

Methodology and coverage of the survey

Background

The International Passenger Survey (IPS) is a large multi-purpose survey that collects information from passengers as they enter or leave the United Kingdom. It is carried out by the Office for National Statistics (ONS) for a range of public and private sector organisations. In particular, the survey provides figures used for the travel account of the balance of payments, international migration statistics, and for informing decisions on tourism policy. The data from the survey are widely used across and outside of Government to provide detailed information on the numbers and types of people travelling to and from the UK. Results are published regularly by ONS on a monthly, quarterly and annual basis. More detailed analyses are possible by downloading the *Travelpac* database from the internet or through marketing agents appointed by ONS.

Travellers passing through passport control are randomly selected for interview, and all interviews are conducted on a voluntary and anonymous basis. Interviewing is carried out throughout the year and in 2004 over a quarter of a million interviews were recorded (254,711), representing about 0.2 per cent of travellers. The overall response rate (complete and partial interviews) for the 2004 survey was 81 per cent.

Since the IPS began in 1961, its coverage has been extended so that it includes all the main air, sea and Tunnel ports and routes into and out of the UK. The only routes excluded are sea routes to and from the Channel Islands, those across the land border with the Irish Republic, and cruise ships travelling to and from the UK.

About 90 per cent of passengers entering and leaving the UK are covered by the survey. The remainder are either passengers travelling at night when interviewing is suspended, or those on routes too small in volume or too expensive to be covered.

The IPS data are weighted on a quarterly basis to produce national estimates of all international travellers to and from the UK. Although some monthly data from the IPS are also published, a single quarter is the minimum period over which most detailed analyses can be made. Annual national estimates are created by combining the four quarters of the year.

The calculation of the weights used on the IPS takes into account its complex sample design and information provided from other sources on, among other things, the non-sampled routes and time periods. For example, estimates of spending by travellers to and from the Channel Islands are provided by the Economic Advisor's Office in Jersey, and the Central Statistical Office in the Republic of Ireland provides information on travellers crossing the land border with Northern Ireland.

Overview of the survey design

The IPS is based on face to face interviews with a sample of passengers travelling via the principal airports, sea routes and the Channel Tunnel. The number of interviews conducted in 2004 was 254,711, which represented about 0.2 per cent of all travellers. This large sample size allows reliable estimates to be produced for various groups of passengers despite the low proportion of travellers interviewed.

The IPS sample is stratified to ensure it is representative by mode of travel (air, sea or Tunnel), port or route, and time of day. Interviews are conducted throughout the year. The frequency of sampling within each stratum is varied according to the variability of tourist expenditure, the volume of migrants and the cost of interviewing. For example, where the expenditure quoted on a particular route varies greatly across respondents, a higher sampling frequency is used to enable a more satisfactory estimate to be produced. (For further details on the sample design, see the *Sampling* section below.)

Some questions on the survey are asked of all of the passengers interviewed, while others are restricted to certain specific sub-groups. Information on the spending and length of stay of UK residents abroad and overseas residents in the UK is only collected on the return leg of a visit. This is because actual spending and length of stay are required, and these may differ from the respondents' intentions when they start their visit. In 2004, 54,174 interviews were carried out with overseas residents departing from the UK and 61,853 with UK residents arriving back from abroad.

The details collected on the survey are used by ONS, along with other sources of information, to produce overall national estimates of the number and expenditure of different types of travellers. A complex weighting procedure is used to do this that takes into account various factors in order to improve the estimates. (For further details of the weighting procedure, see *Producing national estimates* below.)

Sampling

The IPS uses a multi-stage sample design. The sampling for air, sea and tunnel travel is carried out separately, although the underlying principle for each mode of travel is broadly similar. In the absence of a sampling frame of travellers, time shifts or sea crossings are selected at the first stage, and travellers are then systematically chosen at fixed intervals from a random start within these shifts or crossings at the second stage. The details of the sampling scheme for each individual mode of travel are described below.

Air routes

For air routes, time periods are sampled. Shifts are selected for the first stage at the nine 'main' air sites (i.e. the four terminals at Heathrow Airport, the two terminals at Gatwick Airport, and the three terminals at Manchester International Airport) in such a way that the number of shifts are balanced between mornings and afternoons, and days of the week within any quarter. At the second stage, passengers are counted as they cross a predetermined line

and every n^{th} one is interviewed. The sampling interval, n , differs between sites but is never more than 67. Departing passengers are sampled at a higher rate than arriving ones because the expenditure information for overseas residents visiting the UK is more variable than that for UK residents returning from visits abroad.

A small number of shifts every quarter is also conducted at other smaller international airports, referred to as 'residual' airports. However, the sample size is insufficient to provide accurate estimates for most of these airports individually. Those airports with less than about 100,000 passenger movements per quarter are usually excluded from the survey altogether on the grounds of cost effectiveness, but traffic at these sites is taken into account when producing national estimates.

- Sea routes

Sea routes carrying 50,000 passengers a year or more are generally included in the IPS sample. At some seaports, passengers are sampled and interviewed on the quayside as they embark or disembark, while at others, IPS interviewers travel on the boat and conduct interviews on board. The choice between interviewing on the quayside or on crossings is made on practical grounds such as cost, safety, and permission.

Where interviewing is conducted on the quayside, the sample is designed to select shifts that are balanced across different days of the week and times of day within a quarter, with each individual shift covering several sailings. Where interviews are conducted on crossings, a predetermined number of return crossings are selected for each route, spread across time of day and day of week each quarter. As for air sampling, sea passengers are selected at fixed sampling intervals from a random start within each shift or crossing.

The IPS also samples long haul ships capable of carrying more than 200 passengers at the port in Southampton; one outward and one inward sailing are randomly selected per quarter.

- Tunnel routes

The method used for the tunnel routes differs between Eurostar passenger trains and Eurotunnel vehicle shuttles.

The method for passenger trains is similar to that for air travel; time shifts are selected and then passengers are selected at fixed intervals within the time shift. Passengers are interviewed after crossing a predetermined line at Waterloo and Ashford International stations on arrival or departure.

In contrast, for vehicle shuttles, crossings are randomly selected and interviewing takes place on board the shuttles themselves. Because of time constraints, only a certain number of interviews can be carried out on any individual shuttle and the sampling interval used is therefore dependent on traffic volumes.

Producing national estimates

Once the information has been collected from respondents, the survey data are weighted to produce national estimates, which are then published on a monthly, quarterly and annual basis. These weights take account of a variety of factors and the method of producing them varies depending on the mode of travel and type of port:

- Main airports

Each person interviewed at one of the main airports is assigned a value that indicates the number of people they represent in the traffic flow. This initial weight is the inverse of the sampling interval used for the shift, which is then adjusted to take account of time slots that were not selected in the sample design. For example, if the sampling interval is 1 in 25, and one 8-hour period in six is sampled, then the initial weight will be $25 \times 6 = 150$.

This initial weight for each respondent is then built upon to take account of a range of other factors. The series of procedures is described below.

- (a) Firstly, the initial weight is adjusted to take account of people refusing to be interviewed or any non-contacts during the interviewing time (during peak periods an interviewer may not finish an interview before their next assigned contact has crossed the counting line).
- (b) Further adjustment to the weights within country of residence and nationality groups is then made to take into account interviews in which only minimum information is obtained from the respondents, as these "minimum" interviews are not included in the final datasets. This procedure assumes that "minimum" respondents are similar to those of a similar residency and nationality status who provide fuller information.
- (c) Adjustments are then made for passengers arriving or departing outside the eligible times for sampling, usually over the nighttime period between 11.00 pm and 7.00 am. These adjustments are based upon information from the Civil Aviation Authority (CAA).
- (d) The resulting weights are next summed across respondents to give estimated total passenger flows from the IPS sample data. These total flows are then scaled to bring them into line with actual numbers of international passengers passing through the main airports, which are provided to ONS by the CAA. The passenger flow figures for Heathrow and Gatwick are adjusted before scaling to exclude "airside interliners" (passengers in transit to another flight) who do not pass through passport control and so technically do not enter the country.
- (e) The weights are finally adjusted to allow for any imbalance in the sample. This involves comparing total arrivals and departures for each major country and port group over a period of a rolling year and, if the two totals are further apart than can be explained by statistical error, the weights of the relevant contacts are adjusted to reflect this.

This series of procedures leads to a final weight being assigned to each respondent. These final weights are then applied to the individual responses to produce the national estimates.

- Residual airports, seaports and the Channel Tunnel

For all other types of port, sample figures are directly scaled to known international passenger flows. For the residual airports these flows are derived from statistics provided by the CAA, while for the seaports, information is provided by the Department for Transport. Data on Channel Tunnel flows are supplied by both Eurotunnel (vehicle shuttles) and Eurostar (passenger trains). In the case of the vehicle shuttles, only vehicle flows are available; these are converted to passenger flows using information collected from a separate survey of vehicle occupancies conducted on behalf of ONS at the Eurotunnel terminals in the UK and France.

For residual airports, international passenger movement figures are assigned to groups of airports, then subdivided between arrivals and departures. For long and short haul seaports, the passenger movement figures are similarly assigned to groups of routes and subdivided between arrivals and departures. The sample for these grouped routes is then scaled to the passenger flows by dividing the number of contacts into the actual number of passengers.

In the calculation of these scaling weights, no allowance is made for non-response. However, by grouping airports or sea routes, allowances are made for unsampled ports and routes. Finally, the sample within each group is re-weighted to take into account “minimum” interviews and sample imbalance (in the same way as for the main airports, see above) to arrive at a final weight for each respondent.

Imputation

Inevitably, some respondents only partially respond and do not give details of their expenditure, fares or length of stay. For these respondents, ONS imputes the missing information based on the spending, fares and stay of similar types of contacts who do give the details. Spending for overseas residents visiting UK towns is also imputed.

Seasonal adjustment

The number of travellers and their spending both have a clear seasonal pattern, with more visits and spending in the summer than in the winter. Statistical techniques are used by ONS with the package 'X11ARIMA' to produce seasonally adjusted figures. These figures show visits and spending with an estimate for the seasonal component removed. They allow more meaningful comparisons to be made between months and quarters of the year and help to identify underlying trends. More details on seasonal adjustment procedures can be obtained from the IPS Branch of ONS.

Constant prices

Usually, spending by overseas residents in the UK and UK residents abroad grows each year as the price of goods and services rise. Constant price figures are calculated by ONS to show real spending across years with the effects of price inflation removed.

For overseas residents' expenditure in the UK, an index is created by splitting spending into its component parts (accommodation, meals etc.) using past IPS data and uprating these components by their related retail price indices. The resulting index is then used to rebase the overseas figures back to 1995 prices.

For UK residents abroad, spending is split by country of visit. Consumer price indices for particular countries are used with currency conversion rates to produce an index of price rises. The index is then used to rebase UK residents' spending to 1995 prices.

Additional sources of data

The method above explains how the national estimates are produced based on the routes sampled on the IPS. Unfortunately, as the IPS does not cover all passenger routes, additional figures have to be obtained from other sources and added to the totals derived from the IPS. These additions are:

- UK residents on cruises departing from or arriving to UK shores from the Department for Transport;
- Channel Islands expenditure and receipts from tourism from the Economic Advisor's office in Jersey;
- rail fares purchased by overseas visitors to the UK and UK visitors abroad before the start of their visit from British Rail International and Eurostar;
- and estimates of travel across the land border between Northern Ireland and the Irish Republic from the Irish Central Statistical Office. For the years before 1999, information was also provided regarding travel on air and sea routes between the UK and the Irish Republic. However, since 1999, the air and sea routes have been covered by the IPS sample.