

Demand for Outbound Leisure Air Travel and its Key Drivers

CIVIL AVIATION AUTHORITY

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Summary

Introduction

1. This report documents the findings of research undertaken by the CAA about the factors influencing demand for outbound leisure air travel in the UK. It sets out the facts on, and the latest analysis of, how changes in income, wealth, air fares and the composition of the population affect demand for leisure air travel in the UK. The research is based on: interviews with industry representatives; econometric estimation of demand elasticities¹; and a stated preference survey of passengers at Stansted Airport.
2. The report findings suggest that consumer expenditure on holidays abroad (including air fares) still accounts for a small proportion of total consumer expenditure relative to other forms of leisure activity and that the wealthiest and most professional groups take a disproportionately large number of leisure trips abroad. Both of these, together with some more complex econometric analysis of the relationship between income growth and traffic growth over time, indicate that the potential for organic market growth (i.e. income and wealth driven as opposed to price driven) is still quite high.
3. From the viewpoint of individual operators demand appears to have become more price sensitive in recent years because of greater fare transparency and the greater choice open to consumers in terms of destinations, service providers and frequency. At the same time, however, the role of air fares in stimulating or depressing overall demand for leisure air travel may not now be as important as commonly thought. Air fares have fallen dramatically in recent years and now account, on average, for just under one third of the total costs of a leisure trip abroad. Consequently, the overall demand for leisure air travel may be increasingly influenced by other demand drivers such as, for example, accommodation costs and the costs of leisure activities at the destination.
4. The report's conclusions were reached on the basis of an empirical examination of aviation trends in the outbound leisure air travel market in the UK for the period between the liberalisation of the European aviation market in 1993 and the present.

Setting the scene

5. UK outbound leisure travel has been by far the fastest growing aviation market segment in recent years. It now accounts for some 60% of the total international traffic at UK airports. This growth has coincided with a substantial decline in real air fares, resulting from deregulation and increased competition, and with a number of beneficial macroeconomic and socio-demographic developments which have also played an important role in demand growth. These include reduction in the volatility of economic fluctuations, a large increase in household wealth, an increase in home ownership abroad, upward social mobility, changes in household composition and migration.

¹ An elasticity measures the direction and strength of market response to a change in a given demand factor such as price, income or the quality of service. It is defined as the ratio of the percentage change in quantity demanded to the percentage change in the variable that brought it about, holding all other independent variables constant. For example, if an increase in income of one percent causes demand for a good to increase by two percent, the income elasticity for the good in question would be +2.

Views from the industry

6. Although there were areas of difference, there was perhaps more of a common view about the market than might have been expected given the diverse nature of the industry. Consumer confidence was seen as even more important in the holiday sector than in other retail sectors, with rising house prices, low interest rates and a predictable outlook all contributing towards confidence. Consumers now have a far wider and more transparent range of choices; they want flexibility and are themselves prepared to be flexible. This perhaps goes hand-in-hand with consumers regarding the air travel part of a holiday as a commodity, with price the distinguishing feature but being prepared to spend more freely once abroad. So, although the air fare may play a special catalytic role, many consumers would place more emphasis on the total cost of a trip when making travel decisions.
7. There was some feeling that demand elasticities may be higher in a rising market than in a downturn because there are some journeys that must be made even when times are bad. On the other hand, there was a feeling that passengers may be more resilient to a price increase in a very low fare than in the middle of the price range, if the former is still perceived as a bargain.
8. Although industry representatives were unable to contribute data for reasons of commercial sensitivity they outlined a number of issues which they thought the CAA should consider when trying to devise useful measures of demand drivers.

Econometric analysis

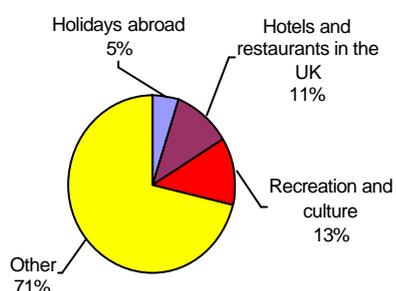
9. Air travel demand elasticities were estimated separately for three international market segments: Western Europe, North America and the Rest of the World.

Income elasticities

10. The evidence collected in the course of the CAA's own econometric investigation suggests that demand for air travel is income elastic, meaning that an income change will cause a more than proportionate change in demand for leisure air travel. Depending on the geographical market, long-run income elasticity values in the range of 1.5 - 1.8 were obtained for the period from 1993 to 2003 with the higher values being in long-haul markets. Although there is some evidence that income elasticities have declined over time in long-haul markets, full maturity, i.e. where income elasticity becomes 1 or less, can still be considered to be some way off.
11. Similar conclusions follow from some more basic data analysis. First, despite an impressive growth record, Figure 1 shows that consumer expenditure on holidays abroad (including air fares) accounts for a small proportion of total consumer expenditure (about 5%) relative to other forms of leisure activity. Second, Mintel's² market surveys over many years have shown that there is still a considerable proportion of the population who never go on holiday, or take all, or most, of their holidays in the UK. Figure 2 shows that those who do not take holidays abroad largely come from less affluent socio-economic groups.

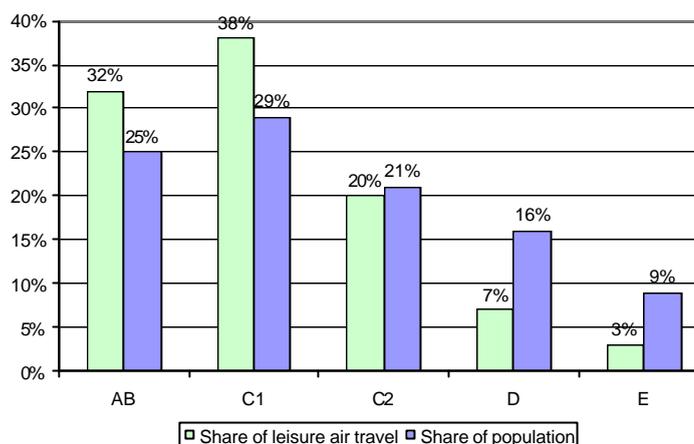
² Mintel is a global supplier of consumer, media and market research.

Figure 1 Breakdown of total consumer expenditure



Source: ONS

Figure 2 Leisure air trips abroad by socio-economic status (adult population)



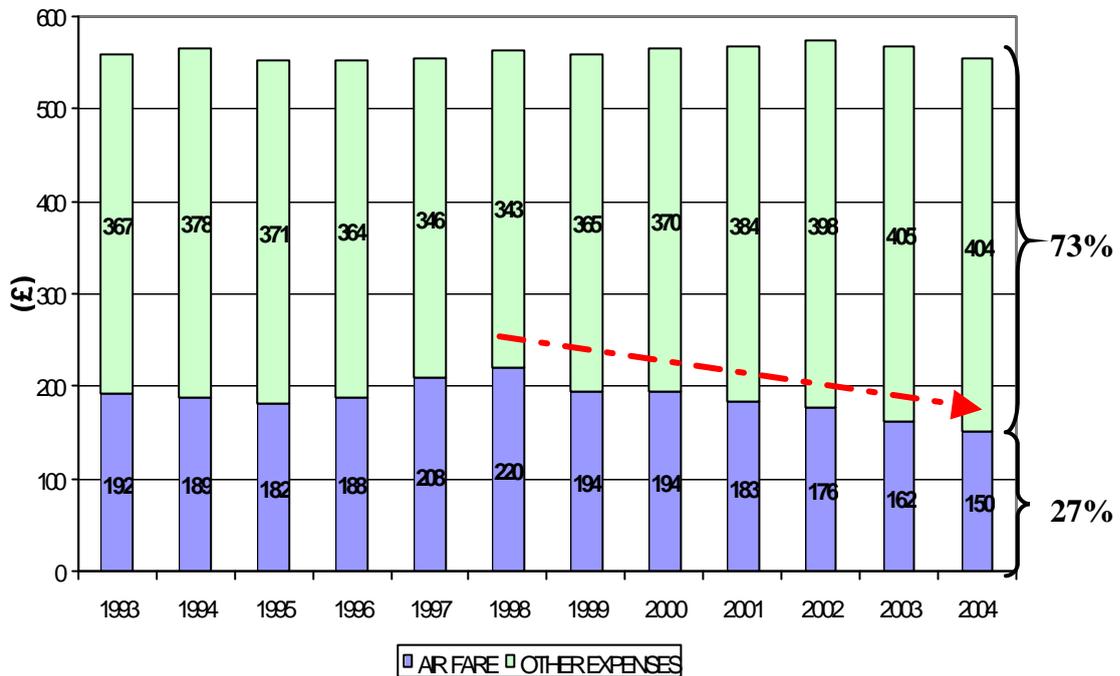
Source: CAA and Mintel

The more affluent AB segments together account for some 32% of outbound leisure air traffic – some 7 percentage points higher than their combined share of the UK population. The less affluent D and E segments are under-represented in outbound leisure air traffic. Together they make up about 25% of the population – two and a half times their share of outbound leisure traffic. In the future, as prosperity increases more households should be able to devote an increasing share of their incomes to discretionary spending, such as holidays abroad.

Price elasticities

12. Regarding the effect of air fares on demand for air travel, the research findings suggest that it is important to distinguish between destination-specific own-price elasticities and aggregate market elasticity. The route level evidence suggests that demand for specific destinations could be fairly elastic with respect to changes in air fares (elasticity values in the range -0.4 to -2.7 were obtained). However, the broader demand for leisure air travel was found to be moderately inelastic (-0.7 to -0.8), meaning that a price change will cause a less than proportionate change in overall demand.
13. The difference between the estimates of destination-specific own-price elasticities and aggregate market elasticity can be explained by reference to two separate effects of a price change – an income effect and a substitution effect. The income effect refers to the impact of a price change on consumer purchasing power. Because air fares account for a relatively small proportion of consumer budgets, this effect is small in both cases (i.e. destination-specific and aggregate market price elasticity). This is illustrated in Figure 3 which shows the breakdown of total costs of a leisure trip to Europe.

Figure 3: Average spending (in £2004) per visit to Europe by UK residents



Source: ONS

UK residents travelling to Europe for leisure purposes in 2004 spent an average of about £560 (in £2004) per trip of which £150, or just over a quarter of the total, was spent on air fares. This means that a given percentage increase in air fares will be equivalent to a much smaller percentage increase in the total costs of a trip to Europe.

14. The substitution effect, which refers to availability and closeness of substitutes, explains why individual operators are experiencing a highly price sensitive demand on some of the routes they serve despite *overall* demand being inelastic with respect to air fares *alone*. Consumers now have much more choice than in the past in terms of destinations, airlines and flight frequencies and they can easily substitute between various options available to them in response to price differentials. This is particularly the case on short haul, where the flight is largely considered a commodity and where there is a large number of routes and airlines to choose from.

Other demand drivers

15. Traffic was also found to be responsive to the price of goods and services at the destination relative to the UK Consumer Price Index (CPI), although in terms of magnitude the effect of relative prices was found to be smaller than the effect of air fares (with elasticity estimates in the range -0.4 and -0.6).
16. House prices were also identified as a demand driver although their impact appears to be of a short- rather than long-term nature.

Stated preference survey at Stansted

17. To further test these findings, a stated preference survey was carried out at Stansted as part of the CAA's continuous passenger survey which is designed to obtain information about departing air travellers, including their surface origins in the UK, journey purpose, cost of travel, means of transport to and from airports, route flown, country of residence, income, age and family make-up.
18. Stated preference surveys are surveys of actual or potential users, in which respondents are asked to express an attitude or make a choice as to how they would act under certain conditions. The attraction of this approach is that respondents can be asked questions specific to the issue under consideration. While the hypothetical nature of stated preference surveys means that the findings must be treated with caution since the participants may not have the same incentive to exercise their best judgement as if they faced an actual economic transaction, the results may be a useful addition to evidence from revealed preference data.
19. One group of respondents was asked directly how they would have reacted if air fares for their trips had been more expensive (by £10, £20 and £40) at the time of booking. They were offered three different possibilities:
 - travel
 - travel somewhere else cheaper
 - not travel

The findings imply that while route-specific increases in air fares would cause a more than proportionate reduction in the number of trips on a route level, the effect at the level of the market would be smaller because many passengers are willing to travel somewhere else cheaper. For example, in response to a £10 increase in the cost of travel (equivalent to a 14% increase in the average round trip fare), 18% of passengers are lost from that route whereas at the market level only 7% of passengers are lost. The other 11% still choose to travel, but to somewhere else cheaper. This is broadly consistent with the findings from the econometric analysis described in paragraph 12.

20. Passenger responses were shown to be dependent on their characteristics, including income, home ownership abroad, purpose of travel, travel budgets and the number of trips already taken in the previous twelve months. By and large, the findings were intuitively and theoretically plausible. Property owners abroad and people travelling to visit friends and relatives are less likely to switch destinations while people living in households on low incomes are more likely not to travel, or to go somewhere else cheaper, in response to an increase in the cost of travel than those on higher incomes.
21. The other group of respondents was asked to state their maximum willingness to pay for the trip they were undertaking. The responses to that question were used to construct a demand curve and to estimate the price elasticity of demand using non-parametric methods. The findings suggest that demand is inelastic at low fare levels but becomes increasingly elastic at higher fare levels (from a low of -0.4 at £50 to a high of about -2.5 at £140).

Introduction

1. This report is the result of a study undertaken by the CAA to provide up-to-date estimates of demand elasticities for UK outbound leisure air travel. Knowledge of the size and variability of these elasticities can help the CAA, and others more generally, to monitor the state of the industry and to formulate policy advice in respect of capacity development, environmental regulation and aviation policy issues in general.
2. Compared with other markets, such as those for consumer products, the demand for airline travel has received relatively little attention in recent years, although a number of studies were carried out following the deregulation of the US domestic airline industry in 1978. Gillen et al (2003)³ provide the most recent review of the available evidence on demand elasticities from the academic literature. They cite 21 studies, 15 of which were completed and/or published prior to 1990 - more than fifteen years ago.

The need for a new study on demand elasticities

3. There are currently good reasons to re-examine empirical estimates of air transport demand elasticities, in part deriving from changes in the airline industry itself brought about by institutional reforms and in particular deregulation of air transport services within the EU. The removal of restrictions on market access, pricing and capacity within the EU prompted the emergence of a multitude of scheduled no-frills airlines together with a fundamental restructuring of existing full-service airlines. Costs of travel have been driven down and the range of EU destinations served from many UK airports has increased substantially. There have also been important developments in the pricing and distribution of air tickets which have resulted in a reduction in input costs and greater fare transparency. The Internet has become a vital tool for researching and booking air fares and holidays.
4. A reassessment of available evidence is also needed in the light of recent macroeconomic developments in the UK. In the thirteen years since the end of the recession of the early 1990s, the average annual growth rate of GDP was 2.9%, which is about 0.5% higher than the post-war average. Inflation averaged a historically low 2.5% a year and unemployment fell from almost 10% to under 5%, its lowest level for almost two decades. This, coupled with large increases in household wealth and falling mortgage servicing costs, has given consumers a sense of financial security and encouraged expenditure on non-essential purchases such as leisure air travel. The strength of the UK economy has also benefited sterling which has appreciated against most of the world's currencies since the early 1990s. This suggests that the established practice in research on the demand for air travel of focusing on fare and income elasticities alone, where measures of income conform to the notion of current income, may no longer be justifiable.

Objectives and scope of the study

5. The overall objectives of the study were to:

³ Gillen DW, Morrison WG, Stewart C. 2003. *Air travel demand elasticities: concepts, issues and measurement*. Department of Finance, Government of Canada avail. on www.fin.gc.ca/consultresp/Airtravel/airtravStdy_1e.html.

- undertake analysis of and research into the factors influencing demand for leisure travel by air; and
 - produce quantitative indications of how strongly these factors influence demand for leisure travel by air.
6. There is a substantial body of evidence as to the relevant demand drivers in air transport, and which of them may be more important than others. But devising useful measures of these factors and estimating their effects are in general complex undertakings due to the nature of the air travel product and a lack of statistically robust data especially on costs of travel. For this reason the CAA has approached this research in four stages:
- (1) a review of past studies of price and income elasticities of demand for air travel for the UK and other major developed countries;
 - (2) a survey of the views of representatives of the industry on the main determinants of demand for air travel, the influence of price and the possible impact of changes in disposable income;
 - (3) an econometric analysis of air travel behaviour aiming to put a range on the elasticities and to see whether changes have occurred over time; and
 - (4) a survey of passengers as to how their behaviour might change if fares changed.

Structure of the report

7. The arrangement of the chapters in this report is as follows:

Chapter 1 sets the scene for the report, discussing recent trends in demand for leisure travel by air and the key drivers behind these trends, specifically:

- industry developments;
- macroeconomic background; and
- socio-economic and demographic changes.

Chapter 2 discusses the key issues that have emerged during the consultation exercise with the industry and stakeholders.

Chapter 3 presents the empirical findings of the CAA's econometric work on estimating demand elasticities.

Chapter 4 discusses the empirical findings.

Chapter 5 reports the results of a stated preference survey carried out by the CAA at Stansted airport.

Chapter 6 contains conclusions.

Appendix 1 contains a brief non-technical explanation of the concept of elasticities and their use in demand modelling.

Appendix 2 reviews empirical estimates of demand elasticities from academic literature and reports produced by government bodies.

Appendix 3 contains a more detailed description of the methodology and data used in the econometric work described in **Chapter 3**.

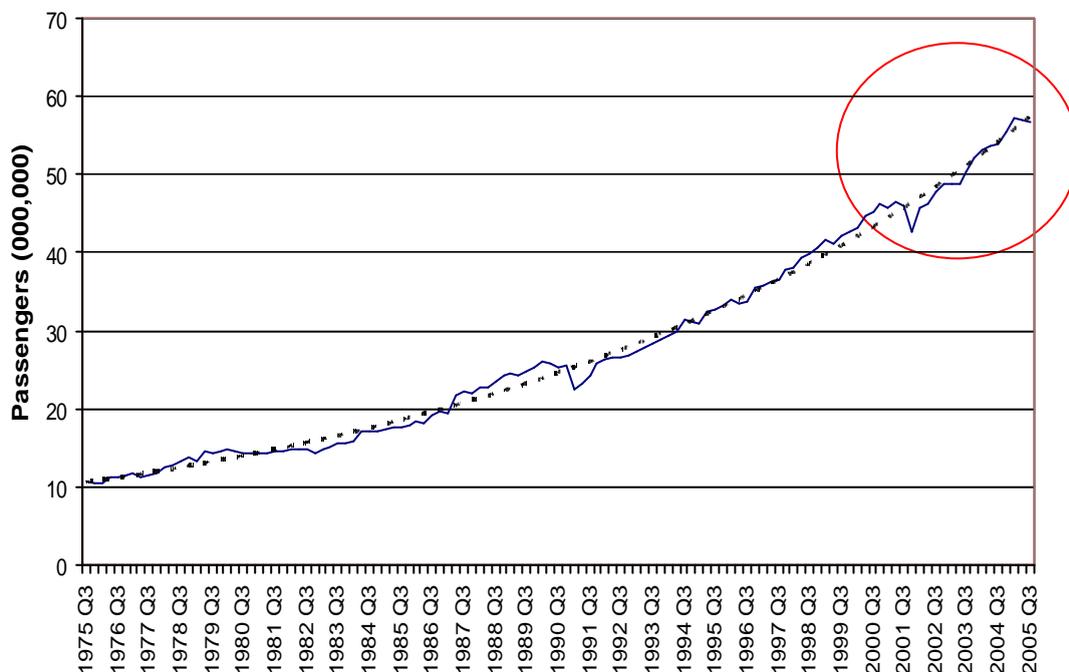
Chapter 1 Setting the scene

Recent trends in UK outbound leisure air travel

Introduction

1. Passenger traffic at UK airports has grown at an average annual rate of about 6% cent since the mid-1970s, which is approximately twice the rate of growth of the UK GDP during the same period. Figure 1.1 shows that passenger numbers in the UK recovered quickly from a series of adverse events in recent years, including 11 September, SARS, the second Gulf War and the Madrid bombing, and that traffic is back to its underlying growth path.

Figure 1.1 Passenger traffic at UK airports (quarterly deseasonalised data)



Source: CAA

This conforms to the historic experience which suggests that demand for air travel in the UK tends to bounce back following exogenous shocks such as wars and acts of terrorism⁴.

2. Table 1.1 shows passenger growth trends in major world aviation markets⁵.

⁴ See the CAA's advice to the Department for Transport on the future nature and distribution of demand for air travel "Air Passenger Growth and Capacity", available on www.dft.gov.uk/stellent/groups/dft_aviation.

⁵ The comparison is made to 2003 because data for 2004 was not available for Germany and World Traffic. ICAO data for 2003 is provisional.

Table 1.1 Comparison of passenger traffic growth in major world aviation markets

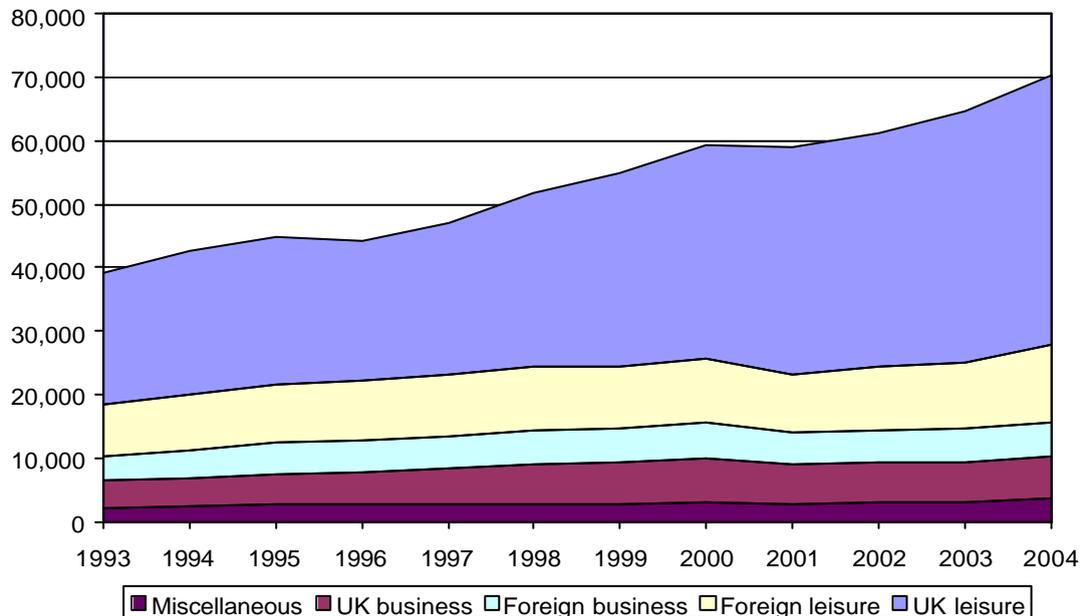
	World	UK	US	Germany	Australia
1993 - 2000	5.6%	7.0%	4.5%	6.3%	5.8 %
1993 - 2003	3.8%	5.9%	2.8%	4.2%	4.3%

Sources: CAA, ICAO, Air Transport Association of America (ATA)⁶ and Australian Department of Transport and Regional Services

It is apparent from Table 1.1 that air traffic in the UK grew faster than traffic in other major developed aviation markets and World traffic, especially after 11 September which caused a particularly marked slowdown in traffic growth in the US.

- UK residents travelling abroad for leisure purpose have been by far the fastest growing component of total international traffic at UK airports since the European aviation market was liberalised in 1993. Figure 1.2 shows the number of international trips by air to and from the UK split by residence and purpose of travel⁷. The number of trips abroad by UK residents travelling for leisure purposes increased from 20.6m in 1993 to 42.5m in 2004 – an average annual increase of 6.8%. Over the same period, the number of trips abroad undertaken by UK business travellers, inbound trips by foreign business travellers and foreign leisure travellers grew annually by averages of 4.1%, 3.6% and 2.9% respectively. Consequently, the share of UK originating leisure traffic in the total international traffic at UK airports increased from 53% in 1993 to about 60% in 2004.

Figure 1.2 International visits by air to and from the UK airports by residence & purpose of travel (000s)



Source: IPS

⁶ US data relates to passengers carried by US airlines only.

⁷ Due to change in the IPS sampling methodology introduced in 1999, care should be taken when comparing results for 1999 to 2004 with earlier years.

Visits by length of stay

- Mintel's market surveys over many years have shown that there is a segment (around 15% of adults in the UK) who never go away from home on holiday, while a further 35% take all, or most, of their holidays in Britain. This suggests that much of the growth in UK leisure travel over the past ten years has been generated by those who do take holidays abroad travelling more frequently. Table 1.2 shows the number of visits abroad by UK residents travelling for leisure purpose by length of stay.

Table 1.2 UK residents' international leisure travel – visits by length of stay (all modes of travel)

nil nights		1-3 nights		4-13 nights		14 and more nights	
growth 1998 – 2004	share of total in 2004	growth 1998 - 2004	share of total in 2004	growth 1998 - 2004	share of total in 2004	growth 1998 - 2004	share of total in 2004
-7.8%	2.4%	17.7%	16.2%	13.8%	50.7%	4.2%	30.7%

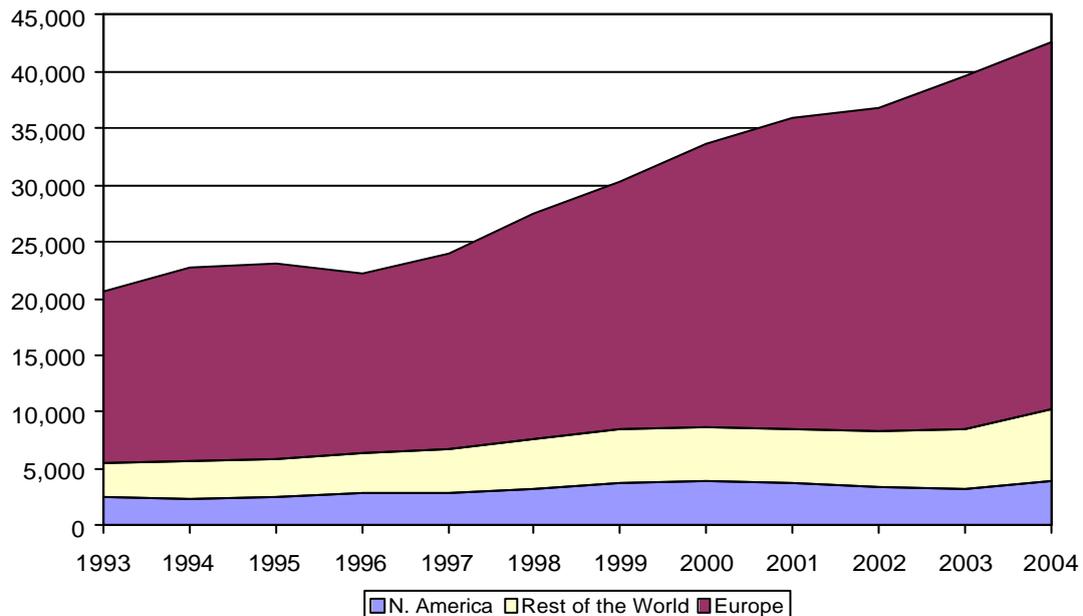
Source: IPS

Trips lasting 1 to 3 nights grew at an average annual rate of 17.7% during the six-year period between 1998 and 2004, and their share of total trips was 16.2% in 2004. They were the fastest growing category followed by trips lasting 4-13 nights which grew at the rate of 13.8% per year during the same period. Trips lasting 14 and more nights (i.e. including the traditional two-week package) grew at an average annual rate of 4.2%.

Visits by geographical region

- Figure 1.3 shows the growth of UK originating leisure air travel between 1993 and 2004 split by geographical region.

Figure 1.3 UK residents' international air travel for leisure purpose by region (000s)



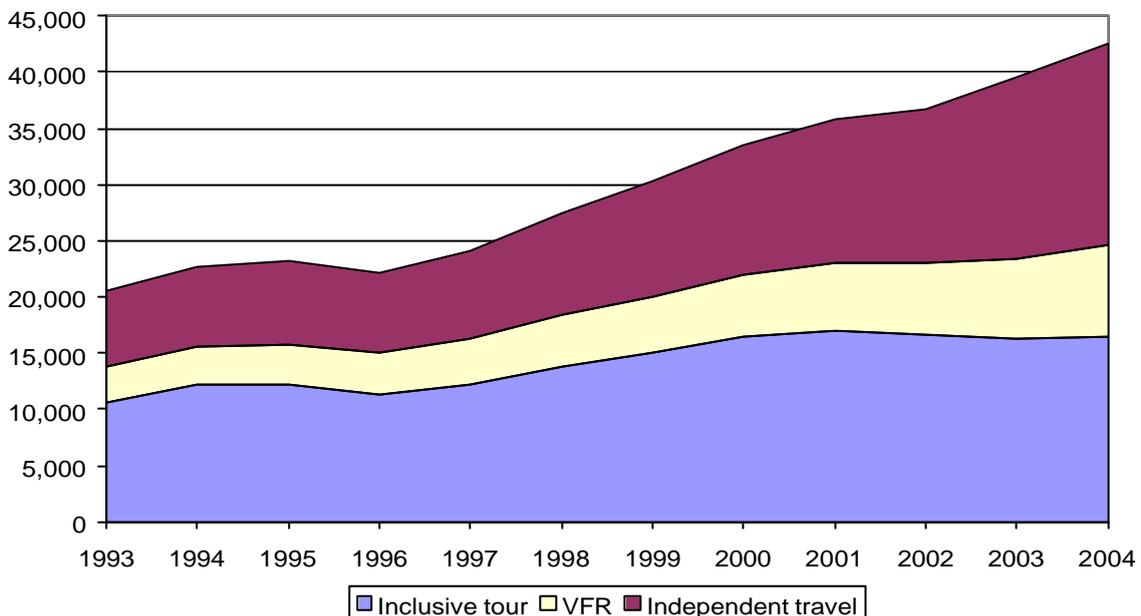
Source: IPS

Between 1993 and 2004, the number of leisure trips by air to Europe by UK residents increased at an average annual rate of 7.2% while the number of trips to North America and the rest of the World grew annually by averages of 4% and 7.3%, respectively⁸. Of the 42.5m of trips abroad taken by UK residents for leisure purpose in 2004, 32.5 million, or 75.7%, were to other European countries, up from the 73.4% share a decade earlier. 3.9 million (or 9.1%) trips in 2003 were taken to North America and 6.5 million (or 15.2%) to the rest of the World.

Visits by type of travel

6. Figure 1.4 shows the growth of UK originating leisure travel split by type.

Figure 1.4 UK residents' international air travel by type of leisure travel (000s)



Source: IPS

The package product dominated the market for leisure travel in volume terms for most of the 1990s. However, its growth has stalled in the recent years and the expansion of the total leisure market since 2000 has been driven mainly by rapid expansion of the independent travel and VFR (visiting friends and relatives) sectors. Independent travel grew at an average annual rate of 12.7% between 1997 and 2004, and its share in 2004, combined with the share of the VFR traffic, was just over 60% of the total market.

Expenditure on holidays abroad

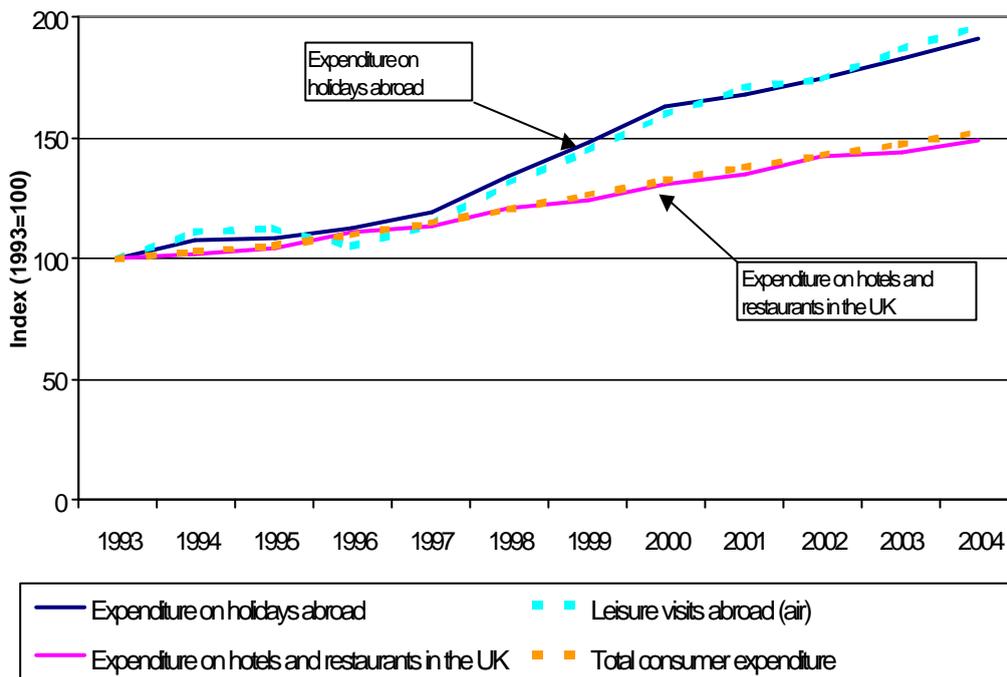
7. A thorough assessment of industry growth and its future potential needs to consider trends in travel expenditure as well as trends in traffic volumes. This

⁸ The growth of traffic to North America has been adversely affected by the events of September 11 and the second Gulf War. For the period 1993 - 2000, the regional growth rates were similar: traffic to Europe, North America and the rest of the World grew annually by averages of 7.3%, 6.8% and 6.9%, respectively

is because the expenditure figures give some idea of the role of price in traffic growth. For example, if the number of trips abroad increases, but the expenditure associated with holidaying abroad remains the same, then much of the traffic growth is likely to be due to price rather than income changes.

8. Figure 1.5 compares the growth in the number of visits abroad, consumer expenditure on holidays abroad (including air fares), total consumer expenditure and expenditure on hotels and restaurants in the UK (expenditure series were deflated using the UK Consumer Price Index (CPI)).

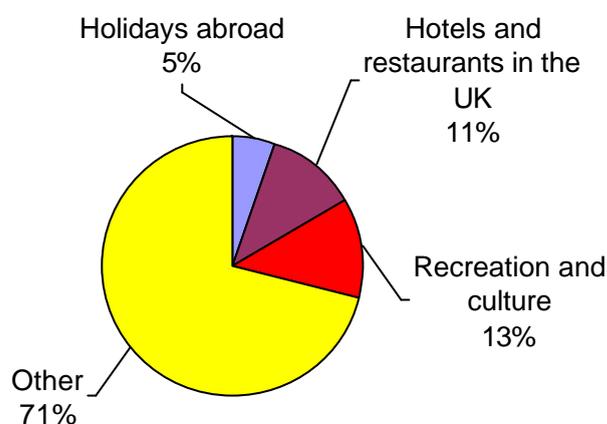
Figure 1.5 Consumer expenditure and visits abroad



Source: ONS

9. Between 1993 and 2004, expenditure on holidays abroad (tourism and air fares) expanded at an average annual rate of about 6.1% which is broadly in line with the growth in visits abroad and well ahead of total consumer expenditure and expenditure on hotels and restaurants in the UK which grew at 3.9% and 3.7%, respectively.
10. Despite such strong growth, the share of expenditure on holidays abroad in total consumer expenditure is small relative to other forms of leisure activity as shown in Figure 1.6.

Figure 1.6 Breakdown of total consumer expenditure



Source: ONS

11. In 2004, only about 5% of total consumer expenditure was on holidays abroad. This is just under half of the amount spent on hotels and eating out in the UK and on recreational activities in the same year.
12. The remainder of this chapter will examine the key drivers behind the trends described in this section.

Industry developments

Effect of no-frills airlines

13. By far the most striking development following the liberalisation of the EU market in 1993 has been the spread of no-frills airlines. Broadly speaking, the effect of these airlines on the air transport industry has been twofold. Firstly, no-frills airlines have broadened the market geographically by increasing the number of scheduled international services from UK airports, particularly to European destinations. In particular, they have radically widened the international scheduled network at many airports which previously mainly offered charter services and domestic services with small regional aircraft.
14. A much wider spread of services and greater variety of available destinations are likely to have been particularly important in the development of the short-breaks market where convenience of travel is a key issue. Interlining, where a passenger has to change aircraft at an intermediate airport, or the addition of several hours of surface access time to or from airports, is clearly less attractive for time constrained holidaymakers than for people holidaying for a longer period.

15. Table 1.3 shows the number of international scheduled services from regional airports in 1996 and 2003⁹.

Table 1.3 International scheduled services from regional airports

AIRPORT	1996	2003	change
ABERDEEN	5	10	5
BELFAST CITY	2	3	1
BELFAST INTERNATIONAL	2	2	0
BIRMINGHAM	30	58	28
BLACKPOOL	1	1	0
BOURNEMOUTH	1	3	2
BRISTOL	6	18	12
CARDIFF	4	15	11
DURHAM TEES VALLEY	2	2	0
EDINBURGH	9	26	17
EXETER	1	2	1
GUERNSEY	9	5	-4
GLASGOW	17	21	4
HUMBERSIDE	2	1	-1
ISLE OF MAN	1	1	0
JERSEY	13	8	-5
LEEDS BRADFORD	6	14	8
LIVERPOOL	1	14	13
MANCHESTER	58	83	25
NEWCASTLE	9	14	5
NORWICH	2	1	-1
NOTTINGHAM EAST MIDLANDS	7	24	17
PRESTWICK	2	14	12
SOUTHAMPTON	3	15	12
ALL	193	355	162

Source: CAA Airport Statistics

Between 1996 and 2003, the number of international services from regional airports almost doubled, increasing from 193 to 355. Liverpool and Bristol are often mentioned as good examples of how an airport's route network can be expanded by no-frills airlines. In 1996 Liverpool had just one international service (Dublin), whereas in 2003 it had a network with 14 international destinations. Bristol had six international services in 1996 and 18 in 2003.

16. Secondly, no-frills airlines have driven down the cost of air travel by offering low fares and have forced a fundamental restructuring of many existing full service airlines and charter airlines. Price competition has intensified on most short-haul international routes out of the UK, yielding considerable benefits to the travelling public. The effect of no-frills airlines on the fares charged by full service airlines was recently documented by the Department of Trade and Industry (2004)¹⁰.
17. The CAA has analysed data from its own passenger surveys at UK airports in order to examine the changes in European leisure air fares available from London airports between 1996 and 2003. In order to confine the analysis to manageable proportions, the analysis focused on a sample of routes from London grouped into four categories:

⁹ The CAA has recently published a study of UK regional air services which provides a detailed picture of the developments of UK regional air services over the last 10-20 years (CAP 754).

¹⁰ Department of Trade and Industry (2004) *The Benefits from Competition: Some Illustrative UK Cases* (www.dti.gov.uk/economics/economics_paper9.pdf).

- routes to hubs
 - routes to sun destinations
 - other routes with more than 500,000 UK leisure passengers a year
 - other routes with less than 500,000 UK leisure passengers a year
18. The findings of the route fare analysis are presented in Table 1.4. A more general econometric analysis using an extended data set (81 short-haul routes) is presented in Box 1.1. It is evident from Table 1.4 that fares paid by UK leisure passengers to all destinations except Dublin¹¹ fell between 1996 and 2003, and in some cases dramatically so. Looking at individual destinations, there appears to be a considerable degree of variation in fare reductions across the sample. Rome and Hamburg saw fare reductions in excess of 40% and, in total, ten out of the eighteen destinations listed in Table 1.4 saw fare reductions in excess of 20%. On a country-by-country basis, the most substantial fare reductions were recorded to destinations in Italy and Germany.
19. As would be expected, the fare reductions had a stimulating effect on passenger traffic. Again, however, the picture is variable. A number of destinations recorded remarkable growth in UK resident leisure traffic, notably the popular tourist destinations Rome and Barcelona with increases of 308% and 251%, respectively, but also destinations such as Nice and Geneva with traffic growth in excess of 100% between 1996 and 2003. However, some destinations, such as Milan, saw only a modest growth (5%) despite considerable fare stimulation (-47% in real terms).

Table 1.4 Fares and traffic for a selection of destinations served from London airports

	RETURN LEISURE FARE				UK LEISURE TRAFFIC (000s)		
			% change				
	1996	2003	nominal	real	1996	2003	% change
HUBS							
Amsterdam	93	78	-16%	-30%	406	698	72%
Rome	177	81	-54%	-62%	202	707	251%
Zurich	145	134	-8%	-22%	171	318	86%
Madrid	128	97	-24%	-36%	199	346	74%
Milan	147	93	-37%	-47%	191	200	5%
ROUTES WITH MORE THAN 500,000 UK LEISURE PAX IN 2003							
Nice	139	102	-27%	-38%	234	537	130%
Barcelona	139	104	-25%	-37%	173	707	308%
Geneva	132	118	-11%	-25%	268	685	156%
Dublin	77	77	0%	-16%	889	1155	30%
ROUTES WITH LESS THAN 500,000 LEISURE PAX IN 2003							
Athens	189	175	-7%	-22%	275	310	13%
Hamburg	129	68	-47%	-56%	81	135	66%
Berlin	130	85	-35%	-45%	73	152	108%
Copenhagen	136	109	-20%	-33%	108	195	81%
Munich	146	104	-29%	-40%	126	230	83%
Naples	178	128	-28%	-34.3%	150	267	79%
SUN DESTINATIONS							
Alicante	132	121	-8%	-23%	545	1176	116%
Malaga	146	127	-13%	-27%	856	1630	90%
Palma	127	103	-28%	-40%	870	1256	44%

Source: CAA O&D Survey at London airports in 1996 and 2003

¹¹ Dublin has had no-frills services from London since 1993 and so the fare levels in 1996 were already low relative to the rest of the short haul market.

Box 1.1 Impact of no-frills airlines on air fares

In order to examine the impact of no-frills airlines on air fares, the following equation was estimated using data for 81 short-haul routes:

$$\text{Yield}_i = a + b \frac{1}{\text{Distance}_i} + c \text{ No-frills route}_i + \text{error}_i$$

The yield* on a route is assumed to be a function of distance and no-frills presence. As the distance of a route increases, the price per kilometre is expected to decrease, given the fixed costs associated with flying a route.

The reciprocal transformation of the distance variable ensures that the price per kilometre decreases at a diminishing rate as the distance increases. The no-frills variable is a binary variable that takes value 1 if a no-frills carrier operates on the route and 0 otherwise. The presence of a no-frills carrier on a route is expected to depress yields. Table 1.1.1 presents the estimation results (p-values are in square brackets):

Table 1.1.1 Results from the yield regression

Variable	Parameter Estimate	Impact on yield
Distance	3178 [0.00]**	-0.008p***
No-frills route	2.02 [0.00]	-2p
Regression R ² = 0.81		

The regression explains 81% of variation in yield. An increase in distance of hundred kilometres (at mean distance of 600km) is expected to lower the yield by about 0.8p. The presence of a no-frills carrier on the route reduces yield by about 2p, which is equivalent to 30% of the mean value of the yield (6.8p). This is a similar but somewhat lower reduction than the equivalent estimate for the US by Morrison (2001)****. Morrison found that the presence of a no-frills carrier on a route reduced yield on average by about 38%.

* Yield is expressed as the average fare per kilometre.

**p-values are in square brackets. p-value, also known as the exact significance level, may be defined as the lowest significance level at which a null hypothesis can be rejected.

*** Calculated by applying the formulae for marginal impact in the case of reciprocal functional form (i.e. -parameter est.*1/(mean distance²)).

****Morrison, A. (2001) Actual, adjacent and potential competition: estimation of the full effect of Southwest Airlines, *Journal of Transport Economics and Policy*, 35, p. 239-256.

The role of technology

- Internet technology, and in particular the availability of a range of search tools, has given consumers relatively costless and quick access to information about prices and products that was not always available through travel agents. It has also allowed the suppliers of the tourism product, most notably the airlines and accommodation providers, to market directly to consumers and to strip out agency costs.

21. The Internet has proved to be particularly popular with time-constrained holidaymakers who can research holiday possibilities and book online instead of trawling through brochures and visiting or telephoning travel agents. According to Mintel, the Internet plays a major role in the information gathering process for holidays with some 44% of holidaymakers using the Internet to research their holiday and 32% using it for holiday ideas in 2003. In terms of actual bookings, travel agents still maintain a lead although the gap has narrowed considerably over recent years as shown in Table 1.5¹².

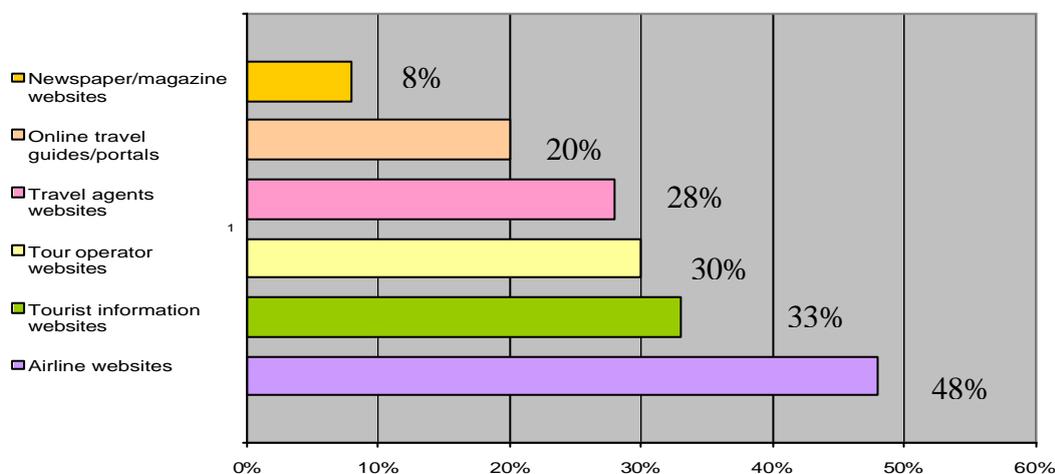
Table 1.5 Channels for booking a holiday

	All holiday-makers		
	2001	2003	change
Travel agent	35%	37%	+2%
Internet	16%	32%	+16%
Brochure	15%	15%	-
Direct from tour operator	10%	13%	+3%

Source: Mintel

22. Data from Mintel also shows that among the respondents who booked their holidays via the Internet, airline websites were the most commonly used, as shown in Figure 1.7¹³.

Figure 1.7 Websites used for holiday bookings



Source: Mintel

Some 48% of those who booked their holiday on the Internet used airline websites. Tourist information websites were the next most popular, used by about one third of Internet holiday bookers, while some 30% of the sample used tour operator websites.

¹² Holidaymakers aged 15 and over were asked the following question: "Thinking about your main holiday or holidays, which, if any, of these have you used to purchase a holiday or travel service in the past 12 months?". Source: "Holidays on the Internet", Mintel, March 2004.

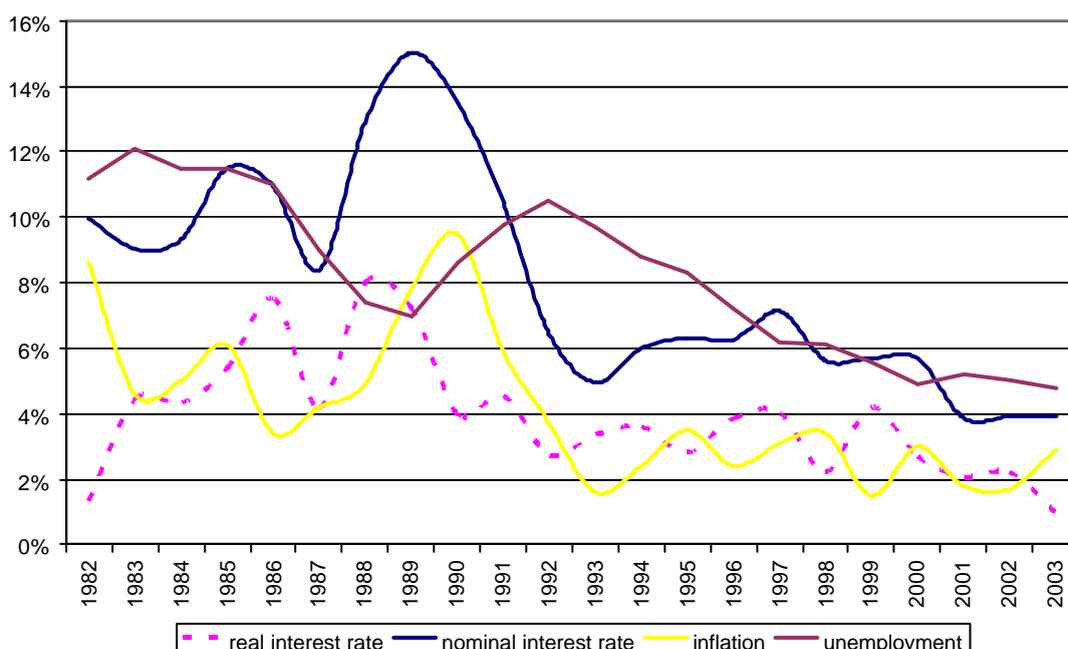
¹³ Holidaymakers aged 15 and over who booked their holiday via the Internet were asked the following question: "Which types of websites do you use?". Source: "Holidays on the Internet", Mintel, March 2004.

23. The Internet is the top booking method for no-frills flights, with no-frills airlines typically receiving almost 90% of their bookings online. The full service carriers are also becoming increasingly reliant on online sales. In May 2004 BA reported that two out of every three BA customers in the UK are travelling with an e-ticket and that more than 50% of all short haul leisure fares are now sold via its website where customers are also able to choose seats, arrange meals and, in the case of flexible tickets, change bookings.
24. Although the growth in Internet penetration is expected to slow down, new technological developments and marketing initiatives are likely to maintain the growth momentum of e-commerce in the market for air travel and holidays. The most recent major development is so-called “dynamic packaging” which provides an online platform for consumers to create customised packages that fit their personal preferences.

Macroeconomic developments

25. In the thirteen years since the end of the recession of the early 1990s, real household consumption in the UK has outgrown real income, on average, by about 0.5% a year. This contrasts with the experience between 1970 and 1993 during which annual real income growth exceeded consumption growth by about 0.2% on average. The relatively rapid expansion of aggregate consumer expenditure over the past ten years or so has been attributed to a number of favourable economic developments, including historically low unemployment, inflation and interest rates, stable economic growth and large increases in household wealth.
26. Figure 1.8 below shows interest rates, inflation and unemployment since comparable records for unemployment began in 1982.

Figure 1.8 Interest rates, inflation and unemployment

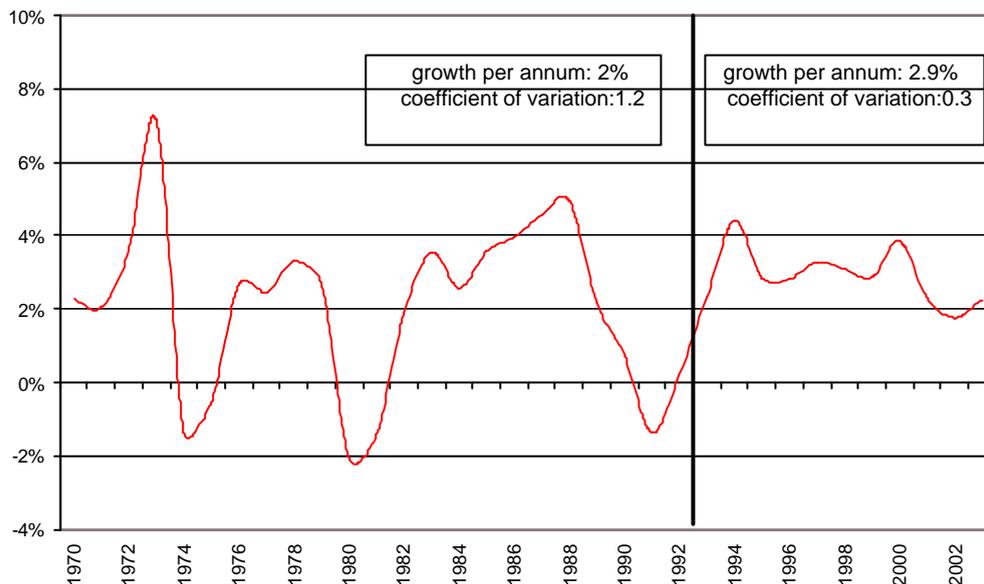


Source: ONS

Real interest rates peaked at about 8% during the “Lawson boom” when the Government increased nominal interest rates sharply so as to curtail spiralling inflation. Once inflation was under control in 1993, real interest rates came down to 3% where they stayed for most of the 1990s before falling even further in recent years. Unemployment fell from about 10% in 1992 to about 4.5% in 2003 - its lowest level for the past twenty years.

27. The reduction in the volatility of economic fluctuations is shown in Figure 1.9 below which plots real GDP growth for the period 1970 to 2003. GDP growth experienced a marked reduction in volatility, as measured by its coefficient of variation¹⁴, after the early 1990s recession. The coefficient of variation declined from about 1.2 in the period 1970 to 1993 to 0.3 in the period between 1993 and 2003 – a reduction in volatility of almost 80%. Importantly, this reduction in volatility has not been achieved at the expense of growth which accelerated from 2% per annum between 1970 and 1993 to 2.9% thereafter.

Figure 1.9 GDP growth (real)

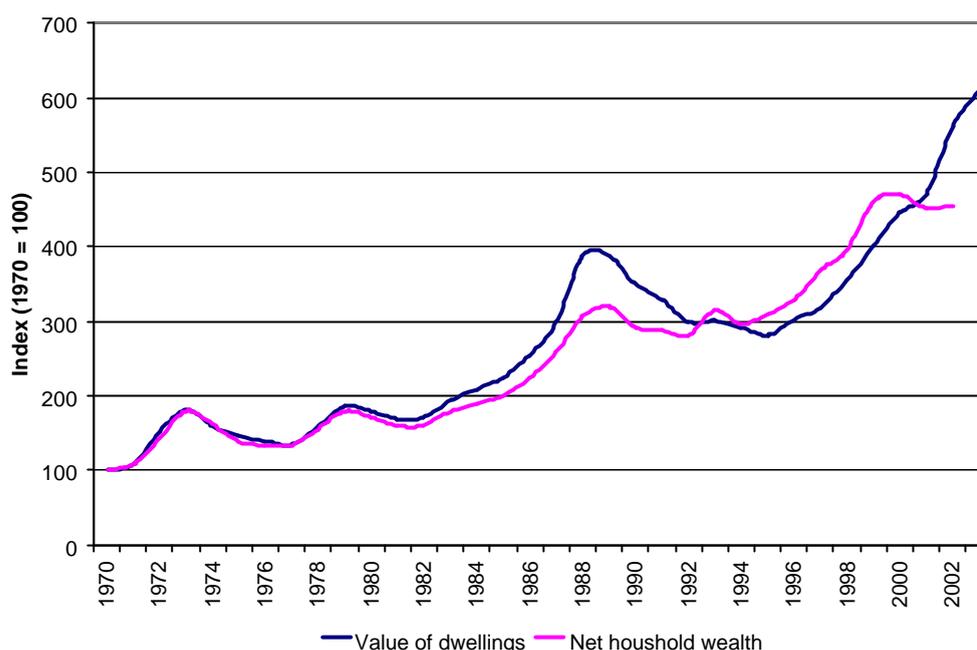


Source: ONS

28. Figure 1.10 shows indices of net household wealth and the value of dwellings measured in real terms.

¹⁴ This is a relative measure of variation defined as the ratio of the standard deviation to the mean.

Figure 1.10 Value of household wealth and dwellings (real)

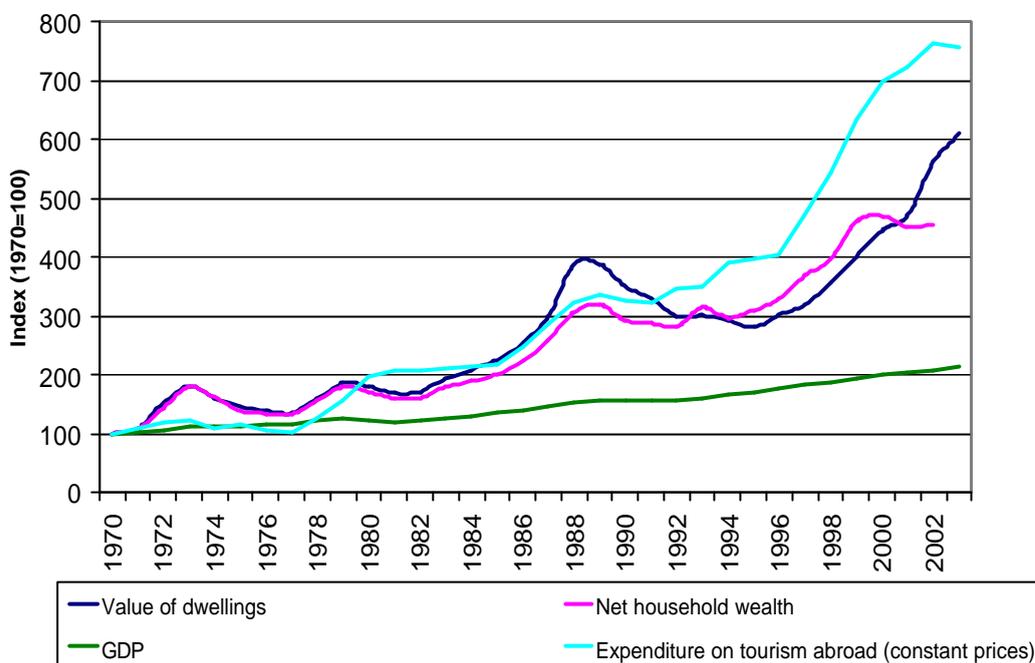


Source: ONS

Having recovered from the late 1980s/early 1990s fall, which was caused mainly by the collapse of house prices, household wealth grew rapidly in the second half of the 1990s before stalling again in 2000, this time due to the financial market downturn. Over the whole period, however, the value of household wealth has outgrown the economy by about a factor of three.

29. There are a number of channels identified in macroeconomic research through which interest rates, unemployment, wealth, exchange rates and economic stability can affect consumption. Of particular importance from the viewpoint of air travel is their effect on consumer confidence, which is one of the key determinants of people's willingness to spend on discretionary activities such as leisure air travel. When households are uncertain about the future of the economy they tend to reduce their non-essential purchases and to increase precautionary savings. Conversely, when households feel secure and are optimistic about the economy they may reduce their savings and spend more on leisure activities.
30. The research on demand for air travel has largely ignored the potential role of macroeconomic factors other than household income or GDP. Figure 1.11 below, which compares the growth in expenditure on holidays abroad with growth in household wealth and GDP, suggests there is a possible impact of household wealth on holidays abroad and therefore air travel.

Figure 1.11 Household wealth, GDP and expenditure on tourism abroad (real)



Source: ONS

Although all four series trend upwards over the whole period, the fluctuations in expenditure on tourism abroad appear to mirror those in the two wealth variables more than those in GDP variable. This is particularly the case over peaks and troughs of the business cycle in the late 1970s/early 1980s, the late 1980s/early 1990s and the late 1990s.

Box 1.2 The role of house prices

A more rigorous way of examining the interaction between the variables in Figure 1.11 is to decompose their movements into trend and cycle components and then examine how these two components correlate over time. The results of one such decomposition (Hodric and Prescott, 1980¹) correlating expenditure on tourism abroad with each of the other three variables from Figure 1.11 are shown in Table 1.2.1.

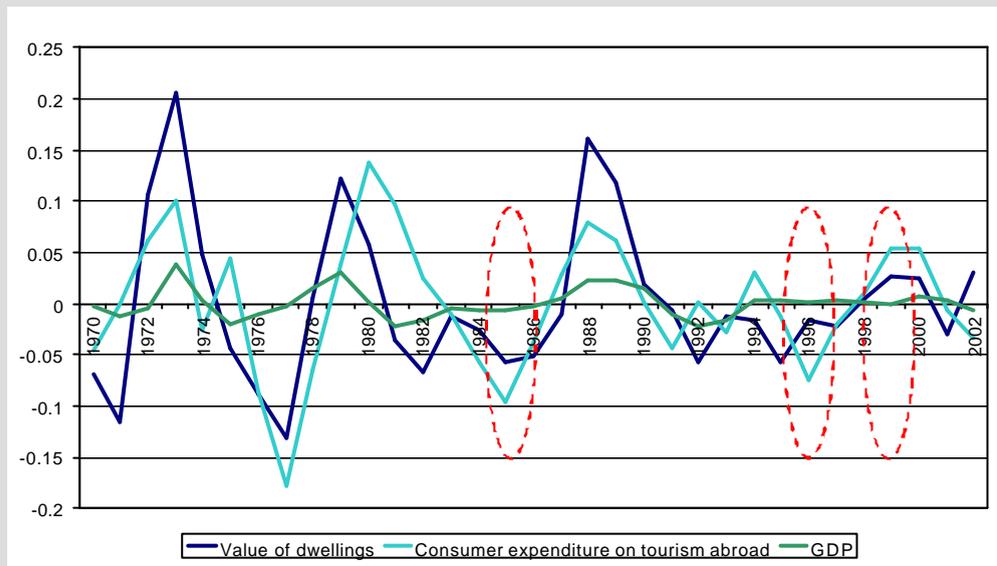
Table 1.2.1 GDP, wealth, dwellings and expenditure on tourism: correlations between trend and cycle components

	Trend	Cycle
GDP	0.99	0.37
Total wealth	0.99	0.62
Value of dwellings	0.98	0.67

Box 1.2 cont.

The correlations between the trend components of the four variables are equally strong. There is, perhaps surprisingly, little contemporaneous correlation between the GDP cycle and the expenditure on tourism abroad cycle, but there is a fairly strong correlation between the latter and the wealth cycle. Figure 1.2.1, which plots the cyclical components of GDP, expenditure on tourism abroad and total wealth, gives further detail.

Figure 1.2.1 Co-movements of dwellings, consumer expenditure and GDP



It is worth noting the absence of correlation between the GDP cycle and the wealth and expenditure abroad cycles during the 1985 and 1996 troughs and the 1999 peak. The coefficient of the regression of expenditure on holidays abroad cycle on the wealth cycle, which has the dimension of elasticity, is equal to 0.68. Although this regression should not be interpreted as causal, as both series may have common determinants, it does give some indication of the possible size of the effect of changes in wealth on expenditure on holidays abroad over the cycle.

The findings above have important implications for modelling purposes. They suggest that household wealth may be an important predictor of demand for air travel over the *short term*. This may in part be explained by the fact that changes in consumer confidence are closely related to wealth since consumers are known to use asset, and in particular house, prices as an indication of the state of the economy. At the same time, however, the preliminary evidence suggests that wealth may add very little, if anything, to *long-term* predictions of demand, over and above the information already contained in the GDP variable.

*Hodrick, R. and E. Prescott (1997) *Post-war business cycles: an empirical investigation*, *Journal of Money, Credit and Banking*, 29, 1-16.

Socio-economic and demographic developments

31. Many important demographic and socio-economic changes have taken place in the UK in recent years. Some of these changes could, in principle, have significant effects on many features of demand for leisure travel abroad. From the viewpoint of demand growth, three developments seem particularly relevant: upward social mobility, change in household composition, and migration.

Upward social mobility

32. The information on social mobility is available in the form of social grade definitions known as ABCs. These definitions have become established as a generic reference series for classifying and describing socio-economic groups for consumer research. There are six reference categories with A being those in senior managerial, administrative or professional roles, B being those in a middle managerial role or equivalent, C1 containing those in junior managerial or supervisory roles, C2 being skilled manual workers, D being semi-skilled and unskilled labour and E being those with no income other than a state pension or benefit.
33. Table 1.6 shows that there has been a marked change in the distribution of population according to socio-economic status in recent years.

Table 1.6 Adult population (000s), by socio-economic status, 1999 - 2003

	1999	2003	1999 to 2003 change
AB	9,951	12,197	22.6%
C1	12,947	13,911	7.4%
C2	10,436	10,059	-3.6%
D	8,355	7,966	-4.7%
E	5,504	4,428	-19.5%
Total	47,193	48,561	2.9%

Source: Mintel¹⁵

34. During the four-year period to 2003, the more affluent AB and C1 segments increased by 22.6% and 7.4%, respectively. At the same time, C2 and D segments declined by 3.6% and 4.7% respectively, while the number in the least affluent group E fell by nearly 20%. The direction of these changes is not unexpected although the scale of the change in, for example, the AB category in such a short period is quite surprising¹⁶.
35. Affluent consumers are, in general, more likely to go on a number of holidays in the year, so upward social mobility in the UK population can be expected to boost the market for holidays abroad. The link between socio-economic status and propensity to take holidays abroad is illustrated in Table 1.7.

¹⁵ Based on data from Mintel's report "Holiday Property Abroad – UK", November 2004.

¹⁶ The CAA has examined ONS (Office for National Statistics) statistics on changes in social class of working age population in order to cross-check Mintel's survey findings. While the two organisations use different definitions so that direct comparison is not possible, ONS figures also point to a marked increase in the proportion of more affluent socio-economic groups in the total population.

Table 1.7 Socio-economic status and holidaying abroad (2003)

	Share of adult UK population ¹⁷	Share of adult outbound leisure traffic ¹⁸
AB	25%	32%
C1	29%	38%
C2	21%	20%
D	16%	7%
E	9%	3%

Source: Mintel and CAA O & D Survey

The more affluent AB segments account together for some 32% of outbound leisure traffic – some 7 percentage points higher than their combined share of the adult population. The proportion of the C1 segment in leisure travel (38%) is 9 percentage points higher than its share of the adult population. C2 accounts for about 20% of leisure travel which is similar to its share of the adult population. The less affluent D and E segments are underrepresented in outbound leisure traffic. Together they make up about 25% of adult population – two and a half times their share of outbound leisure traffic.

Change in household composition

36. The change in household composition in the UK in recent years is shown in Table 1.8.

Table 1.8 Adult population (000s), by household composition, 1999 - 2003

All Adults (000s)	1999	2003	1999 to 2003 change
Pre-/no family (under 45 who are not parents)	12,499	13,383	+7.1%
Families	13,600	13,350	-1.8%
Third age (aged 45-64 with no children aged under 16)	11,860	12,331	+4%
Retired	9,238	9,472	+2.5%
Total	47,197	48,536	+2.8%

Source: Mintel¹⁹

Evidently, there has been an increase in households with no dependent children since 1999. The most marked change has been a 7.1% increase in the pre-/no family group households during the period in question. The other two groups likely not to have dependent children - the third age group and the retired group - have grown by 4% and 2.5% respectively. The family group, which was the largest single group in 1999, has contracted by some 1.8% over the four-year period to 2003, and is now approximately equal in size to the pre/no family group.

37. Households with no dependent children are, in general, expected to have a higher propensity to take holidays abroad because they are more likely to have greater resources of time (and often income) available for leisure activities. The link between household composition and holidaying abroad is illustrated in Table 1.9 below.

¹⁷ Based on data from Mintel's report "Holiday Property Abroad – UK", November 2004.

¹⁸ Based on the CAA passenger survey at Birmingham, Bristol, Cardiff, Nottingham East Midlands, Exeter, London City, Gatwick, Heathrow, Liverpool, Luton, Manchester and Stansted.

¹⁹ Based on data from Mintel's report "Holiday Property Abroad – UK", November 2004.

Table 1.9 Adults living in households with no dependent children, 2003

	% Share
Population	72% ²⁰
Outbound leisure at Heathrow	85%
Outbound leisure at Gatwick	80%
Outbound leisure at Stansted	80%
Outbound leisure at Luton	78%
Outbound leisure at regional airports	75%

Source: Mintel and CAA

It is apparent that representation in outbound leisure traffic of adults living in households with no dependent children is larger than their proportion of the UK population, especially in the case of London airports, in whose catchment areas such adults may be more prevalent than in the rest of the UK. At Heathrow, for example, this group accounts for 85% of outbound leisure traffic – some 13 percentage points higher than its share of the population.

Migration

38. Increasing globalisation, diminishing international barriers and the general right to free movement between countries of the EU have all increased the mobility of the population. The ONS statistics shown in Table 1.10 point to an increase in both inward and outward migration activity.

Table 1.10 International migration to and from the UK (000s)

	Inflow	Outflow
1998	390	251
2002	513	359
% change	32%	47%

Source: ONS

In 2002, some half a million people migrated into the UK while 350 thousand moved from the UK to other countries. Such two-way flows of migration create growth in the VFR component of leisure travel; migrants receive visits from friends and relatives and travel to their countries of origin to maintain these relationships. Table 1.11 illustrates how much VFR traffic has increased between 1998 and 2003.

Table 1.11 Holiday and VFR visits abroad (000s), 1998 and 2003

	Holiday	VFR
1998	22,945	4,449
2003	32,644	6,939
% change	42%	56%

Source: IPS

39. The number of visits by UK residents to friends and family abroad has increased between 1998 and 2003 by about 56% - some 14 percentage points higher than growth in the number of visits in the holiday market during the same period. The VFR traffic accounts for some 20% of outbound leisure traffic. However, its share varies considerably between different airports as seen in Table 1.12.

²⁰ Based on data from Mintel's report "Holiday Property Abroad – UK", November 2004.

Table 1.12 Outbound VFR traffic at selected airports, 2003

Airport	% of UK outbound leisure
Birmingham	22%
Bristol	15%
Cardiff	12%
Exeter	5%
London City	57%
Gatwick	18%
Heathrow	49%
Liverpool	24%
Luton	31%
Manchester	14%
Nottingham East Midlands	12%
Stansted	41%

Source: CAA O&D Survey

The share of VFR traffic in total outbound leisure traffic is higher at airports serving major population centres, notably London. The exceptions are Manchester and Gatwick - the two airports with the greatest charter presence.

Chapter 2 Industry views

Introduction

1. The CAA held meetings with representatives of the following organisations: BAA, British Airways (BA), Britannia, Air Transport Group University of Cranfield, easyJet, Flybe, Ryanair, Thomas Cook, Virgin Atlantic. Although the industry representatives were unable to contribute data for reasons of commercial sensitivity they were supportive of the study, shared their experience and knowledge of the market, and helped to guide the CAA's research with their advice. However, the research findings are the CAA's own.
2. The CAA has extracted the key themes from these meetings under the major headings relevant to this report. In order to preserve confidentiality, the views of industry representatives are not attributed to the individual participants in the exercise.

The effect of GDP

3. At the level of the total market, the industry generally saw GDP or consumer expenditure as the main long-term driver although many focussed on their own carryings which represented only a small share of the total and hence were seen as being less affected in the short term by macroeconomic changes. Many were comfortable with an income elasticity range of between 1.3 – 1.8 although this was expected to diminish over time. Indeed, one expert suggested that any value much over one needed to be treated with caution.

Box 2.1 Market maturity

GDP or income elasticities are often used to assess the degree of market maturity. Graham (2000)*, for example, suggests the following five-stage model of market maturation process:

Table 2.1.1 The five stages of maturity/saturation

Income elasticity value	Maturity/saturation stage
Constant and substantially greater than 1	Stage 1 (Full Immaturity)
Decreasing but still greater than 1	Stage 2
Approaching 1	Stage 3
1 or below	Stage 4 (Full Maturity)
0	Stage 5 (Full Saturation)

'Full' maturity is defined to occur when the income elasticity is unity or below, that is when increases in income do not produce proportionately larger increases in demand. 'Full' saturation on the other hand is defined to occur when the income elasticity value is zero (i.e. changes in income have no effect on demand). Earlier stages of market maturity are considered to exist when elasticity values are falling but are still larger than one.

Products start their lives as highly income elastic. They become less so as they become more commonplace, and eventually their consumption approaches maturation, or even saturation, giving zero elasticities. In general, the speed at which this process takes place is slower for broader categories of products (e.g. air travel), which are less subject to changes in fashion, than for more narrowly defined products (e.g. package tours).

*Graham, A. (2000) Demand for Leisure Air Travel and Limits to Growth, Journal of Air Transport Management,6, p.109-118.

4. Although airlines acknowledged that the macroeconomic environment has an important long-term influence, they noted that there were many other factors such as liberalisation and that, as many short-haul prices are now not “big ticket” items, they are less likely to be affected by moderately adverse macroeconomic developments. One airline noted that its fares competed against products like jeans and that spending £100 for a weekend away is “no big deal”.
5. Some suggested that the effect of GDP is asymmetric: an increase in GDP is likely to cause a proportionately greater impact on traffic than its decrease. There is virtually “no limit” to the number of trips that can be taken as income rises but when income falls there are still “must take” or “core” trips, visits home etc. Similarly, short breaks are likely to be more responsive to income and interest rate changes than the main family holiday.

Interest and mortgage rates

6. Interest rates are seen as important. However, while low interest rates might help stimulate spending on travel, they adversely affect older travellers who have substantial savings and are an increasingly significant segment of the market. The effect of mortgage rates on demand for holidays will also vary from passenger to passenger. Some recent house buyers may be affected considerably by a rate increase, while others may have enough head-room to be able to absorb increases in mortgage payments.
7. Most airlines seemed to believe that passengers regard their annual holiday as a necessity nowadays but it was noted that passengers on their main holiday now account for a much lower proportion of total traffic than in the past. Others also pointed out that people may take several short breaks in place of a traditional annual holiday.

Wealth and well-being

8. One carrier expressed the view that there was no reason to suppose that the impact of housing wealth on spending on air travel was any different to its effect on any other retail spending. Rising house prices and the consequent increase in wealth were seen as positive not only because of the scope for equity release but also, and perhaps more significantly, because they strengthen consumer perceptions of well-being. This is important when it comes to a consumer’s willingness to buy a holiday well in advance of travel. Predictability is crucial for this kind of commitment and uncertainty about the future can be highly detrimental to the industry. This is particularly true of events which people do not understand or know little about, for example SARS or the anthrax scare in the US. It is conceivable that this type of confidence factor may be more important for air travel than for other forms of consumer expenditure.
9. Housing wealth was seen by the industry as more important than financial wealth as it affects more people in the UK. According to ONS data, home ownership reached 69% in 2002. Job security was also seen as less important than in the past, especially for younger people who have not experienced periods of high unemployment. Young people without property may prefer to spend their money on travel, rather than saving up to enter the property market.

Home ownership abroad

10. One carrier noted that the number of UK citizens owning properties abroad had increased substantially in the past few years. As another airline pointed out, property ownership abroad boosts demand for air travel: in buying abroad, people often incur substantial fixed costs, and therefore want to use these properties as much as possible, thereby stimulating demand.

Box 2.2 Home ownership abroad

The data on home ownership abroad is available from The Survey of English Housing (SEH). This is a continuous household survey carried out for the Office of the Deputy Prime Minister by the National Centre for Social Research. In 2003/04 the SEH asked respondents whether they have a second home abroad and, if so, to give the country in which the second home is located. The survey findings are presented below:

Table 2.2.1 Home ownership abroad, 2003/04

Country of second home							All percentages	Total (000s)
France	Spain	Italy	Portugal	US	Other European	Other Non-European		
25%	36%	2%	2%	4%	14%	18%	100%	150

*The figures exclude households in other parts of the UK as well and second homes which are the main residence of somebody else.

Some 150,000 English households (about 1% of the total number of households in England) own a second home abroad. More than one third of second homes are in Spain while France is the second most popular location.

The CAA has recently carried out a survey at Stansted Airport in which passengers were asked whether they own property abroad. The findings based on some 550 responses indicate that about 15% of passengers travelling from Stansted own property abroad. Given that only 1% of households own property abroad this suggests that those who do have a very high propensity to fly.

Fares and total costs

11. Airlines commented that passengers differ in their characteristics. There are impulse buyers but, on the other hand, there are people who like to research in advance the place they are going to stay and hence book ahead. Some people focus on the fare, others on the whole cost of their journey. The shorter the trip, the more important the fare level. One carrier said that it is difficult to isolate the effects of fares on traffic because of the effects of other costs such as airport car park charges.
12. Some emphasised the need to take into account the total costs of a trip when modelling demand for air travel and not just to consider fares. They noted that exchange rates affected the total cost and could therefore divert passengers from one destination to another; Spain became unpopular in 2004 less because of the Madrid bombings than the strength of the euro.

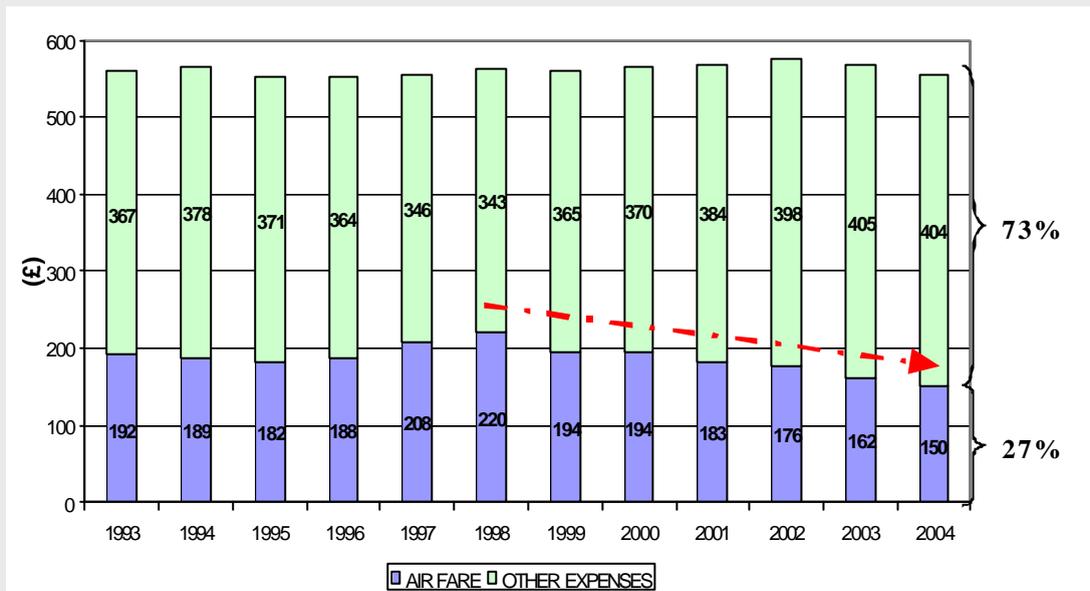
13. Several airlines pointed out that the fact that Ryanair's well-publicised one-million-seat giveaway was not taken up fully indicates that travel trends cannot be explained by economic factors and fares alone. However, it should be noted that "free seats" were offered for outbound flights only and passengers still had to pay tax and charges.

Box 2.3 Fares and total costs

Many previous studies of demand for air travel have considered fares as the only relevant price variable to be included in the demand function. This practice is problematic since travel abroad has two price elements – the cost of travel to the destination and the costs of accommodation and leisure activities at the destination. An analysis which ignores this may generate erroneous results especially since air fares have fallen dramatically in recent years and so travel behaviour may increasingly be influenced by the costs of other components of travel abroad.

The importance of considering the costs of other components of travel abroad in addition to air fares is illustrated in Figure 2.3.1 below which shows the average spending per visit to Europe by UK residents travelling for leisure purpose.

Figure 2.3.1 Average spending (in £2004) per visit to Europe by UK residents



In 1998, which marks the start of the boom in no-frills services, air fares were a major, if not the biggest, *single* component of holiday expenses. UK residents travelling to Europe for leisure purposes in 1998 spent an average of about £560 (in £2004) per trip of which £220 (or approximately 40%) was spent on air fares. From that point, the average spending on air fares fell every year to £150 in 2004 (or, by 32%) while the average spending on other elements of a trip abroad* increased to £404 (or, by 18%) during the same period. In 2004, air fares accounted for about 27% of holiday expenses for travel to Europe and, as a result, a 10% increase in air fares would have added less than 3% to the average total costs of a trip**.

* The costs of "other elements of a trip" were created by adjusting ONS figures on average spending per visit abroad by adding the costs of airport access. The costs of airport access were set to £25 for 2004 (the price of a return journey on Stansted Express) and then extrapolated backwards using CPI for transport services.

** In long-haul markets, air fares accounted for about 35% of holiday expenses in 2004. A traffic weighted average for short- and long-haul markets was about 30% in 2004.

Airline revenue

14. One airline suggested that an air trip is now regarded as a commodity whereas a holiday is not. So, although demand for air travel has been growing rapidly, airlines are finding it increasingly difficult to make profits. People are prepared to spend more on air travel but only by virtue of getting flights to more distant destinations. Passengers are also prepared to spend once they got to their destination; accommodation and entertainment costs are taking up an increasing share of travellers' budgets. Cruise ships, for example, can capture this because they provide the whole experience. Another noted that hotels could afford to sell rooms at close to marginal costs because of the revenues from bars, restaurants, shops and tours.
15. Another airline expressed similar views. In its opinion, passengers see the up-front payments in a different light to those incurred on the holiday itself. Passengers will put considerable effort into getting the best available fare or package, but once abroad they tend to spend considerably more freely on different activities such as eating out, car hire, etc.

Air Passenger Duty (APD) and fuel surcharges

16. Airlines which expressed an opinion on APD said that they had little evidence of a noticeable suppression of traffic. Among other things, it was noted by some that APD may only be a small proportion of the total trip cost, especially for long haul, and that the advertised fare level may be perceived by some as more of a determinant of passenger behaviour than the total price paid. Moreover there was no clear evidence at the time²¹ of any significant effect of oil surcharges on traffic levels.
17. Although one view was that passengers in general do not like "extras" being added to their fares, others felt that passengers will tolerate surcharges if there is a reasonable explanation. One airline saw demand as being driven more by a general sentiment about what people thought they could afford than by elaborate calculations.

The Internet

18. The greater transparency provided by the Internet was generally seen as having increased cross-price elasticities. Some argued that consumers were now faced with a vastly increased number of possibilities with stays from a day upwards and accommodation from sleeping under the pier to a 5* hotel.
19. Some regarded consumers as more adaptable now: if the prices go up, say because of an oil price surcharge, people may not stop travelling but rather trade down from a five-star hotel to a four-star hotel, go to Turkey not Spain, take a city break or a seven-day package instead of a two-week package, or travel off-peak rather than on more expensive flights. But there was no general agreement on whether the transparency and flexibility offered by the Internet had affected the overall elasticity of demand.
20. For their main holidays or for long-haul flights passengers are probably more cautious and are more likely to go through travel agents rather than use the Internet.

²¹ The interviews were carried out between June and September 2004.

Fare elasticities

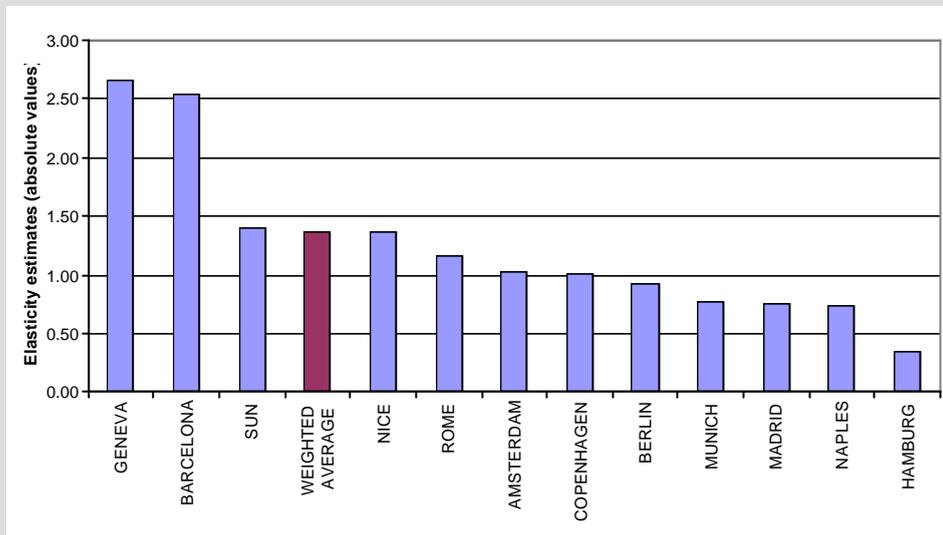
21. Some believe that elasticities are symmetric, i.e. if a 5% increase in fares causes traffic to fall by, say, 5%, then a 5% reduction in fares will increase traffic by 5%. Some see the elasticity as lower at the higher end of the market; some view the elasticity as likely to be low when the fare is low, "a £10 increase in a £20 fare still leaves the consumer with a bargain". Combining these thoughts, one expert also felt that fare elasticities are not independent of the fare level and may be "U-shaped", lower at the top and bottom ends of the range than in the middle. Another felt that people might be more price sensitive in the case of short holidays as these have less priority than main holidays.
22. One airline believed that breaking the cost of a journey down into fare and various surcharges may have reduced elasticity. Similarly, passengers may be reluctant to withdraw from the booking process at a late stage when they become more aware of the total cost of their journey.
23. Passengers were much less price conscious with respect to special events, such as football and rugby matches, and airlines could use personal marketing to tap into this.
24. One airline described how it had estimated own-price elasticities for a sample of its routes using the arc elasticity approach. Although the elasticity estimates varied considerably from route to route, they were fairly large in general. The average elasticity estimate for the sample was about -2, the highest estimate was about -4 and the smallest about -1.

Box 2.4 Route-specific elasticities

The CAA has applied the arc approach* to calculate elasticities for a sample of destinations served from London airports, using the traffic and fares data for the UK outbound leisure sector for 1996 and 2003. Before applying the arc elasticity formulae, the passenger numbers in 2003 were adjusted for the likely effect of income on traffic growth. In the absence of destination-specific empirical estimates of income elasticities, an assumption was made that the traffic on those routes would have expanded at one and a half times the rate of expansion of total consumer expenditure over the same period (i.e. assuming an income elasticity of 1.5).

Figure 2.4.1 plots the absolute values of expenditure adjusted arc elasticity estimates obtained in this exercise:

Figure 2.4.1 Price elasticities for a selection of destinations served from London airports estimated using the arc approach



In some cases the traffic between 1996 and 2003 grew at a slower rate than the assumed “natural” growth due to income, which implied positive own-price elasticities. These were deemed implausible and were not included in Figure 2.4.1 above. The highest elasticity estimates were obtained for Geneva (-2.7) and Barcelona (-2.5%) followed by the group of sun destinations** (-1.4). The two smallest elasticities were estimated for Naples (-0.7) and Hamburg (-0.4). The variation in elasticity values can be attributed to a number of factors. One is that consumers may consider some destinations more attractive than others and so the “one size fits all” income effect assumption may not be appropriate. For example, as consumers’ incomes increase they may prefer to direct additional expenditure towards going to, say, Barcelona rather than Naples. The other reason is that the level of service and competition before no-frills entry varied from route to route. For example, some popular destinations like Rome previously lacked competitively priced air services from the UK. A traffic-weighted average of the elasticity estimates was found to be -1.4***.

*Arc approach calculates the elasticity between two points on demand curve as the percentage change in the quantity demanded divided by the percentage change in price.

**Malaga, Palma and Alicante.

***It is shown in Chapter 4 (Box 4.1) that aggregate market elasticity is likely to be smaller (in absolute terms) than a traffic-weighted average of route-specific elasticities.

Chapter 3 Econometric analysis

*Methodology and Data*²²

1. Air travel demand elasticities were estimated separately for three international leisure market segments: Western Europe, North America and the Rest of the World. From an investigation of the aviation demand literature, and the discussion in **Chapter 1** and **Chapter 2**, the following variables were considered as potential demand determinants:
 - total consumer expenditure
 - price of travel
 - UK house prices

The consumer expenditure measure is generally preferable to the measure based on disposable income because some consumers may save part of their disposable incomes while others may finance consumption from savings, borrowing, or sale of assets.²³ Two different elements of the price of travel were considered: air fares and the costs of living at the destination relative to the UK. The house prices variable was included to capture the short-run effect of consumer confidence on demand for air travel.

2. The general form of the demand function for international air passenger traffic market i in year t is expressed as:

$$Traffic_{it} = f(\text{Consumer Expenditure}_{it}, \text{Air Fares}_{it}, \text{Effective Price of Tourism}_{it}, \text{House Prices}_{it})$$

3. Quarterly traffic and fares data for the UK outbound leisure sector spanning the period 1994Q1-2003Q4 were obtained from the International Passenger Survey (IPS)²⁴ and the macroeconomic data were taken from various issues of the Office for National Statistics' (ONS) publication 'Economic Trends'.

Estimation results

4. All the variables in the model were transformed logarithmically prior to estimation and so the parameter estimates shown in Table 3.1 can be interpreted as elasticities. In general, the best results were obtained for Western Europe where the parameter estimates were robust to alternative specifications of the nuisance variables (shocks and seasonal dummies). Attempts to estimate cross-price elasticities between the three market segments were not successful. The estimates for North America and the Rest of the World were sensitive to different formulations of the effects of 11 September and the Second Iraq War and thus need to be treated with caution.

²² A more detailed description of the methodology and data is provided in **Appendix 3**.

²³ This report follows the usual convention of referring to total expenditure elasticities as income elasticities.

²⁴ This is a questionnaire-based survey and as such may be subject to a number of sources of error.

Table 3.1 Estimation results

Variable	Western Europe		North America	Rest of World
	Long Run	Short Run	Long Run	Long Run
<i>Air Fare (log)</i>	-0.7[.000]		-0.8[.007]	-0.7[.009]
<i>Effective Price of Tourism (log)</i>	-0.4[.091]		-0.6[.007]	-0.4[.078]
<i>Total Consumer Exp.(log)</i>	1.5[.000]		1.8[.200]	1.6[.000]
<i>D₄ Air Fare (log)</i>		-0.2[.319]		
<i>D₄ Effective Price of Tourism(log)</i>		-0.2[.258]		
<i>D₄ Total Consumer Exp.(log)</i>		-0.4 [.776]		
<i>D₄UK House Prices (log)</i>		0.3 [.152]		

5. As expected, income elasticities are positive and greater than unity. The responsiveness of traffic is strongest for North America where a 10% increase in *Total Consumer Expenditure* is expected to boost traffic by about 18%, other things being equal. A similar increase in *Total Consumer Expenditure* is expected to boost traffic to the Rest of the World and Western Europe by 16% and 15%, respectively. This suggests that as consumer expenditure increases UK residents are more likely to view North America as a more desirable (i.e. first choice) destination than Western Europe and the Rest of the World.
6. The estimates of price elasticities are similar for all three markets. They indicate that demand for leisure air travel is inelastic with respect to *Air Fares*. A 10% increase in air fares *alone* is expected to result in 8% fewer passengers to North America and 7% fewer passenger to Western Europe and the Rest of the World. The *Effective Price of Tourism* elasticity appears negative and significant in all three markets. The magnitude of the decrease in demand for North America in response to an increasing *Effective Price of Tourism* (-0.6) is greater than that for Western Europe and the Rest of the World (-0.4).
7. While demand for air travel appears to be inelastic with respect to *Air Fares* and *Effective Price of Tourism*, if both increase/decrease by the same percentage, they will cause a more than proportionate percentage decrease/increase in demand for air travel. For North America, a 10% increase in both *Air Fares* and *Effective Price of Tourism* will decrease demand by about 14%. Similar increases will reduce demand for Western Europe and the Rest of the World by about 11%.
8. The short-run model could only be estimated for Western Europe and, even there, was less robust than the long-run models. The short-run elasticities of *Air Fare* (-0.2) and *Effective Price of Tourism* (-0.2) are approximately a third and a half of their long-run values, respectively. The short-run elasticity of *Total Consumer Expenditure* was not statistically significant. A 10% increase in house prices will increase demand for air travel by about 3% in the short term²⁵.

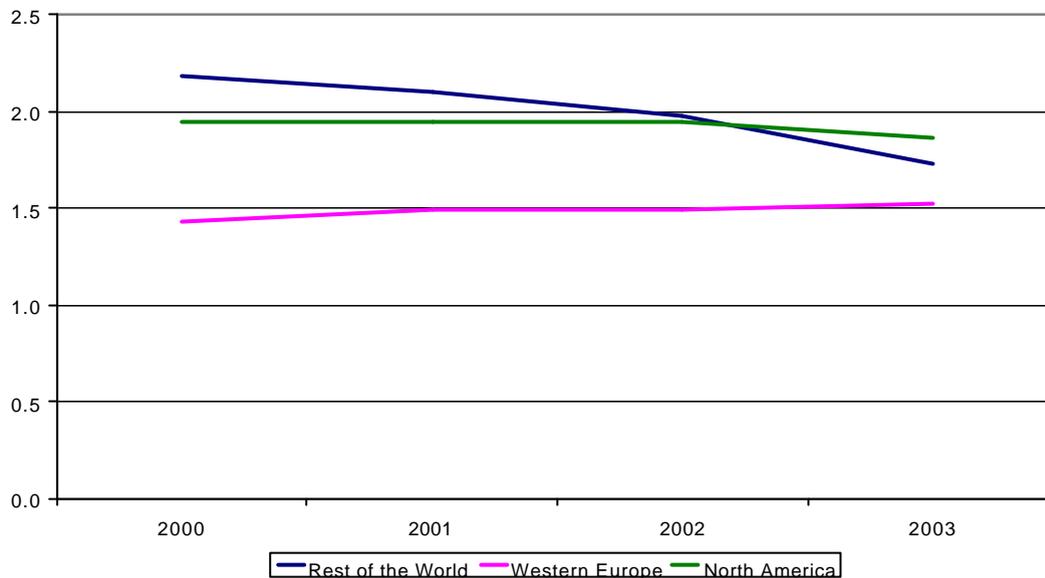
Variation over time

9. The question of whether income and price elasticities have changed over time is investigated below using the recursive estimation procedure. This procedure starts by estimating the model parameters using only a subset of the sample observations. Once parameters are estimated, an additional data point is

²⁵ Note that *UK House Prices* is significant at 80% confidence level.

added and the parameters are re-estimated and so on until all the remaining data points are used²⁶. Figure 3.1 plots the estimates of income elasticities obtained in this exercise which were averaged over calendar year:

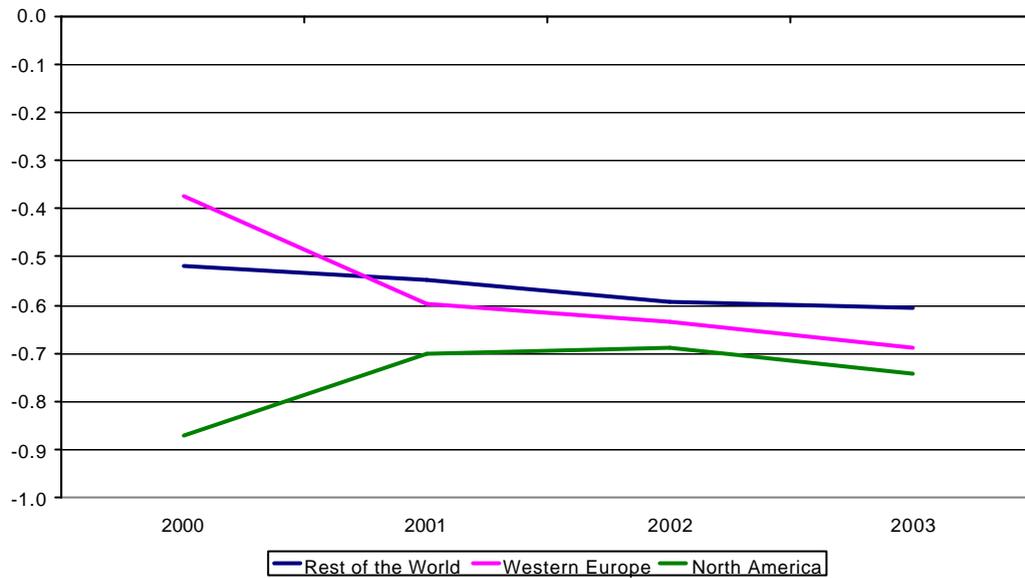
Figure 3.1 Variation of income elasticities over time



10. There is no evidence of traffic maturity in the case of Western Europe. If anything, income elasticity appears to have increased somewhat over the past three years. Partly this may be due to the increasing popularity of short-breaks which seem to have revitalized the tourist industry in Western Europe. Income elasticities for North America and the rest of the World, on the other hand, have declined between 2000 and 2003. This does not mean that long haul holidays are necessarily becoming less fashionable, but may simply be due to the effects of recent shocks which have mainly affected long-haul markets and a deteriorating security situation in general, which may have not been captured fully by dummy variables.
11. Figure 3.2 plots the estimates of air fares elasticities for the period 2000Q1 - 2003Q4:

²⁶ To ensure a sufficient number of observations, the parameters were estimated over the period 2000Q1 to 2003Q4. Another way of examining parameter variation over time is to use the so-called rolling regression technique. Whereas recursive regression extends the sample by one each time it re-estimates, rolling regression keeps the sample size (e.g. 30 observations) the same and shifts it over the available data span.

Figure 3.2 Variation of air fare elasticities over time



The estimates of air fares elasticities appear somewhat more volatile than the estimates of income elasticities, especially those for North America. The fare elasticity for Western Europe appears to have increased (in absolute terms) over the past three years, from about -0.4 to about -0.7 . The demand for the Rest of the World also appears to have become more elastic during the period in question although towards the end of the sample this trend appears to have stalled. This apparent volatility notwithstanding, it is reasonably safe to conclude on the basis of the evidence shown in Figure 3.2 that demand leans on the price inelastic side.

Chapter 4 Discussion of findings

Income elasticity of demand

1. The income elasticities estimated in **Chapter 3** are consistent with the analysis in **Chapter 1** which showed that expenditure on holidays abroad (including air fares) accounts for a small proportion of total consumer expenditure relative to other forms of expenditure on leisure activity, and that the groups AB take a disproportionately large number of leisure trips abroad. Taken together, these facts suggest that the potential for organic market growth (i.e. income and wealth driven as opposed to price driven) is still quite high. In the future, as more households become prosperous, they are likely to devote an increasing share of their incomes to discretionary expenditures such as leisure air travel.
2. The relative ordering of income elasticities (i.e. 1.8 for North America, 1.6 for the Rest of the World and 1.5 for Western Europe) is plausible if holiday travel to the US and Canada is in general less budget-oriented than travel to Western Europe and the Rest of the World. This is given support by Table 4.1 which shows the average spend per day and region by UK residents travelling abroad for a holiday.

Table 4.1 Average spend (£ per day) and region by UK residents travelling abroad for a holiday

	1999	2000	2001	2002	2003
North America	53	57	63	66	67
EU Europe	38	38	41	44	45
Non EU Europe	34	36	39	42	43
Other Countries	40	41	43	47	48

Source: IPS Travel Trends 2003

North America has consistently been the region with the highest average spend per visit by UK residents travelling for a holiday. In 2003, UK residents spent £67 per day in North America which is approximately a third more than the daily expenditure in other regions.

Price elasticity of demand

3. The market demand for leisure air travel was found to be moderately inelastic with respect to air fares alone (-0.7 to -0.8). The finding that demand for leisure air travel in aggregate is inelastic with respect to air fares alone is consistent with Dargay and Hanly's (2001) study of demand for air travel in the UK, but less so with some of the evidence from other countries reviewed in **Appendix 3**, and the estimates of the route-specific elasticities presented in **Chapter 2** (see Box 2.4 Route specific elasticities).
4. The difference between aggregate and route-specific elasticities can be explained with reference to two separate effects of a price change – the income effect and the substitution effect. The income effect refers to the impact of a price change on consumer purchasing power. Because air fares account for a relatively small proportion of consumer budgets, this effect is small in both cases (i.e. destination-specific and aggregate market price elasticity). The second effect refers to the availability and closeness of substitutes. This effect

is much stronger on an individual route than at the aggregate level because individual destinations compete with each other for consumer travel budgets.

Box 4.1 Aggregate market and route-specific elasticities

The relationship between the aggregate market own-price elasticity, E , and destination-specific elasticities (own-price elasticity E_{ii} and cross-price elasticity E_{ij}) can be described by the following expression:

$$E = \sum_i S_i \left(\sum_j E_{ij} \right)$$

where S_i denotes the traffic share of destination i . It follows from the above expression that the higher the cross-price elasticities (i.e. the greater the degree of substitution between different routes) the lower will be the aggregate own-price elasticity.

To illustrate this in a brief numerical example, suppose that there are only two routes, A and B with own price elasticities $E_A = -1.5$ and $E_B = -1.5$; market shares $S_A = 0.5$ and $S_B = 0.5$; and cross-price elasticities $E_{AB} = 0.7$ and $E_{BA} = 0.7$ ^{*}. The weighted average elasticity is -1.5 , but using the expression for aggregate elasticity yields:

$$E = S_A(E_A + E_{AB}) + S_B(E_B + E_{BA}) = 0.5(-1.5+0.7) + 0.5(-1.5+0.7) = -0.8 \quad \dots(1)$$

To show why -0.8 rather than the weighted average of the two own-price elasticities is the true market own-price elasticity, Table 4.1.1 considers the effect of a 10% reduction in air fares to both destinations:

Table 4.1.1 Change in traffic in response to change in fares (example)

	Effect on A	Effect on B
10% reduction in fare A	+15%	-7%
10% reduction in fare B	-7%	+15%
Net Effect	8%	8%

The effect of a 10% fare reduction on both routes would be to increase the total traffic in the market by 8% (i.e. weighted average of the route net effects) which is precisely what is implied by an aggregate market elasticity of -0.8 computed using (1). Using the weighted average elasticity of -1.5 , on the other hand, would erroneously imply a 15% increase in the aggregate traffic.

^{*}The cross-price elasticities were chosen to satisfy the Slutsky or symmetry condition which implies the following relationship between cross-elasticities and market shares $E_{AB} = (S_B/S_A)E_{BA}$.

5. The finding that demand for leisure air travel in aggregate is inelastic with respect to air fares alone is intuitively plausible given that air fares typically account for less than a third of the total costs of travel abroad. To illustrate this with a brief numerical example, suppose that air fares fall by 20%. A fare

elasticity of, say, -1.5 (which is the median estimate for short haul from the Gillen et al. (2003) review of the past evidence) implies traffic generation in order of 30% which seems disproportionate given that the total cost of travel would only have been lowered by 5%.

6. Two additional observations support this intuitive argument. First, airline revenue from leisure traffic has grown at a slower rate than total consumer expenditure since no-frills airlines²⁷ took off in 1998 and, second, inbound leisure travel showed hardly any growth before 2003 despite low fares being available for visitors to the UK as well as to UK passengers travelling abroad.
7. As regards to the first point, if demand for air travel was indeed price elastic then, other things being equal, falling air fares should increase airline revenue. Although it is hardly ever possible to observe the behaviour of consumers at different prices under anything approaching *ceteris paribus* conditions, Table 4.2 suggests that total industry revenue has not benefited from lower prices even though some firms may have done well by attracting traffic from other carriers.

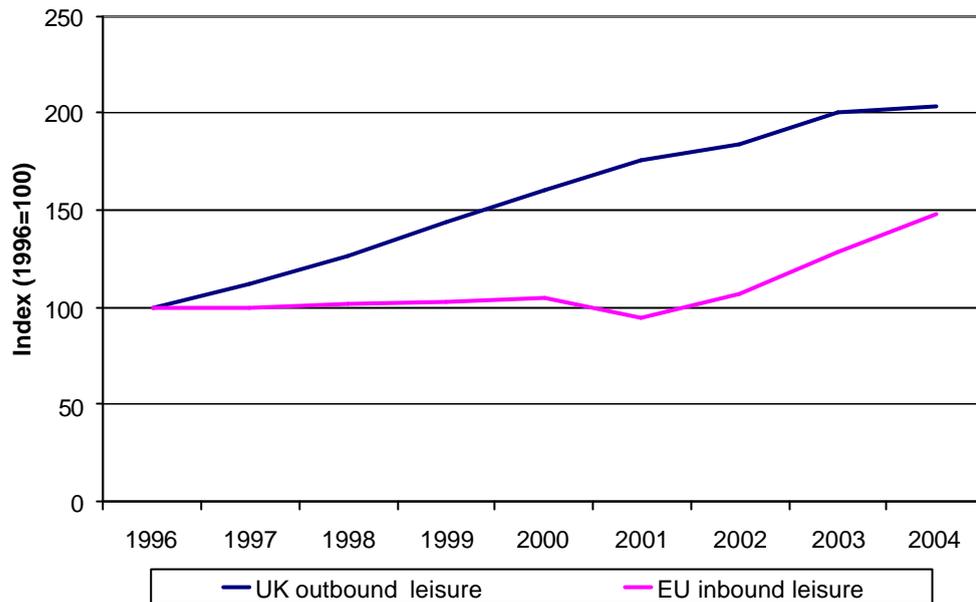
Table 4.2 Historic trends in consumer expenditure, airline revenue and air fares growth (all in nominal terms)

	Total Consumer Expenditure	Total Expenditure on Holidays in Europe (inc. fares)	Airline Revenue from Europe Leisure Traffic	Average Leisure Fare UK-Europe
Period	Average annual growth			
1993-1998	6%	9%	9%	5%
1998-2004	5%	9%	5%	-5%

8. During the period before strong market penetration by no frills carriers (1993-1998), the average fare increased and airline revenue from leisure fares grew at a much faster rate than total consumer expenditure. Since 1998, the average fare has fallen but airline revenue has grown at a same rate as total consumer expenditure. However, the growth of total expenditure on holidays abroad (i.e. fares plus other costs of holiday) has broadly remained the same since 1998, which suggests that lower costs of transportation have boosted expenditure on other components of holidays abroad such as leisure activities at the destination.
9. The second observation is that while low fares are in general available for visitors to the UK as well as to UK passengers travelling abroad, inbound traffic showed hardly any growth until 2003, as illustrated in Figure 4.1 below.

²⁷ No-frills airlines operated from the UK before 1998; Ryanair for example adopted a no-frills strategy in 1991. However, the impact of these airlines become much more substantial after 1997 and this is why 1998 is used in the paper as a break-point for descriptive analysis.

Figure 4.1 UK – EU leisure traffic by air



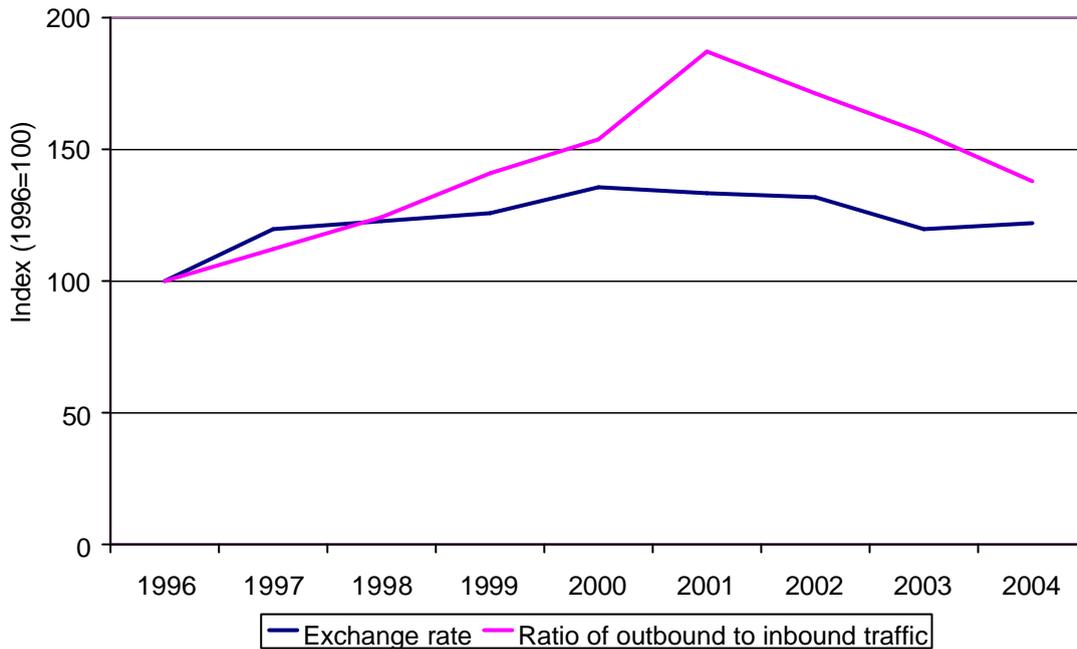
Source: ONS

Although the interpretation of this graph is made difficult because of the ambiguous consequences of September 11 and SARS²⁸ for short-haul traffic, it is reasonably safe to make the comparison for the periods 1996 – 2000 and 2003 – 2004. During the 1996 – 2000 period, outbound traffic expanded by about 60.2%, the equivalent of an annual growth of 12.5%, while inbound traffic expanded by a mere 4.3% (or, by 1.1% per year). However, outbound traffic grew year-on-year in 2004 by only about 1.6% while inbound traffic expanded by as much as 15%. Although there is an element of the recovery in inbound traffic from the various shocks that occurred between 2001 and 2003, the difference is quite striking.

10. In part, the difference may reflect the particular markets chosen by the no-frills airlines but it also suggests that other factors such as, for example, economic growth, consumer confidence, the nature of the services being provided and the costs of other components of holiday abroad may together be more influential than air fares.
11. The possible effect of the costs of other components of holiday abroad on traffic trends can be illustrated by plotting together the exchange rate (euro to one pound sterling) and the ratio of outbound to inbound traffic as shown in Figure 4.2.

²⁸ These events have reduced the overall demand for air travel, but they have also caused a shift in demand from long haul to short haul.

Figure 4.2 Exchange rate and ratio of outbound to inbound traffic



Source: ONS

12. Between 1996 and 2000, sterling rose in value against the euro by just over a third, which increased the purchasing power of UK tourists in the EU and lowered the purchasing power of tourists from the EU in the UK. This stimulated outbound traffic and depressed inbound traffic. The opposite happened between 2000 and 2004 when sterling depreciated against the euro by about 10%²⁹. The outlier in 2001 may be, in part, due to a lagged response of traffic to exchange rate changes and, in part, to the effect of September 11.

²⁹ Since inflation trends in the UK and the EU were broadly similar in recent years, deflating the exchange rate by relative costs of living would not alter the picture.

Chapter 5 Stated preference survey at Stansted

Introduction

1. Stated preference surveys are surveys of actual or potential users, in which respondents are asked to express an attitude or make a choice as to how they would act under certain conditions. The attraction of this approach is that respondents can be asked questions specific to the issue under consideration. However, the hypothetical nature of stated preference surveys means that the findings must be treated with caution since the participants may not have the same incentive to exercise their best judgement as if they faced an actual economic transaction. Stated preference surveys are often used in demand analysis where there is an absence of market data on price and quantity.
2. This chapter presents the results of a stated preference survey of some 550 UK outbound leisure passengers at Stansted airport. The survey was intended as a cross-check on the elasticity estimates derived from the econometric analysis of revealed preference data described in **Chapter 3**, and also to provide some evidence on the degree of substitutability between different routes which was shown analytically in **Chapter 4** to be an important element of route-specific price elasticities. Stansted was chosen for the survey because it has the largest proportion of UK independent outbound leisure traffic among London airports, and also because of the breadth of its no-frills services which offer considerable possibilities for substitution.
3. The survey was carried out between November 2004 and April 2005 in conjunction with the CAA's continuous passenger survey which is designed to obtain information about air travellers, including their surface origins in the UK, journey purpose, cost of travel, means of transport to and from airports, route flown, country of residence, income, age and family makeup. The stated preference questions were asked at the end of the standard list of factual questions which may help mitigate the potential problems with the hypothetical nature of stated preference surveys.
4. The main survey was preceded by several pilot surveys which helped in designing and testing the final questionnaire, training interviewers and obtaining an estimate of the likely response rate which was needed to determine the required sample size for robust and generalisable results. Given the practicalities of interviewing passengers as they pass through an airport and the corroborative nature of the exercise, the hypothetical questions were phrased as simply as possible. Two different question formats were used. One group of respondents was asked directly how they would react to a fare increase of £X where X was set at three different levels. The respondents in the other group were asked to state the maximum they would be willing to pay for the trip they were undertaking.

Sample characteristics

5. The descriptive statistics for the respondents' characteristics are compared with the characteristics of the relevant market segment (i.e. UK outbound leisure travel) at Stansted in 2003 in Table 5.1.

Table 5.1 Sample composition for UK outbound leisure traffic

Variable		Group I	Group II	Stansted (2003)
Purpose	VFR	47%	46%	45%
	Other leisure	53%	54%	55%
Income	Less than £29K	33%	34%	36%
	£29K - £57K	42%	41%	40%
	More than £57K	26%	26%	24%
Household size	1	22%	22%	24%
	2	42%	45%	42%
	3	17%	14%	14%
	4	15%	14%	14%
	5 and more	4%	5%	6%
Average fare		£73	£70	£74

6. The respondents on lower incomes are slightly underrepresented in both groups (by about 3% in Group I and 2% in group II). By and large, however, the composition of the two groups is representative of the target population assuming that the general characteristics of Stansted passengers during the survey period were the same as those in 2003.

Analysis of results

Discrete choice question

Q1: Thinking back to when you booked your ticket, what would you have done if your (return) ticket was³⁰:

	Action		
£10 more expensive	Travel	Travel Somewhere Else Cheaper	Not Travel
£20 more expensive	Travel	Travel Somewhere Else Cheaper	Not Travel
£40 more expensive	Travel	Travel Somewhere Else Cheaper	Not Travel

7. 321 passengers were asked this question. Of these, 294 (or, 92%) gave usable responses. The average fare³¹ paid by the respondents was £73 (return). The responses are shown in Table 5.2.

Table 5.2 Responses to the discrete choice question

More expensive by:	Travel	Travel Somewhere Else Cheaper	Not travel	Total
£10 (or 14% of average fare)	244 (83%)	31 (11%)	19 (7%)	(294) 100%
£20 (or 28% of average fare)	184 (63%)	61 (21%)	49 (17%)	(294) 100%
£40 (or 55% of average fare)	92 (31%)	73 (25%)	129 (44%)	(294) 100%

8. In response to a £10 increase in the cost of travel (equivalent to a 14% increase in the average round trip fare), 19 (7%) passengers stated that they would not travel, 31 (11%) stated that they would go somewhere cheaper and 244 (83%) stated that they would still go to their preferred destination. When asked about how they would react to a £20 increase in the cost of travel (a 28% increase in

³⁰ The £X increase was envisaged as applying to *all flights at all airports* to the intended destination and interviewers were instructed to advise passengers that no cheaper flights to wherever they were going were available at other times, or from other airports. All they could do is to a) accept the increase and fly to their intended destination; b) fly somewhere else cheaper from Stansted (but not from other airports), or c) choose not to travel.

³¹ Inclusive of taxes, fees and surcharges.

the average fare), 49 (17%) stated that they would not travel, 61 (21%) stated that they would go somewhere cheaper while 184 (63%) stated that they would still go to their preferred destination. Finally, when asked what would be the effect of a £40 (55%) fare increase, 129 (44%) said that they would not travel, 73 (25%) would go somewhere cheaper and 92 (31%) would still go to their preferred destination.

9. The ratios of the percentage increase in the average air fare to the percentage reduction in demand and the percentage of respondents switching to a cheaper destination for £10, £20 and £40 fare increases are calculated in Table 5.3.

Table 5.3 Analysis of responses to the discrete choice question

Increase	% change in average fare (A)	% change in demand (B)	(B)/(A)	% change of destination (C)	(C)/(A)
£10	+14%	-7%	-0.5	+11%	0.8
£20	+28%	-17%	-0.6	+21%	0.8
£40	+55%	-44%	-0.8	+25%	0.5

Under the first two scenarios the reduction in specific route demand is proportionately smaller than the increase in price, and the number of those changing destination is greater than the number of those deciding not to travel. The latter supports the anecdotal evidence from the industry which suggests that the cross-price elasticities in the market for short breaks could be quite high. Under the third scenario - a £40 increase – the outcome is reversed with more respondents deciding not to travel than being willing to switch destinations.

Open-ended question

Q2: Thinking back to when you booked your ticket, what is the maximum amount you would have paid for your ticket (per person if in group)?

10. 221 passengers were asked this question. Of these 210 (or, 94%) gave usable responses. The average fare paid by the respondents was £70 (return). The responses were used to construct a demand curve and to calculate the price elasticity of demand using the simple framework explained below.
11. From a microeconomic perspective, the willingness to pay values represent the height of the inverse demand curve. Denoting the willingness to pay of the *i*th individual as p_i , the individual demand curve is described by:

$$q_i(p) = 1 \text{ if } p_i \geq p,$$

$$q_i(p) = 0 \text{ otherwise,}$$

where p is the market price. Assuming that p_i is a continuous random variable with probability density function $PDF(p)$, the aggregate demand function is given by:

$$Q(p) = \text{proportion of } p_i \text{ that are greater than or equal to } p$$

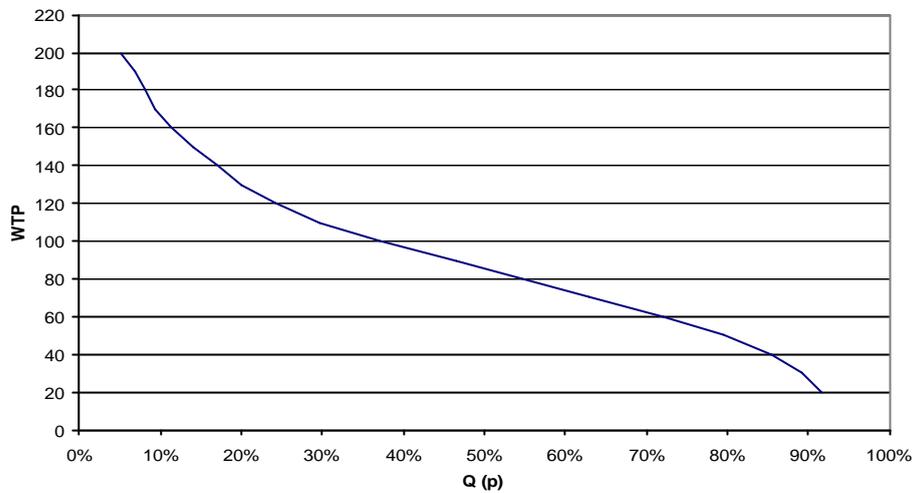
$$= P(p_i \geq p)$$

$$= 1 - CDF(p)$$

where $CDF(p)$ denotes the cumulative distribution function of p 's.

12. The shape of this demand curve, which was estimated using the Gaussian kernel procedure³², is shown in Figure 5.1.

Figure 5.1 Demand curve constructed from responses to Q2



13. Even though the successive values of $Q(p)$ are constructed by cumulation (i.e. the curve slopes downward by definition) the shape of the curve inspires a fair degree of confidence in the model. Approximately 80% are willing to pay more than £50 for a round trip. 50% would be prepared to pay more than £90 while some 20% would pay more than £130. Only about 5% of the respondents would pay £200 or more for a round trip.
14. The price elasticities along this demand curve, which were calculated as “arc” elasticities at multiples of £10 between £50 and £150, are presented in Table 5.4.

Table 5.4 Elasticities based on WTP kernel-smoothed CDF

Price (WTP)	Elasticity
£50	-0.4
£60	-0.6
£70	-0.8
£80	-1.0
£90	-1.3
£100	-1.8
£110	-2.3
£120	-2.3
£130	-2.2
£140	-2.5
£150	-3.2

15. The estimated elasticities are seen to vary considerably along the demand curve - they tend to increase with the price (from -0.4 at £50 to -3.2 at £150). Since the average fare was about £70, the most relevant elasticity for analytical purposes can be taken to lie in the range between -0.6 and -1 .
16. The intention in the phrasing of questions Q1 and Q2 was to try to put passengers in the position they were when they were booking their journey, i.e.

³² Kernel estimation technique is a statistical technique which can be used to develop a continuous approximation to an empirical frequency distribution which is jagged in appearance.

with a free choice amongst a number of feasible options. However, the interviews were conducted when they were about to board a holiday flight and this may have influenced their responses: it is possible that some people will have answered the questions in a mood more committed to travel than they might have been at the booking stage. In this sense the estimated elasticities are therefore likely to lie between the short-run and the long-run values. Generally, the long-run elasticity tends to be higher than the short-run value because consumers have a greater range of choice and a longer period over which to adjust their behaviour and preferences.

Analysis of demand drivers

17. This section explores whether the survey findings can be “explained” using the other variables collected as part of the CAA’s main survey. Finding intuitively and/or theoretically correct signs on the relevant variables is effectively one way of testing the validity of the survey findings. For example, other things being equal, rising air fares should have less of an impact on travellers on higher incomes than on those on lower incomes. If this was not the case, the possibility cannot be ruled out that the responses of a significant number of respondents were broadly given at random.
18. The responses to *Question 1* were analysed in a multinomial logistic regression framework in which the probability of getting different answers (Travel\Travel Somewhere Else Cheaper\Not Travel) was modelled as a function of the respondents’ fare, total cost of travel (e.g. accommodation, food, etc.), number of leisure trips in the last 12 months, income (in three brackets), purpose of travel (VFR as opposed to holiday) and property ownership abroad.
19. Essentially, the methodology compares the characteristics of each respondent who chooses not to travel at all or to travel somewhere cheaper with those of a baseline group who choose to travel. The most satisfactory results from the viewpoint of a priori expectations and statistical significance were obtained for the £40 fare increase scenario. The next paragraph provides a brief summary of the findings while a more detailed presentation of the results is given in Box 5.1.
20. Passenger responses were shown to be dependent on their characteristics, including income, home ownership abroad, purpose of travel, travel budgets and the number of trips already taken in the previous twelve months. By and large, the findings were intuitively and theoretically plausible. Property owners abroad and people travelling to visit friends and relatives are less likely to switch destinations while people living in households on low incomes are more likely not to travel, or go somewhere else cheaper than those on higher income. The difference between people on medium and high incomes was not found to be statistically significant at conventional levels of significance.

Box 5.1 The results of the multinomial logit model

Table 5.1.1 Parameter estimates for multinomial logit model (“Travel” set as baseline category)

		ESTIMATE	SIGNIFICANCE	EXP(ESTIMATE)
EQUATION 1 “Travel Somewhere Else Cheaper”	<i>Intercept</i>	-0.12	0.95	
	<i>Total Costs per Person (log)</i>	0.15	0.55	1.16
	<i>Fare (log)</i>	-0.09	0.81	0.91
	<i>Trips in Last 12 Months</i>	-0.06	0.12	0.95
	<i>Own property abroad</i>	-1.41	0.04	0.24
	<i>Low Income (under £29K)</i>	1.08	0.09	2.95
	<i>Medium Income (£29K - £57K)</i>	-0.07	0.88	0.93
	<i>VFR purpose</i>	-0.54	0.18	0.58
EQUATION 2 “Not Travel”	<i>Intercept</i>	3.11	0.05	
	<i>Total Costs per Person (log)</i>	-0.47	0.04	0.63
	<i>Fare (log)</i>	-0.17	0.62	0.85
	<i>Trips in Last 12 Months</i>	-0.04	0.12	0.96
	<i>Own property abroad</i>	-0.35	0.44	0.71
	<i>Low Income (under £29K)</i>	2.59	0.00	13.31
	<i>Medium Income (£29K - £57K)</i>	0.61	0.13	1.84
	<i>VFR purpose</i>	-0.13	0.72	0.88

The parameter estimates in EQUATION 1 can be interpreted as the change in the logarithm of odds of getting the answer “Travel Somewhere Else Cheaper” instead of “Travel” in response to a unit change in an explanatory variable. Similarly, the parameters in EQUATION 2 can be interpreted as the change in logarithm of probability of getting the answer “Not Travel” instead of “Travel” associated with a unit change in an explanatory variable. The negative sign on the parameter estimate for the *Own property abroad* explanatory variable in column 1 of EQUATION 1 (-1.41) indicates that, other things being equal, a £40 fare increase is less likely to cause a respondent who owns property abroad to change travel plans and “Travel Somewhere Else” than the one who does not. Similarly, there is a negative relationship between *VFR Purpose* and the probability of a response “Travel Somewhere Else Cheaper” in response to a £40 increase in fare, although the effect is smaller than in the case of *Own property abroad*. In contrast, there is a positive relationship between *Low income group (under £29K)* and the probability of a response “Travel Somewhere Else Cheaper”. In fact, a person in the *Low income group* is 2.9 times more likely to change travel plans than one in the *High income group (more than £57K)* which is set as the reference category under the scenario in question. The effects of *log of Fare*, *log of Total costs*, and *Medium income group* are not significant in EQUATION 1.

Looking at EQUATION 2 (i.e. the “Not Travel” equation), the effects of *Own property abroad* and *VFR Purpose* are not significant. An increase in the *log of Fare* and the *log of Total costs* is seen to lower the probability of “Not Travel” relative to “Travel” although the effect of *log of Fare* is not statistically significant. This is intuitively plausible: the bigger the traveller’s budget, the weaker the effect of a given fare increase is likely to be. By far the strongest effect is that of *Low income group (under £29K)* which increases the odds of “Not travel” by a factor of 13 relative to *High income group (more than £59K)*. The *Medium income group* increases the probability of a response “Not travel” relative to *High income group* by a factor of about 1.8. The negative sign associated with *Trips in last 12 months* variable could be regarded counterintuitive as it could be argued that each additional trip is likely to yield diminishing utility as the number of trips taken increases. On the other hand, it is also possible that a high frequency of travel is correlated with other hidden factors which increase the resilience to price increases.

Chapter 6 Conclusions

1. The data analysis presented in **Chapter 1** suggests that demand for outbound leisure air travel may be relatively immature. Despite a rapid growth in recent years, expenditure on holidays abroad (including air fares) still accounts for a relatively small proportion of total consumer expenditure. In the future, as households become more prosperous, they may be able to devote an increasing share of their incomes to items such as holidays abroad.
2. The more sophisticated analysis using time series econometric techniques in **Chapter 4** suggests that the income elasticity of outbound leisure air travel varies between 1.5 – 1.8 depending on the geographical destination market. The responsiveness of demand to income changes is strongest for North America where a 10% increase in *Total Consumer Expenditure* is expected to boost demand by about 18%, other things being equal. A similar increase in *Total Consumer Expenditure* is expected to boost demand for the Rest of the World and Western Europe by 16% and 15%, respectively.
3. The long haul income elasticities (North America and the Rest of the World) appear to have declined somewhat between 2000 and 2003. This does not mean that long haul holidays are necessarily becoming less fashionable, but may be due to the effects of the recent shocks, which have mainly affected long-haul markets, and a deteriorating security situation in general. In contrast, no evidence of decline in the income elasticity was found for Western Europe. This seemingly paradoxical result could in part reflect important supply side developments which have recently produced a much wider and more flexible range of price/quality options to match a diverse spectrum of passenger preferences.
4. It has been hypothesised generally that demand for leisure air travel is elastic with respect to changes in air fares. The evidence presented in this report suggest that this may be true in the case of traffic to some more popular short-haul destinations served by no frills airlines. Overall, however, the demand for leisure air travel was found to be moderately inelastic with respect to changes in air fares alone in all three aggregate geographical destination markets (elasticity values in the range -0.7 to -0.8 were obtained). The finding that demand for leisure air travel in aggregate is inelastic with respect to air fares alone is intuitively plausible given that air fares typically account for just under one third of the total costs of travel abroad.
5. The extent to which costs other than air fares influence the demand for leisure air travel is difficult to estimate in practice because of a lack of suitable data. Although some attempts have been made to develop various tourist price indices, such information is generally not available. One possibility, which was explored in this report, is to consider changes in exchange rates adjusted for differences in inflationary conditions between UK and abroad. These were found to have significant impact on demand although approximately half the size of the effect of air fares.
6. The results of the stated preference survey at Stansted presented in **Chapter 5** help reconcile the findings from the econometric analysis that, on the one hand, demand for air travel is overall inelastic with respect to air fares alone, but, on the other hand, that individual operators may experience a highly price sensitive reaction from their markets. The findings imply that while route-

specific increase in air fares would cause more than proportionate reduction in the number of trips on a route level, the effect at the level of the market would be smaller because many passengers are willing to travel somewhere else cheaper. The survey also suggests that demand becomes more elastic at higher fare levels.

Appendix 1 Concept of elasticities

1. An elasticity measures the direction and strength of market response to a change in a given demand factor such as price, income or the quality of service. It is defined as the ratio of the percentage change in quantity demanded to the percentage change in the variable that brought it about, holding all other independent variables constant. For example, if an increase in income of one percent causes demand for a good to increase by two percent, the income elasticity for the good in question would be +2. An elasticity will be negative in case of an inverse relationship between two variables. Because elasticities are 'unit-free' measures they allow for a quantitative comparison between different variables and markets without the need to standardise the units of measurement.
2. Mathematically, the absolute value of the coefficient of elasticity could range from zero to infinity. When this absolute value is between zero and one, demand is said to be 'inelastic' - the quantity demanded is relatively unresponsive to a change in the factor that caused it. On the other hand, when the absolute value of the elasticity is greater than one, demand is said to be 'elastic' - the quantity demanded changes proportionately more than the factor that caused it. With unitary elasticity the percentage change in quantity demanded exactly matches the percentage change in the causal factor.
3. Three types of elasticities are frequently encountered in applied economic work: the own-price elasticity of demand, the income elasticity of demand and the cross-price elasticity of demand.

Own-price elasticity

4. The own-price elasticity, ($e_{Q,P}$), measures how the demand for a good (Q) changes (in percentage terms) in response to a percentage change in the price of that good (P). Own-price elasticities have traditionally been used to examine how total revenue changes in response to a price change, as shown in Table A1.1:

Table A1.1 Relationship between price elasticity and revenue

Demand	Response of Revenue	
	Price Increase	Price Decrease
Elastic, $ e_{Q,P} > 1$	Falls	Rises
Unit elastic, $ e_{Q,P} = 1$	No change	No change
Inelastic, $ e_{Q,P} < 1$	Rises	Falls

5. As a general rule, the own-price elasticity of demand depends on:
 1. The number and closeness of substitute goods. The more substitutes there are, and the closer they are, the greater the price elasticity of demand will tend to be; and
 2. Consumers' access to knowledge about substitutes. Improvements in information technology should in principle increase consumers' price elasticity by giving them the opportunity to compare alternative offers for a much lower search costs;

3. The proportion of income spent. The higher the proportion of income that is spent on a good, the more consumption will need to be reduced when its price rises;
4. The time period. The long-run elasticity of demand tends to be greater than its short-run elasticity as consumers may take time to adjust their consumption in response to a price change.

Income elasticity

6. The income elasticity of demand, ($e_{Q,I}$), measures the relationship between changes in income (I) and changes in quantity (Q). It can be positive or negative because an increase in income can cause quantities consumed to increase (normal goods) or decrease (inferior goods). Among normal goods there is considerable interest about whether $e_{Q,I}$ is greater than or less than 1. Goods or services for which $e_{Q,I} > 1$ are the goods for which purchases increase more rapidly than income. If the product or service has a high income elasticity of demand, demand is likely to expand rapidly as income rises, but may also fall significantly if the economy moves into recession.

Cross-price elasticities

7. Cross-price elasticities of demand, ($e_{Q,P'}$), measure how demand for a good or service varies in response to changes in the price of complements and substitutes. Complements are products and services which are used together. There is an inverse relationship between the demand for a product or service and the price of a complement. An example of complementary goods in this context might be passenger air transport and hotels. A substitute is any product or service that can be used by a consumer instead of an airline's service. A decline in the price of a substitute may be expected to shift demand towards that substitute and away from the airline. So, $e_{Q,P'} > 0$ for a substitute and $e_{Q,P'} < 0$ for a complement.

Appendix 2 Review of past evidence

Introduction

1. There are two broad sources of empirical estimates of aviation elasticities. One consists of papers published in established academic journals and presented at academic conferences. Although these papers are generally aimed at the academic community they are often used by government bodies, consultants and the industry for policy and commercial purposes. The other source comprises reports produced by government bodies, consultants and the industry itself. This review looks at both of these sources in order to amass a much larger set of evidence than would otherwise be possible. It starts by reporting international empirical evidence before looking at UK-specific work.

International evidence

2. A recent comprehensive survey by Gillen et al (2003) provides a useful comparative evaluation of the elasticity estimates available from the academic literature covering major developing countries. They have collected 254 own-price elasticity estimates from 21 empirical studies and 132 income elasticity estimates from 14 studies.

Own-price elasticities

3. The survey findings suggest that estimates of price elasticities of demand differ significantly between types of traveller, travel distance, geographical markets and the age of the studies. Leisure travellers tend to be more sensitive to changes in air fares than business travellers and considerably more so on short haul than on long haul (by a factor of about two).

Short-haul leisure own-price elasticity

4. The distribution of elasticity estimates for short- and medium-haul leisure traffic - 19 in total - is shown in Figure A2.1.

Figure A2.1 Histogram of all short-haul leisure travel own-price elasticities



Source: Gillen et al. (2003)

The median elasticity for leisure travel on short haul is -1.5 implying that this market segment is fairly price elastic. However, the estimates of price elasticities are concentrated into two separate groups – one in an elastic range between -1.4 and -2.2 and the other in an inelastic range between -0.4 and -0.8.

5. The bimodality of short-haul leisure elasticities should not be surprising given the heterogeneity of the routes in the short haul sample and the varying degree of data aggregation. In Europe, for example, on some routes airlines face competition from trains and cars (typically where a surface journey time takes less than three to four hours) and the cities themselves compete in a weekend leisure market. At the other extreme there are short haul routes where distance, geographical barriers, and/or absence of good rail links preclude competition from other transport modes.

Long haul own-price elasticities

6. Turning to long-haul leisure traffic, the distribution of elasticities - 55 extracted from 7 studies – is shown in Figure A2.2.

Figure A2.2 Histogram of all long-haul international travel own-price elasticities



Source: Gillen et al. (2003)

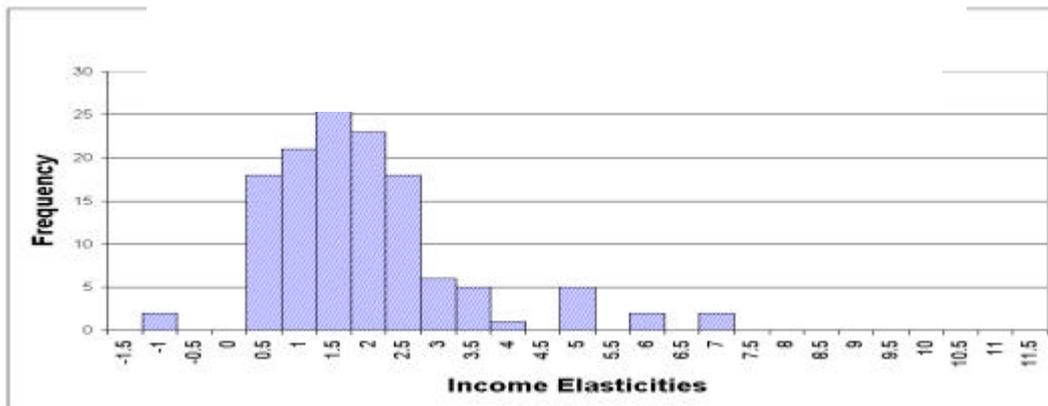
The median elasticity for long-haul leisure traffic is -0.99, implying that price increases (decreases) will result in approximately proportional reductions (increases) in demand. The long-haul leisure elasticities are clustered in two, possibly three, large groups. As in the case of short-haul traffic, this is likely to reflect geographic and distance differences between various routes but it could also be due to methodological differences between the studies.

Income elasticities

7. Gillen et al. (2003) also compiled a database containing 132 income elasticities from 14 studies. In Gillen’s review, the estimates of income elasticities range from -1.21 (implying an inverse relationship between income and demand for

air travel) to +11.58. The majority of the estimates fall between 0.5 and 2.5, as seen in Figure A2.3.

Figure A2.3 Histogram of aggregate income elasticities for all studies



Source: Gillen et al. (2003)

The median elasticity of income is +1.4 indicating that demand for air travel is moderately income elastic. As in the case of price elasticities, it is likely that income elasticities will vary according to geographical region (reflecting different stages of maturity) and trip purpose, but these possibilities were not explored by the authors of the study.

UK-specific evidence

8. The evidence on aviation demand elasticities in the UK is relatively sparse. The Department for Transport (DfT) produces regular studies of demand for air travel to and from the UK, the latest in 2000². The forecasts developed in this study were one of the key inputs to the Aviation White Paper³. The DfT disaggregated its data by geographical region, travel purpose and residence giving a total of 19 market segments (16 international and 3 domestic).
9. DfT estimated an income elasticity of +1.5 implying that for a 1% of increase in income demand for air travel will rise by 1.5%. This is fairly close to the median income elasticity of +1.4 of the Gillen survey. Leisure traffic was found to be price elastic (elasticity value of around -1.3) and business traffic price inelastic (elasticity value of around -0.5).
10. There are two recent academic studies of demand for air travel in the UK. Graham (2000)⁴ estimated the income elasticity for UK leisure travel to be about +2, but found no significant relationship between demand and air fares. Dargay and Hanly (2001)⁵ used pooled time-series/cross-section data which covered the years 1989 to 1998. They estimated a long-run income elasticity

² DETR (2000): *Air Traffic Forecasts for the United Kingdom 2000*, Department of the Environment, Transport and the Regions. London: HMSO.

³ DfT (2003): *The Future of Air Transport – White Paper*, Department for Transport. London: HMSO.

⁴ Graham, A. (2000) Demand for leisure travel and limits to growth, *Journal of Air Transport Management*, 6, 109-118.

⁵ Dargay J. and M. Hanly (2001) The determinants of the demand for international air travel to and from the UK. *Paper presented at the 9th World Conference on Transport Research*.

for UK outbound traffic of about +1 and a fares elasticity of about -0.6. Dargay and Hanly found exchange rate (local currency per pound) and relative prices ($RPI_{UK}/RPI_{FOREIGN}$) to be more influential than air fares with elasticity estimates of +1 and -0.8, respectively.

Appendix 3 Methodology and data

1. The demand function is estimated using the ARDL procedure developed by Pesaran (1995)¹. This procedure comprises two stages. The first stage involves testing for the existence of the long-run relation between the variables under investigation. If the long-run relation exists, the long-run coefficients are estimated in the second stage together with the associated short-run error-correction model.
2. The demand for air travel is assumed to be determined in the long run by the following equation²:

$$\log Traffic_{it} = a_i + \beta_i \log Air\ Fare_{it} + \gamma_i \log Effective\ Price\ of\ Tourism_{it} + d_i \log Total\ Consumer\ Exp_{.t} + \sum_j \delta_{ij} Dummies_{it} + e_{it}$$

and in the short run:

$$D_n \log Traffic_{it} = a_i + \beta_i D_n \log Air\ Fare_{it} + \gamma_i D_n \log Effective\ Price\ of\ Tourism_{it} + d_i D_n \log Total\ Consumer\ Exp_{.t} + c_i D_n \log House\ Price_{it} + g_i \log Air\ Fare_{it-1} + j_i \log Effective\ Price\ of\ Tourism_{it-1} + d_i \log Total\ Consumer\ Exp_{.t-1} + \sum_j \delta_{ij} Dummies_{it} + e_{it}$$

where

- $Traffic_{it}$ is the total number of UK leisure passengers carried by all airlines in market i in period t ;
- $Total\ Consumer\ Expenditure$ is real consumers' expenditure on all goods and services. This measure is generally preferable to the measure based on disposable income since consumption can also be financed from savings and borrowing, and from sale of assets.
- $Air\ Fare_{it}$ is the real average fare paid by UK leisure travellers in market i ;
- $Effective\ Price\ of\ Tourism_{it}$ is the ratio of the cost of living in market i (CPI_i) to the cost of living in the UK (CPI_{UK}) divided by the relevant exchange rate (ER_i)³:

$$Effective\ Price\ of\ Tourism_{it} = \frac{(CPI_{it} / CPI_{UKt})}{ER_{it}}$$

First, other things being equal, the lower is ER_{it} , the smaller is the amount of foreign currency received by UK tourists per unit of sterling; and second, the higher the ratio of foreign prices to those in the UK, the higher the cost of a holiday abroad. Thus, a rising/falling *Effective Price of Tourism* is expected to dampen/boost demand for air travel by UK residents to market i . In the case of Western Europe, the cost of living index is a composite obtained by weighting

¹ Pesaran, M.H. and Shin, Y. (1995), 'An Autoregressive distributed lag modelling approach to cointegration analysis', in S. Strass, A. Holly and P. Diamond (eds.), *Centennial Volume of Rangar Frisch*, Econometric Society, Cambridge University Press, Cambridge.

² Because the study deals with the aggregate data, it is reasonably safe to treat fares as being exogenous. In the case of a route-specific data, higher traffic, by virtue of economies of density, may result in lower average costs and this may lead to a simultaneity problem.

³ Exchange rate is defined as the amount of market i 's currency per unit of UK currency.

each individual destination country's price index by the volume of UK originating traffic to that country.

- *House Price* is the annual change of the Nationwide house price index. This variable is included in the *short-run* model only in order to capture the effect of changes in house prices on consumer confidence.
 - *Dummies* account for seasonality and various shocks that may have impacted traffic such as, for example, 11 September 2001 and the second Gulf War;
 - D_n is the difference operator with $n=1$ if data which is quarterly is deseasonalised and $n=4$ otherwise.
3. Implicit in the specification of the demand function is the assumption that the service quality is constant over the estimation period. This may not be an unreasonable assumption given two different developments associated with no-frills airlines. On the one hand, as mentioned in **Chapter 1**, no-frills airlines have increased frequency and widened the international scheduled network especially at various regional airports. On the other hand, the product offered by no-frills airlines gives less to passengers in terms of check-in and on-board facilities than the product offered by full-service before the liberalisation of the EU market.