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Socio-economic impacts of tourism in the European Union

A pilot estimation framework based on Tourism Satellite Accounts

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Contents

Abstract

The tourism sector has been indicated by the European Commission as one of the 14 strategic industries to build a stronger single market for Europe's recovery after the COVID-19 pandemic shock. Despite the importance of tourism, the data describing its socioeconomic impact are still limited and fragmented. The direct economic impact of tourism is appraised through the Tourism Satellite Account (TSA) framework compiled by National Statistical Institutes under the coordination of Eurostat.

TSA data have an unrealized potential to evaluate not only direct, but also indirect and induced effect of tourism on the economy. This report documents a pilot study coordinated by the JRC in collaboration with Eurostat and DG GROW carrying two main tasks: (i) the collation and harmonization of TSA data from different EU countries, and (ii) their combination with input-output tables to estimate the direct and indirect economic impact of tourism in terms of total consumption, value added and employment. The methodology is applied to a sample of 10 EU countries, and the results are compared with estimates provided by official statistics and other sources.

This study demonstrates that TSA data can be harnessed to assess the socioeconomic contribution of tourism and support EU policy in a more complete and systematic way. However, the study also identified issues in the availability, completeness and consistency of TSA data, from which suggestions to improve TSA data production, dissemination and publication are drawn.

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Authors' contributions

Paolo Figini: data collection and harmonisation, writing of expert report.

Roberto Patuelli: estimation model, writing of expert report.

Riccardo Curtale: technical coordination, assembly of final report.

Filipe Batista e Silva: conceptualisation, overall coordination, review.

Executive summary

Scope

This study was promoted by the Territorial Development unit of the Joint Research Centre (JRC.B.3) in the context of a collaboration with DG GROW aiming to support the Transition Pathway for Tourism by improving the knowledge base about European tourism. This report proposes a methodology to estimate the direct and indirect economic impact of tourism for a subset of EU countries. Necessary data to produce the estimations are input-output tables (IOT), tourism satellite account (TSA) and employment data. The work was conducted as a pilot exercise for 10 EU Member States (MS), selected based on availability of data, with the possibility of extending to additional MS as forthcoming work. The results of the estimates are presented and discussed herein, along with recommendations for improving TSA reporting and dissemination.

Main findings

The report shows that **it is possible to estimate the direct and indirect impact of tourism starting from TSA data**. This is done through a routine to semi-automatically compute the total economic impact of tourism using available TSA and IOT for an initial set of 10 EU countries (Austria, Czechia, Estonia, Finland, Germany, Italy, Portugal, Romania, Slovenia, Spain). The selected countries have been chosen based on data availability and reliability, and for representing different patterns of tourism according to their geography and economic specialization. The routine is applied to the 2017–2020 period using real TSA data and, when not available, using TSAs estimated according to a procedure herein explained. Advantages of the procedure refer to (i) its consistency, which can be applied to all countries and years with a minimum set of data, and (ii) the use of official data sources (Eurostat, NSOs), without resorting to unofficial sources or to econometric approaches to estimate missing values. Hence, the procedure is especially useful for building annual estimates for those countries when the TSA is not produced every year, and to be reported in reports or dashboards at the EU level by EU institutions.

Limitations

We encountered limitations in the TSA data, mainly because TSAs are not part of the legal framework of Eurostat, and the NSOs compute the TSA on a voluntary basis. Hence, although common methodological guidelines exist, each country faces specific data limitations which are addressed independently, with the consequence that TSAs are not fully comparable. Specifically: (i) Some countries do not disaggregate tourism consumption between tourists and same-day visitors in TSA Table 1 and Table 2[1]. (ii) Some countries do not disaggregate Tables 1, 2 and 4 according to the complete list of products suggested by Eurostat and UNWTO. (iii) Some countries do not compute (or partially compute) Table 4.3 (Other components of tourism consumption), while a few others present some of these values directly computed in Tables 1 and 2. (iv) Some countries do not compute Table 10 or, when they compute it, they do not count same-day visitors, or do not count tourists staying in own houses or visiting friends and relatives. Such caveats have two consequences on this project: (i) They force us to complete TSA tables by making assumptions that, although reasonable, lower the degree of reliability of the procedure. (ii) They limit the international comparability of results.

In terms of usability/comparability, (i) National TSAs are treated as a “black box”, not knowing the specific approaches or definitions that have been applied by the NSO in the data collection and organization. Hence, the international comparability is limited. (ii) The methodology (based on IOT) is useful only in the short term, when the economy is not hit by shocks nor experiences a structural break. Consequently, estimates for 2020 might have a lower degree of reliability because of the pandemic, especially when the impact on employment is computed, due to the implementation of various job protection schemes in many countries. The report also critically assesses why our estimates are different from those of official statistics (when available, in very few cases) and the World Travel and Tourism Council (WTTC) (which also includes induced effects, that we did not consider but that could be included in future extensions of this study).

[1] The complete list of TSA tables is available in the Annex 4.

Lessons learnt and recommendations for TSA production

The inclusion of TSAs in Eurostat's legal framework would be recommended, in order to produce national TSAs on a consistent basis (for example, every two years – estimating the missing years with the procedure presented in this report) and to centrally define the application of common methodological approaches and solutions to data issues. Specifically, we advocate the inclusion of Table 10 for all countries producing the TSA (including both tourists and same-day visitors), the breakdown of Tables 1 and 2 between tourists and same-day visitors consumption, and the production of a complete Table 4.3 related to "Other tourism consumption".

As a second step, we foresee the implementation of a specific page within the Eurostat database (as it is currently done with IOT or arrivals and overnight stays data) where figures for all the countries with available data can be extracted according to own needs, and in a homogeneous format. Given that such solution would require having all issues of data reliability and comparability addressed and solved, a second-best solution might suffice, should NSOs agree to use the same template for publishing TSA data in their homepage. The use of a common template would facilitate and speed up the process of collection and organization of data.

Future research

In future extensions of this project, we would prioritize the inclusion of induced effects in the estimation of the total economic impact, the presentation of results broken down by components of tourism (showing the value-added impact of inbound versus domestic tourism, together with the computation of their respective multipliers), and the extension of the procedure to compute the economic impact of tourism disaggregated by economic industry.

1 Introduction

After the COVID-19 crisis and its huge impact on tourism-related industries, the tourism sector has been identified by the European Commission as one of the 14 strategic industries to build a stronger single market for Europe's recovery. To highlight the relevance of tourism, the transition pathway for tourism has been the first one in a series of foreseen transition pathways for EU industrial ecosystems[2].

Notwithstanding the relevance of the tourism sector in Europe in terms of total consumption, value added and employment, the official statistics to evaluate its economic impact and monitoring its evolution are limited. The availability of good data is essential to formulate better tourism related policies, so that it is important to have a broad picture of its effect on the economy. This includes the direct impact (i.e. consumption and employment related to strictly touristic industries), but also the indirect (upstream) and induced (downstream) effect.

To obtain a common data source to build knowledge on the tourism sector, Eurostat is engaged in collecting and harmonizing data from different EU countries following the tourism satellite account (TSA) format, the internationally recognised methodological framework[3]. TSA data measure the direct impact of tourism on the economy, considering both overnight tourists and excursionists. While measuring the direct economic impact of tourism, TSA data have an untapped potential to evaluate also the indirect and induced effect of tourism on the economy.

This report is the output of a study promoted by the Territorial Development unit of the Joint Research Centre (JRC.B.3) in the context of a collaboration with DG GROW aiming to support the Transition Pathway for Tourism by improving the knowledge base about European tourism. In particular, the report presents a procedure to (i) harmonize and analyse together TSA data from different EU countries, (ii) estimate, through a peer-reviewed methodology, the direct and indirect economic impact of tourism in terms of total consumption, value added and employment.

The report is subdivided into 3 main sections: methodology and data, results, conclusions. Finally, in the Annex 1-2, a particular emphasis is given to the most important caveats and limitations found in the data, and the operational procedures applied to overcome such issues. While the main objective of this report is to explain the details of the methodology and to show the found limitations, additional material is provided to replicate the estimates, and to consult the main results, as shown in the Annex 3.

2 Methodology and data

This section contains a description of data sources and the routine to obtain estimates about the economic impact of tourism. It is subdivided into subsections and is complemented by additional materials, consisting in (i) excel files, (ii) txt files, (iii) code scripts, indicated in the Annex 3. Sections 2.1 and 2.2 illustrate the selected countries for this study, and the data sources, respectively. Section 2.3 provides a step-by-step guide on how the estimations have been conducted and can be replicated. The data limitations, and additional material for documentation and replication of the estimation routine are reported in the Annex 1-3.

2.1 Selected countries

The sample used to conduct the estimations consists of 10 countries: Austria, Czechia, Estonia, Finland, Germany, Italy, Portugal, Romania, Slovenia, Spain. Those countries have been selected having the best available TSA among the EU member states, meaning that: (i) TSA data are available, at least for one year, in data format (at least the tables including tourism consumption and number of visitors: Tables 1, 2, 4 and 10, which are the most relevant for this project) and not simply in PDF reports; (ii) the classification used in the TSA to present

[2] https://single-market-economy.ec.europa.eu/news/transition-pathway-tourism-published-today-2022-02-04_en

[3] 2008 Tourism Satellite Account: Recommended Methodological Framework (TSA:RMF 2008); United Nations Statistics Division (UNSD), Statistical Office of the European Communities (Eurostat), Organisation for Economic Cooperation and Development (OECD) and World Tourism Organisation (UNWTO).

products/sectors closely resembles (although not completely for some countries) the structure recommended by Eurostat and UNWTO in their TSA methodological guidelines.

2.2 Data

Three groups of data have been used: Input-output tables (IOT), employment, tourism satellite accounts (TSA), discussed below.

2.2.1 Input-output tables (IOT)

IOT data are available and freely downloadable from the Eurostat database[4]. The presence of the IOT in the Eurostat database means that data are already organized according to the same template (64 products/sectors), which speeds up the subsequent process of data organization. However, it is remarkable that a few countries prepare the Industry-by-Industry (named naio_10_cp1750 series in the Eurostat database) rather than the Product-by-Product tables (named naio_10_cp1700 series). While the practical consequences are negligible, the structure of the two files is slightly different, implying a manual intervention to fix and adapt the procedure that needs to be applied. The IOT for 2015 (or for the closest year) for each country has been downloaded from the Eurostat database. Since the IOT table is needed to calculate the technical coefficients of production, which are assumed not to change in the short-term, only the most recent IOT per country (generally available for 2015) has been used.

2.2.2 Employment

Disaggregated data by economic activity for the same year of the IOT have been collected for each of the ten countries from the ILO database. Among the several series available in the ILO database, we have considered the number of full-time equivalent (FTE) jobs, including all workers (both employees and self-employed), likely the most relevant series for the tourism sector, which is characterized by a high share of fixed-term jobs and family businesses. The figures are already disaggregated according to the IOT structure with 64 sectors and have been added to each IOT file in the sheet "Employment" [5].

2.2.3 Tourism satellite account (TSA)

TSA data have been collected from relevant information available in Eurostat, the NSOs databases, or directly communicated by NSO officers. For each combination of country/year with TSA data availability, a specific spreadsheet (in .xlsx format) has been compiled starting from a common template. While the collection of IOT and employment data was smooth, the most problems arouse with TSA, which has issues involving both the format and the content. Assumptions and data-imputation methods have been used to obtain complete TSA data, which are described, with relative limitations, in the Annex 1-2.

2.2.4 Data files

The files produced as described in section 2.2, used to feed the routine explained in section 2.3 are described in the Annex 3: there are 10 IOT files (one for each country, including employment data) and 16 TSA files (according to the availability of real TSA tables, as shown above, also including two "technical sheets" which are needed for Section 2.3.1.1. and that are described below. The files are named XX_YYYY_ZZZ.xlsx where XX is the country code, YYYY is the year, and ZZZ is either IOT or TSA.

2.3 Estimation method

In this section we show the procedure to estimate the economic impact of tourism by combining information from IOT, employment and TSA data. In section 2.3.1 we describe how to obtain yearly updates for tourism consumption, value added and employment. In section 2.3.2 we explain the calculation method to measure multipliers of type I and multiplying effect, two of the main indicators that can be constructed on top of the mentioned estimates.

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[4] https://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/data/database.

[5] Data can be downloaded from: https://ilostat.ilo.org/data/

2.3.1 Generation of yearly updates of socio-economic impacts of tourism

TSA are very rarely computed every year and, in the reference period we considered (2017-2020), we either had one or two TSA for each country. We explain in section 2.3.1.1. how to estimate economic impacts when TSA available, while in 2.3.1.2. We propose a method to include estimates for years with missing data.

2.3.1.1 Estimation for years with available TSA data

A semi-automatic procedure has been developed through R coding. The R script automatizes the method proposed by Figini & Patuelli (2022). Before running the routine, the IOT and TSA files have been modified in the following way:

1. In the IOT file, a sheet named "IOforR" has been generated starting from the "Total" sheet of IOT;
2. In the TSA file, two sheets named "expenditure" and "expenditure + shopping" have been generated by merging data coming from Tables 1, 2 and 4 with the IOT structure.

The sheets listed above have been generated using the same template and are needed to clear the data from any formatting and extra information. In fact, the above sheets can be exported in a simple .txt format, which is done in the next step.

The routine starts from here and combines the IOT table with the TSA of the same country to produce the following estimates:

- Tourism consumption:
    - inbound tourists (direct effect only; total effect)
    - domestic tourists (direct effect only; total effect)
    - total tourism (direct effect only; total effect)
- Value added:
    - inbound tourists (direct effect only; total effect)
    - domestic tourists (direct effect only; total effect)
    - total tourism (direct effect only; total effect)
- Employment:
    - inbound tourists (direct effect only; total effect)
    - domestic tourists (direct effect only; total effect)
    - total tourism (direct effect only; total effect)

The direct effects are also already available in the official TSA, so our estimation of these figures serve for three reasons: (i) They are needed to compute total effects, (ii) To guarantee internal consistency in our estimation procedure, (iii) to double check if our procedure is consistent with the TSA computations of each country.

For a preliminary check, the procedure was estimating the values in two different ways: the first one was excluding general shopping (with the purpose of then adding up pro-quota the value of shopping to the final estimated figure), while the second one was considering products connected and non-connected to tourism as all accruing to the retail trade sector. This second option has been chosen because it is methodologically sounder. However, the routine also includes the first option for completeness, and for facilitating future refinements and modifications.

The only exception to this procedure is Czechia, for which the cells corresponding to the "Retail trade services" sector in the IOT are empty. Hence, the procedure heavily underestimates the economic impact of tourism because of these missing data, and we manually corrected the procedure by multiplying the estimated figure with the ratio of "generic shopping" out of other consumption expenditure.

The code is attached to this report in the Annex 1, and is composed of ten files (one for each country) named "XX_code.R" where XX is the code of the country.

2.3.1.2 Estimation for years in which TSA data are not available

This task aims at identifying a robust procedure for estimating TSA for missing years. To complete this task, we assumed that:

- The production structure of the economy does not change from year to year. This is the typical assumption entailing the economic concept of "short-term". Coherently, the IOT, which provides a picture of the production links between sectors, is the typical tool used to describe the functioning of the economy in the short-term. It is computed by NSOs only every five years and it is theoretically and methodologically sound to use the IOT of adjacent years to compute the technical coefficients of production (which are assumed not to change from year to year) of the relevant year. However, it is important to highlight that when the economy is hit by an important shock, the production structure can abruptly change, and hence a new IOT should be computed. This is exactly what happened in 2020 when considering the economic disruption generated by the pandemic. Hence, an extra flag of caution should be raised when presenting the estimates for 2020, which might be less reliable compared to other years, exactly because the available IOT might not fit anymore the production structure. This is especially important for employment, given the job protection schemes introduced or implemented by governments, and the asymmetric elasticity of labour market when responding to increases/decreases of demand. In other words, it is likely that our procedure overestimates the fall in employment due to the pandemic crisis.
- The expenditure structure of each category of tourism does not change over time, so that total tourism consumption changes only because of inflation and the change in the number of visitors, and not because tourists modify the composition of their consumption pattern. Again, this is a reasonable assumption to consider in the short run when relative prices and preferences are stable. This assumption, as explained above, might not hold in 2020.

Based on these two assumptions, a new file for each year in which the country did not produce the TSA has been generated according to the following steps:

1. Take the official number of inbound and domestic arrivals and overnights in OAE from Eurostat dataset. These numbers are reported in cells A11-J16 of Table 10 of the newly generated file XX_YYY_TSA.xlsx.
2. Compute the ratio between those values and the corresponding values for the year before (which are copied from the file of the adjacent year, in A31-J36 of Table 10). The ratios are reported in cells B18-F19 of Table 10.
3. Multiply the overall numbers (which also include accommodation on own account or visiting friends and relatives) of the adjacent year (which are copied from the file of the adjacent year, in cells A21-J26 of Table 10) by the ratio computed in B18-F19. The resulting numbers are written in cells A1-J6 of Table 10 and represent the "estimated Table 10" for the newly generated TSA.
4. Table 1, 2 and 4.3 are built by multiplying the corresponding values of each cell of the adjacent year by:
   - the rate of increase in overnight stays reported in cell B19 of Table 10 (when considering Table 1.1) and reported in cell E19 of Table 10 (when considering Table 2.1). Overnights have been chosen rather than arrivals because they are more proportional to expenditure, as they already take into account possible variations in the length of stay.
     - or by the rate of increase in same-day visitors reported in cell C18 of Table 10 (when considering Table 1.2) and reported in cell F18 of Table 10 (when considering Table 2.2). If the rate of increase of same-day visitors cannot be computed, it is assumed that same-day visits increase by the rate of arrivals of tourists, reported respectively in cell B18 and E18.
     - or by the rate of the overall increase in overnight stay reported in cell F9 of Table 10 (when considering "Other tourism consumption" reported in Table 4.3).
   - the rate of inflation (reported in cell I18 of Table 10). The harmonized consumer price index, computed by Eurostat and retrieved from the Eurostat database, has been used.
5. For most of the countries, same-day visits are not available, or not consistent. In these cases

- When there is a figure for the previous year, the ratio of arrivals (B18 for inbound visitors, E18 for domestic visitors) has been used to generate values in cells C5 and F5 respectively. Arrivals rather than overnights have been used in this specific case due to the nature of same-day visits, which are "arrivals not associated with overnights".
- When there are no data about the previous year, the value stays missing.

The procedure has a good degree of reliability. In fact, to test its ability to replicate real data, the estimation has been used to check three combinations of country-year for which real data were available (Finland 2018, estimated using data from Finland 2017; Italy 2019, estimated using data from Italy 2017; Spain 2018, estimated using data from Spain 2016). In all cases the difference in the estimated value of total tourism consumption was below 2% of the real value, a discrepancy that can be considered statistically acceptable.

The same caveats described for real TSA in section 2.2.3 apply also to the estimated TSA, for each country. We refer to the Annex 1-2 for a full description.

The files produced under Section 2.3.1.2. are referenced in the Annex 3. In total, 43 combinations of country-year TSA have been considered (16 real and 27 estimated), as reported in Table 1, separating the cases of "real TSA" from the cases of "estimated TSA". Files are named "XX_YYYY_TSA.xlsx" where XX is the code of the country and YYYY is the year.

Table 1. List of TSAs used in the project

Country	2014	2015	2016	2017	2018	2019	2020
Austria				Estimated	Real	Real	Estimated
Czechia				Real	Estimated	Real	Estimated
Estonia				Real	Estimated	Estimated	Estimated
Finland				Real	Real	Estimated	Estimated
Germany		Real		Estimated	Estimated	Estimated	Estimated
Italy				Real	Estimated	Real	Estimated
Portugal				Real	Real	Estimated	Estimated
Romania	Real			Estimated	Estimated	Estimated	Estimated
Slovenia				Real	Estimated	Estimated	Estimated
Spain			Real	Estimated	Real	Estimated	Estimated

Source: Own elaboration based on TSA data availability from countries

2.3.2 Type I multiplier I and multiplying effect

For each combination of country/year, provided in the file Summary.xlsx, it is possible to compute:

- The multiplier of type I, as the ratio between the total VA generated by tourism and the direct VA. This value is reported in the sheet "Multipliers", under columns C-F (columns D-F are not reported yet, but the values can be computed by extracting information from the single files' results).
- The multiplying effect, as the ratio between the total VA generated by tourism and the initial value of tourism consumption. This value is reported in the sheet "Multipliers", under columns G-J (columns H-J are not reported yet, but the values can be computed by extracting information from the single files' results).

3 Results

The results obtained applying the procedure presented in section 2.3 are reported in the supplementary material described in the Annex 3 (file Summary.xlsx, sheet "Results", column C-N). In this section we provide the guidelines on how to consult the file. We present an overview of the results in subsection 3.1, and some considerations for the interpretation of the results in subsection 3.2.

Guidelines to consult the file Summary.xlsx, sheet "Results" are listed below:

- Each line represents a TSA. The green lines indicate that the procedure has been run on the "real TSA" (obtained as explained in section 2.3.1.1.). The yellow lines indicate that the procedure has been run on the "estimated TSA" (obtained as explained in section 2.3.1.2.).
- For sake of simplicity, only aggregated values (direct and total estimations of Tourism consumption, Tourism Value Added, and Tourism Employment) are included in the file. The procedure also computes, for each of the above categories, the disaggregated values (inbound tourism, inbound same-day visits, domestic tourism, domestic same-day visits, other tourism consumption), which are available in the corresponding files of results, named XX_YYYY_results.txt where XX is the country code and YYYY the year. 43 such files are referenced in Annex 3.
- In the second part of the file, Columns O-X, the real values computed by the NSO in the TSA or in associated documents have been reported. This way, it is possible to check how our estimates differ from the original ones.
- To better assess the reliability of results, in the third part of the file, Columns Y-AH, the values estimated by the WTTC in their "Economic Impact Reports" have been added.

3.1 Overview of the results

In this section we provide an overview of the results obtained by means of the input data and procedures described in the previous sections. The results should be interpreted as indicative, and not as precise estimations due to the caveats expressed in Section 2.

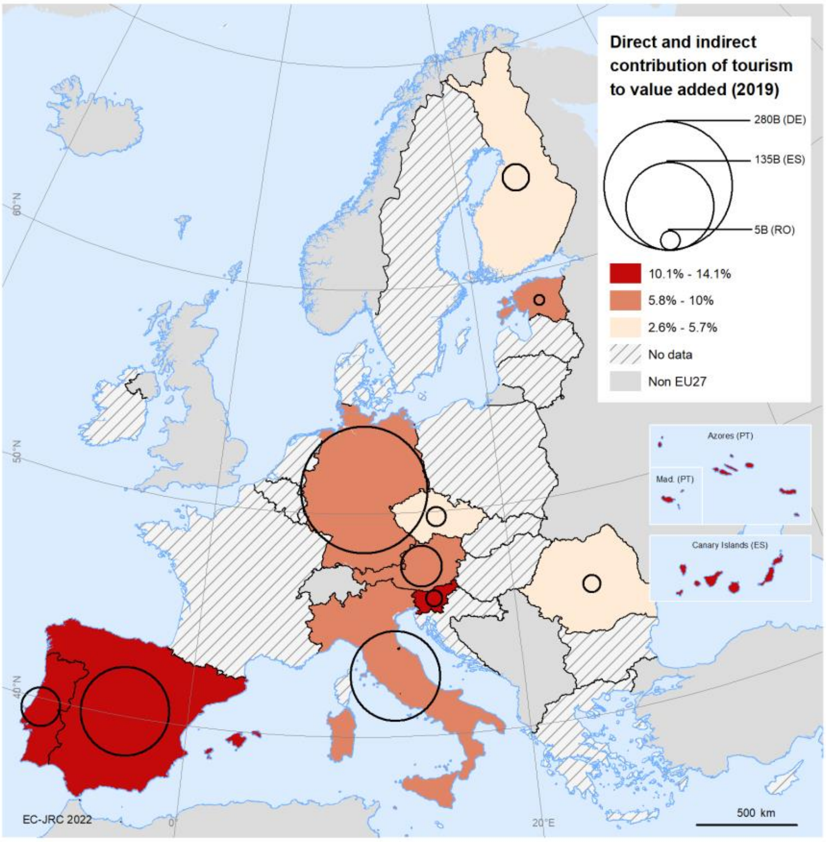
Results by country are presented in Table 2, in absolute and relative terms, for the 10 countries included in this study. From this set of countries, Portugal and Spain are estimated to be countries with the highest share of tourism total consumption, value added and employment. Conversely, tourism is estimated to have the smallest economic contribution in Czechia and Romania.

Table 2. Results of direct and indirect impact in 2019 of total consumption, value added (VA) and employment (in full-time equivalent - FTE).

Country	**Total consumption**		**Value added**		**Employment**	
	Absolute value	**% of country GDP (2018)**	**Absolute value**	**% of country VA**	**Absolute value**	**% of country FTE**
Austria	61,798	8.3%	29,088	8.2%	445,689	9.8%
Czechia	22,467	4.6%	6,592	3.2%	173,841	3.2%
Estonia	4,947	8.9%	1,907	7.9%	82,274	12.5%
Finland	30,380	6.6%	11,861	5.7%	194,857	7.3%
Germany	633,114	9.9%	281,068	9.0%	5,798,047	12.8%
Italy	289,697	8.3%	139,394	8.7%	2,177,129	8.5%
Portugal	56,757	14.9%	26,083	14.1%	827,451	16.7%
Romania	13,159	3.5%	5,153	2.6%	370,600	4.3%
Slovenia	9,724	9.7%	4,345	10.3%	172,692	16.5%
Spain	260,302	11.9%	136,932	12.1%	2,576,157	12.7%

To show geographical patterns, the map in Figure 1 presents the value added from tourism (direct and indirect) as absolute value and relative to total GVA in 2019 for the countries included in this study.

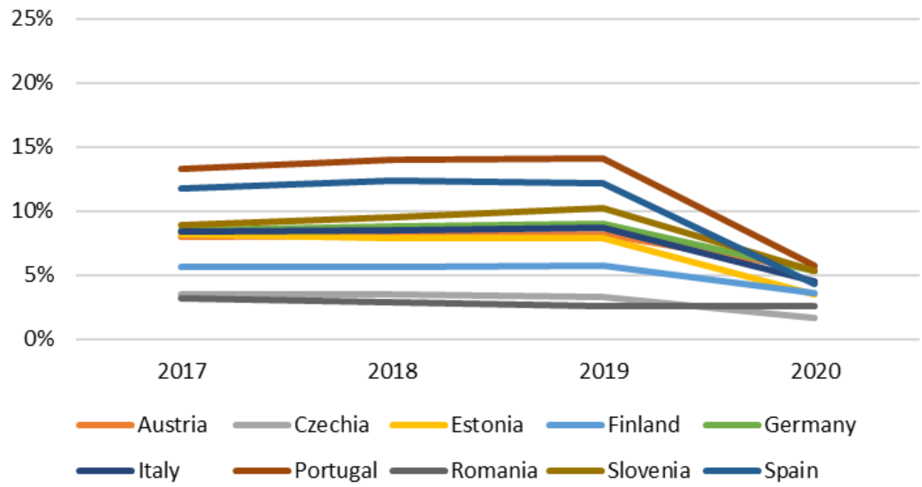
Figure 1. Direct and indirect contribution of tourism to value added (2019).



Source: Own elaboration, based on herein estimates.

A chart with the trend of shares of value added in the analysed period is presented in Figure 2, showing very diverse contributions of tourism to GVA across countries, but rather steady in the period 2017-2019. In 2020, however, due to the COVID-19 pandemic (Curtale et al. 2022), the contribution of tourism to GVA dropped substantially scoring less than 6% for all analysed countries.

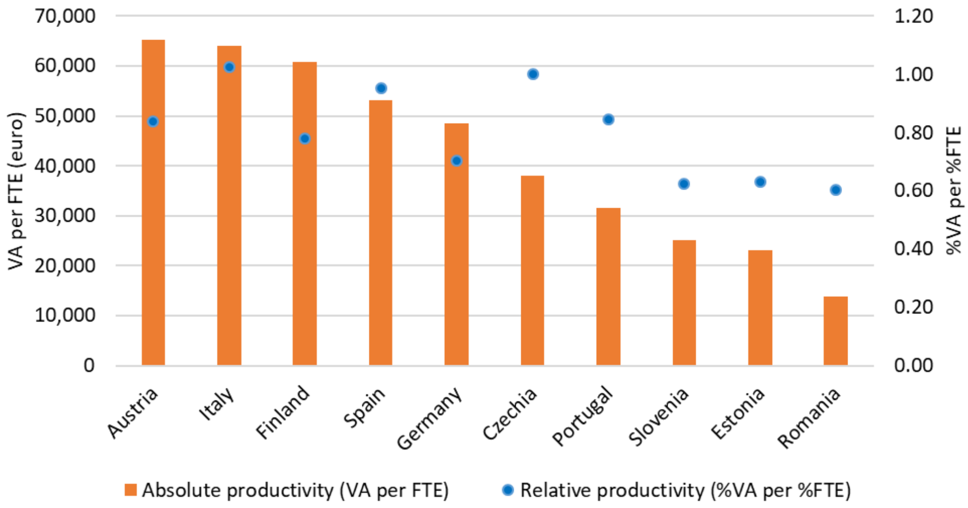
Figure 2. Trend of share of value added (direct and indirect)



Source: Own elaboration, based on herein estimates.

The estimation of value added and employment allows the calculation of the productivity in the tourism sector. We calculated absolute productivity (value added per full-time equivalent) and relative productivity (% of country VA per % of country FTE), results are shown in Figure 3. Absolute productivity is measured in euro and is useful for a country comparison. Relative productivity is an indicator which assumes values higher (lower) than 1 when productivity in tourism is higher (lower) compared to the average of other sectors in the same country. According to the estimates, the tourism sector in Austria, Italy and Finland is the most productive in absolute terms. In Italy, Czechia and Spain the productivity in the tourism sector is in line with the average of other sectors. Romania, Estonia and Slovenia present the lowest productivity both in absolute and relative terms.

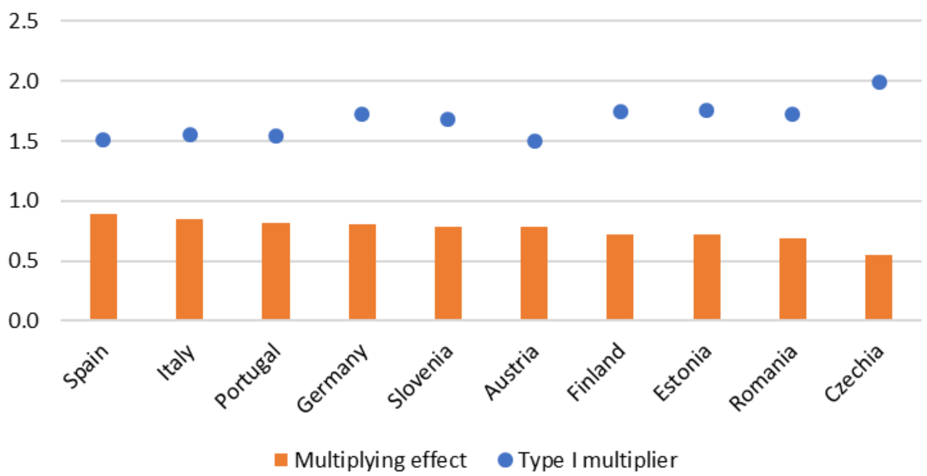
Figure 3. Productivity of the tourism sector, in absolute and relative terms, sorted by decreasing absolute productivity.



Source: Own elaboration, based on herein estimates.

The type I multiplier and the multiplying effect by country are presented in Figure 3 sorted by decreasing multiplying effect.

Figure 4. Type I multiplier and multiplying effect, sorted by decreasing multiplying effect



Source: Own elaboration, based on herein estimates.

Overall, the results show that the proposed methodology allows to capture heterogeneity across countries and the effect of the pandemic shock. A comparison of the results with other data sources on TSA data is presented in Section 3.2.

3.2 Validity of the results in comparison with other data sources on TSA

A sheet named "Comparisons" has been added in the Summary.xlsx file, showing, in percentage terms, the difference between our estimates and the official estimates (in Columns C, E, G, I, K, M for respectively direct tourism consumption, total tourism consumption, direct value added, total value added, direct employment, total employment), and between our estimates and the WTTC estimates (in Columns D, F, H, J, L, N for respectively direct tourism consumption, total tourism consumption, direct value added, total value added, direct employment, total employment). The main results from the systematic comparisons follow:

- Compared to available official estimates of TSAs, our estimates of direct tourism consumption are very precise, showing that the procedure starts from the correct figures (see Column C).
- Moving to direct value added (Column G), the gap of our estimates from the official ones is less than 10% in a few cases (Estonia, Romania) and around 10–15% in Austria, Italy, Portugal. The other countries show higher gaps (Finland, Spain, around 20%, and Czechia, Germany, and Slovenia, around 25–30%).
- Differences are stable for each country, showing that the discrepancies are likely due to different estimation procedures used by the NSOs compared to ours, and are not stemming from idiosyncratic issues in the TSA files. When we consider differences with total value added (Column I), they are very low in Austria, still less than 10% in Estonia, and high in Germany (27%). However, the sign of the gaps between the two sets of estimates are split between positive and negative, suggesting that our procedure does not have a clear unidirectional bias (over- or under-estimation).
- Our routine has the advantage of being consistent across countries and, to the best of our knowledge, technically correct. On the other hand, NSOs know better than us specific issues related to their own countries, and they might have put in place specific (ad hoc) solutions that are unknown to us. Hence, an investigation ought to be carried out with NSOs to improve the consistency of procedures at the EU level.
- When moving to the comparison with WTTC estimates, a few words are needed. One, the WTTC uses a mix of IOT, TSA and macroeconometric estimates to compute the economic impact of tourism. Although the methodology is not fully explained, the WTTC procedure should be highly consistent with ours. Two, since the WTTC computes the impact also for countries that do not produce TSAs, they use a mix of data, "correcting" TSA data with figures coming from other sources (STR, WorldBank, IMF, etc.). Hence, their procedure is not born to be fully consistent with TSAs. This is clearly visible in Column D, as WTTC estimates of tourism consumption are noticeably different from ours and from official ones. Three, WTTC's estimation of total economic impacts includes direct, indirect and induced effects, while the latter effect is not included in our procedure. Because of this last issue, WTTC estimates are structurally higher than ours.
- Having said that, Column J shows that our total value-added estimates are between 20% (Slovenia 2019) and 65% (Romania 2019 and 2020) lower than WTTC estimates. It is not possible to understand how much of this difference is due to the induced effect, and how much is due to the procedure. One part of this latter aspect is the fact that WTTC publishes effects in terms of GDP, which tends to be about 10–15% higher than value added.
- Finally, estimates of employment effects must be handled with special care, as the impact is computed linearly with tourism output, while some nonlinear effects (e.g. due to the exogenous shock stemming from the pandemic crisis) might be at play here. In this respect, WTTC admits in the methodological report to correct (via econometric estimation) the impact that job protection schemes had on employment. We did not implement such as correction. Additionally, while we compute FTE employment effects, WTTC (and probably several NSOs) appear to compute nominal employment effects, which obviously lead to greater values.

4 Conclusions

In this report we described a methodology to estimate the direct and indirect economic impact of tourism on total consumption, value added, and employment, based on IOT, employment and TSA data of 10 EU countries (Austria, Czechia, Estonia, Finland, Germany, Italy, Portugal, Romania, Slovenia, Spain). We present a step-by step procedure to input missing data and obtain estimates for the 2017-2020 period. Additional material is provided to replicate the routine to other countries and years.

The main take-away from the results is that, from available TSA data, through the proposed methodology it is possible to impute TSA data for missing year and obtain estimates that (i) reflect heterogeneous economic impact of the tourism sector across EU, and (ii) are sensitive to the COVID-19 shock. Due to the data limitations herein described in detail, the results should be interpreted with caution.

A more detailed and wider analysis can be provided in the future by improving the quality of the data, that could be obtained, for instance, (i) by including the provision of TSA data in a legal framework requiring countries to compile a template every 2 years (estimating the missing years with the procedure presented in this report) and (ii) by defining centrally the application of common methodological approaches and solutions to data issues. Specifically, it would be of utmost importance the inclusion of Table 10 for all countries producing the TSA (including both tourists and same-day visitors), the breakdown of Tables 1 and 2 between tourists and same-day visitors consumption, and the production of a complete Table 4.3 related to “Other tourism consumption”. The data could be published on a specific page within the Eurostat database (as it is currently done with IOT or arrivals and overnight stays data), or alternatively on NSOs websites, using a common template and format, that would facilitate and speed up the process of collection and organization of data.

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List of abbreviations and definitions

EU	European Union
FTE	Full-time Equivalent
GVA	Gross Value Added
IMF	International Monetary Fund
IOT	Input-Output Table
OAE	Official Accommodation Establishments
NSO	National Statistics Office
STR	Smith Travel Research
TSA	Tourism Satellite Account
WTTC	World Travel and Tourism Council

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Annexes

Annex 1. TSA issues

Format issues

Given that the TSA is not in the legal framework of Eurostat, NSOs can decide to organize and publish TSA data in the format they prefer. The issue had been already highlighted by Figini (2019). In some cases, data are well organized in Excel files (e.g., Italy, Portugal), whereas in others (e.g., Estonia, Spain) they can be easily extracted and downloaded from a specific webpage within the NSO dataset. In both cases, however, the data are not organized in a homogeneous format, which delays and complicates the subsequent analysis by part of independent researchers willing to carry out comparison analyses.

Content issues

As regards the content, there are several different problems involving both missing data and issues of not comparability. We highlight that:

- Some countries do not present the **disaggregation of consumption between tourists and same-day visitors**, that should be reported in Table 1.1 and 1.2 (inbound visitors) and Table 2.1 and 2.2 (domestic visitors). The availability of such disaggregation is not strategic to this project, in the sense that the main estimates of value added and employment can still be computed; however, this breakdown would allow the computation of the (arguably different) marginal impacts of additional tourists vs. additional same-day visitors, something that might have relevant policy implications. Countries without the breakdown of consumption between tourists and same-day visitors are: Czechia, Estonia, Spain.
- The following countries do not present data for all the **relevant products of the TSA**: Austria, Germany (the products "cultural services" and "recreation and other entertainment services" are clustered together); Slovenia (rail, road, water and air transport are clustered together, as accommodation in commercial establishment and use of holiday homes on own account or for free are clustered together). In all these cases we were forced to use specific assumptions to breakdown the clustered value into its components. Arguably, the most neutral assumption is that tourists' consumption breaks down pro-quota in the different products based on the value of the total output of the different sectors.
- Most of the countries, in addition, do not report the complete **disaggregation between "country specific tourism goods and services", "tourism connected products", "non-tourism related consumption products" and "valuables"**. Moreover, how these figures are reported varies a lot across countries. In general, this is not a big problem, as all this consumption is somehow related to generic shopping that tourists undertake while at destination, either to buy tourism related goods (e.g., a swimsuit in a clothing shop), normal products (e.g., a can of beer in the mini-market or band-aid in the pharmacy), or specific products (e.g., a necklace in a jewellery). Hence, it can be assumed that all this expenditure accrues to the retail trade sector, which is a specifically coded sector in the IOT. We used the same assumption also for treating consumption related to "country specific goods and services" for those countries that measure this category (Estonia, Portugal, Romania) given the marginal importance of this type of products in the TSA.
- **Table 4.3** (Other components of tourism consumption) represents another problem for both the reliability of data and the comparability between countries. This table identifies a few components that must be included in the overall economic impact of tourism but are not directly linked to tourists' spending. These are mainly:
    - the value of services provided by holiday homes on own account or for free
    - the contribution of business domestic tourism, which should not be reported in Table 2 to avoid double accounting
    - the value of in-kind services provided by the public administration (e.g., a free concert offered by the municipality, or free entrance to a museum).

  Some countries do not compute Table 4.3 (Czechia) or its computation is clearly missing important products (Austria, Germany, Romania, Slovenia). In all these cases, the relevant values of Table 4.3 could be missing either because they are already imputed in the value of inbound and domestic expenditure, or because they are not recorded at all. Of course, the implications are different: in the former case, the overall impact of tourism could still be comparable across countries, but the comparability of the impact of its components (built differently across countries) would be disrupted. In the latter case, the single components would be comparable but not the total impact, since a relevant component of the TSA would be missing. This issue should be highlighted when results are presented.

– A specific point must be raised for **Table 10**, which is central to the computation of the economic impact of tourism. In principle, the figures reported in TSA Tables 1 and 2 should be estimated by multiplying the surveyed spending values coming from a representative sample of visitors, times the estimated number of each type of visitor, reported in Table 10. In practice, NSOs can use different estimation procedures to compute Tables 1 and 2 without recurring to the numbers of Table 10, but it is however surprising that most countries do not compile the number of arrivals and overnights that should appear in Table 10. Countries in such condition are Austria, Estonia, Finland, Germany, Portugal. Apart from the methodological puzzle, raising curiosity about the operational procedure used to estimate values of Tables 1 and 2, this also complicates the analysis. In fact, it is not possible to simply refer to the official statistics of arrivals and overnight stays in Official Accommodation Establishments (OAE), easily available in the Eurostat database, for two main reasons:

  - OAE does not consider same-day visitors, which are a fundamental component of the TSA.
  - OAE does not consider visitors staying in non-commercial dwellings (own houses or hosted by friends and relatives), another very important component of the TSA.

  It seems, however, that OAE figures are reported in Table 10 by a few countries, which is not theoretically correct for the above-mentioned reasons. Countries in such condition are Finland (inbound only), Germany, Portugal, Slovenia. As stressed above, the lack (or the unreliability) of figures in Table 10 is not invalidating the procedure, as the values reported in Tables 1, 2 and 4 would suffice for the computation of indirect and total economic impacts. However, we raise three flags:

  - The first one is an issue of comparability between countries. As some countries do not measure same-day visitors and/or people not staying in commercial establishments, we cannot be sure that different TSAs are computed over the same basis, which invalidates the comparability.
  - The second flag is related to a policy implication: the availability of complete and coherent figures in Table 10 would allow to compute the marginal economic impacts of different types of visitors, also allowing their comparability between countries.
  - The last flag is related to the fact that some figures in Table 10 have been collected through direct communication with NSOs. However, we must mention that some of the data reported in these communications are either incoherent with official Eurostat statistics, or being suspiciously closed to the ones of OAE, or incoherent with data reported in other sections of the NSO website.

  The joint combination of issues listed above leads to a rather heterogeneous framework, where each country has some specificity in how the TSA is computed and data are collected, raising serious concerns of reliability and comparability of findings across countries. For sake of clarity, we have then decided to complement the data of Table 10 (which are reported, when available, as Table 10a, in rows 1-10 of Table 10, in each TSA file) with official statistics of arrivals and overnight stays in OAE, available in the Eurostat database: https://ec.europa.eu/eurostat/databrowser/view/TOUR_OCC_ARNAT/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/TOUR_OCC_NINAT/default/table?lang=en (they are reported as Table 10b, in rows 11-20 of Table 10, in each TSA file) to have a broader set of data from which to start the procedure

  Finally, the way in which same-day visitors are computed (when computed) raises another concern. Take two similar countries like Spain and Italy, for example: the number of domestic same-day visitors reported in Spain (around 240 million) is about four times the number for Italy (around 60 million). Of course, the measurement of same-day visits is a tricky issue and there is no agreement among NSOs on how to measure it. However, we want to raise a flag on the fact that the total economic impacts could be significantly affected by how same-day visits are measured and computed.

Annex 2. TSA - Specific country limitations

- **Austria** (TSA available for years 2018, 2019): As Table 10 is not provided in the official TSA, we have used arrivals and overnights in OAE only, collected from Eurostat. Hence, if marginal values are computed, these are likely to overestimate the economic impact of each visitor, since they are computed on a smaller basis. Eurostat also provides an estimate for the number of domestic same-day visitors; hence the only missing value in the Table 10 of Austria is the number of inbound same-day visitors. Sport and culture consumption is jointly measured in Tables 1, 2 and 4. It has been disaggregated assuming that the distribution of visitors' consumption follows pro-quota the value of total output for each sector, as recalled in Section 1.2.b above.
- **Czechia** (2017, 2019): Table 10 is provided with all the relevant figures. However, we notice that the estimated number of same-day visits is 1.26 times the value for the same aggregate that is available into the Eurostat database. We must also highlight that consumption in Table 1 and 2 is not disaggregated between tourists and same-day visitors and that in-kind transfers to the tourism sector is not included in the Czech TSA. All other components of tourism consumption that should appear in Table 4.3 (domestic business trips, imputed rent) are instead already included in Tables 1 and 2. Hence, it is likely that the impact of inbound and domestic tourism is overestimated compared to other countries, while the total impact is slightly underestimated.
- **Estonia** (2017): Table 10 is not included, although direct communication with the NSO allowed us to obtain the number of arrivals and overnight stays for domestic tourists. As regards inbound visitors, they have been considered equal to the numbers of OAE, so they are likely to be underestimated. Moreover, same-day visits are not available. Given that consumption in Table 1 and 2 is not disaggregated by tourists and same-day visitors, when computing the marginal impact of visitors (which can be done only for tourists) this figure is likely to be overestimated (as the denominator is lower), especially for inbound tourists.
- **Finland** (2017, 2018): Table 10 is not included, although direct communication with the NSO allowed us to have the number of arrivals and overnight stays for domestic tourists. As regards inbound numbers, they have been considered equal to the numbers of OAE, so they are likely to be underestimated. Moreover, same-day visits are available in Eurostat only for some years, hence the value for 2017 (cell F5 of Table 10) is estimated by using the proportion between tourists and same-day visitors of 2018, for which we real data are available in Eurostat.
- **Germany** (2015): The numbers of Table 10 are not computed by the NSO; hence, they have been considered equal to the number of arrivals and overnight stays in OAE, for both inbound and domestic tourism. The number of same-day visitors is not computed. For both reasons, when computing the marginal impact of visitors (which can be done only for tourists) this figure is likely to be overestimated (as the denominator is lower), missing the same-day visitors and those who stay in private accommodation. Sport and culture consumption is jointly measured in Tables 1, 2 and 4. It has been disaggregated assuming that the distribution of visitors' consumption follows pro-quota the value of total output for each sector, as recalled in Section 1.2.b above.
- **Italy** (2017, 2019): No issues to be reported.
- **Portugal** (2017, 2018): Data in the TSA are expressed in thousands of EUR (not millions). Table 10 is not computed and available data from other sources (Eurostat, NSO, direct communication) are somehow contradictory. For this project, official arrivals, and overnight stays in OAE have been considered, as they seem to be the most reliable. Moreover, same-day visitors are not available. For both reasons, when computing the marginal impact of visitors (which can be done only for tourists) this figure is likely to be overestimated (as the denominator is lower), missing the same-day visitors and those who stay in private accommodation.
- **Romania** (2014): No issues to be reported.
- **Slovenia** (2017): Tables 1, 2 and 4 do not show the typical distinction between expenditure in OAE (product 1.a) and value of the services provided on own account or for free (product 1.b). Similarly, transport is not disaggregated between its four components (rail, road, water, air). Hence, they have been disaggregated assuming that the distribution of visitors' consumption follows pro-quota the value of total output for each of the four sectors, as recalled in Section 1.2.b above. As regards Table 10, the

reported number of arrivals and overnights are suspiciously close to the numbers for OAE, so it is likely that they underestimate the real numbers. Finally, as the number of same-day visits is not computed every year, we estimated the number of same-day visitors starting from the closest year for which this figure is available from Eurostat database (2018), keeping the same proportion with arrivals.

- **Spain** (2016, 2018): Consumption reported in Table 1 and 2 is not disaggregated between tourists and same-day visitors. Hence, only inbound, and domestic marginal impacts could be computed.

To facilitate the reading and evaluation of data issues, Table 3 below summarizes, country by country, the presence of data problems, the solutions that have been implemented, and the consequences in terms of interpretation and comparability of results. Unfortunately, there are no two countries with the same exact TSA structure and, hence, international comparability is affected by this to some degree

Table 3. Summary of data issues

Country	Disaggregation of consumption between tourists and same-day visitors in Tables 1 and 2	Full disaggregation of products in Tables 1, 2 and 4	Country-specific and connected products in Tables 1, 2 and 4	Presence of Table 4.3	Table 10 includes total numbers (not only OAE numbers)	Table 10 includes both tourists and same-day visitors
Austria	OK	Cultural and recreational services are clustered together Solution: tourists' consumption for the two products is estimated pro-quota based on the value of their total output Consequence: This estimate is not fully comparable with the other countries	Country-specific products are not available Solution: Only connected products are considered as generic shopping and linked to the retail trade in the IOT Consequence: none	Incomplete, as only the value for tourism connected product is estimated Solution: none Consequence: the impact of inbound and domestic tourism is likely to be overestimated compared to other countries, while the total impact might be slightly underestimated	Table 10 not included Solution: arrivals and overnights in OAE only, collected from Eurostat, have been used Consequence: marginal values are likely to overestimate the economic impact of each visitor, since they are computed on a smaller basis	Same-day visitors are not included Solution: number of domestic same-day visitors are collected from Eurostat Consequence: these values are not fully comparable with the other countries; inbound domestic same-day visitors are missing
Czechia	No disaggregation Solution: none Consequence: the comparison between the (arguably different) marginal impacts of additional tourists vs. additional same-day	OK	Country-specific products are already integrated in connected products, including all goods/services which are significant for visitors (food products, beverages, tobacco products, clothes, petrol, medicaments,	Not computed: domestic business tourism and imputed rents are already included in Tables 1 and 2. Moreover, the value of in-kind transfers is not estimated	OK	The value of same-day visitors is different from the one available in the Eurostat database. Solution: we keep the TSA value

	visitors cannot be implemented		electronics, telecommunications etc.) Solution: Only connected products are considered as generic shopping and linked to the retail trade in the IOT Consequence: none	Solution: none Consequence: the impact of inbound and domestic tourism is likely to be overestimated compared to other countries, while the total impact is likely to be underestimated		Consequence: none, although this figure might be unreliable
Estonia	No disaggregation Solution: none Consequence: the comparison between the (arguably different) marginal impacts of additional tourists vs. additional same-day visitors cannot be implemented	OK	OK	OK	Table 10 not included Solution: data on domestic tourism, directly provided by the NSO, are used; data on inbound tourism are assumed equal to OAE Consequence: marginal values of inbound tourism are likely to overestimate their economic impact, since they are computed on a smaller basis	Same day visitors are not included Solution: none Consequence: when computing the marginal impact of visitors (which can be done only for tourists) this figure is likely to be overestimated (as the denominator is lower), missing the same-day visitors
Finland	OK	OK	Country-specific products are not available Solution: Only connected products are considered as generic shopping and	OK	Table 10 not included. Solution: data on domestic tourism, directly provided by the NSO, is used; data on inbound tourism	Same-day visitors are not included Solution: same-day visits are available in Eurostat for an adjacent year, hence

			linked to the retail trade in the IOT Consequence: none		are assumed equal to OAE Consequence: marginal values of inbound tourism are likely to overestimate their economic impact, since they are computed on a smaller basis	the value for the missing year is estimated by maintaining the same proportion between tourists and same-day visitors of the adjacent year Consequence: figures are not fully comparable with other countries
Germany	OK	Cultural and recreational services are clustered together. Solution: tourists' consumption for the two products is estimated pro-quota based on the value of their total output Consequence: This estimate is not fully comparable with the other countries	Country-specific products are not available Solution: Only connected products are considered as generic shopping and linked to the retail trade in the IOT Consequence: none	Incomplete, as only the value for a few categories of products is available Solution: none Consequence: the impact of inbound and domestic tourism is likely to be overestimated compared to other countries, while the total impact might be slightly underestimated	Table 10 not included Solution: arrivals and overnights in OAE only, collected from Eurostat, have been used Consequence: marginal values are likely to overestimate the economic impact of each visitor, since they are computed on a smaller basis	Same-day visitors are not included Solution: none Consequence: when computing the marginal impact of visitors (which can be done only for tourists) this figure is likely to be overestimated (as the denominator is lower), missing the same-day visitors
Italy	OK	OK	Country-specific products are already integrated in connected products, including all goods/services which are significant for visitors	OK	OK	OK

			(food products, beverages, tobacco products, clothes, petrol, medicaments, electronics, telecommunications etc.) Solution: Only connected products are considered as generic shopping and linked to the retail trade in the IOT Consequence: none			
Portugal	OK	OK	OK	OK	Table 10 not included Solution: arrivals and overnights in OAE only, collected from Eurostat, have been used Consequence: marginal values are likely to overestimate the economic impact of each visitor, since they are computed on a smaller basis	Same-day visitors are not included Solution: same-day visits are available in Eurostat for an adjacent year, hence the value for the missing year is estimated by maintaining the same proportion between tourists and same-day visitors of the adjacent year Consequence: figures are not fully comparable with other countries
Romania	OK	OK	OK	Incomplete, as only the value for a few	OK	OK

				categories of products is available Solution: none Consequence: the impact of inbound and domestic tourism is likely to be overestimated compared to other countries, while the total impact might be slightly underestimated		
Slovenia	OK	Rail, road, water, and air transports are clustered together. Moreover, the typical distinction between consumption in OAE (product 1.a) and service provided on own account or for free (product 1.b) is not provided Solution: tourists' consumption is broken down pro-quota for those products according to the value of their total output Consequence: This estimate is not fully	Country-specific products are already integrated in connected products, including all goods/services which are significant for visitors (food products, beverages, tobacco products, clothes, petrol, medicaments, electronics, telecommunications etc.) Solution: Only connected products are considered as generic shopping and linked to the retail trade in the IOT Consequence: none	Incomplete, as only the value for a few categories of products is available Solution: none Consequence: the impact of inbound and domestic tourism is likely to be overestimated compared to other countries, while the total impact might be slightly underestimated	Table 10 is likely to include OAE only Solution: none Consequence: marginal values are likely to overestimate the economic impact of each visitor, since they are computed on a smaller basis	Same-day visitors are not included Solution: same-day visits are available in Eurostat for an adjacent year, hence the value for the missing year is estimated by maintaining the same proportion between tourists and same-day visitors of the adjacent year Consequence: figures are not fully comparable with other countries

		comparable with the other countries				
Spain	No disaggregation Solution: none Consequence: the comparison between the (arguably different) marginal impacts of additional tourists vs. additional same-day visitors cannot be implemented	OK	Country-specific products are already integrated in connected products, including all goods/services which are significant for visitors (food products, beverages, tobacco products, clothes, petrol, medicaments, electronics, telecommunications etc.) Solution: Only connected products are considered as generic shopping and linked to the retail trade in the IOT Consequence: none	OK	OK	OK

Source: own elaboration

Annex 3. Description of additional files

A summary of the necessary files to replicate the analysis are reported in Table 4. The data and code produced in the frame of this study may be made available upon reasonable request to the authors. Given the presence of cross-file references in the TSA files, in order to properly work, files should be positioned in their respective folders, one for each country.

Table 4. List and description of deliverables

Name of the file	Description	Content	Number of files
XX_YYYY_IOT.xlsx	IOT of country XX for year YYYY e.g., AT_2015_IOT.xlsx	Input-Output table for the reference country, used to compute the technical coefficients of production (sheet "total"). The file also includes a sheet with the number of full-time equivalent jobs by economic activity and a sheet including the IOT to be extracted in the following steps.	10
XX_YYYY_TSA.xlsx	TSA of country XX for year YYYY e.g., AT_2017_TSA.xlsx	Relevant TSA tables (1, 2, 4, 10) either collected from "real TSA" or estimated according to the procedure described in Section 2.3.1.2. The file also includes two "technical sheets" used for computing the estimation described in Section 2.3.1.	43 (16 real; 27 estimated)
Template_TSA.xlsx	Template file for TSA	Template used to build TSA files in Section 2.3.1.2.	1
XX_code.R	R code used to compute values for country XX e.g., AT_code.R	The R code described in Section 2.3.1.1.	10
XX_IOdataforR.txt	IOT table in .txt format	Extraction of the IOT table, which is needed for running the routine in R.	10
XX_YYYY_expenditures_shop.txt	TSA table arranged in the IOT structure, in .txt format	Extraction of Tables 1, 2 and 4 of each TSA table, which are arranged according to the typical IOT format. This is needed for running the routine in R.	43

XX_YYYY_results.txt	Estimated values for country XX in year YYYY	Text files including the estimated values of direct and total tourism consumption, value added, and employment. The file also includes the breakdown by type of visitors (inbound/domestic) and category (tourists/same-day visitors)	43
Summary.xlsx	Summary file	The file includes a sheet “Results” summarizing the main estimates of tourism consumption, value added, and employment. The sheet “Aggregates” includes data of Domestic Output, Total Value Added, and Total Employment, needed to compute the share of tourism (in the sheet “Results”. The file also includes a sheet “Multipliers” with the estimation of multipliers and multiplying effects	1

Annex 4. Overview of TSA tables

The list of TSA tables is available below, for a detailed description and template, consult the 2008 Tourism Satellite Account: Recommended Methodological Framework (TSA:RMF 2008).

TSA Table 1 Inbound tourism expenditure

TSA Table 2 Domestic tourism expenditure

TSA Table 3 Outbound tourism expenditure

TSA Table 4 Internal tourism consumption

TSA Table 5 Production accounts of tourism industries and other industries

TSA Table 6 Total domestic supply and internal tourism consumption

TSA Table 7 Employment in the tourism industries

TSA Table 8 Tourism gross fixed capital formation

TSA Table 9 Tourism collective consumption

TSA Table 10 Non-monetary indicators

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