Delineating the Tourism Profile of the EU Countries in Terms of Length of Stay using the Correspondence Factor Analysis Method

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Abstract

It is well known that the international statistics provide us with different databases of European tourist traffic. The choice of certain statistical and mathematical methods and software for processing these databases can provide the framework for carrying out research covering the most diverse aspects, from the measurement of the tourist market and the analysis of its evolution on its two main components, tourism demand and supply, to the knowledge of the tourists' behavior and identification of similarities and/ or differences in the manifestation of their tourist activities according to their country of residence.

This work is concerned with the application of the correspondence factor analysis (CFA) method, using the statistical software SPSS-Statistical Package for Social Sciences, which leads to a comparative study on the distribution of the number of domestic trips taken in 27 EU countries, in 2015.

Key words: length of stay, correspondence factor analysis (CFA), resident tourists
J.E.L. classification: C10, C38, L83, J63, Z33

1. Introduction

At the level of various international organizations and specialists there is a whole range of concerns to improve and harmonize tourism statistics. It has long been considered that the tourism statistics system was established by Council Directive 95/57/EC of the European Union on November 23, 1995. This regulation set out a number of issues related to the collection of statistics on tourism but also to the obligation of the EU Member States to provide a set of comparable tourism statistics on a regular basis. (http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics/ro).

A few years later, in July 2011, the European Parliament and the Council of the European Union adopted Regulation (EU) 692/2011 on the European statistics on tourism and repealed Council Directive 95/57/EC of the European Union. The new regulation has been in force since 2012.

The EU's tourism-specific statistical system contains two main components: one includes the statistics on the capacity and occupancy of collective tourist accommodation establishments, and the other includes tourist demand statistics. It is also noted that the tourist demand statistics are collected in relation to the number of the tourist trips taken (and the number of overnight stays therein), distributed per country of destination, trip purpose, length of stay, accommodation type, departure month, mode of transport, expenditures.(http://ec.europa.eu/eurostat/statistics-explained/index.php/ Tourism_statistics/ro).

The indicator "number of overnight stays" expresses the number of nights spent by a tourist in a facility with accommodation functions (Snak, Baron, Neacsu.2001) and may also be referred to as "days/ tourist" (calculated as a product between the number of the tourists and the length of stay/ overnight stays). The data taken from the EU statistics and processed in this study refer to the tourist demand, respectively to the number of domestic trips taken by resident tourists, structured by length of stay, expressed in the number of overnight stays.

2. Creating the appropriate research framework

The research presented in this paper has the following features: it is a quantitative desk research, with a descriptive nature, and it is based on the analysis of secondary cross-sectional data from international statistics, represented by the values of the "length of stay" indicator. (Baltagi, B. H., 2008),

The scientific working tools are represented by the exploratory statistical method "*correspondence factor analysis*" (*CFA*) and by the *SPSS software (Statistical Package for Social Sciences)*. (Field, A., 2009),

In this study, we processed the Eurostat data (from the Data Explorer menu) on the number of domestic trips taken for personal purposes by the residents of 27 European countries, with data available for 2015.

The concepts and definitions used in this study are consistent with the specifications described in the "Methodological Handbook for Tourism Statistics". (New York / Madrid, 2008, Series M,No.83/Rev.1(http://unstats.un.org/unsd/trade/IRTS/IRTS%202008%20unedited.pdf).

In this context, we recall that the indicator "number of overnight stays" (from our study) covers all the overnight stays of residents aged 15 and above, who took at least one domestic trip with at least one overnight stay for personal purposes.

3. Data, results and discussions

For the purpose of this study, we used the statistical method known as *correspondence factor analysis (CFA)*. This method consists in determining the eigenvectors and the eigenvalues of the correlation matrix associated with the set of the analyzed variables. (Benzecri, J. P. (1992), Pintilescu, C., 2007)

Data processing, indicator significance testing, and graphical representations were performed by the SPSS statistical software. The SPSS (Statistical Package for Social Sciences) is one of the most used software in statistical data analysis.

The correspondence table, which is the database underlying this study, is represented by the distribution of the "*number of trips*" in terms of "*country of residence*" and "*length of stay*".

Table 1. Correspondence table for the number of domestic trips, by main length of stay intervals and the tourists' country of residence (2015)

Correspondence Table

Country of residence	Length of stay				
	1-3 nights	**4-7 nights**	**8-14 nights**	**15-28 nights**	**Active Margin**
Belgium	2325916	701932	160954	49338	**3238140**
Bulgaria	1511811	820198	175338	28029	**2535376**
Czech Republic	16811281	5317824	1299740	420191	**23849036**
Denmark	20791374	670526	2655938	95342	**24213180**
Germany	111600930	37956895	11702057	2415668	**163675550**
Estonia	2426805	217137	44012	0	**2687954**
Ireland	5791333	886778	168820	64191	**6911122**
Greece	1655412	1725073	804847	537429	**4722761**
Spain	92513420	19472749	6967939	3394211	**122348319**
France	98677646	44488654	20794703	9130021	**173091024**
Croatia	2173789	1084921	476729	214801	**3950240**
Italy	23093606	9895533	4565622	2996713	**40551474**
Cyprus	1103141	163506	21276	11637	**1299560**
Latvia	2658581	223321	62944	0	**2944846**
Lithuania	2209438	305935	133989	12978	**2662340**
Luxembourg	14829	0	0	0	**14829**
Hungary	9485825	2705991	349980	73564	**12615360**
Malta	174135	24504	0	0	**198639**
Netherlands	17072203	4825231	1374354	592101	**23863889**

Austria	7913101	2625807	363351	153033	**11055292**
Poland	24237175	9921094	4150513	1164182	**39472964**
Portugal	10325848	2265010	1083733	371515	**14046106**
Romania	10181814	4471461	845886	207112	**15706273**
Slovenia	1195578	280526	52405	0	**1528509**
Slovakia	4103593	1146643	174551	149583	**5574370**
Finland	23641634	4602810	705514	166138	**29116096**
Sweden	24041680	5388313	1513293	418896	**31362182**
Active Margin	**517731898**	**162188372**	**60648488**	**22666673**	**763235431**

Source: Eurostat data processed by SPSS

Applying the CFA method involves calculating *the profiles of the categories* for the variable *"length of stay"* (i.e., the relative frequencies of this category), which show the distribution of the categories of the other variable ("*country of residence*"), among the categories of the first variable ("*length of stay*").

By applying the CFA method, we determined the relative frequencies of the categories of the "length of stay" indicator and the distribution of the categories of the other variable ("*country of residence*") among the categories of the first variable ("*length of stay*"). (Spircu, L., 2005; Spircu, L., Calciu, M., Spircu, T., 1994)

Table 2. Table of the column profiles for the distribution of the number of domestic trips taken by tourists, by length of stay interval and country of residence (2015) (Column Profiles output)

Column Profiles

Country of residence	length of stay				
	1-3 nights	4-7 nights	8-14 nights	15-28 nights	**Mass**
Belgium	.004	.004	.003	.002	**.004**
Bulgaria	.003	.005	.003	.001	**.003**
Czech Republic	.032	.033	.021	.019	**.031**
Denmark	.040	.004	.044	.004	**.032**
Germany	.216	.234	.193	.107	**.214**
Estonia	.005	.001	.001	.000	**.004**
Ireland	.011	.005	.003	.003	**.009**
Greece	.003	.011	.013	.024	**.006**
Spain	.179	.120	.115	.150	**.160**
France	.191	.274	.343	.403	**.227**
Croatia	.004	.007	.008	.009	**.005**
Italy	.045	.061	.075	.132	**.053**
Cyprus	.002	.001	.000	.001	**.002**
Latvia	.005	.001	.001	.000	**.004**
Lithuania	.004	.002	.002	.001	**.003**
Luxembourg	.000	.000	.000	.000	**.000**
Hungary	.018	.017	.006	.003	**.017**
Malta	.000	.000	.000	.000	**.000**
Netherlands	.033	.030	.023	.026	**.031**
Austria	.015	.016	.006	.007	**.014**
Poland	.047	.061	.068	.051	**.052**
Portugal	.020	.014	.018	.016	**.018**
Romania	.020	.028	.014	.009	**.021**
Slovenia	.002	.002	.001	.000	**.002**
Slovakia	.008	.007	.003	.007	**.007**
Finland	.046	.028	.012	.007	**.038**
Sweden	.046	.033	.025	.018	**.041**
Active Margin	1.000	1.000	1.000	1.000	

Source: Eurostat data processed by SPSS

The values presented in Table 2 show the distribution of the number of domestic trips per *country of residence*, under each column, represented by a *length of stay interval*.

What is specific to this table is that it shows and highlights the column profiles, respectively the structure of each length of stay interval, according to the tourists' country of residence. (Everitt, B., Dunn, G., 2001)

In addition, Table 2 shows the ranking of countries within each length of stay interval; at the same time, we can measure the interest shown by resident tourists in the analyzed countries for each length of stay interval. The shares held by the holiday intervals, presented in the 4 columns, show/ express the travel rates of the residents from each analyzed country, for each length of stay interval.

The following considerations are significant:

• The interval 1-3 overnight stays is the most attractive for the tourists from Germany (with a share of 21.6%), France (19.1%) and Spain (17.9%); it is the least attractive for the tourists from Cyprus and Slovenia (0.2%), Bulgaria and Greece (0.3%), and totally unattractive for the tourists from Malta and Luxembourg (0%).

• The interval 4-7 overnight stays is the most attractive for the tourists from France (27.4%), Germany (23.4%) and Spain (12%); it is the least attractive for the tourists from Slovenia and Lithuania (0.2%), Cyprus and Latvia (0.1%), and totally unattractive for the tourists from Malta and Luxembourg (0%).

• The interval 8-14 overnight stays is the most attractive for the tourists from France (34.3%), Germany (19.3%) and Spain (11.5%); it is the least attractive for the tourists from Lithuania (0.2%), Slovenia and Latvia (0.1%), and totally unattractive for tourists from Malta, Cyprus and Luxembourg (0%).

• The interval 15-28 overnight stays is the most attractive for the tourists from France (40.3%), Spain (15%), Italy (13.2%) and Germany (10.7%); it is the least attractive for the resident tourists from Bulgaria, Cyprus and Lithuania (0.1%) and unattractive for the tourists from Latvia, Malta and Luxembourg (0%).

The data presented in this table, which reflect the structure of each length of stay interval according to the tourists' country of residence, can be used for the segmentation of the tourist market.

4. Conclusions

The combination of the working methods used in this study allowed us to shape the profile of each length of stay interval, according to the tourists' country of residence, but also to measure the contribution or the participation rate of the domestic trips taken by residents in each country, per each length of stay interval.

The greatest differences (in terms of the trips taken by resident tourists) are noticed between the intervals 1-3 overnight stays and 15-28 overnight stays.

It can be stated that the tourists who choose the very short interval 1-3 overnight stays are not attracted by the long trips of 15-28 overnight stays. Moreover, the factors influencing the tourism demand and supply determine extremely different behaviors in the tourists who prefer/ decide to travel for shorter intervals (i.e. 1-3 overnight stays), compared to those who prefer/ decide to travel for a very long period (i.e. 15-28 overnight stays). In this context, the forms of the tourism practiced, the reasons for taking domestic trips, the tourist destinations, the amount of leisure time, the tourists' age group, but also other aspects vary significantly for these two segments of tourists.

5. References

• Baltagi B. H., 2008. *Econometrics (4th ed.),* New York: Springer
• Benzecri, J. P., 1992. *Correspondence Analysis Handbook.* (Statistics: A Series of Textbooks and Monographs) 1st Edition, New-York
• Everitt, B., Dunn, G., 2001. *Applied Multivariate Data Analysis*. London: Arnold
• Field, A., 2009. *Discovering Statistics Using SPSS*. London: Sage Publications Ltd.
• Kachigan, S., 1982. *Multivariate statistical analysis*. New York: Radius Press

- Minciu, R., 2004. *Economy of tourism.* Bucharest: Uranus Publishing House
- Pintilescu, C., 2007. *Multivariate analysis*. Iasi: "Alexandru Ioan Cuza" University Publishing House
- Sank, O., Baron, P., Neacșu, N., 2001. *Economy of tourism.* Bucharest: Expert Publishing House
- Spircu, L., 2005. *Economic Data Analysis Applications,* Bucharest: ASE Publishing House
- Spircu, L., Calciu, M., Spircu, T., 1994. *Analyzing marketing,* Bucharest: All Publishing House
- http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics/ro
- http://ec.europa.eu/eurostat/documents/3859598/5925845/KS-GQ-13-007-EN.PDF/bb88fb0a-a1de-4790-b1c5-df45bb900c88?version=1.0