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Measuring Tourism Seasonality Across Selected Mediterranean Countries

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Abstract

Seasonality, as one of the key features of tourist activity, represents an unavoidable topic in scientific and professional analyses, whose aim it is to determine its causal effects. The economic consequences of seasonality are the kind of consequences that are most often emphasized and considered in discussions. They include inefficiencies in resource use, income variability, changes in the employment level, etc. However, only a few analyses have provided a more in-depth discussion of the common problems of seasonality among the Mediterranean countries. The most commonly used method of calculating the Gini coefficient will be used in order to estimate seasonality. This coefficient is characterized by certain advantages, such as taking into account the distribution asymmetry and the relative insensitivity to extreme values, as well as the stability indication of overnight stays distribution in a single year. Based on individual calculations of the seasonality index, this paper will provide a unique view of the similarities and differences between countries with regards to seasonal tourism oscillations. The analysis will cover the total number of tourists' overnight stays in hotels and similar accommodation facilities, RevPAR revenue, and the average room price -- ADR per month between 2007 and 2017. This paper will focus on determining the seasonal characteristics of the selected Mediterranean countries. The quantitative seasonality calculation will be a key indicator for seasonality measurements across different research areas. The contribution of this paper is reflected in the application of financial and non-financial indicators in hotel business that has not yet been implemented.

Keywords: Tourism seasonality, RevPAR, ADR, gini index

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1. Introduction

Upon reviewing scientific literature in the field of tourism, we can state that seasonality, as well as its impact on different economic and social trends, has been a topic that has for many years been drawing the attention of scholars and experts, whereby seasonality has been recognized as one of the key characteristics of tourist activity. As most important part of tourism accommodation supply in this paper only hotel accommodation sector will be analyzed.

Hotel accommodation capacities, with the aim of meeting the tourist demand, have grown and become increasingly complex. However, destination development must be in line with the quantitative and qualitative development of the accommodation offer [6]. Inadequate use of hotel resources leads to seasonal business and low levels of accommodation availability. Therefore, a hotel business needs to maximize its business performance in a given environment that is marked by seasonal business, for which it is necessary to know the determinants of the business.

When it comes to the causes of seasonality in tourism, literature mostly makes the distinction between natural and institutional causes. The natural causes of seasonality in tourism are predominately related to climatic conditions, but they are only reflected in the context of certain forms of tourism -- in the case of summer vacation tourism. On the other hand, health and business tourism, for example, is much more resistant to the natural causes of seasonality. Institutional causes relate to the written and non-written norms and customs that determine the social practice, such as school holidays, state holidays, and so on. The consequences of tourism seasonality are characterized as economic, ecological, and socio-cultural. In this paper, emphasis will be placed on the economic consequences of seasonality, which imply the inefficiency in resource use, turnover, variability, and so on.

Business seasonality is characteristic of almost every destination in the world. However, negative impacts are mostly pronounced in mass tourism destinations [2]. Mediterranean countries are characterized by a highly pronounced seasonal demand structure and high pressure on the resource base. Seasonality as a negative characteristic of tourism is a very important topic of strategic documents, and efforts are being made to steer its determined causes and consequences in the direction of their suppression. Although research results that point to a causal connection are much more frequent, there is significantly less research that has contributed to concrete measures for its suppression.

The limited possibility of influencing the suppression of such variability stems from the deep psychophysical needs of the end users -- tourists. Since their needs are linked to swimming and vacation, holiday destinations, in this case the Mediterranean, can satisfy these needs only in the summer months. Therefore, natural factors that are predictable and stable with relatively small changes can be added to the psychological needs [1, 15]. Paradoxically, this means that the attraction factor, such as the climate, is at the same time a limiting factor for the business of coastal vacation destinations, given that it limits tourism to just a few months [9]. If, in addition to the resource constraint, we

take into account the massiveness of tourism, then the tourist activity manifests itself as a problem known as tourist saturation.

The primary objective of each hotelier is to maximize the revenue per available room, which illustrates the competitive ability of individual countries in the hotel market through a financial statement of the use of available capacities. Therefore, it is important to adequately use hotel resources in order to reduce the seasonality and maximize the performance, for which knowledge on the determinants of business performance is required.

By reviewing the literature, the revenue of an available room is emphasized as the most important business performance indicator of the hotel business [16, 17, 24, 26, 27], the average room price [16, 24, 27], and the rate of accommodation occupancy [18, 20, 24, 26, 28, 31]. Business performance is a multi-dimensional concept that requires taking into consideration financial and non-financial indicators [25]. This paper, therefore, aims to contribute to the area of empirical research on tourism seasonality based on financial (ADR, RevPAR) and non-financial (total number of overnight stays) indicators using the Gini coefficient. Given that the Gini coefficient points out certain advantages, such as the indication stability of overnight stays allocation within a single year [21], its use is not limited to calculating the variability in the number of overnight stays and the number of tourists, but it can also be used to measure economic impacts, which, according to [21], represent a better standard than non-economic indicators.

2. Literature Review

Seasonality represents an imbalance between the supply and demand on the tourism market and may be analyzed as a result of numerous circumstances, but also as a cause of management problems. The first comprehensive study of seasonality in tourism was published by [4] and [5], describes tourism seasonality as ``a temporal imbalance in the phenomenon of tourism, and may be expressed in terms of dimensions of such elements as number of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment and admission to attractions.''

According to [21], there are several reasons for using seasonality:

- seasonality has a great economic importance

- seasonality influence pricing

- to analyse the possibilities and the impacts of season

- the implication of seasonality for tourism forecasting

- to be able test the stability or instability of seasonality.

Only few authors have tried to compare different seasonality measures by emphasizing their merits and pitfalls [21]. In most empirical works [4, 19, 23, 32], seasonality is analyzed by means of decomposing the time series with the aim of quantifying cyclic variation magnitudes by various methods, such as the method of calculating the seasonal ratio of the lowest and highest frequencies, the univariate modeling method, and the Gini coefficient method.

For the destination, and especially the tourism industry, seasonality is a problem of efficient capacity utilization. By looking at the economic structure of hotel business, we can conclude that hotels have a strong desire for seasonal expansion. The season has a decisive impact both on the economy and the hotels, and it is clear that their goal is to increase the capacity utilization beyond the main season. In order to achieve this goal, it is important to also know the methods for seasonality measuring, along with the causes and consequences of seasonality in tourism (see Table 1).

Tourism seasonality, both globally and at the European level, is gaining in importance, and its relevance has been confirmed by the European Commission's special programs [7]. Encouraging further activities to combat seasonality in tourism, that is, encouraging the extension of the tourist season, has been identified as one of the most important measures for boosting competitiveness in the European Tourism Sector [12]. From an economic perspective, excess seasonality, and the fluctuations between under-and overcapacity it generates can negatively affect the profits, the attraction of investment capital, and the employment situation [3]. This paper will contribute to a better understanding of tourism seasonality by measuring the economic impacts.

3. Methodology and Data

This part of the paper aims at evaluating the degree of tourism seasonality in Mediterranean countries, which certainly poses a problem. In the existing literature, various methods of seasonality measurements are used, but the Gini coefficient, among all the methods used in statistical surveys to measure the seasonality of tourism, has proved to be the most appropriate [35]. There are numerous examples of the application of the Gini index in research on tourist seasons, but despite their wide use in seasonality

TABLE 1: Seasonality in Europe – recent research papers.

Author	Methods	Results
[10]	Seasonality ration Seasonality indicator Seasonality share Gini coefficient	Based on the comparative analysis it can be concluded that the information, as a measurement outcome, is varying between measurement methods. No measurement method is superior to another, they are complementary. Each measurement approach has its purpose with advantages and disadvantages. A combination of different measurement methods is required to understand the structure and to get a full insight into the pattern.
[13]	Relative Seasonality index Cluster Analysis	Cyprus (for the residents' series) and Bulgaria (for the non-residents' series) as the countries with the highest degree of seasonality.
[11]	Theil index Decomposes the concentration	The seasonal concentration of Spain's international tourism revenue has increased considerably since the 2009 crisis. This concentration is already in its base a question of tourism volume given its increased role and, at the same time, decrease in the role of daily income and length of stay. This result naturally suggests that any policy aimed at significantly mitigating the concentration must focus on attracting tourists out of season without any specific additional specifications.
[34]	Forecast SARIMA models	The results of the forecasts – obtained by fitting data from SARIMA models – highlighted more reliable forecasts in the case of two-peak seasonality. Monthly forecasts are more accurate for Austrian and Finnish data than for Portuguese and Dutch data.
[22]	Relative Seasonality index Cost Matrix	The new proposed indices for measuring seasonality – derived from solving the problem of minimizing the cost of eliminating seasonality by transferring units from high to low season periods
[3]	The Tourism Climatic Index (TCI)	In Europe climate change may help to relief some extreme causes of seasonality under condition that institutions and tourists are sufficiently flexible. Otherwise, climate change may even intensify seasonality.

measurement, the theoretical arguments in favor of these indices are largely derived from the income inequality literature [8, 29, 30, 36]. The Gini coefficient is a statistical measure developed by the Italian statistician Corrado Gini for measuring income inequality and can be used to calculate any distribution [14]. Many authors apply it in economics as well as in geography as a measure of income and wealth of individual countries. In order to precisely define the Gini coefficient, the graph of the Lorenz curve is presented in Graph 1. It should also be noted that, the Lorenz curve and the Gini coefficient will be discussed on the example of the total number of overnight stays in

hotels and similar accommodation facilities, while the results will also include the results of RevPAR and ADR along with the total number of overnight stays in hotels and similar accommodation facilities.
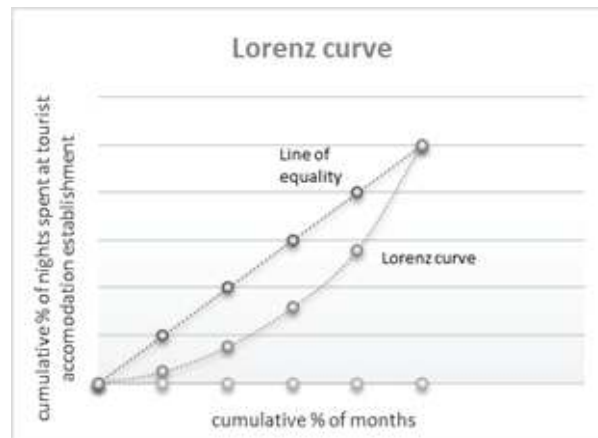

Figure 1: The Lorenz curve.

The Lorenz curve shows the distribution of the total value of the numerical sequence (totals) to its members [33]. The graph of the Lorenz curve is constructed by means of a cumulative data set, that is, the frequency of data from the lowest to the highest. The first point of the Lorenz curve has the coordinates (0.0) and the last point the coordinates (1,1). In the case of total number of overnight stays, cumulative percentages on the x-axis are calculated in percentages per month in a year from 1/12, 2/12 ... to 12/12 percent, while the total number of overnight stays pertaining to the given proportions are depicted on the y-axis. In a situation of uniform distribution of the number of tourist overnight stays, the Lorenz curve would be consistent with a straight distribution line. If there is a certain degree of inequality in the allocation of overnight stays per month, then the diagonal line crosses the curve shown in Graph 1, marked as the Lorenz curve. The Gini coefficient, therefore, represents the ratio of the surface that is enclosed on the graph by the Lorenz curve and the line of uniform distribution, the x-axis and the y-axis. The more curved the Lorenz curve, the less uniform the overnight stays of tourists between individual months of the year, and the higher the tourism seasonality.

The analytical formula that is often used for the calculation of the Gini coefficient, and is applied in this paper, is as follows [33]:

$$G = \frac{2\Sigma_{(i=1)}^{n} i \cdot x_i}{n\Sigma_{(i=1)}^{n} x_i} - \frac{n+1}{n} \tag{1}$$

where n represents the number of months per year and represents the rank of each month in a series of months, beginning with the month with the least to the month

with the highest number of overnight stays, and xi represents the total number of overnight stays of tourists in the month of the i-rank. In theory, the Gini coefficient value ranges between 0 and 1, where 0 represents the perfect equality, or a low degree of concentration, and 1 the perfect inequality or a high degree of concentration. In the case of measuring the degree of seasonality or inequality of the allocation of tourist overnight stays over a twelve-month period in a single year, the Gini coefficient can have the interval value between 0 and 0.9167.

Receptive tourist countries, whose data are used for comparative analysis, are Portugal, Spain, France, Italy, Croatia, and Greece. The selected countries are comparable according to the form of tourism, sun, and sea. The period between 2007 and 2017 was chronologically organized over a period of 132 months, with the unit of measure representing the total number of overnight stays in hotels and similar accommodation facilities as a non-financial indicator, as well as the average room rate (ADR) and room revenue (RevPAR) as financial indicators.

Data on the number of overnight stays in hotels and similar accommodation facilities were collected from Eurostat, while relevant sources of comparable indicators of hotel business were obtained from the American company Smith Travel Research Inc. (STR), which has been publishing monthly reports called the Smith Travel Accommodation's Report since 1988.

4. Results

The Gini coefficient, which, in this paper, is used to measure the degree of seasonality, is calculated at the level of one year. In the first step, data on tourist overnight stays are aggregated per month, followed by a calculation of the inequality of the allocation of tourist overnight stays between different months.

As noted in the previous section, tourism seasonality was analyzed on the basis of three data sets. Based on the first data set, a multi-year trend of the seasonality of the total number of tourist overnight stays was measured in hotels and similar accommodation facilities in the selected Mediterranean countries. Based on the second data set, a yearly revision of the RevPAR seasonality was measured, and the multi-year trend of ADR seasonality was measured based on the third data set. The results of the Gini coefficient calculation are presented in the tables below and each table is accompanied by an analytical comment briefly discussing the results.

Table 2 presents the values of the Gini coefficient of the total number of overnight stays in hotels and similar accommodation facilities for six comparable countries and the index movement for a period of ten years. The highest seasonality in 2017 was recorded in Greece, followed by Croatia. Three countries have very similar seasonal patterns (Italy, Spain, and Portugal), with Portugal having the best results with 9.53 months of the tourist season. A tourist season of 10.55 months and by far the lowest level of seasonality of tourist overnight stays in hotels and similar accommodation facilities were recorded in France. Particularly noteworthy is that the average Gini coefficient for the analyzed group of countries for 2017 is 0.28.

TABLE 2: Gini coefficient – nights spent at tourist accommodation establishment.

Gini coefficient -Nights spent at tourist accommodation establishment - (2007-2017)										
Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Greece	0.4536	0.4575	0.4560	0.4674	0.4791	0.4843	0.4893	0.4777	0.4745	0.4673	0.4640
Spain	0.2061	0.2103	0.2167	0.2235	0.2256	0.2272	0.2307	0.2249	0.2238	0.2164	0.2145
France	0.1245	0.1234	0.1311	0.1350	0.1347	0.1264	0.1337	0.1325	0.1378	0.1217	0.1200
Croatia	0.4886	0.4833	0.4838	0.4972	0.4983	0.4936	0.4905	0.4914	0.4861	0.4776	0.4580
Italy	0.2591	0.2561	0.2665	0.2681	0.2750	0.2699	0.2758	0.2734	0.2810	0.2754	0.2707
Portugal	0.1942	0.1943	0.2058	0.2151	0.2305	0.2374	0.2410	0.2374	0.2283	0.2157	0.2052

The results of seasonality revenue per available room are summarized in Table 3. The aim was to investigate whether there is seasonality of revenue per available room and whether it is high. Croatia records the highest level of seasonality of revenue per available room in 2017 of 0.4093. However, considering the highest Gini index value when measuring seasonality in tourism, 0.9167, we can conclude that the value of 0.4093 is a somewhat middle value. However, compared to other countries, this is a poor value. Portugal (0.2302), Greece (0.2195), and Italy (0.1731) have similar values, with Spain (0.1253) and France (0.1009) having the lowest seasonal revenue per available room. Even in here France stands out as the country with the lowest seasonality.

If we compared 2007 to 2017, it is clear that all countries in 2007 had a very low seasonality of revenue per available room. The cause of the poorer seasonality after 2007 can be linked to the 2008 crisis from which some economies are still recovering.

Table 4 presents the results of the seasonality of the average daily room price. The situation is similar to that in Table 3. In this case, Croatia is showing the highest seasonality of the average daily room price compared to the other countries. It is

TABLE 3: Gini coefficient – Revenue Per Available Room.

Gini coefficient - Revenue Per Available Room - RevPAR (2007-2017)										
Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Greece	0.1219	0.1432	0.1306	0.1364	0.1778	0.1832	0.2178	0.2149	0.2217	0.2239	0.2195
Spain	0.0856	0.0892	0.0905	0.1005	0.1065	0.1159	0.1140	0.1211	0.1212	0.1195	0.1253
France	0.1086	0.0887	0.0924	0.1208	0.1186	0.1352	0.1181	0.1208	0.1031	0.1239	0.1009
Croatia	0.2303	0.2864	0.2808	0.3807	0.3950	0.3969	0.4276	0.4259	0.4435	0.4434	0.4093
Italy	0.1470	0.1288	0.1340	0.1442	0.1565	0.1548	0.1588	0.1581	0.1905	0.1710	0.1731
Portugal	0.1642	0.1795	0.1792	0.1952	0.2278	0.2144	0.2243	0.2386	0.2432	0.2402	0.2302

followed by Portugal (0.1206), Greece (0.1269), and Italy (0.1074). Spain (0.1253) and France (0.1009) have the lowest seasonality of the average daily room price.

TABLE 4: Gini coefficient – Average Daily Rate.

Gini coefficient - Average Daily Rate - ADR (2007-2017)										
Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Greece	0.0481	0.0659	0.0509	0.0734	0.0894	0.1015	0.1167	0.1214	0.1267	0.1257	0.1269
Spain	0.0288	0.0301	0.0344	0.0286	0.0335	0.0436	0.0472	0.0532	0.0563	0.0582	0.0701
France	0.0482	0.0356	0.0354	0.0510	0.0497	0.0716	0.0538	0.0579	0.0388	0.0661	0.0506
Croatia	0.0587	0.0574	0.0599	0.1148	0.1405	0.1264	0.1636	0.1629	0.1870	0.2231	0.2345
Italy	0.0681	0.0571	0.0686	0.0730	0.0750	0.0786	0.0838	0.0885	0.1051	0.0971	0.1074
Portugal	0.0698	0.0670	0.0603	0.0628	0.0721	0.0688	0.0793	0.0908	0.1065	0.1112	0.1206

Based on the Lorentz curve of financial and non-financial indicators (see Appendix 1), we can conclude that the highest seasonality exists in the case of non-financial indicators, that is, the total number of overnight stays in hotels and similar accommodation facilities. The lowest seasonality occurs in the case of the average daily room rate.

5. Conclusion

According to UNWTO – highlights 2018, the share of Mediterranean countries in total tourist arrivals in 2017 is 20 percent, which is the strongest tourist subregion in the world followed by Western Europe (15 percent) and North America (12 percent). A comparative analysis of the specific indicators of hotel business performance (RevPAR, ADR) has shown that Croatia significantly lags behind the selected Mediterranean countries.

The seasonality of tourism in Croatia is constantly present due to the structure of accommodation facilities as well as the more intensive increase in the number of overnight stays in the summer season compared to the rest of the year. The share of hotels in total capacities in Croatia is considerably lower than in other researched countries. Hotels are, of course, a form of accommodation with a higher added value than other facilities, which would mean that larger-scale hotels have a higher potential for per-night earnings. France stands out as the country with the lowest seasonality in all researched variables. Interestingly, France is also among countries with highest share of hotels in total capacity (61.3 percent in 2017).

The average occupancy rate of the Mediterranean countries in the analysis is 68.88 percent at the level of 365 days per year, which means there is room for improvement. Accepting the perception of the Mediterranean as a sea destination potentially undermines the image of other attractive factors such as cultural heritage and festivals, events etc. Namely, hoteliers wishing to maintain their all-year business with an innovative approach, including other stakeholders in tourism and catering at the destination level, should create the kind of offer that would attract other segments that are independent of the sea. In other words, the struggle against the perception of "sea tourism" means directing the focus to selective forms of tourism through innovative models, taking thereby into account the possibilities provided by the destination. In order to achieve that, cooperation between the public and private sectors is of paramount importance.

Seasonality, apart from being a strategic problem, is at the same time the problem of every hotelier trying to maintain an all-year business. Although seasonality is one of the most recognizable features of the tourism market, there is a lack of knowledge of the factors, apart from the climate and institutional ones, which would explain annual demand fluctuations; however, there is also little understanding of the already defined causes of seasonality. In the effort to mitigate seasonal influences, it is necessary to better understand the periods beyond the main season followed by better planning and more effective use of resources in the tourism sector [19].

The problem of seasonality is extremely complex, resulting in challenges in finding solutions to seasonal stagnation, which can be declared as one of the most important priorities in the development of global tourism.

6. Appendix: Chart 2

Chart 2. Lorenz curves – comparasion of the concentration of nights spendt at tourist accommodation establishment, RevPar and ADR by country in 2017.
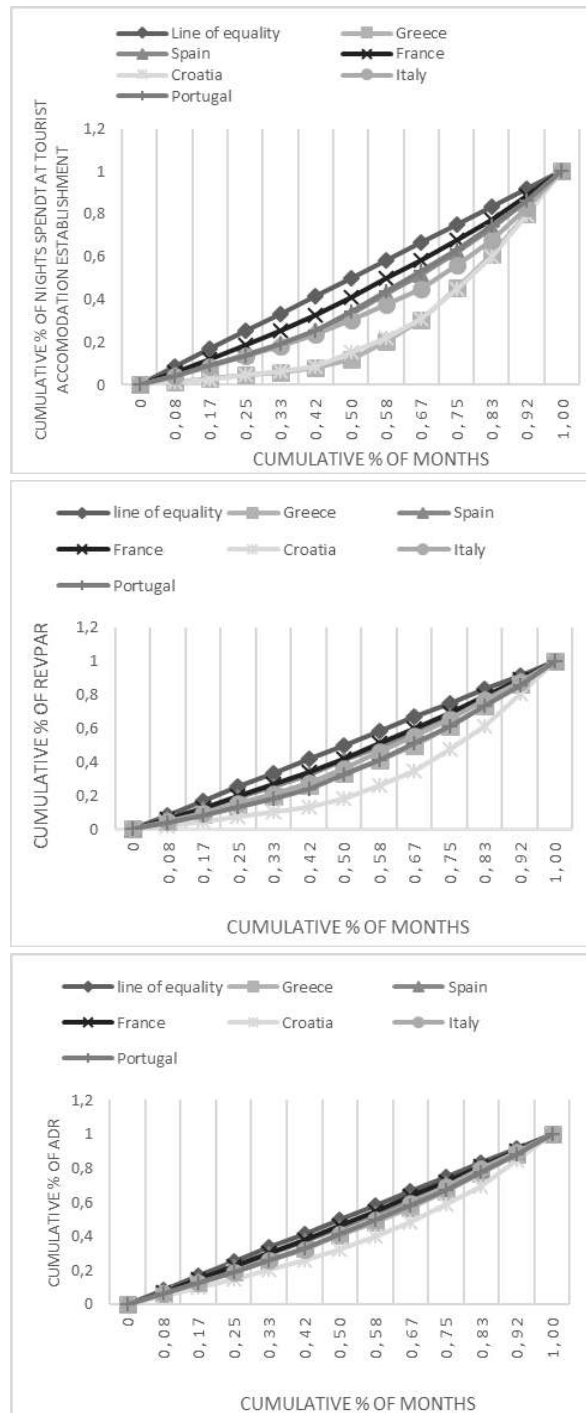
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