

# Methodology changes in the UK Tourism Satellite Account (UK-TSA): 2020

An overview of challenges faced and methods used to produce the UK Tourism Satellite Account: 2020.

Contact:  
Natalie Jefferies  
tourism@ons.gov.uk  
+44 1633 456241

Release date:  
24 February 2023

Next release:  
To be announced

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# 1 . Main points

- The coronavirus (COVID-19) pandemic meant that important data sources used to create the UK Tourism Satellite Account (UK-TSA) were unavailable in 2020.
- Estimates of domestic tourism expenditure (Table 2) were particularly affected because no data were available from the Great Britain Tourism Survey (GBTS) or Great Britain Day Visits Survey (GBDVS), which are important sources for domestic tourism data in normal times.
- Some parts of the UK-TSA 2020 have been estimated by modelling alternative data sources, using a combination of pro rating alternative data and regression methods.
- The result of these changes to sources and methods is that the estimates in many tables are more uncertain than usual and should be treated with caution, particularly when wishing to compare 2020 estimates with those from earlier years.
- Given the unusual pattern of tourism in 2020 and into 2021, the Nowcast (2021) table published in previous UK-TSA reports is not available this year.

## 2 . About the UK Tourism Satellite Account (UK-TSA)

The UK Tourism Satellite Account (UK-TSA) is published annually by the Office for National Statistics (ONS), and created according to the [Tourism Satellite Account: Recommended Methodological Framework 2008](#).

The UK-TSA is an extension to the System of National Accounts (SNA). It allows users to gain an understanding of the size and role of tourism-related economic activity. Using the SNA framework to examine tourism is important because it allows for the separation of expenditure of residents and tourists. This facilitates the estimation of main variables, such as how much individual industries depend upon tourists, and, by extension, how much value-added and employment is supported by tourists.

## 3 . The coronavirus (COVID-19) pandemic led to important changes in 2020

The main data sources for the UK Tourism Satellite Account (UK-TSA) in normal times, as outlined in our most recent [UK Tourism Satellite Account methodology guide: 2017](#), include the:

- International Passenger Survey (IPS)
- Input-output supply and use tables, and Consumer trends (for detail of household final consumption expenditure (HHFCE))
- Great Britain Tourism Survey (GBTS)
- Great Britain Day Visits Survey (GBDVS)
- Northern Ireland Continuous Household Survey
- Annual Business Survey (ABS)
- labour market surveys: Annual Population Survey (APS) and Annual Survey of Hours and Earnings (ASHE)

There was a major disruption to tourism in 2020 because of lockdowns and restrictions on international travel following the outbreak of coronavirus (COVID-19). These restrictions also affected the availability of source data used to produce the UK-TSA, including:

- pausing the [Great Britain Tourism Survey](#) in periods of 2020; this, in combination with a merging of the GBTS with GBDVS, has resulted in Visit Britain not publishing domestic tourism statistics from these sources for the period January 2020 to March 2021
- pausing the [International Passenger Survey](#) from 16 March 2020, meaning that no IPS data on spending on international visits between the UK and the rest of the world were available for Quarter 2 (Apr to June) 2020, Quarter 3 (July to Sept) 2020 and Quarter 4 (Oct to Dec) 2020; the IPS data are a major input to the UK-TSA
- no data from the Northern Ireland Continuous Household Survey were available for 2020

These interferences created substantial challenges to producing the UK-TSA for 2020, most notably a need to use alternative data sources. This has reduced the amount of direct tourism-relevant data and greater use of economic data, meaning that the estimates in the UK-TSA 2020 are subject to more uncertainty than usual, affecting all data tables in the UK-TSA. It has also meant that there has been a discontinuity in UK-TSA estimates, because of having to use alternative data sources and new modelling techniques. This particularly affects Table 2 of the UK-TSA, these values are also used in Tables 4 and 6. The values of Table 6 are also used in Tables 7 and tourism direct gross value added (TDGVA).

## 4 . Data sources and methods employed in 2020

### Overview of the UK-TSA tables

The Tourism Satellite Account (UK-TSA) consists of seven “core” tables. Table 6 is regarded as the “heart” of the UK-TSA, reconciling data found elsewhere in the UK-TSA (Table 4 – synthesises data from Tables 1 and 2, which relate to inbound and domestic tourism expenditure, and Table 5 relating to the products produced by tourism activities). Table 7 of the UK-TSA presents information on tourism employment within the labour market. The tables are available in [The UK Tourism Satellite Account \(UK-TSA\): 2020 dataset](#).

The nature of the UK-TSA tables is interdependency, meaning that the quality of estimates in most tables affects the quality of estimates in many other tables.

## Methods used: Tables 1 and 3

“Table 1: Inbound tourism expenditure by products and classes of visitor (overnight versus same-day visitors)” and “Table 3: Outbound tourism expenditure by products and classes of visitor” use data from the International Passenger Survey (IPS) and household final consumption expenditure (HHFCE).

Our estimates of [Overseas travel and tourism 2020](#) are used in Tables 1 and 3, in line with methods in other years at total level. As previously mentioned, users should be aware that the IPS was conducted only in Quarter 1 (Jan to Mar) 2020, meaning that these published estimates used administrative data sources of passenger travel data for the period covering April to December 2020. Air fares data were not available from the IPS for the period April to December 2020 and are excluded from the UK-TSA after Quarter 1 2020. More information on the administrative data used for the IPS can be found in the November edition of our [Overseas travel and tourism November 2020 bulletin](#).

It was necessary to create the day visit and overnight visit spend totals from the published totals, as these estimates were not published in as much detail as normal. This was done by using the proportion of spend on day visits compared with the total spend on all visits in Quarter 1 2020 from the published IPS data. This proportion was applied to the published total, therefore creating our totals split by day visits and overnights. There is higher uncertainty around the final estimates, as the only data showing this split contained data from just Quarter 1 2020.

The IPS data are proportioned in Tables 1 and 3 using spend data from our household final consumption expenditure (HHFCE) for all categories, except “exhibitions and conferences” and “other consumption products” that we draw on estimates from Table 2. “Other consumption products” was proportioned into “other consumption products” and “exhibitions and conferences”, using the relationship between the domestic values of these spend categories from Table 2. The estimates in Table 2 were modelled for 2020, as described in the following.

## Methods used: Table 2

“Table 2: Domestic tourism expenditure by products, class of visitor and types of trip” uses a variety of data sources to produce estimates of domestic and international-related spending. Estimates in all cells of the table were affected by the unavailability of data from the Great Britain Tourism Survey (GBTS) and the Great Britain Day Visits Survey (GBDVS), and limited reporting of IPS data in 2020. All estimates have had to be modelled.

The first stage of modelling involved producing an estimate of the value of “all visitors” on “all types of trip”. The process for each product was conducted independently, using the available data sources felt to best fit the product type. In each case, two approaches were in scope: pro rating and ordinary least squares linear regression.

The chosen modelling method and data source for each product are summarised in the following:

- accommodation services for visitors – used the pro rating method and the Monthly Business Survey (MBS), Standard Industrial Classification (SIC) 55 “accommodation” data source
- food and beverage serving activities – used the pro rating method and the MBS, SIC 55 “accommodation” data source
- railway passenger transport service – used the pro rating method and the Eurostar passengers’ data source
- road passenger transport services – used the pro rating method and the published National Express underlying revenue data source
- water passenger transport services – used the pro rating method and the Domestic sea and international passenger numbers (source: Department for Transport) data source
- air passenger transport service – used the pro rating method and the Civil Aviation Authority (CAA) Terminal passenger numbers on UK operators at UK reporting airports (scheduled flights) data source
- transport equipment rental services – used the regression method from UK-TSA Table 5, transport equipment rental spend by all industries and the transport equipment rental industry data source
- travel agencies and other reservation services – used the pro rating method and the MBS, SIC 79 Travel agency, tour operator and other reservation service and related activities data source
- cultural activities – used the pro rating method and the Annual Survey of Visits to Visitor Attractions data source, with a variable created to reflect the attraction types that reflect the UK-TSA definition of culture
- sport and recreation activities – used the regression method and the Consumer trends recreational and cultural services data source
- exhibitions and conferences – used the regression method and the Index of Services SIC 55 “accommodation”, published GetLink Shuttle services revenue, Local passenger journeys on buses (source: Department for Transport), UK-TSA Table 5 Spend on transport equipment rental in transport equipment rental industry, and International short sea passenger numbers (source: Department for Transport) data sources
- other consumption products – used the pro rating method and the MBS, SIC 55 “Accommodation” data source

Pro rating was used in most cases as it has the advantages of involving fewer assumptions and requiring a shorter back series than regression. The method compares the relationship between the new source data (or predictor series) used and the UK-TSA estimate for previous years to define an average ratio, that was then applied to the new source data in 2020 to produce our estimate. In most cases, the natural logarithm of both the UK-TSA series being modelled and the predictor series were used. However, in some cases the logarithm of the predictor series gave a poor prediction, and the non-logged data were used instead, provided the prediction series was within acceptable bounds.

The quality of the pro rating models was checked. Any models that produced a modelled estimate 10% above or below the actual estimate were deemed to be of insufficient quality, and another model was made for that UK-TSA series. However, there was one exception for water passenger transport services; this predictor produced a higher degree of uncertainty, with the difference between the prediction series and the published UK-TSA estimate being as high as 18% in one year. No other data sources were found to produce a better-quality measure.

The estimates from the pro rating method were then sense-checked against low-level estimates from the MBS. Relevant MBS SIC's were grouped together using the UK-TSA SIC's. The average total growth rate for each group was used as a comparison. If the change seen in the MBS data was broadly in line with what was seen from the pro-rata models, the prediction was used. If not, another model was tested. Other sense checking included ensuring the prediction was not negative (as negative spend is impossible) and that the model did not predict a growth, as it was known this was unlikely.

In cases where a model of sufficient quality could not be created from pro rating, a regression approach was used. This involved using ordinary least squares linear regression and was carried out using the following steps:

1. a selection of up to eight predictors that were thought to be related to the UK-TSA series being predicted was made
2. an ordinary least squares regression model was created using all eight of the selected predictors
3. an F-test was performed to test whether the model significantly fit the trends of the data; if it was found that the model did not significantly fit the trends of the data, we moved immediately back to step one
4. a t-test was performed on each predictor in the model to ensure it was significantly contributing to the model
5. if all predictors were significantly contributing to the model, the prediction was sense checked using the same procedure as previously described; if the prediction failed the sense check, the method was restarted from step one, normally with the same set of predictors but the UK-TSA series was now logged (to prevent negative values)
6. if there was a predictor that was not significantly contributing to the model it was removed, and a new model was generated without it; in cases where there were multiple predictors not significantly contributing to the model, the one that was most insignificant was removed (the predictor with the highest p-value)
7. steps three to six were repeated until a significant model was created with a prediction that passed the sense check

It should be noted that regression models require a longer back series than the pro-rata models, and there is a noticeable level shift in 2016 in the UK-TSA back series because of revisions from IPS only being brought back to 2016. This level shift means there is greater uncertainty in estimates created using regression modelling techniques, and these estimates should be treated with caution.

The approach to splitting domestic and outbound (spend in the UK as part of a trip overseas) was tailored based on the product. When creating a split, it was considered whether the split roughly matched what has been seen historically and whether using this split led to a larger decrease (compared with 2019) in outbound spend compared with domestic spend. This was because IPS and MBS estimates showed a larger decrease in international travel. The exceptions to these rules were “transport equipment rental services”, “cultural activities”, “sport and recreation activities” and “exhibitions and conferences etc.” where all expenditure historically has been assigned to domestic; the same method has been applied to these products in 2020.

Two approaches were used to create these splits. The first was the use of other data sources that contained information on outbound and domestic trips to create a proportional split that was then applied to the total value. The second was to decrease 2019 data on either domestic or outbound spend by what was seen in either the IPS estimates of outbound travel or the MBS estimates of domestic industries, depending on which was more suitable. The chosen method and data source for each product are summarised in the following:

- accommodation services for visitors – used the percentage decrease method and the IPS outbound spend data source
- food and beverage serving activities – used the percentage decrease method and the IPS outbound spend data source
- railway passenger transport services – used the proportional split method and the Eurostat data on EU residents going on domestic holidays and international holidays data source
- road passenger transport services – used the percentage decrease method and the MBS data source
- water passenger transport services – used proportional split method and the Eurostat data on EU residents going on domestic holidays data source
- air passenger transport services – used the proportional split method and the CAA domestic flights and flights on UK operators
- transport equipment rental services – had outbound set to 0 and no data source was used
- travel agencies and other reservation services – used the proportional split method from CAA flights on UK operators and all flights data source
- cultural activities – had outbound set to 0 and no data source was used
- sport and recreation activities – had outbound set to 0 and no data source was used
- exhibitions and conferences – had outbound set to 0 and no data source was used
- other consumption products – used the proportional split method and the Table 2 total all visitors, all types of trips and IPS inbound and outbound spend data source

For outbound trips, IPS data for Quarter 1 2020 were used to define the split between tourist (overnight stays) and excursionist (same-day visitors) expenditure. The IPS was run in Quarter 1 2020, when the majority of overseas trips for the year were made.

For domestic trips, data for Quarter 2 (Apr to June) 2021, Quarter 3 (July to Sept) 2021 and Quarter 4 (Oct to Dec) 2021 were used to define the split between tourist (overnight stays) and excursionist (same-day visitors) expenditure, as equivalent survey data for 2020 was not collected. While these data refer to a period outside of the UK-TSA 2020, they had similarities to tourism in 2020 in that they were different to other years.

The total same-day spend from the GBDVS in Quarter 2 to Quarter 4 2019 was £53.3 billion, for Quarter 2 to Quarter 4 2021 this was £25.6 billion. This shows a marked difference in spend between the two years. There was also a difference in spend on overnight trips between 2019 and 2021, with the GBTS showing a spend of £20.3 billion in Quarter 2 to Quarter 4 2019, compared with £27.2 billion in Quarter 2 to Quarter 4 2021. While this is not a decrease it is a significant difference, and since 2021 was also affected by the coronavirus pandemic, it is assumed that the 2021 values match 2020 better than 2019 values would. However, the fact that it is drawn from a period outside of the reference year means that we advise caution when interpreting the values in Table 2 for tourist versus excursionist expenditure.

## **Methods used: Table 4**

Most of “Table 4: Internal tourism consumption by products” is drawn from Tables 1 and 2. Therefore, the observations previously provided in relation to “all visitor” estimates in those tables apply to Table 4 as well. Table 4 also contains the “other components of tourism consumption” column, which contains data from the:

- Department for Business Energy and Industrial Strategy (BEIS)
- Living Costs and Food Survey (LCF)
- national Council Tax bases

The data were published for 2020, so no method changes were required for this column.

## **Methods used: Table 5**

The data used to create “Table 5: Production accounts of tourism industries and other industries” are drawn from the:

- supply and use tables
- Annual Business Survey (ABS)
- Annual Population Survey (APS)

Data for each of these sources have been published by the ONS, meaning that no methodology changes were employed.

In a normal year, data from the Annual Business Survey are used to proportion out the more general SICs in the Supply and use tables into the tourism-specific categories. However, for 2020, SIC 49.311, which is used for rail passenger transport estimates, was showing negative gross value added (GVA). This SIC was removed because negative proportions are not possible, and this would have led to other values in the final table being negative that could not be negative.

## **Methods used: Table 6**

The data used to create most of “Table 6: Total domestic supply and internal tourism consumption” are drawn from the:

- supply and use tables
- ABS
- APS

Data for each of these sources have been published by the ONS, meaning that no methodology changes were needed. However, figures for internal tourism consumption are drawn from Table 4, therefore the detail provided for Table 4 should be referenced.

The estimates provided for tourism ratios are created by dividing column “Internal tourism consumption” by column “Domestic Supply (at purchaser prices)”. Therefore, the method changes required to produce the internal tourism consumption must be referenced when considering the tourism ratios.

## **Methods used: Table 7**

The data used to create this table come from ONS labour market surveys, which were conducted in 2020. Therefore, there is no methodological change to the way the main body of Table 7 is created. However, users should be aware that:

- response rates for the Labour Force Survey were lower than normal in 2020, particularly during the first lockdown, which created higher standard errors around employment estimates
- although a number of employees were furloughed in 2020 under the government's Coronavirus Job Retention Scheme (CJRS), labour market surveys followed an international principle for classifying workers: "Workers furloughed under the CJRS, or those who were self-employed but temporarily not in work, had a reasonable expectation of returning to their jobs after a temporary period of absence. Therefore, they were classified as employed under the International Labour Organization (ILO) definition"; Annual Survey of Hours Earnings (ASHE) is used to determine better full-time equivalents (FTEs), and ASHE collected hours worked based on usual hours rather than actual hours worked
- tourism ratios in the table are copied from Table 6, therefore the detail provided above for Table 6 should be referenced
- tourism direct employment and tourism direct FTEs are the total employment and total FTEs columns multiplied by the tourism ratios column, respectively; therefore, the detail provided for Table 6 should be referenced

## Methods used: Table TDGVA

The "Table TDGVA: Total direct gross value added" only uses data from Tables 5 and 6, therefore no methodology changes were required, however the caveats that apply to those previous tables also apply to this one. The "total GVA" column is the "total GVA" row in Table 5, and the "tourism ratios" column is the "tourism ratios" column from Table 6. These values are then multiplied together to create the TDGVA.

## 5 . Related links

### [The UK Tourism Satellite Account \(UK-TSA\)](#)

Dataset | Released 24 February 2023

Quarterly and annual data on household expenditure in the UK, latest release

### [UK Tourism Satellite Account methodology guide: 2017](#)

Methodology guide | Released 27 November 2019

Methodology and data source information relating to the UK Tourism Satellite Account: 2017.

### [Overseas travel and tourism: 2020](#)

Bulletin | Released 24 May 2021

Annual estimates of visits to the UK by overseas residents, visits abroad by UK residents and estimates of spending by travellers, using administrative sources of passenger travel data for the period covering April to December 2020.

### [Consumer trends, UK: July to September 2022](#)

Bulletin | Released 22 December 2022

Quarterly and annual data on household expenditure in the UK, latest release.

### [GB Domestic Overnight Tourism: Latest results](#)

Web page | Released 2021

Quarterly and annual estimates of spend on overnight UK domestic trips, number of overnight UK domestic trips and number of nights on overnight UK domestic trips.

### [GB Day Visits: Latest Results](#)

Web page | Released 2021

Quarterly and annual estimates of spend on UK domestic same-day trips and number of UK domestic same-day trips.

## 6 . Cite this methodology

Office for National Statistics (ONS), released 24 February 2023, ONS website, methodology, [Methodology changes in the UK Tourism Satellite Account \(UK-TSA\): 2020](#)