.13 - AVERAGE LEVEL OF INCONVENIENCE MEASURED FOR EACH CONDITION -

HOLIDAY TRAVELLERS

	First- Class	Full Economy	Special One-Way	Excur- sion	APEF	Other	Total
No stopovers allowed	2.57	1.34	0.76	1.15	0.65	1.54	0.99
Limited to one stopover in each direction	1.42	0.82	0.27	0.35	0.22	0.62	0.39
Limited to two Stopovers in each direction	0.83	0.50	0.15	0.14	0.16	0.31	0.23
Payment 3 months in advance	2.73	2.18	2.55	2.39	1.09	1.85	1.87
Payment 1 month in advance	1.55	1.44	1.59	1.61	0.47	1.17	1.14
Not free to choose exact day of travel	2.64	2.85	2.51	2.75	2.67	2.60	2.70
Minimum stay of 21 days	2.57	2.28	1.90	1.09	1.69	2.27	1.63
Minimum stay of 45 days	2.80	2.92	3.13	2.67	2.71	2.78	2.79
Maximum stay of 180 days	1.30	1.63	1.92	1.31	1.18	0.86	1.38
Maximum stay of 270 days	0.00	0.37	0.27	0.37	0.47	0.00	0.39
Specific departure flight	3.25	2.31	1.88	1.82	1.15	2.07	1.69
Specific departure and return flight	3.25	2.54	2.44	2.33	1.44	2.54	2.06
Unable to get a seat in December	2.75	2.91	2.35	2.76	2.78	2.86	2.74
Unable to get a seat in December or January	2.83	3.24	2.93	3.20	3.16	3.29	3.15

TABLE I.14 - AVERAGE LEVEL OF INCONVENIENCE MEASURED FOR EACH CONDITION - ALL TRAVELLERS
	First- Class	Full Economy	Special One-Way	Excur- sion	APEF	Other	Total
No stopovers allowed	3	53	34	118	162	8	378
Limited to one stopover in each direction	3	49	34	116	155	8	365
Limited to two stopovers in each direction	3	47	33	115	152	8	358
Payment 3 months in advance	3	50	34	127	186	8	408
Payment 1 month in advance	3	50	34	127	183	7	404
Not free to choose exact day of travel	3	59	37	134	198	10	441
Minimum stay of 21 days	3	42	19	106	167	8	345
Minimum stay of 45 days	1	37	3.2	99	142	6	317
Maximum stay of 180 days	3	55	35	122	186	9	410
Maximum stay of 270 days	3	41	17	103	163	8	335
Specific departure flight	3	54	37	122	180	8	404

## TABLE I.15 - NUMBER OF RESPONDENTS INCLUDED FOR EACH CONDITION -

VFR TRAVELLERS

Specific departure

Unable to get a seat

Unable to get a seat

and return flight

in December

January

in December or

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	First- Class	Full Economy	Special One-Way	Excur- sion	APEF	Other	Total
No stopovers allowed	3	23	18	42	51	3	140
Limited to one stopover in each direction	3	23	18	42	51	3	140
Limited to two stopovers in each direction	3	23	18	42	50	3	139
Payment 3 months in advance	3	29	21	49	65	3	170
Payment 1 month in advance	3	29	21	49	65	3	170
Not free to choose exact day of travel	3	32	22	50	66	3	176
Minimum stay of 21 days	1	14	14	39	47	2	116
Minimum stay of 45 days	3	22	16	40	48	2	131
Maximum stay of 180 days	1	30	22	49	58	3	163
Maximum stay of 270 days	1	14	14	39	44	2	114
Specific departure flight	3	28	20	50	65	3	169
Specific departure and return flight	3	28	20	50	65	3	169
Unable to get a seat in December	3	29	21	50	62	3	168
Unable to get a seat in December or January	3	29	21	50	62	3	168

## TABLE I.16 - NUMBER OF RESPONDENTS INCLUDED FOR EACH CONDITION -

HOLIDAY TRAVELLERS

## TABLE I.17 - NUMBER OF RESPONDENTS INCLUDED FOR EACH CONDITION -

ALL TRAVELLERS

	First- Class	Full Economy	Special One-Way	Excur- sion	APEF	Other	Total
No stopovers allowed	14	97	79	177	218	13	598
Limited to one stopover in each direction	12	90	77	175	211	13	578
Limited to two stopovers in each direction	12	88	75	174	207	13	569
Payment 3 months in advance	11	104	88	195	256	13	667
Payment 1 month in advance	11	104	85	195	253	12	660
Not free to choose exact day of travel	14	117	90	203	270	15	709
Minimum stay of 21 days	7	69	50	161	219	11	517
Minimum stay of 45 days	10	79	72	156	192	9	518
Maximum stay of 180 days	10	108	87	190	250	14	659
Maximum stay of 270 days	7	68	48	158	212	11	504
Specific departure flight	12	106	85	191	250	13	657
Specific departure and return flight	12	107	85	191	250	13	658
Unable to get a seat in December	12	105	85	193	252	14	661
Unable to get a seat in December or January	12	105	85	193	252	14	661

## APPENDIX II ECONOMETRIC DEMAND MODELS

In this Appendix, details are given of the ways in which econometric demand models were constructed in support of the study. As described in the body of this paper, separate treatment was given to leisure and business travel. This Appendix also gives detailed descriptions of the variables used in the models.

EQUATIONS FOR THE LEISURE TRAVEL MODEL

1n DP

In general, the leisure travel model explained per capita leisure travel demand in terms of real equivalent air fares<sup>(1)</sup>, real per capita income, an exchange rate index and the proportion of the Australian population born overseas. The basic specification of the demand model was:

$$DP = a F^{b} Y^{c} E^{d} MA^{e}$$
(II.1)

(II.2)

#### or

where DP is per capita demand for leisure travel,
F is real equivalent air fares,
Y is per capita real income,
E is the exchange rate index,

= a' + b ln F + c ln Y + d ln E + e ln MA

MA is the proportion of the Australian population born in the overseas country of origin or destination of travel, a' = ln a,

and a', b, c, d and e are the coefficients to be estimated.

The following general equation was estimated on a pooled time-series/crosssectional basis over the period March 1964 to March 1977 for leisure travel by Australians going to seven overseas countries<sup>(2)</sup>:

<sup>(1)</sup> The 'equivalent fares' concept is explained in detail in Chapter 4. Essentially, the equivalent fare is the sum of the actual fare paid and the notional monetary penalty attached to any conditions associated with particular ticket types.

<sup>(2)</sup> The overseas countries included in the analysis were Germany, Italy, Japan, Malaysia/Singapore, New Zealand, United Kingdom and the Unites States of America.

1n DP	= 1.15	- :	1.78 I	ln F	+ 2.36	ln Y	+ 0.55	ln E
	(3.8)	(-1:	7.00)		(12.3)		(3.5)	
	+ 0.48	1n MA	+ 0.5	57 SI	0 - 0.5	2 CD <sub>2</sub>	- 1.16	CD <sub>5</sub> (II.3)
	(34.5)		(12.0	6)	(-7.3	5) 2	(-7.2)	J
2								
R <sup>2</sup>	= 0.92	0						

where	SD	is a seasonal dummy variable which is described in Table II.1,
	CD <sub>2</sub>	is a dummy variable which has value 1 when data for Italy
	-	are used, and zero otherwise, and is used to account for
		factors which relate to travel between Australia and Italy,
		but which cannot be identified explicitly,
and	CD5	is a dummy variable which has value 1 when data for New
	, J	Zealand are used, and zero otherwise.

Note that 't' values are given in parentheses below the respective coefficients. These are equal in each case to the coefficient estimates divided by the standard error of the estimate. The higher the value of the t-statistic, the less likely it is that the true coefficient is equal to zero.

Country of	Quarter								
	March	June	September	December					
Germany	0	1	1	0					
Italy	0	1	1	0					
Japan	0	1	0	1					
Malaysia/Singapore	0	1	0	1					
New Zealand	1	0	0	1					
United Kingdom	0	1	1	0					
USA	0	1	1	0					

## TABLE II.1 - SEASONAL DUMMY VARIABLE VALUES<sup>(a)</sup> FOR LEISURE TRAVEL BY AUSTRALIANS GOING OVERSEAS

where

(a) These values are used to account for normal seasonal variations in travel. As well as using the pooled approach (Equation (II.3)), individual equations were estimated for travel by Australians to each of the seven countries, on a time-series basis alone. Clearly, these equations are less reliable than the pooled formulation. The equations for leisure travel by Australians to individual countries are presented in Table II.2.

The general equation for leisure travel by residents of the seven overseas countries travelling to Australia was again estimated on a pooled time-series/ cross-section basis for the period March 1964 to March 1977.

1n DP	$= 16.21 - 1.85 \ln F + 2.51 \ln Y (9.3) (-13.6) (9.4)$
	+ 0.27 ln MA + 0.53 SD + 0.09 CDY <sub>1</sub> - 1.39 CDY <sub>2</sub> (1.9) (14.0) (1.1) (-7.2)
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	-0.27 CDY <sub>6</sub> (II.4)
$R^2$	= 0.977
SD	is the seasonal dummy variable which is described in
	Table II.3,
CDY 1	is the product of Y and the value of the country dummy
-	variable CD <sub>1</sub> ,
CDY2	is the product of Y and the value of the country dummy
	variable CD <sub>2</sub> ,
CDY 3	is the product of Y and the value of the country dummy
	variable CD <sub>3</sub> ,
CDY 4	is the product of Y and the value of the country dummy
	variable CD <sub>4</sub> ,
CDY5	is the product of Y and the value of the country dummy
	variable CD <sub>5</sub> ,
CDY <sub>6</sub>	is the product of Y and the value of the country dummy
	variable CD <sub>6</sub> ,
$CD_2$ and	$CD_5$ are as defined for Equation (II.3),

with where

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Country of	Dependent		Inde	pendent Va	riables		<sup>2</sup>	Durbin-Watson	
destination	variable	ln F	1n Y	ln E	ln MA	SD	R	statistic	
Germany	ln DP	-1.15 (-6.8)	1.24 (3.1)	0.56 (2.2)	1.49 (10.2)	0.70 (15.4)	0.959	1.260	
Italy	ln DP	-1.13 (-4.2)	2.84 (5.1)		4.35 (4.5)	1.01 (12.9)	0.919	2.036	
Japan	ln DP	-4.57 (-4.6)	1.53 (2.0)			0.31 (3.6)	0.895	1.668	
Malaysia/ Singapore	ln DP	-1.54 (-1.6)	0.68 (1.2)			0.35 (5.8)	0.940	2.674	
New Zealand	ln DP	-1.01 (-3.7)	1.13 (5.8)			0.66 (23.1)	0.970	2.010	
United Kingdom	ln DP	-1.16 (-5.7)	3.49 (8.4)		1.76 $(3.6)$	0.66 (11.6)	0.966	1.981	
United States of America	ln DP	-1.67 (-5.2)	3.32 (10.7)			0.60 $(13.2)$	0.965	2.028	

## TABLE II.2 - INDIVIDUAL EQUATIONS FOR LEISURE TRAVEL BY AUSTRALIANS GOING OVERSEAS

Note: t-values are given in parentheses below the corresponding coefficients.

All equations were estimated using Cochrane-Orcutt correction for serial correlation.

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	$CD_1$	is a dummy variable which has value 1 when data for Germany
		are used, and zero otherwise,
	CD3	is a dummy variable which has value 1 when data for Japan
	U	are used, and zero otherwise,
	$CD_4$	is a dummy variable which has value 1 when data for Malaysia/
	·	Singapore are used, and zero otherwise,
and	CD6	is a dummy variable which has value 1 when data for UK are
	v	used, and zero otherwise.

## TABLE II.3 - SEASONAL DUMMY VARIABLE VALUES FOR LEISURE TRAVEL BY OVERSEAS RESIDENTS TO AUSTRALIA

Country of	. Quarter								
	March	June	September	December					
Germany	1	0	0	1					
Italy	0	0	1	1					
Japan	1	0	0	1					
Malaysia/Singapore	1	0	0	1					
New Zealand	0	1	0	1					
United Kingdom	1	0	0	1					
USA	1	0	0	1					

The individual equations for leisure travel by residents of the overseas countries to Australia are presented  $^{(1)}$  in Table II.4.

#### EQUATIONS FOR THE BUSINESS TRAVEL MODELS

It was found necessary to establish two slightly different models for business travel. The business travel models explained business travel demand in terms of real air fares, the volume of trade and a time trend. The specification of the model used for Australian business travellers going overseas was:

$$D = a F^{b} XM^{c} e^{d T}$$
(II.5)

(1) It was not found possible to estimate a satisfactory equation for leisure travel to Australia by residents of Japan.

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Country of	Dependent		Indepe	ndent Variable	es .	"2	Durbin-Watson
residence	variable	ln F	ln Y	ln MA	SD	ĸ	statistic
Germany	ln DP	-0.58 (-2.2)	4.99 (9.1)		0.68 (10.1)	0.945	1.993
italy	ln DP	-1.94 (-4.5)	3.81 (4.7)		0.60 (6.2)	0.893	1.911
Malaysia/ Singapore	ln DP	-0.96 (-3.4)	2.28 (7.8)		0.33 (4.9)	0.821	1.829
New Zealand	ln DP	-1.20 (-6.5)	1.54 (2.7)	2.16 (3.2)	0.28 (8.1)	0.793	1.862
United Kingdom	ln DP	-1.00 (-3,7)	1.13 (2.7)	2.33 (3.1)	0.81 (11.5)	0.919	1.806
United States of America	ln DP	-1.38 (-3.2)	3.37 (2.6)		0.58 (14.8)	0.928	2.217

										(a)		
TABLE	II.4	-	INDIVIDUAL	EQUATIONS	FOR	LEISURE	TRAVEL	ΒY	OVERSEAS	RESIDENTS	TO	AUSTRALIA

(a) Japan omitted. See text.

Note: t-values are given in parentheses below the corresponding coefficient.

All equations were estimated using Cochrane-Orcutt correction for serial correlation.

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or	ln D	= $a^{t} + b \ln F + c \ln XM + d T$ (II.6)
where	D	is the total demand for business travel,
	F	is real equivalent air fares
	ХМ	is the volume of trade between Australian and the overseas
		country and is equal to the sum of exports and imports
		measured in real terms,
	Т	is time,
	a'	= ln a
and	a', b,	c and d are the coefficients to be estimated.

The following general equation was estimated on a pooled time-series/crosssection basis over the period March 1964 to September 1975 for business travel by Australians going to seven overseas countries<sup>(1)</sup>:

 $\ln D = 1.75 - 1.23 \ln F + 0.83 \ln XM + 0.015 T$  (4.6) (-23.1) (14.5) (5.5)  $- 1.27 CD_{3} + 0.43 CD_{4} + 0.71 CD_{6} (11.7)$  (-10.3) (3.9) (5.8) (5.8)with  $R^{2} = 0.760$   $CD_{3}, CD_{4} \text{ and } CD_{6} \text{ are country dummies as defined for the leisure equations (II.3) and (II.4).}$ 

Note that t-values are given in parentheses below the respective coefficients.

The specification of business travel demand by overseas residents to Australia is more complicated. The most satisfactory explanation of the current level of demand was obtained when allowance was made for a lag in the response of demand to changes in the independent variables. A change in the independent variables will result in a new desired level of demand corresponding to the new values of the independent variables. But actual demand will not adjust to the desired level immediately. This lag in the adjustment of demand can be represented as follows:

$$\frac{D}{D}_{-1} = (\frac{D^*}{D}_{-1})^r$$
(II.8)

<sup>(1)</sup> The countries included were the same as those included in the general leisure equations.

where D is demand in the current quarter, D<sub>-1</sub> is demand in the previous quarter, D\* is the desired level of travel in the current quarter given the current levels of the independent variables, and r is a measure of the rate of adjustment of the actual level of demand towards the desired level.

From Equation (II.8):

 $\mathbf{or}$ 

$$\ln D - \ln D_{-1} = r (\ln D^* - \ln D_{-1})$$
(II.9)  
$$\ln D = (1 - r) \ln D_{-1} + r \ln D^*$$
(II.10)

The expression for the desired level of demand is:

$$D^* = a F^b XM^c d^d T.$$
(II.11)

Substituting for D\* in equation (II.10) gives:

$$\ln D = a' + r' \ln D_{-1} + b' \ln F + c' \ln XM + d' T \quad (II.12)$$

where	a'	=	ln a,
	r'	=	1 - r,
	. b'	=.	r b,
	c'	=	r c,
	d'	=	r d,
and	a', r',	ь',	c', d' are the coefficients to be estimated.

The following equation for business travel by residents of the seven overseas countries travelling to Australia was estimated on a pooled time-series/ cross-section basis over the period March 1964 to September 1975:

$$\begin{array}{rcl} \ln D &=& 2.16 &+& 0.22 & \ln D \\ && (10.7) && (4.2) && -1 && -0.74 & \ln F &+& 0.61 & \ln XM \\ && (10.7) && (4.2) && -1 && (-23.9) && (19.3) \\ && +& 0.0063 &T &+& 3.58 & CD_2 &+& 3.88 & CD_3 &-& 0.46 & CD_4 \\ && (3.4) && (13.8) && (12.2) && (-11.5) \\ && -& 0.88 & CD_6 && (11.13) \\ && (-13.2) && (11.13) \end{array}$$

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with 
$$R^2 = 0.976$$

where all the variables are as previously defined.

Equation (II.13) differs from the earlier estimated equations in that the coefficient estimates are not equal to the equilibrium values of the elasticities. These are found by dividing the coefficients by 1 - r = r'.

Because of the lesser importance of business travel in the current study, individual equations for business travel to and from individual overseas countries were not estimated.

#### DESCRIPTION OF VARIABLES

This section provides descriptions and sources of data for the variables used in the models estimated for leisure and business travel<sup>(1)</sup>. In some cases, the published or available data sources did not present the data in a suitable form for the econometric analysis described in the preceding Sections. Where necessary, the construction of the variables used and adjustments to data series are described.

#### Demand

Data on international travel movements have been collected by the Australian Bureau of Statistics (ABS) and published in <u>Overseas Arrivals and Departures</u> categorized by purpose, country of origin and country of destination. A change in definition by ABS made it necessary to perform adjustments of the published data.

Prior to 1974, the definition of destination referred to the intended country of disembarkation from the aircraft which took the passenger from Australia. This meant that if an Australian travelling to an overseas country stopped en route at an intermediate country then this latter country would be reported as his destination. In March 1974, the definition was changed to reflect the main destination by identifying the country in which a passenger spent most time.

<sup>(1)</sup> Data for this study were in many cases originally collected for work undertaken in the BTE study of Sydney Region Aviation Forecasts.

The statistics prior to 1974 were adjusted using a survey by R. Travers  $Morgan^{(1)}$  which gave tables for both business and leisure travellers which matched first and ultimate destinations (see Table II.5).

Statistics on demand have been affected by changes in travel patterns resulting from the introduction of new fare structures. In 1968, a Group Affinity (GA) arrangement was introduced on the Australia-United Kingdom route to cater for the growing VFR market. Substantially reduced fares were offered under the GA arrangements, but these fares were not available to groups in categories other than VFR travellers. However, an increasing number of charters were operating from Europe to the Far East, attracting traffic to Singapore where the people could join a charter flight. The old ABS definition of destination classified these people as travelling to or from Singapore.

In February 1972, the scheduled airlines introduced a low-cost Excursion fare to the general public. The fare attracted Australians back from the Far East charters. After the introduction of the Excursion fare, some travellers would have gone directly to London whereas before they would have travelled first to Singapore. Table II.5 shows that, in 1973, 28 per cent of leisure travellers stopping at Singapore had the UK as their ultimate destination. This is the factor used to adjust the ABS data prior to 1974. Between 1968 and 1972, this percentage would have been higher and therefore the estimate of travel to the UK has probably been underestimated during this period and travel to Singapore overestimated. The size of the error is not known. An inspection of the adjusted data disclosed no obvious discontinuities and so the effect on demand was assumed to be small.

#### Equivalent Real Fares (F)

Air fares in the period 1964 to 1971 changed slowly over time with a basic fare structure of First-Class and Full Economy tickets. Availability of low-cost fares was severely limited. By 1972, regular airline operators

(1) R. Travers Morgan and Partners, <u>A Study of Traffic Management Measures</u> at Sydney (Kingsford-Smith) Airport, 1974.

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First	Ultimate Destination								
Descination	Germany	Italy	Japan	Mal./Sing	. New Zealand	i uk	US		
		Leisu	ire Trav	el (per cen	nt) <sup>(a)</sup>				
Germany	87	1				6	1		
Italy	.3	85				6			
Japan	1	3	62			16	3		
Mal./Sing.	4	2	2	48	2	28	2		
New Zealand					94	4			
United Kingdom	1					97	1		
USA	4	3				26	54		
		Busir	ness Tra	vel (per ce	ent) <sup>(a)</sup>				
Germany	68					27			
Italy	12	31				40	6		
Japan			95	3			1		
Mal./Sing.			6	54		24	3		
New Zealand					96	1	7-4		
United Kingdom	5		2			83	1		
USA	2	2				22	62		

# TABLE II.5 - FIRST DESTINATION BY ULTIMATE DESTINATION FOR AUSTRALIANS

TRAVELLING OVERSEAS

(a) The rows do not add to 100 because some ultimate destinations are omitted.

Source: P. Travers Morgan and Partners, op. cit.

recognised the need for new low promotional fares which would attract the traffic back to scheduled services and satisfy growing consumer demand for low-cost travel. Since 1972, several promotional fares with varying sets of conditions aimed at different market segments have been introduced.

In order to estimate aggregate models, it is necessary to obtain a measure of the average fare paid by the travellers included in demand. The average fare paid is calculated by applying weights to the various fare types, the weights being related to the number of passengers using each type of fare. The fare variable is constructed as follows:

$$F_{ij} = FF_{i} FF_{ij} + EF_{i} EP_{ij} + LF_{i} LP_{ij}$$
(II.14)

where

and

F <sub>ij</sub>	is the average fare for origin/destination i and
-5	purpose j,
FF i	is the First-Class fare for O-D i,
FP <sub>ij</sub>	is the proportion of passengers travelling First-Class
-5	for O-D i for purpose j,
EPi	is the Full Economy fare for O-D i,
EP ij	is the proportion of passengers travelling Full Economy
_5	for O-D i and purpose j,
LFi	is the equivalent low-cost fare for O-D i,
LPii	is the proportion of people travelling on low-cost fares
-5	for O-D i and purpose j.

The fares  $FF_i$  and  $EF_i$  are actual values applying to residents in the country of origin at the time of travel.  $LF_i$  is the actual level of low-cost fares applying at the time of travel, adjusted by a factor designed to account for the lower service levels in comparison with Full Economy travel. This factor was derived from the analysis of the survey data, and reflects the amount travellers would be prepared to pay to avoid restrictions on low-cost tickets. The weights  $FP_{ij}$ ,  $EP_{ij}$  and  $LP_{ij}$  were calculated for each O-D by averaging passenger movements by ticket type over periods where the fare structure did not change. Additional information on demand by ticket type by purpose allowed the weights to be purpose-specific.

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The fares calculated above were then divided by the consumer price index to reflect changes in the rate of inflation. This allowed a direct comparison of fares between periods for each country. A further adjustment was necessary to allow a comparison of fares in a common unit of currency in the pooled time-series/cross-sectional models of travel to Australia. Common currency equivalence was achieved by dividing by the Australian exchange rate for June 1971 for the overseas to Australia leisure model and the rate for March 1964 for the overseas to Australia business models.

Information on the consumer price index was obtained for Australia from ABS, <u>Consumer Price Index</u>, and for overseas countries from the United Nations (UN) publication, <u>Monthly Bulletin of Statistics</u>. The currency exchange rates were obtained from the International Monetary Fund (IMF) publication, International Financial Statistics.

#### Trade (XM)

The trade variable was formed by adding the real level of exports from Australia and the real level of imports into Australia:

> XM = Exports Export Price Index + Imports Import Price Index

Information on exports and imports was obtained from ABS, <u>Overseas Trade</u>. The indices were derived from the ABS publications, <u>Quarterly Summary of</u> <u>Australian Statistics</u>, <u>Import Price Index Bulletin</u> and <u>Export Price Index</u> <u>Bulletin</u>.

#### Real Income (Y)

The income variable for Australian travel overseas is personal disposable income divided by the consumer price index and the Australian population. Information for personal disposable income came from ABS, <u>National Income</u> and <u>Expenditure</u> while information on the Australian population is from ABS, Population and Vital Statistics.

The overseas income variables were obtained by dividing each country's gross domestic product, obtained from IMF, <u>International Financial Statistics</u>, by its consumer price index, exchange rate in a fixed period (see <u>Fares</u> above) and population. Population estimates were obtained from UN, <u>Monthly Bulletin</u> of Statistics.

#### Migrants (MA)

MA is the number of overseas-born migrants permanently resident in Australia as a proportion of the Australian population. Information obtained from ABS Census publications has been adjusted for permanent movements (ABS, <u>Overseas</u> <u>Arrivals and Departures</u>) and migrant deaths (ABS, <u>Deaths</u>) for the intercensal years.

## NOTATION AND ABBREVIATIONS

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ABS	Australian Bureau of Statistics					
APEF	Advance Purchase Excursion Fare					
a,a'	Constant terms in demand models					
BTE	Bureau of Transport Economics					
b	Elasticity of demand with respect to relevant variable					
CD1	Route dummy variable for Germany in econometric model					
CD <sub>2</sub>	Route dummy variable for Italy in econometric model					
CD <sub>3</sub>	Route dummy variable for Japan in econometric model					
CD <sub>4</sub>	Route dummy variable for Malaysia/Singapore in econometric model					
CD <sub>5</sub>	Route dummy variable for New Zealand in econometric model					
CD <sub>6</sub>	Route dummy variable for United Kingdom in econometric model					
CD <sub>7</sub>	Route dummy variable for USA in econometric model					
CDY 1	Product of real per capita income with the country dummy variable ${\rm CD}_1$					
CDY <sub>2</sub>	Product of real per capita income with the country dummy variable ${ m CD}_2^-$					
CDY <sub>3</sub>	Product of real per capita income with the country dummy variable $CD_3^-$					
CDY <sub>4</sub>	Product of real per capita income with the country dummy variable ${\rm CD}_4$					
CDY 5	Product of real per capita income with the country dummy variable ${\rm CD}_5$					
CDY	Product of real per capita income with the country dummy variable $CD_6$					
CDY <sub>7</sub>	Product of real per capita income with the country dummy variable $CD_7$					
D	Total demand for international air travel					
DP	Per capita demand for international air travel					
D <sub>1</sub>	Demand in the current period					
D <sub>2</sub>	Projected demand					
D_1	Demand in the period prior to the current period					
D*	Desired level of travel in current period					
9	Partial derivative					
Е	Exchange rate between Australia and the overseas country					
EF	Actual economy class fare in real terms					
EP	Proportion using economy class fare					
e <sub>F</sub>	Elasticity of demand with respect to equivalent fares					
e <sub>M</sub>	Elasticity of demand with respect to actual fares					
F	Equivalent real fare in the country of residence					
FF	Actual real first class fare					

FP	Proportion using first class fare
FSD	Flight Service Director
F <sub>1</sub>	Real equivalent current fare
F <sub>2</sub>	Real equivalent projected fare
f	First derivative of DP with respect to F
ICAP	International Civil Aviation Policy
IMF	International Monetary Fund
LF	Equivalent real low-cost fare
LP	Proportion using low-cost fares
ln	Natural logarithm
М	Actual fare paid
MA	Proportion of the Australian population born in the overseas country
МО	Number of Australian-born permanent residents in the overseas country
0-D	Origin/Destination
pa	per annum
QF	Qantas Flight
R	Coefficient of Multiple Correlation
S	Monetary equivalent of certain conditions attached to low-cost tickets
SD	Seasonal dummy variable used in econometric model
Т	Time variable
UN	United Nations
х	An independent variable
Y	Real per capita income in country of residence
YE180	Excursion ticket
YE270	Excursion ticket
YOX	Special One-Way ticket
\$A	Australian dollars

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