



# Measuring tourism seasonality across European countries

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## ABSTRACT

This paper will propose a general approach for the analysis and measurement of seasonality in tourism, based on an analysis of the pattern of seasonal swing, as a preliminary step for the assessment of seasonal amplitude. The seasonality of tourism demand across European countries will be analyzed and clusters of countries identified, which are based on a similarity of their seasonal pattern. After discussing the limitations of the most frequently used indices employed in the tourism literature, a new index for measuring seasonality in tourism will be suggested in order to measure seasonal amplitude. The latter takes into account the ordinal and cyclical structures of seasonal variations. The results demonstrate a strong connection between seasonal patterns and the spatial distribution throughout European countries, which may orient future policy actions for dealing with seasonality on a European level.

## 1. Introduction

The objective of this paper is to present a methodological framework for analyzing seasonality in tourism, in which an analysis of the pattern of seasonal fluctuations will have been performed prior to the measurement of its amplitude. This approach is based on a comparison of seasonal patterns by means of measuring the distance between seasonal factors; thereafter a clustering approach will be used in order to identify clusters of countries, which are based on similarities between their patterns. The seasonal amplitude will then be evaluated via the use of a new index, which takes into account the ordinal and cyclical structure of time periods. From a wider perspective, a classification of seasonal profiles in tourism will also be proposed, one which is based on the key characteristics of patterns, such as the number of seasonal peaks and their intensity.

Although tourism seasonality has been widely investigated (in terms of causes, impacts and policy implications), considerably less attention has been devoted to the measurement of seasonality and seasonal pattern classification (Croce & Wöber, 2010; Duro, 2016; Koenig-Lewis & Bischoff, 2004). Only a few authors have attempted to compare different measures of seasonality by highlighting their merits and pitfalls (Lundtorp, 2001, pp. 23–50). Moreover, the existing literature, with only a few exceptions (Amelung, Nicholls, & Viner, 2007; Bender, Schumacher, & Stein, 2005; Charles-Edwards, 2004; Coshall, Charlesworth, & Page, 2015), has not focused on the spatial dimension of seasonality. And little research has addressed the problem of whether seasonality in tourism-related aggregates varies in nature and intensity

on a spatial basis (Charles-Edwards & Bell, 2015; Coshall et al., 2015).

On the European level, overnight stays in hotels and similar establishments in the 28 member countries of the EU, from 2005 to 2016, experienced a growth of approximately 23%: from 1.51 to 1.86 billion, and this growth was considerably higher for non-residents (+35.2%), compared to residents (+12.5%) (Eurostat, 2017a). Nonetheless, a strong seasonal behaviour characterizes the distribution of overnight stays over a one year period. This poses several challenges related to the sustainability of the tourism industry as well as the impact of tourism from economic, socio-cultural and environmental perspectives (Cisneros-Martínez, McCabe, & Fernández-Morales, 2018). The application of the aforementioned approach, over a 10 year period, will attempt to produce in-depth, longitudinal research on the European level in order to improve our understanding of seasonality in tourism.

Given these premises, this paper posits certain questions, which arise from various research challenges. From a general point of view:

- What are the main features of seasonality which require particular attention from an empirical perspective?
- How can seasonal patterns be classified in order to recognize their features on the basis of current classifications?
- Can the current measures of seasonal amplitude capture all the compelling features of seasonality?

In the specific context of tourism seasonality throughout European countries, this study will provide answers to questions, such as:

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- What are the main patterns of seasonality on the European level?
- Is there a spatial dimension to seasonality in Europe?
- What has been the trend in seasonality throughout the last decade?

In order to provide answers to these questions, a methodological framework for the analysis of tourism seasonality has been proposed and applied to an evaluation of seasonality in overnight stays in hotels and similar establishments across European countries from 2005 to 2016. Specific features of seasonal fluctuations have been highlighted, also taking into account the spatial distribution of countries under consideration and the specific tourism segment under analysis (i.e. residents and non-residents in hotels and similar establishments). A longitudinal analysis of seasonality in a large-scale geographical context may provide new insights for recognizing its main causes and for designing counter-seasonal strategies, as well as for evaluating the effectiveness of these counter-seasonal policies.

## 2. Background

### 2.1. Seasonality in tourism research

The analysis of seasonality in tourism is a complex task, particularly as it involves the determination of causes and consequences. According to Butler (2001), seasonality can be defined as “a temporal imbalance in the phenomenon of tourism, which may be expressed in terms of the number of visitors, traffic on the highways, employment and admission to attractions” (Butler, 2001, p. 5–21). Although the idea of seasonality can be said to be one of the simplest ideas in many natural and human phenomena – related to the different intensity of solar rays and its effects on the environment and human habits (Ulijaszek & Strickland, 2009) – its analysis and measurement is still a challenging task. Climate and weather are relevant factors for analyzing tourist behaviour in the tourism sector (Scott, McBoyle, & Schwartzentruber, 2004; Ridderstaat et al., 2014; Li, Song, & Li, 2017; Li, Goh, et al., 2017), as are institutional factors, related to work and holiday periods; all these play an important role in determining tourist seasons (Hartmann, 1986; Hinch & Jackson, 2000). Additional causes of seasonality, recognized by Butler (1994), include social pressure and fashion, sporting seasons and inertia or tradition.

Seasonal fluctuations of tourism-related aggregates have been recognized as an issue since the very beginning of tourism studies (BarOn, 1975), mainly due to their implications from economic, environmental and socio-cultural perspectives. The economic effects of seasonality are related to the inefficient use of tourism resources, the overcrowding of destinations and attractions during peak demand periods, and lack of capacity (Getz & Nilsson, 2004). Moreover, increases in prices in the peak season, with a negative impact on a consumer's perception of value, and seasonality in the labour market (Ashworth & Thomas, 1999; Ball, 1988; Lundmark, 2006), have been recognized as a major, economic impact on tourism seasonality. The effects of seasonality on the environment are mainly related to damage to vegetation and disturbance to fauna (due to tourism pressure in the peak season), water supply and waste management, to mention but a few (Cuccia & Rizzo, 2011; Ioannides & Petersen, 2003; Lusseau & Higham, 2004; Martín-Martín, Jiménez-Aguilera, & Molina-Moreno, 2014). Finally, the socio-cultural effects of seasonality affect the community which is being visited by tourists when substantial numbers make use of a destination's resources and cause overcrowding, thereby having a negative impact on residents (Deery, Jago, & Fredline, 2012). Departing from causes of seasonality, six basic supply and demand strategies for reducing it have been identified (Weaver & Oppermann, 2000). These include: strategies to increase demand in off-season or shoulder periods, to reduce demand in peak periods, and to redistribute demand between peak season and off seasons. On the supply side, there are strategies to increase the supply in off-season or low demand periods, to reduce supply in high seasons, and to redistribute supply from a peak season to a low season

period.

Despite the availability of a number of reviews relating to tourism seasonality, (Baum & Lundtorp, 2001; Koenig-Lewis & Bischoff, 2005), few authors have focused their attention on the spatial features of seasonality (Amelung et al., 2007; Bender et al., 2005; Butler, 2001; Charles-Edwards, 2004; Coshall et al., 2015). For example, Getz and Nilsson (2004) highlighted a predominance of summer seasonal peaks in the northern hemisphere, whereas the winter seasonal peak prevails in tropical destinations. On the other hand, Yacoumis (1980) has recognized tourism seasonality as a general issue which varies only in the intensity of seasonal peaks; he has also suggested that seasonality should be analyzed on different levels: national, regional and sectoral. Nonetheless, a deeper knowledge of the spatial features of seasonality is required in order to assess the impact of policy interventions, in addition to improving our understanding of the causes and consequences of tourism seasonality (Ahas, Aasa, Mark, Pae, & Kull, 2007). To date, there have been few large-scale, geographical analyses of patterns of tourism seasonality (Coshall et al., 2015), which may highlight the role of the spatial and institutional causes of seasonality.

### 2.2. Pattern of tourism seasonality

Seasonality is generally characterized by a well structured pattern, rather than random irregularities, and seasonal fluctuations are determined by well-defined causes of different origin and intensity (Granger, 1979). Subsequently, one of the key-features of seasonal fluctuation is related to its regularity, in addition to the shape of seasonal fluctuations, that is, the distribution of the phenomenon under consideration in a well-defined time period. From an empirical perspective, there have been several attempts to classify seasonal patterns in tourism. Several authors have identified different profiles of seasonality in tourism (Butler & Mao, 1997; Candela & Figini, 2012; Chen & Pearce, 2012; López-Bonilla, López-Bonilla, & Sanz-Altamira, 2006). An initial, more common, profile is characterized by a single peak season: this is typical of many coastal destinations in the Mediterranean, which experience an intense peak of tourists in the summer (Fernández-Morales, 2003; Vergori, 2012). A second profile presents a peak season and a shoulder season, namely a minor peak which falls between the high and the off season, usually determined by specific tourist segments which are more likely to visit the destination out of the peak periods (Candela & Figini, 2012). A third profile is characterized by two main peaks, generally involving summer and winter seasons. This latter kind of seasonality may indicate the capability of the destination to meet different tourist needs, and it is typical of mountain resorts (Butler & Mao, 1997; López-Bonilla et al., 2006). Finally, a fourth profile identifies those destinations which do not experience strong seasonal peaks, since they tend to have relatively low fluctuations in tourism-related time series. This is the case, for example, of many cultural cities, which are generally characterized by a low degree of tourism seasonality (Butler, 2001; Cuccia & Rizzo, 2011; Figini & Vici, 2012; Hall & Page, 2003). Of course, the pattern of seasonal fluctuations can also derive from a combination of these main categories, in relation to the specific tourist target being considered, the generating region, and the destination's characteristics.

Although the classification proposed by Butler and Mao (1997), still remains the main reference for tourist seasonal patterns (Vergori, 2017), only a few authors (Chen & Pearce, 2012; Croce & Wöber, 2010; Hadwen, Arthington, Boon, Taylor, & Fellows, 2011; Koenig-Lewis & Bischoff, 2003) have attempted to develop methods which are capable of classifying seasonal patterns in tourism. Despite the development of a variety of methods for comparing and classifying time series, only a few examples of seasonal pattern classifications can be found in the tourism literature. For example, Koenig-Lewis & Bischoff (2003; 2004) have used Principal Component Analysis in order to examine seasonal patterns of occupancy data in Wales. The proposed approach allowed for the identifying of groups of establishments with similar seasonal

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