Statistical information on air passenger numbers and characteristics

Collected for the House of Lords Science and Technology Committee inquiry into the Air Cabin Environment
by the Parliamentary Office of Science and Technology (POST)

I Information sources

There are six main sources of statistical information relevant to this inquiry:

- *Airlines* – These have both 'regular' data that arise from the sales and subsequent use of tickets, and any special surveys undertaken for marketing or other purposes. Understandably, comparatively few of such data are published in a regular or aggregated form. An important distinction is that between airlines operating primarily scheduled services and other (mainly chartered) airlines. Data on the operations of the former are more readily available in a consistent form.

  Airlines will also be the primary agencies who collect data on health/medical circumstances, at least as these relate to the immediate context of carried passengers. POST has not, however, been able to identify any collated, systematic, sources of information on these circumstances published by airlines individually or collectively.

- A*irport operators* (of which, in the UK, the British Airports Authority (BAA) is the largest) – Data arising from these sources are mainly surveys of passengers 'terminating' or 'transiting/interlining' their airports, for forward planning and marketing purposes. Published data are variable in their consistency and frequency.

- *National aviation regulatory authorities* (the Civil Aviation Authority [CAA] in the UK) – Their main concern is matters such as air traffic regulation, general safety, consumer protection, etc. These authorities usually place requirements on airlines, airport operators, etc, to provide data that they then collate for their own purposes. They may also collect primary data, mainly through surveys at airports. The CAA is the main source of UK information relevant to the inquiry, mainly through the data it routinely collects on air traffic and the regular airport surveys it conducts.

- *National central government departments* (in the UK, primarily the Department of the Environment, Transport and the Regions [DETR]) – These are responsible for setting the overall operational framework of aviation regulatory authorities and for developing strategic policy for aviation. This usually includes the production of forecasts of future demand for air travel, for capacity planning purposes. The bases of such forecasts are usually combinations of data reported by organisations listed above with econometric data from central government forecasts. In the UK, the annual International Passenger Survey, conducted by the Office of National Statistics, also collates data on air, as well as other modes of travel. Data from this source have an emphasis on economic correlates of travel and are used to calibrate DETR forecasts. Published data however provide limited information relevant to this inquiry.

- *International aviation trade associations* – These are regionally (e.g. the Association of European Airlines) or globally focussed organisations of airlines and/or other air transport operators. The leading global airline organisation is the International Air Transport Association (IATA), which represents most of the world's scheduled airline

operators[1]. The Airports Council International (ACI), an association of airport operators, publishes rankings of airports by passenger throughput. The primary data collection concern of such organisations is forecasting of market circumstances that are relevant to advancing their members' interests.

- *An international regulatory authority* – The International Civil Aviation Organisation (ICAO) is an agency of the United Nations whose primary responsibility is the promotion and monitoring of international agreements on matters such as standardisation of air safety arrangements. ICAO publishes some general context-setting data regarding these activities[2].

- *Aircraft manufacturers* – For corporate relations purposes, these place some of their market forecasts in the public domain. An example is Airbus Industrie, which publishes an annual *Global Market Forecast* (the latest in July 2000, while Boeing publishes similar information[3]). The forecasts are based on estimates of airlines' market expectations and overall national, global regional and global economic growth data. They may also include some general information on expectations of trends in flight destinations and durations, cabin configurations, etc.

II Characteristics of air passenger data

The data that are systematically published by the aviation industry are not immediately revealing of information relevant to the inquiry. Passengers tend to be treated not as individuals but as 'movements'. For example, data may be presented not in terms of individual passengers but passenger/kilometres. Another characteristic is the treatment of individual passengers who make a change of airline or plane during a journey (e.g. from London to Honolulu via Chicago). In many cases, the data will report this as two or more passenger journeys. Particularly for domestic flights, where passengers are departing and arriving at airports within the same 'statistical jurisdiction', they may be counted twice, as may be 'interlining' passengers, who change from one aircraft to another at the airport. 'Transit' passengers, those arriving and departing at an airport on the *same* aircraft (less than 1% of UK airport passengers) tend to be counted once but sometimes not at all. In some cases, (see below), corrections are made for double counting which arises in these ways.

Direct data on flight durations tend not to be collected systematically. Information on passenger movements between 'country' or 'region' pairs provide a reasonable surrogate and are normally used to derive aggregates of 'short haul' and 'long haul' flight passengers. Many data sources do not distinguish between passengers originating at one or the other end of pairs, which makes it difficult to provide figures based on passengers' country of residence. In some cases, traffic between a pair may be reasonably in balance but in other cases, particularly leisure traffic, (e.g. to Palma de Mallorca or the Seychelles, from the UK) the overwhelming majority of passengers will originate from one (e.g. the UK) end of the pair.

---

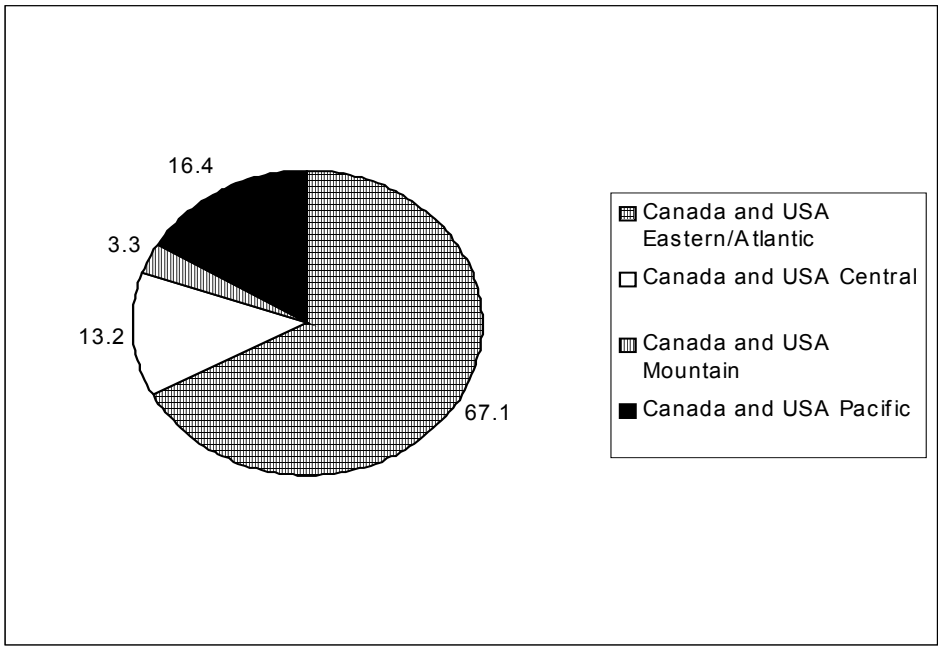
1 IATA also collects some data on non-scheduled operations.

2 For example, see the Annual Review of Civil Aviation published in the *ICAO Journal*, July/August 2000 and *The World of Civil Aviation*, ICAO circular 279, expected to be published October 2000.

3 See www.airbus.com and www.boeing.com/commercial/cmo/3at00.html

Country/region pair data break down as a direct surrogate for flight duration in the case of large countries with destinations separated by thousands of km. This is particularly true with the USA and Canada, where direct flights to the eastern seaboard may last around five hours, while those to the Pacific time zone are double this. Figure 1 gives an indication of the time zone of point of entry to/final departure from the USA/Canada of passengers flying to or from the UK, in 1999. The figures are for both scheduled and charter flights and show that 2/3rds of the traffic is to airports in the Eastern and Atlantic time zones.

Figure 1 Time zone destinations of passengers to/from UK airports to/from USA/Canada, 1999
percentages



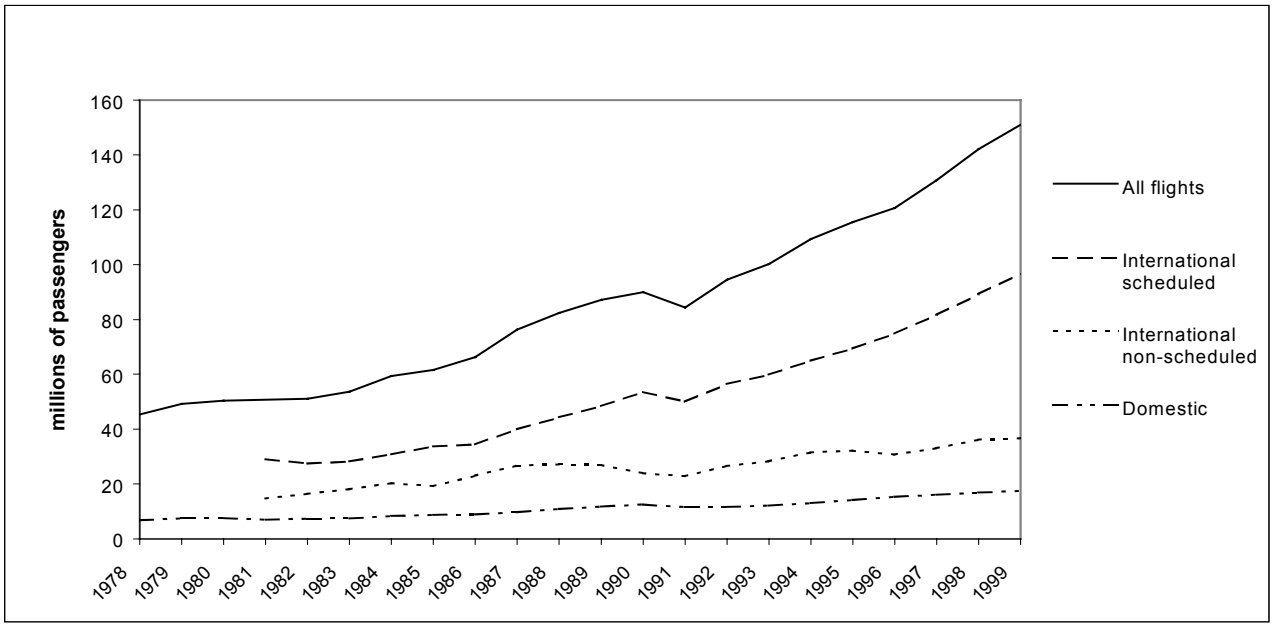
Source: CAA data

Demographic, socio-economic and other data on individual passenger characteristics tend not to be available from airline sources. Virtually all the relevant data arise from surveys of passengers at airports conducted by airport operators or regulatory authorities, (especially the CAA in the UK). Time series analysis of such data is constrained by the frequency and consistency (range of airports covered) of surveys and changes in reporting conventions.

III Historical trends in air travel

Both UK-related and global air travel have expanded over the past twenty years, driven by economic growth, falling real prices of air travel and increases in international business activity and leisure time. The only exception to this trend occurred in 1991, when fears of incidents related to the 'Gulf War' led to a temporary downturn in activity across the world (for example, UK passenger numbers declined by 6% on the previous year). Figure 2 and Table 1 give data for UK air passenger numbers from 1978-1998.

Figure 2 Terminal passengers by flight type, UK airports, 1978-1999



Data from which Figure 2 is derived are given in Table x below.

Table 1 Millions of terminal passengers by flight type, UK airports, 1978-1999

	1978	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*
Domestic (Note 1)	6.8	7.4	7.5	7.0	7.3	7.4	8.3	8.7	8.9	9.7	10.9
International Scheduled	Note 2	Note 2	Note 2	29.0	27.4	28.2	30.8	33.7	34.4	39.9	44.3
International Non-scheduled	Note 2	Note 2	Note 2	14.7	16.4	18.1	20.3	19.2	23.0	26.7	27.1
International Total	38.6	41.8	42.9	43.7	43.8	46.3	51.1	52.9	57.4	66.6	71.4
All flights	45.4	49.2	50.4	50.7	51.1	53.7	59.4	61.6	66.3	76.3	82.3

	1989	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*
Domestic	11.8	12.5	11.5	11.6	12.1	13.0	14.1	15.3	16.0	16.8	17.5
International Scheduled	48.4	53.5	50.0	56.4	59.8	64.9	69.4	74.8	81.7	89.2	96.7
International Non-scheduled	26.9	23.9	22.8	26.6	28.3	31.5	32.1	30.7	33.1	36.1	36.7
International Total	75.3	77.4	72.8	83.0	88.1	96.4	101.5	105.4	114.7	125.4	133.4
All flights	87.1	89.9	84.3	94.6	100.2	109.4	115.6	120.7	130.7	142.2	150.9

Notes to Figure 2 and Table 1

1) Data for domestic passengers are adjusted to correct for double-counting.

2) Data enabling a scheduled/non-scheduled breakdown of international passengers are not available for years before 1981. Note that international non-scheduled includes traffic to UK offshore oil and gas installations (693,000 passenger movements in 1998). Domestic non-scheduled passengers comprised 1.8% of all passengers in 1998.

3) Terminal passengers (arrivals and departures) include both UK and overseas residents using UK airports, (e.g. visiting Britain or transferring planes at the airport). It is not possible to obtain such time series data for UK residents alone from published sources.

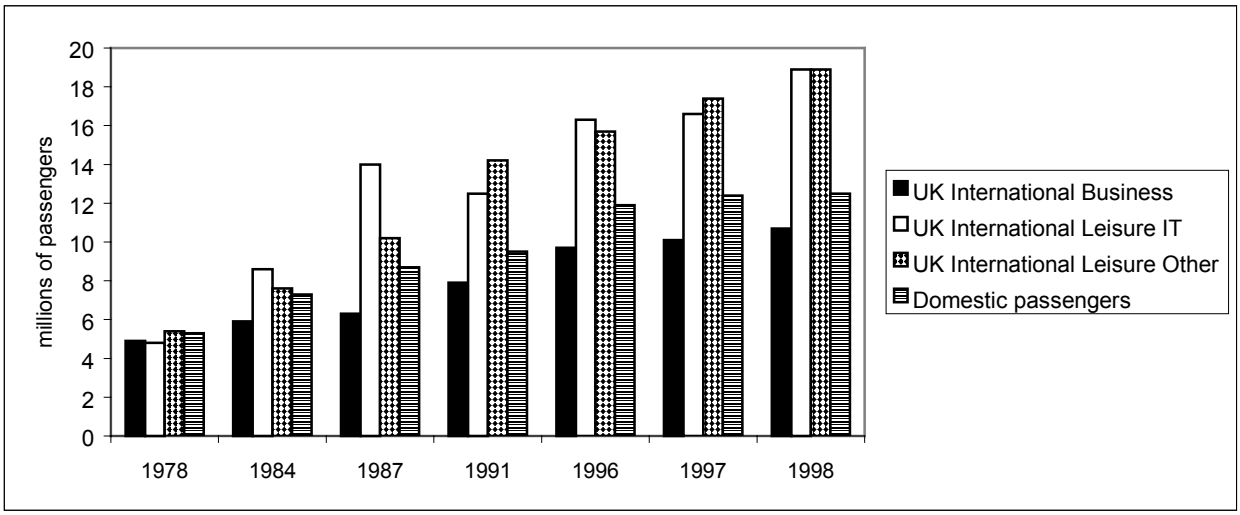
4) Source: Annual issues of *Transport Statistics, Great Britain*, HMSO/TSO, derived from CAA figures.

IV Demographic and socio-economic characteristics of air passengers

The data presented in this section are taken from the latest CAA survey of passenger characteristics published at the time this note was prepared[4]. This covers passengers at three airports – Gatwick, Heathrow and Manchester, only. In 1998, these airports accounted for about 78% of all international scheduled business travel from UK airports, 81% of all international scheduled leisure passengers and around 60% of international charter passengers. The information is therefore reasonably representative of UK air passengers as a whole.

Figure 3 gives some information on trends in passenger types at these three airports, to set the following remaining data in this section in context.

Figure 3 UK resident terminal passengers at Heathrow, Gatwick and Manchester Airports, 1978-1998



Notes to Figure 3

1) Source: CAA figures

2) Domestic passengers include non-UK residents.

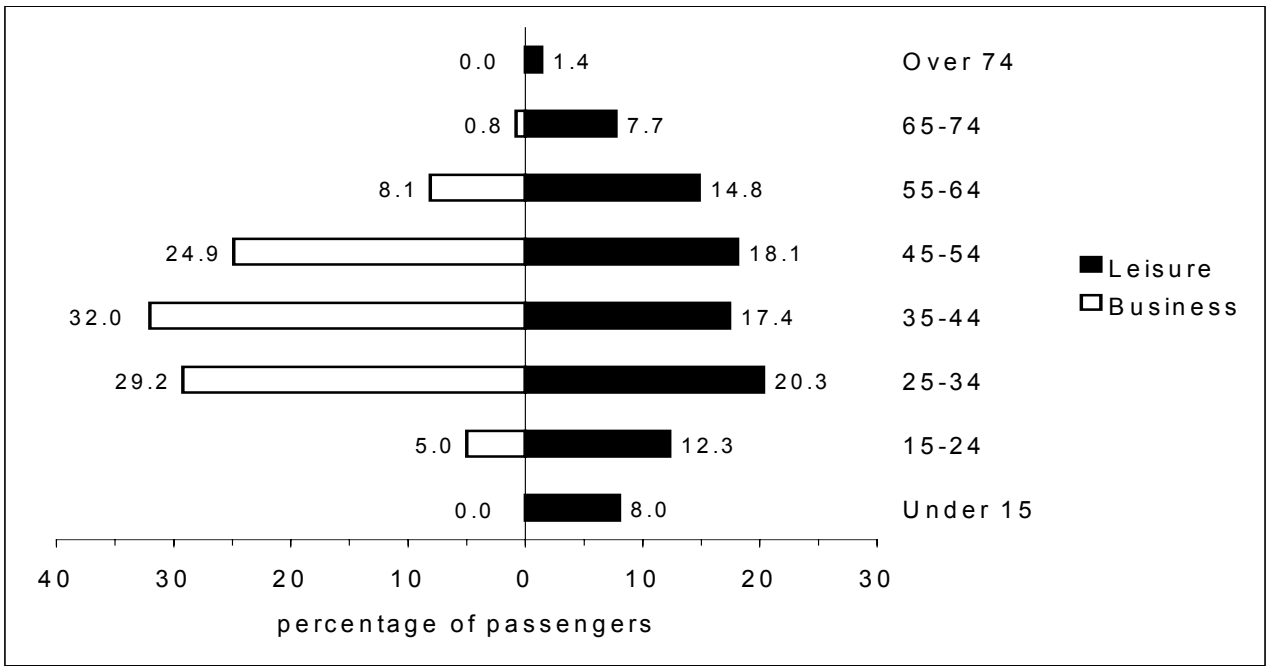
Age structure

Figure 4 gives the age structure of *UK-resident* business and leisure passengers at the surveyed airports. The data confirm what might be expected – that there is a greater spread in the age range of leisure passengers and a greater proportion of older leisure passengers, with nearly a quarter of them being aged 55 or over (compared with under 10% of business passengers). Passenger ages have been collected in earlier CAA surveys at the three airports but the published reports use different age groupings from those shown in Figure 4, making it impossible to confirm whether there has been an increase in proportions of older passengers over time.

[4] *Passengers at Gatwick, Heathrow and Manchester Airports in 1998,* (CAP703), CAA, November 1999

POST has been unable to find any published data on passenger ages related to flight destinations/durations, flight type (scheduled/chartered), etc.

Figure 4 Age structure of UK-resident passengers at Gatwick, Heathrow and Manchester airports, 1998



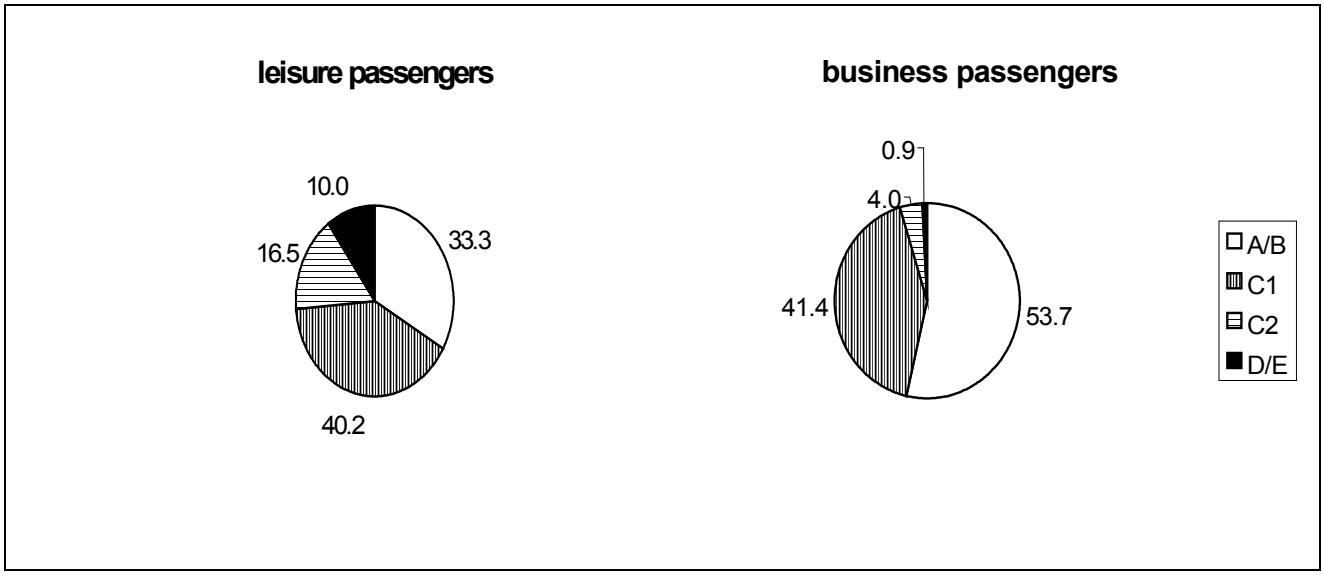
Notes to Figure 3

1) Source: *Passengers at Gatwick, Heathrow and Manchester Airports in 1998,* (CAP703), CAA, November 1999

Socio-economic group

Figure 5 gives the socio-economic group (SEG) (according to Market Research Society definitions) of business and leisure passengers at the airports. As might be expected, there is a dominance of passengers from the higher SEGs and a greater spread in the SEGs of leisure passengers compared with business passengers.

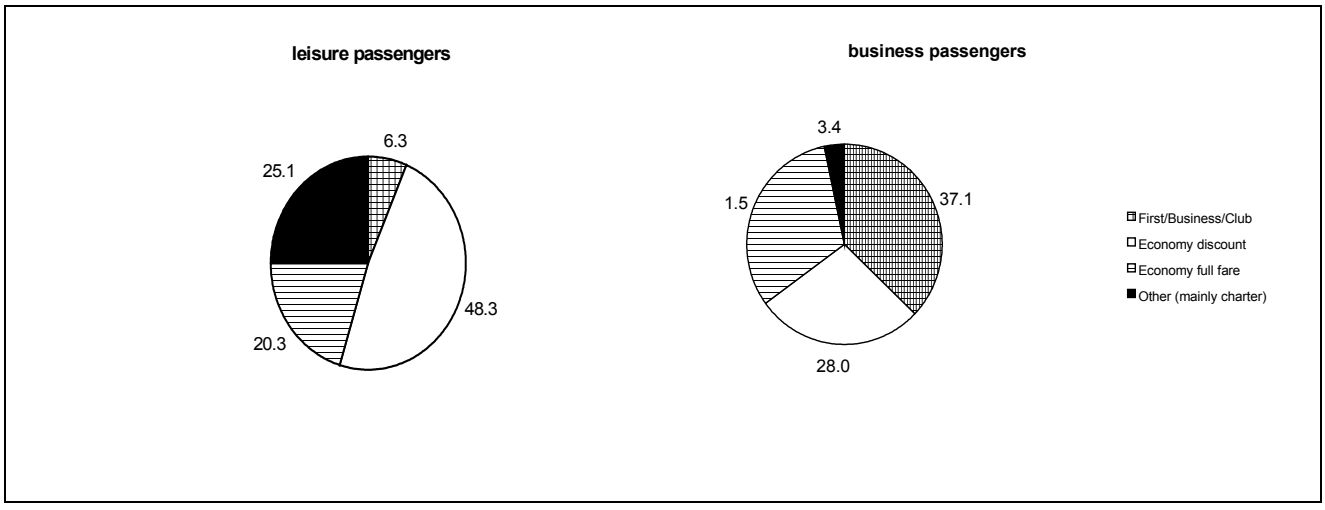
Figure 5 Socio-economic group (%) of business and leisure passengers at Gatwick, Heathrow and Manchester airports, 1998



Ticket types

Information on the class of ticket with which passengers are flying could provide some indication of the internal environmental characteristics they experience (seating, etc), although obviously there are significant variations within classes. Figure 6 gives information on ticket types at the airports, for *UK and overseas residents* at the airports. As might be expected, far more (over a third) of business passengers travel first or business class, compared with only 1 in 17 leisure passengers.

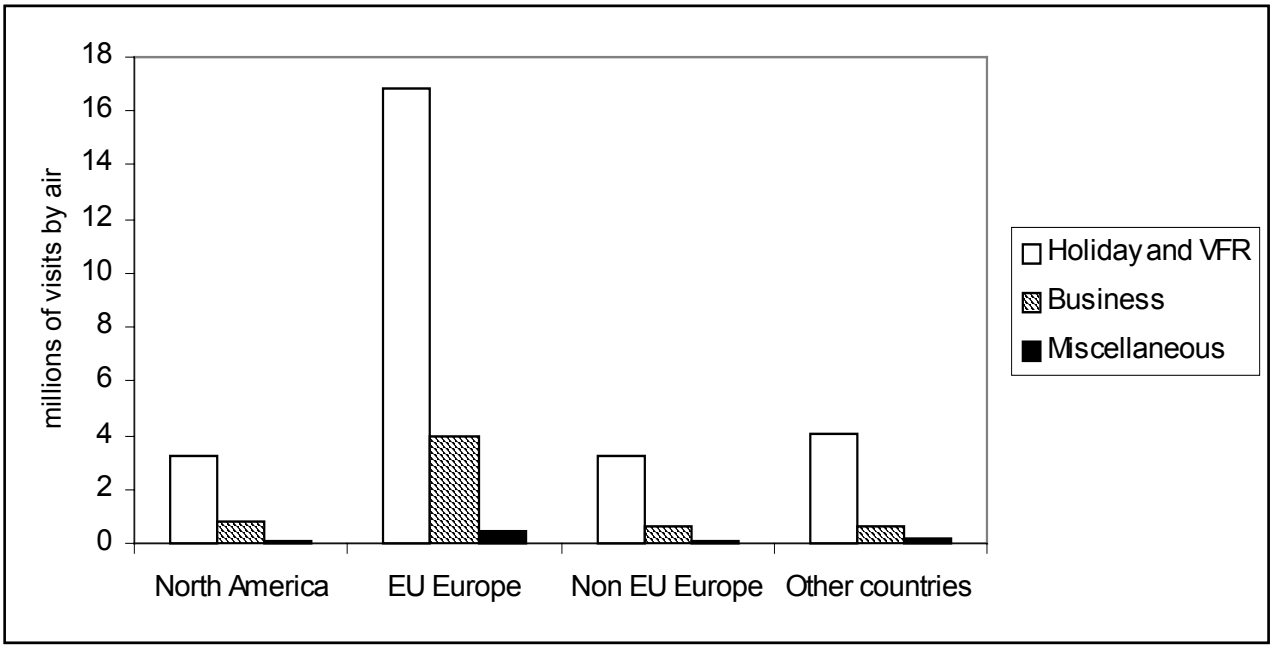
Figure 6 Ticket type (%), UK and overseas resident passengers, Gatwick, Heathrow and Manchester airports, 1998



V Passenger destinations/origins

Figure 7 gives some general details of overseas air visits by *UK residents*, taken from the 1998 International Passenger Survey. Unfortunately, the data from which the Figure is plotted are the only information relevant to the inquiry in the report. They show the overwhelming dominance of air travel to EU countries, particularly for holiday journeys.

Figure 7 International air visits by UK residents by purpose, 1998



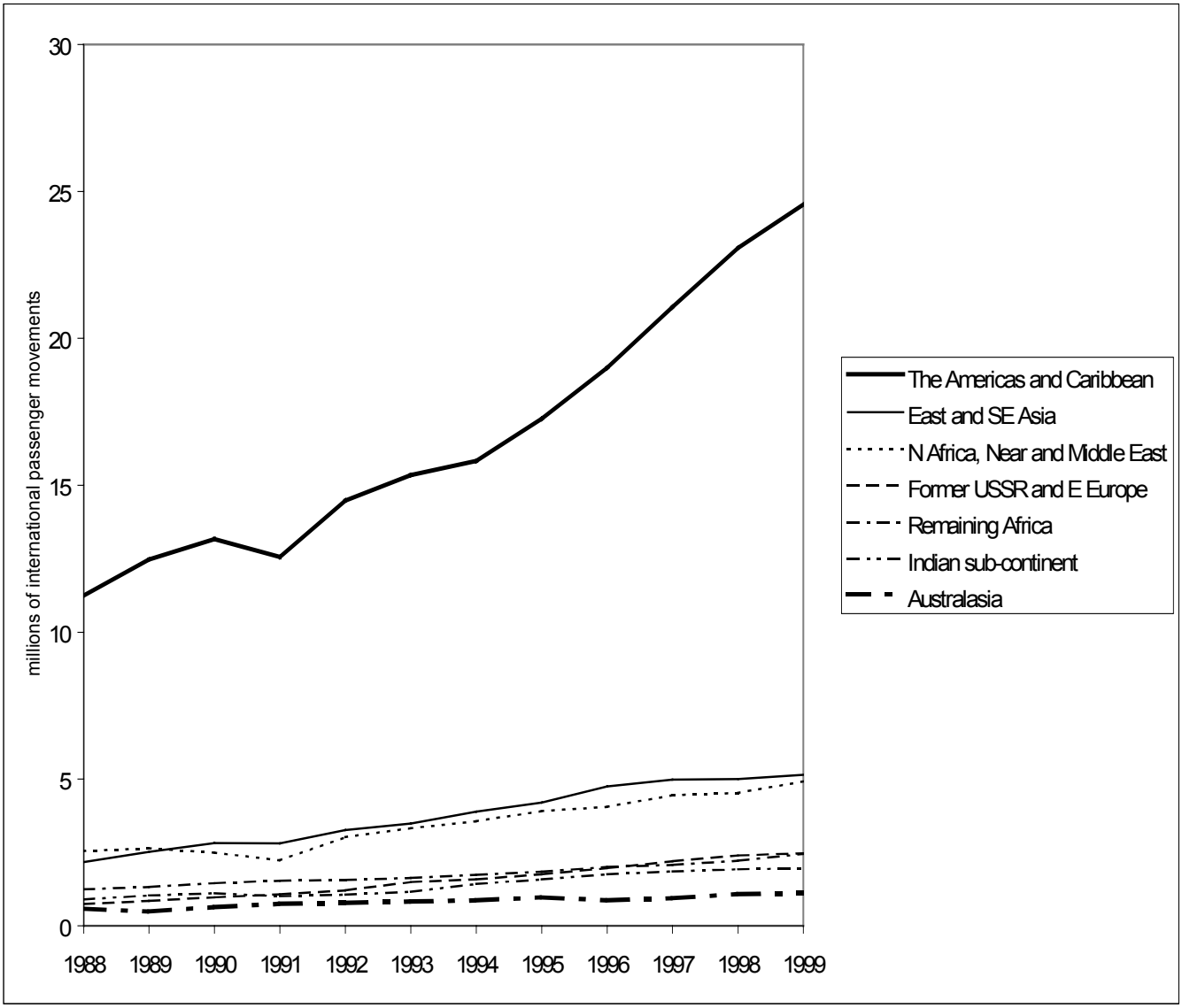
Notes to Figure 7

1) Source: *Travel Trends – a report on the 1998 International Passenger Survey*, Office of National Statistics, 1999
2) VFR = visiting friends or relatives

CAA data permit a more detailed breakdown of destinations and give some trend information but not on purpose of visit. Figure 8 charts some of this information for longer distance international destinations, from 1988-1999. Western European journeys, which dominate, as shown in Figure 7 above, are excluded from the chart. The data are for passenger movements (arrivals and departures) by UK and foreign residents.

The data are dominated by flows to/from North America and the Caribbean, destinations which, apart from the 1991 downturn, which was particularly marked for this group of destinations, have also grown the most rapidly. Unfortunately, published data do not permit further breakdown of this information, for example into destinations/origins in Eastern, mid or Pacific North America.

Figure 8 Trends in passenger movements to/from longer distance destinations, UK airports, 1988-1999



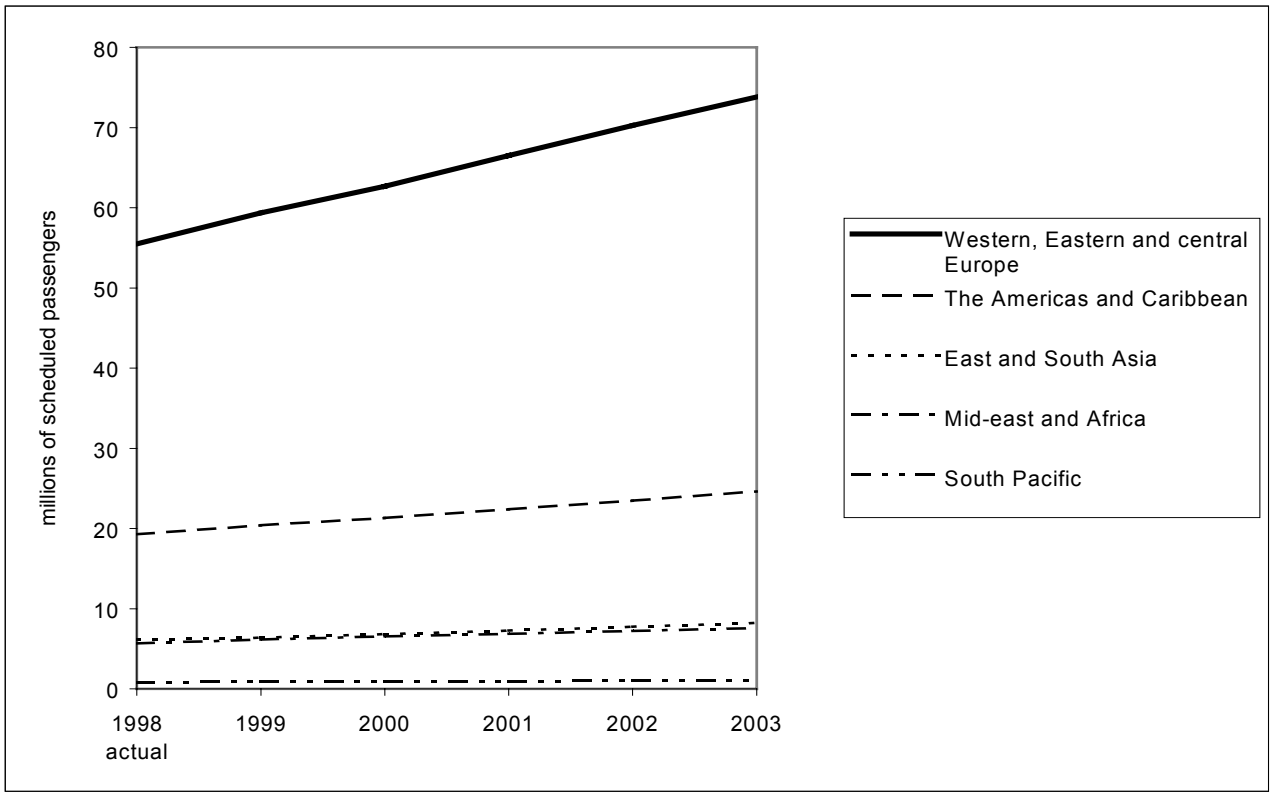
Notes to Figure 8

1) Source: Annual issues of *Transport Statistics, Great Britain*, compiled from CAA data

VI Forecasts of air traffic

IATA produces some short-term forecasts of *scheduled* traffic to/from various countries and world regions. Figure 9 plots some data for the UK from the latest forecast available at the time this note was prepared[5]. Traffic to Western, Eastern and central Europe dominates and is also expected to show the most rapid growth.

Figure 9 IATA Forecast of International Scheduled Passengers to/from UK, 1998-2003



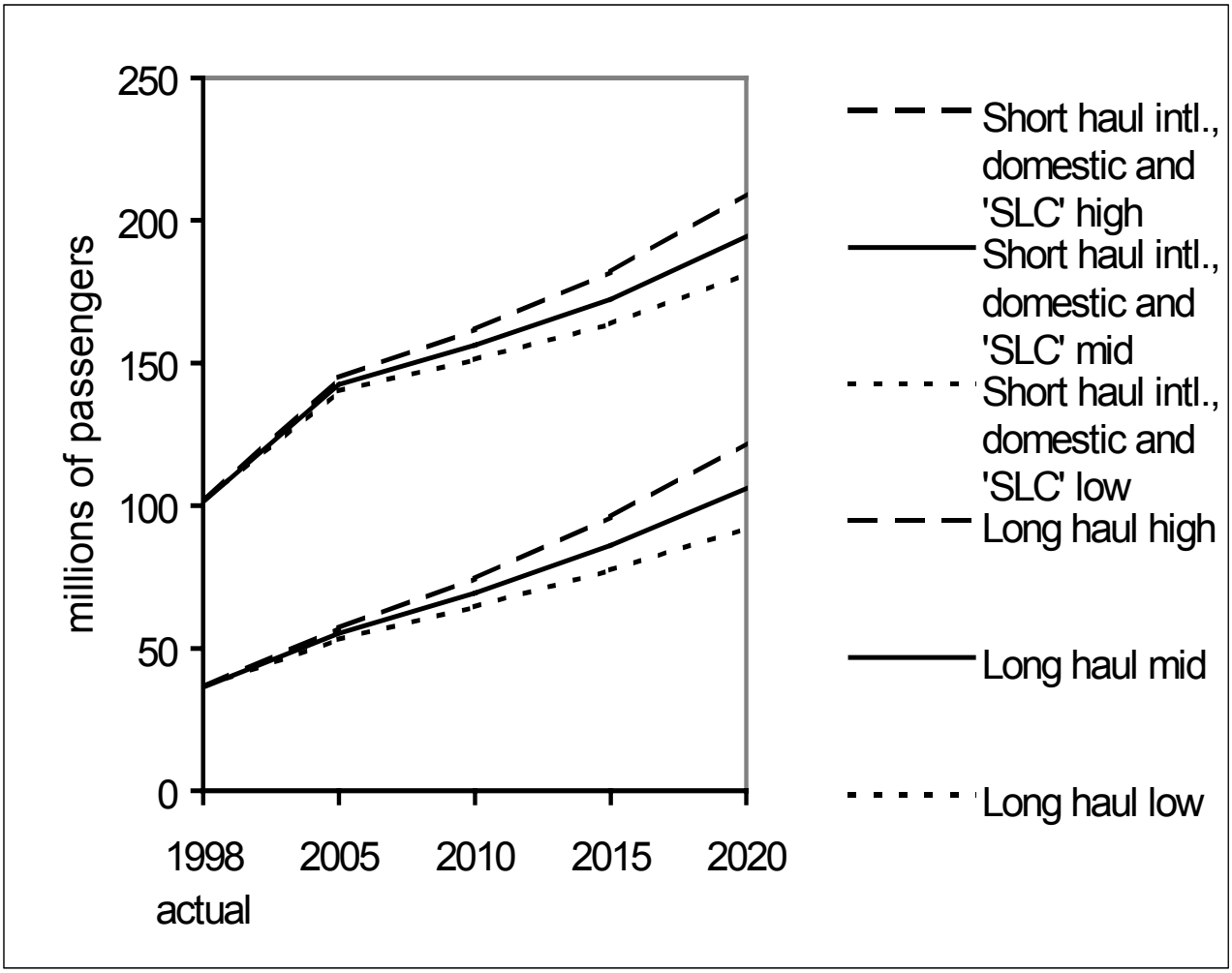
Notes to Figure 9

1) Source: *Passenger Forecast 1999-2003,* Part 2 – Forecast Tables, IATA, Montreal, October 1999

More ambitious, longer term forecasts are published every three years by the DETR, the latest, for 2000, being issued in July. These attempt to forecast air traffic growth for a twenty year period. Figure 10 plots some data from this set of forecasts. The published data break down 'long haul' flights into OECD, 'NIC' (newly industrialising) and 'LDC' (less developed) country destinations but these categories are not very illuminating for the purposes of this inquiry and are not given in the figure. Unpublished data used to compile the forecasts could enable a more detailed breakdown to be made.

[5] 1999-based forecasts are expected to be published in October/November 2000.

Figure 10 DETR Air Traffic Forecasts for the United Kingdom, 2000-2019



Notes to Figure 10

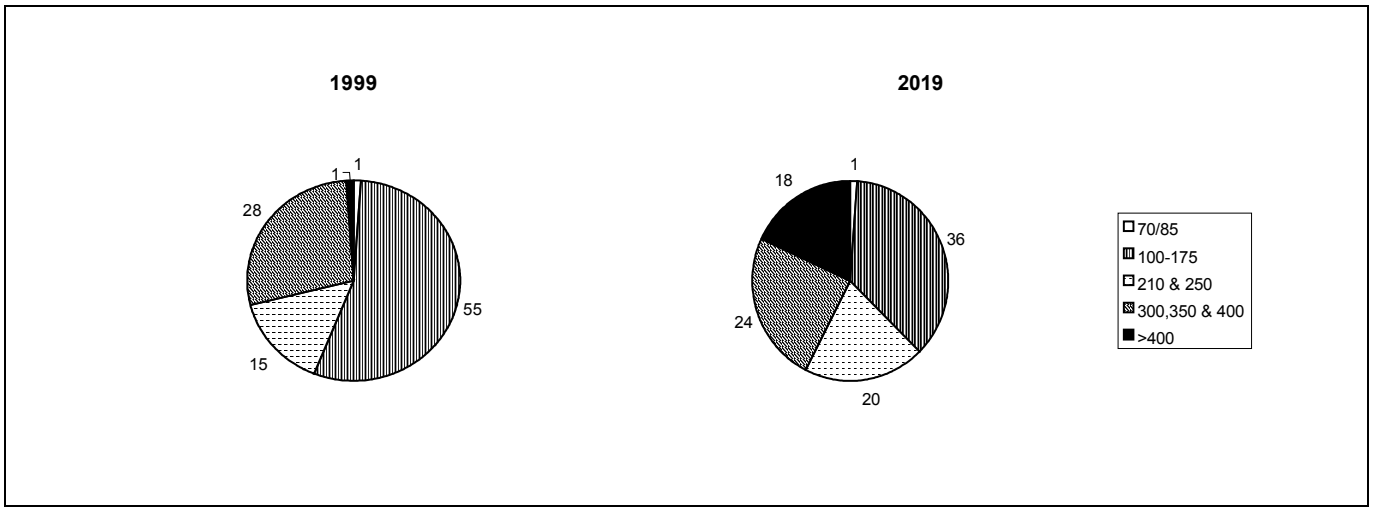
1) DETR = Department of the Environment, Transport and the Regions
2) The full text of the forecasts is available at: *www.aviation.detr.gov.uk/atfuk2000.*
3) The data plotted in the Figure are the forecasts for demand for air travel *to and from* UK airports by *UK and foreign residents*.
4) The forecasts are based on estimates of *unconstrained demand* for air travel, projected using econometric assumptions about the relationship between economic growth and demand levels (see note 7). They exclude any effects of factors such as airport handling and air traffic management constraints, or competition from other future transport modes (e.g. upgraded mainline rail) on total numbers.
5) 'Short haul' = 'Western Europe[1]' and 'Long haul' = 'everywhere else' (DETR terminology).
6) 'SLC' = 'Scheduled Low Cost' airlines (e.g. buzz, Go, Easyjet and Ryanair). The impact of these new entrants pre-sented the forecasters with considerable modelling difficulties, as there are no long term data available on the relationship between their contribution to total demand and econometric variables. Instead, an 'off model' forecast was used for this contribution in the future. This assumes rapid growth from a 1998 actual number of 6.9 million pass-engers until 2005 (mid point assumption of 18.7 million passengers), followed by growth at the same rate as short haul leisure traffic. Published data for SLCs give no breakdown between domestic and international traffic. All SLC international traffic has been assumed to be 'short haul' (according to the definition in note 5 above).
7) The 'high', 'mid' and 'low' forecasts essentially correlate with Treasury long term forecasts of economic growth, together with the impact of other potential demand-influencing factors, such as increases in air fares from fuel taxes and the income elasticity of demand for air travel, especially leisure travel.
8) The data plotted in the Figure do not include UK offshore oil and gas rig traffic, 'airside interliners' (passengers changing flights without passing through terminal exits) or military, diplomatic and airline personnel traffic.

[1] defined as all EU countries plus Bosnia-Herzogovina, Croatia, Faroe Islands, Iceland, Macedonia, Malta, Norway, Serbia/Montenegro, Slovenia, Switzerland and Turkey. Within the EU, Spanish traffic includes the Canary Islands and Portuguese traffic includes Madeira.

VII Aircraft Configurations

As noted in Section I, aircraft manufacturers publish some forecasts of their expectations of the numbers and types of future aircraft. The data probably most relevant to this inquiry from such sources relates to the size of aircraft, although obviously, seat configuration can vary widely within given sizes. For example, Boeing 747-400s have an average seating capacity of about 380 seats but this can vary from about 160 to about 570 seats[6] Figure 11 gives Airbus Industrie's expectations of the global percentage of aircraft with different seating capacities in 2019, compared with the actual situation in 1999.

Figure 11 Global percentage of seats in different sizes of aircraft, actual 1999 and forecast 2019



Notes to Figure 11

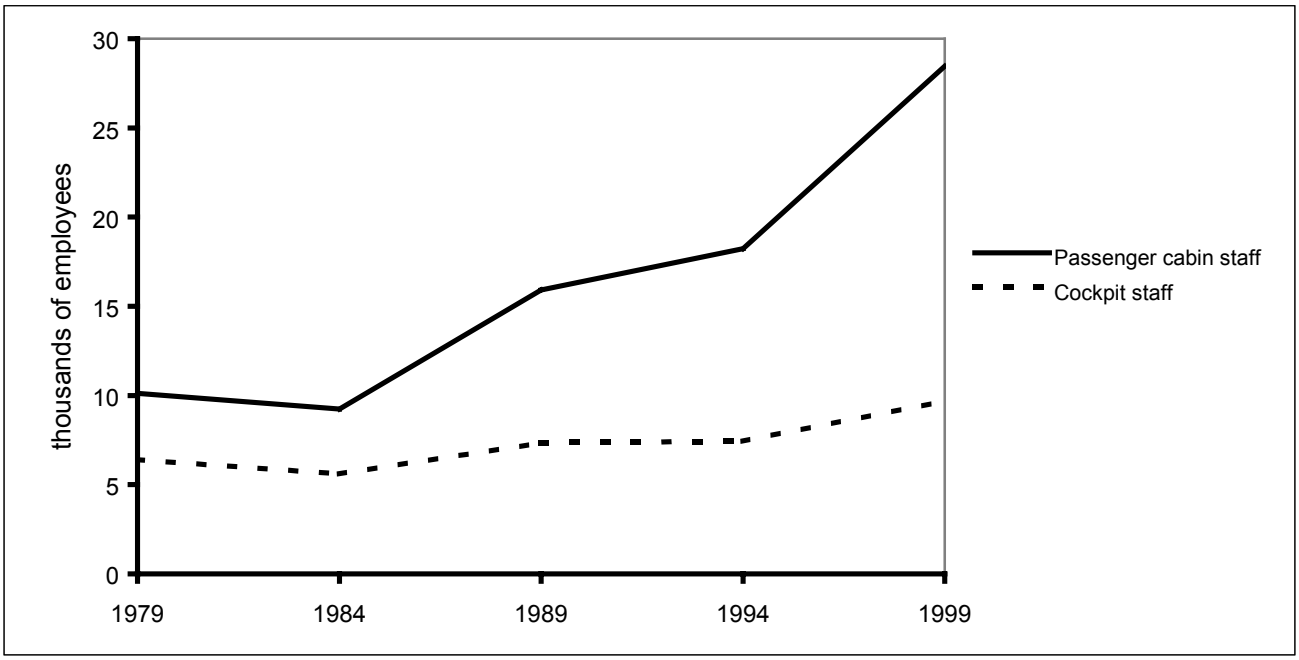
1) Source: *Global Market Forecast, 2000-2019*, Airbus Industrie, July 2000

VIII Cockpit and Cabin Staff

Published CAA data also give an indication of trends in employment by UK airlines of airline staff who regularly travel in aircraft. Figure 12 shows this trend for 1988-1999. The much more rapid growth of cabin staff compared with cockpit staff is partly explained by increased use of larger aircraft and partly by higher standards of service in aircraft cabins.

6 Source: Chart in *Global Market Forecast, 1999-2018*, Airbus Industrie, May 1999, p9

Figure 12 Flight employees of UK airlines, 1979-1999



Notes to Figure 12

1) Source: Annual issues of *Transport Statistics, Great Britain*, compiled from CAA returns

2) Includes UK airline employees whether working in the UK or abroad.

IX Conclusions

Published data are of limited use in providing detailed quantitative background information to the inquiry. Secondary analysis of the data sets used could provide some basic information, e.g. on journey destinations and types by age groups. The inclusion of additional questions in the regular surveys conducted by agents such as the CAA could provide more detailed specific information.

X Acknowledgements

POST would like to acknowledge the assistance of Martin Ross of the CAA.

October 2000