


Chapter 19

Outdoor Solutions for the Seasonal Concentration of Tourism Demand in Northern Portugal: An Integrated Approach Based on the Gini Index

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ABSTRACT

Measures that address the seasonality, one of the identified overtourism direct causes, allow making a critical reflection on the application of control policies and monitoring regional measures crucial on a sector with such importance at the regional development analysis. The measures should stimulate or reduce tourism demand during low or peak seasons, respectively, generating a better distribution of tourism flows and eliminating potential overtourism situations. Therefore, this chapter focuses on the development of a Gini Index to analyse the distribution of the seasonality in northern Portugal and through it control current public measures in practice and suggest the implementation of different and more effective policy measures. For instance, the ones that make a clear bet on outdoor tourism activities. It will be used in the Gini Index, by the tourists' market of origin measured by the overnight stays in hotel establishments. The results showed the high seasonal concentration of tourist flows.

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INTRODUCTION

The discussion around the concept of overtourism is not recent. Overtourism, albeit a relative new term, deals with old problems (Capocchi, Vallone, Amaduzzi, & Pierotti, 2019) and gained a renewed importance due to the increasing concern expressed by academics, policy-makers, population and social media. Such concerns include the excessive number of tourists in a place at a given moment, that may generate conflicts between residents and tourists and crowding phenomena, loss of authenticity, reduction of residents' quality of life and lower experience enjoyment by tourists (Dodds & Butler, 2019; Phi, 2019). According to Goodwin (2017) among the direct causes of overtourism is the seasonality. Indeed seasonality, related to the trend of tourism flows concentrated in a short period of the year, became one of the crucial challenge factors that the managers of the tourism sector have been facing. Its reduction and, ultimately, elimination, has not been easy to achieve by policy and decision-makers, whether at the public or private level since it presents an imbalance between demand and supply of a certain tourism destination.

Measures that address the seasonality allow making a critical reflection on the application of control policies and monitoring regional measures crucial on a sector with such importance at the regional development analysis. Such measures should stimulate tourism demand during low seasons or reduce tourism demand during peak seasons. In this regards, the current chapter focus on the development of a Gini Index to analyse the distribution of the seasonality in the North region of Portugal and through it control current public measures in practice and suggest the implementation of different and more effective policy measures like, for instance, outdoor events (which may include sports, culture and music). Such alternative tourism strategies have already been identified as strategies to manage seasonality and differentiate destination offers (Smeral, 2019). The Gini index, that is being viewed as a measure of the level of fairness of resources distribution among a group of individuals (namely to measure the level of inequality in distributions), will be applied in the present context as a measure of the dispersion of the data over the year among different regions in an innovative approach applied to the Portuguese tourism sector. With the specific application to the North region of Portugal, a region well known not only by the cultural patrimony and sea activities but also by its natural and well-preserved mountain landscapes, specific gastronomy and Winter cultural traditions, which offer multiple and different experiences all over the year, would be possible to recommend and suggest tourism activities related to outdoor tourism. Such unexplored branch of tourism might allow the Portuguese northern tourism destinations to benefit from a more uniform distribution of tourism demand over the year and optimise the existent resources causing minimal negative impacts associated with seasonal fluctuations in tourism demand and enhancing the positive impacts for the development of a region that suffers from problems as ageing, desertification, low levels of employment and regional income.

In order to reach the main objective of the study, it will be used the information of the tourism market of origin (Portugal market and the Top-5 foreign countries with the highest market share: Spain, France, United Kingdom, America and Germany), measured by the overnight stays in hotel establishments. This study allows obtaining the Gini Index for each tourism destination (8 regions), each segment share of overall tourism demand and the Gini relation of these segments with the overall tourism demand. To understand the tourism flows the analysis will be focused on the matrix of interregional tourism flows in the North region of Portugal and in the graphical techniques. The current and official data of the National Statistics of Portugal (INE) will be considered for all 8 regions that belong to the North region

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of Portugal, over the period 2014-2017 (the period for each could be found the most updated statistics according to the last NUT¹ revision, in Portugal).

In Portugal, namely in the North region as in many other destinations, the complex phenomenon of seasonality is a concern in the tourism sector. At the institutional level, the attempt to combat seasonality has been recognised as an important topic and it is revealed in the Portuguese National Strategic Tourism Plan as an objective to improve. At the same time, and at the regional level, the municipalities intend to implement measures directed towards encouraging efforts to mitigate seasonality as part of the growth strategy for tourism. The seasonal concentration produced by tourists visiting the North region of Portugal and its municipalities cannot be considered very high since it does not reach a high seasonality ratio, i.e. over two. This situation can be justified by the adjustments and efforts that have been made by public policymakers to reduce the seasonality problem in the tourism sector.

According to the above mentioned, it is fundamental to apply measures never used in the Portuguese economy to measure the seasonality concentration at a regional level, to present solutions to mitigate the seasonality and, by consequence, potential overtourism issues. Such measures, already presented for other international realities have proved to be efficient to monitor the movement of tourism flows all over the months of a year and regions. Indeed, with this chapter, it is believed that calculating and presenting an innovative but robust measurement of tourism seasonality is important from the perspective of developing and evaluating seasonal public policies, measures and private business strategies.

The first section of the chapter is devoted to the literature review on the concept of seasonality and the phenomena of the seasonality, in particular, in the tourism research. The section also approaches tourism development in the North region of Portugal. In the third part of the chapter, the methodology for conducting the study is presented and explained, after the goals being set and the statistical data collection and analysis are described. In the fourth part, the results obtained from the application of the method of analysis are presented and critically analysed. In conclusion, some remarks on recommendations and implications are presented.

BACKGROUND

Seasonality in Tourism Research

Touristic seasonality phenomenon denote a key topic in the fields of policymaking and practical tourism management and also in the academic literature on literature (Koenig-Lewis & Bischoff, 2005). The seasonal touristic demand variations or touristic seasonality is a phenomenon characterized by instability between supply and demand at certain times of the year. It is assumed to be the unequal distribution of tourism movements over time (concentration of tourist flows over short periods of the year) and can be expressed in terms of number of visitors, revenues, employment, occupancy rates, traffic, among other indicators. The uneven demand growth generates fluctuations and consequent imbalances for the territories and the operators (Coshall, Charlesworth & Page, 2015).

The concentration of holidays or the existence of events, weather conditions (seasons), purchasing power, social or cultural behaviours (religious or sports motivations), fashion trends and habit are factors that influence the seasonality of the touristic demand (Rosselló & Sansó, 2017). There are also issues related to the environment itself such as temperature, sunny hours, rain levels or snow (Koenig-Lewis & Bischoff, 2005).

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The causes of seasonality are assorted and multifaceted, as are their effects, dealt with in some academic research about seasonality. Wall and Yan (2003) argue that the impacts are likely to have become larger with the development of mass tourism. This is due to the fact that the number of tourism-dependent enterprises has increased as well as their size and thus their ability to adapt to changing demand has been reduced (Koenig-Lewis & Bischoff, 2005). According to Wall and Yan (2003), a strict and detailed analysis of demand variations and their effects can point out profit opportunities and find out ways to reduce losses.

In these contexts, seasonality conditions the social and economic sustainability of tourist destinations, threatening their environmental and natural resources through the pressure exerted at summertime on the territory, local people, services and infrastructure (Budeanu, 2007). In economic terms, seasonality motivates low profitability of tourism facilities (occupancy rate drops), unbalanced pricing policy (high swings) and creates precarious employability (Turrión-Prats & Duro, 2018). As far as the environmental aspect is concerned, there are consequences such as the unregulated construction of infrastructures and equipment and the pollution itself. Overcrowding of spaces may also lead to an increase in crime and accidents (Cannas, 2012).

Regarding the question of tourist seasonality in Portugal, Kastenholz and Lopes de Almeida (2008) describe that, as a beach destination, its attraction is strongly associated with the climate, which contributes to the accentuation of seasonality. These flows are not only visible in sun and sea destinations such as the Algarve, but also in nature destinations such as those in the north of the country. These authors point out that Portugal needs measures to minimize this reality. In order to mitigate the seasonality are suggested strategies which are based on the design and development of new products as well as the diversification of markets and consequent actions of communication and promotion to new segments (Connell, Page & Meyer, 2015).

Being able to quantify the degree of seasonality of an observed demand pattern is extremely important in assessing its impact. However, there are few exploratory works in this area. Most of the research has been focused on longitudinal studies involving time series decomposition. In general, seasonal variables are isolated in the first step of the analysis and subsequently are compared using a variety of measures for the acuteness of the seasonal distinctions (Koenig-Lewis & Bischoff, 2005).

As an example of indicators aimed at measuring the level of seasonality, it can be highlight those based on the ratio of foreign visitor arrivals in the summer/winter months to total entries during the year; the seasonal amplitude index, which explores the relationship between summer and winter traffic variations; the tourism saturation index, based on the relationship between the number of tourists visiting a destination and its population (Cunha, 2006, 2007). Moreover, the coefficient of seasonal variation, seasonality ratio, seasonality indicator and the Gini index are the tools that allow to analyse tourism seasonality derived from seasonal factors (Koenig-Lewis, & Bischoff, 2004, 2005; Þórhallsdóttir, & Ólafsson, 2017).

Finally, effective policies for tourism in the North of Portugal may allow the generation of spillover effects which allow tourism sustainability avoiding or mitigating the negative impacts of seasonality and overtourism on the territory and its communities, maintaining the interest in both the national and international touristic flows and its long term economic profitability, social positive impact and environmental protection.

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Tourism Development in North Region of Portugal

Portugal has a well-balanced tourism strategy and has several competitiveness strengths, achieving the 15th place in the Travel and Tourism Competitiveness Index Ranking 2015.

The Northern region of Portugal has 144 kilometres of Atlantic coast and is the Portuguese region with the largest border area (it borders the Spanish Autonomous Communities of Galicia and Castile-Leon). According to the *Comissão de Coordenação e Desenvolvimento Regional do Norte* (CCDRN, 2018), the North region of Portugal is one of the tourism destinations with the highest potential for internal and external growth. For several consecutive years, it has earned the praises of different foreign entities, such as the title of Best European Destination, which resulted in an increasing number of visitors. Among the various tourist attractions, four UNESCO “World Heritage Site” classifications to recover urban, historical and natural areas with strong potential for internationalisation and tourism are also part of the region’s cultural assets and its potential tourism: i) the Oporto’s Historic City Centre, in 1996; ii) the Prehistoric Rock Art Site of the Côa Valley; in 1998; iii) the Historic Centre of *Guimarães*, and iv) the *Alto Douro* Wine Region, in 2001, which was considered a “living evolutionary cultural landscape.”

The relevance that the national government attributes to tourism and its promotion (national and international) is well expressed in the public policies that frame the current Tourism Strategy 2027.

Territory is a result of the complex interdependencies between market size, the dynamics of interactions and a political-institutional framework more or less conducive to economic and social achievements (Camagni, 2008). It is the modes of governance (shared and territorially integrated) that help territories achieve higher or lower levels of competitiveness and territorial cohesion (C&TC). Competitiveness and territorial cohesion depend on the external dynamics that condition territories, but they also depend largely on the ability to build endogenous, differentiating and community-wide solutions in the form of shared public policies and modes of governance.

Tourism is considered a sector of the economy and as any sector of the economy and its related activities has specificities that objectively condition interventions in its domain, whether public policy, enterprise policy or modes of innovation (Nordin & Hjalager, 2017). Tourism has as its main specificity to be produced and consumed in a specific territory and its added value, namely in terms of its multiplier effects - is determined, quantified and qualified territorially. Tourism can be a territorial singularity, that is, it can be a manifestation of economic ubiquity (production and consumption) in the same territory (Nunes & Sousa, 2019). The contribution of tourism to C&TC, in addition to the result of innovative and competitive tourism companies, is the result of this competitiveness integrated into an economically coherent economic framework.

METHODOLOGY

A wide range of measures has been used to describe the tourism seasonality as a temporal and spatial inequality (Cuccia, & Rizzo, 2011; Connell, Page, & Meyer, 2015; Duro, 2016; Gil-Alana, & Huijbens, 2018; Turrión-Prats, & Duro, 2018), but the definition that seems to be the most acceptable one has been provided by Butler (1994). Butler (1994) defined tourism seasonality as a temporal imbalance that can be expressed in terms of different indicators, as numbers of visitors, expenditure of visitors, traffic on high-ways and other forms of transportation, employment and admissions to touristic attractions. The basic unit used to measure seasonality is the number of visitors (Lundtorp, 2001), overnight stay data or

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arrivals/departure data using days, weeks or months (Cuccia, & Rizzo, 2011; Martín-Martín, Jiménez-Aguilera, & Molina-Moreno, 2014; Þórhallsdóttir, & Ólafsson, 2017).

The most used tools to analyse tourism seasonality, derived from seasonal factors, are the coefficient of seasonal variation, the seasonality ratio and the Gini index (Koenig-Lewis, & Bischoff, 2004, 2005; Þórhallsdóttir, & Ólafsson, 2017). According with these authors the:

- Coefficient of variation (*CV*) is a measure of spread and describes the amount of variability relative to the mean. It can be used instead of the standard deviation to compare the spread of data sets that have different measurement units or different means and is expressed in Eq. (1):

$$CV = \frac{s}{\bar{x}}; \text{ where } s \text{ is the standard deviation and } \bar{x} \text{ is the mean value} \quad (1)$$

- Seasonality ratio (*SR*) is found by dividing the highest value of a distribution by its average value (Eq. 2). The ratio increases with the degree of seasonal variation. Its lower bound is one and its upper bound is equal to the number of periods compared - twelve when monthly data is used (Lundtorp, 2001). If the same number of visitors came every month, the ratio would be one. A seasonality ratio ≥ 2 , indicates extreme seasonality. The seasonality indicator (*SI*) is the inverse value of the seasonality ratio (Eq. 3). A seasonality indicator ≤ 0.5 , indicates extreme seasonality.

$$SR = \frac{x_{\max}}{\bar{x}} \quad (2)$$

$$SI = \frac{\bar{x}}{x_{\max}} \Leftrightarrow SI = \frac{1}{SR} \quad (3)$$

- Gini index is the most used tool to analyse seasonality based on the well-known Lorenz curve, which is defined as twice the area between the curve and the line of perfect equality (Duro, 2016). It is derived from the Lorenz curve that displays the cumulative frequency of the ranked observations starting with the lowest number. The coefficient is varying between 0 (0%), reflecting complete equality (every month would have the same number of tourist overnight stays), and 1 (100%), indicating complete inequality (all annual tourist overnight stays would be realised in one month). This is 0 \leq Gini index \leq 1. The formula, adapted to the analysis of seasonal tourism concentration, can be expressed as follows (Eq. 4):

$$G = \frac{1}{2\mu} \sum_i \sum_j p_i p_j |y_i - y_j| \quad (4)$$

where p_i and p_j are the relative weights of the observations (months or seasons), y_i is the variable for observations (in this case tourism demand), and μ is the annual mean. The values are first ordered by size - from the lowest to the highest value - and then normalised by the total number of visitors over the year; the sum of the normalised values should be one and the normalised values are then accumulated and the highest of the cumulative values should be one (Þórhallsdóttir & Ólafsson, 2017).

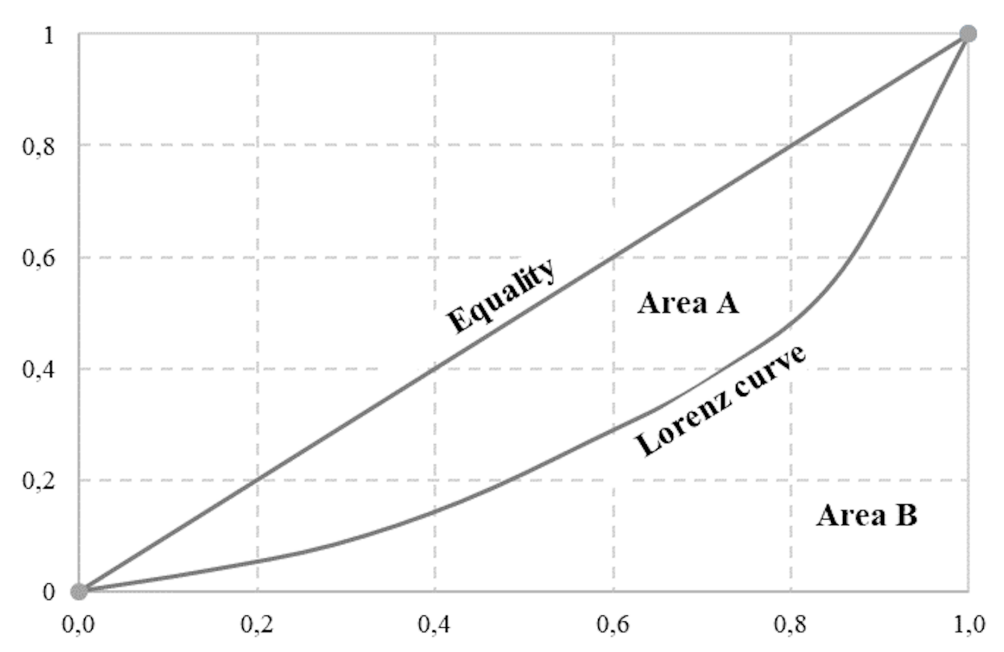
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The Gini index is equal to the area between the Lorenz curve (area A) and the 45° line divided by the total area under the line (area B) (see Fig. 1). This means Gini index is equal to the area under the line (Area A) of perfect equality (0.5 by definition) minus the area below the Lorenz curve (Area B), divided by the area below the line of perfect equality. To find the area between the Lorenz curve and the 45° line, area B needs to be found. Mathematically, the Gini index is defined as a ratio of the areas on the Lorenz curve diagram (see Fig. 1). If the area between the line of perfect equality and the Lorenz curve is A, and the area under the Lorenz curve is B, then the Gini index is $A/(A+B)$; as $A+B=0.5$, the Gini index is given by $A/(0.5)$ (Þórhallsdóttir & Ólafsson, 2017). The higher Gini index, the greater is the inequality of distribution of tourist overnight stays, i.e., the seasonality. A Gini index > 0.5 shows extreme seasonality.

To understand tourism development in the North Region of Portugal time series based on two different frequencies it will be used: annual and monthly, from 2014 to 2017. As a numerical measure of tourism demand will be used the number of overnight stays in hotel establishments by the tourists' market of origin (Portugal market and the Top-5 foreign countries with the highest market share: Spain, France, United Kingdom, America and Germany). The current and official data of the National Statistics of Portugal (INE) will be considered for all 8 regions that belong to the North region of Portugal; the period for each could be found the most updated statistics according to the last NUT III revision, in Portugal. The 8 regions under analysis will be (Fig. 2): *Alto Minho* (AMin); *Área Metropolitana do Porto* (AMP); *Alto Tâmega* (ATâm); *Ave* (Ave); *Cávado* (Cáv); *Douro* (Dou); *Tâmega e Sousa* (T&S); and *Terras de Trás-os-Montes* (TTM). To understand the tourism flows the analyses will be focused on the matrix of interregional tourism flows and on the graphical technique.

Figure 1. The Lorenz curve.

Source: Adapted from Þórhallsdóttir and Ólafsson (2017, p.20).



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It should be noted that overnight stays data show where the visitors overnight but not which destinations they visit. The off-peak visitors have a tendency to stay in the main local destinations or cities and travel from there to other destinations as day visitors. Therefore, overnight stay data does not give accurate results about which destinations and regions they visit. In this chapter, the goal is to find a more appropriate method.

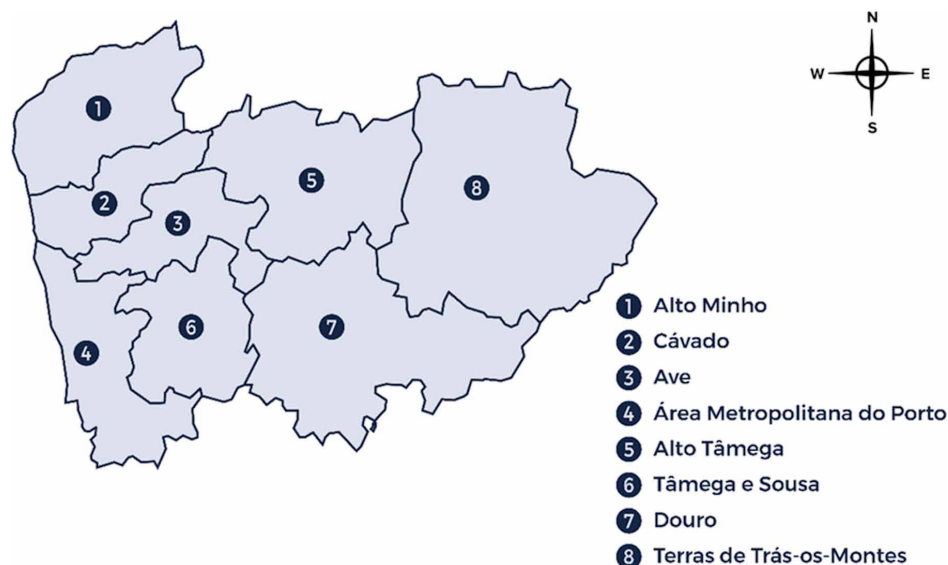
RESULTS AND ANALYSIS

In the last four years, the tourism in the North region of Portugal expanded significantly. On average, 12% per year from 2014 to 2017. During the period under analysis, there was an average annual variation of around 12% (Fig.3). Hotel establishments recorded an average of 6.5 million overnight stays, and it is obvious the region's growing trend (Fig. 3). Based on the following figure, the existing seasonality is observed. This seasonality presents high peaks in summer months and low peaks in winter months. This phenomenon and profile is typical of Mediterranean destinations. The different regions that form the north of Portugal follow exactly the same behaviour and profile presented for the region as a whole. This means that the tourist arrives at the chosen destination and present a propensity to visit other places in the region.

The internal market contributed with an average of 3.4 million overnight stays, which correspond to an average around 46% of the market share. The five main inbound markets, plus other markets, represented 51.9% of total overnight stays of non-residents and mostly presented positive results. The Top-5 inbound market has a significant expression, with the main markets in the region being Spain, America (namely Brazil) and France. The contribution of the inbound markets has been very positive, with all presenting increasing results except for the French market that decreased in 2017. All this achievements can be observed in Table 1.

Figure 2. North region of Portugal and division into NUT III.

Source: Adapted from Google.com.



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Figure 3. Monthly number of overnight stays at hotels in the North region of Portugal (2014:01-2017:12).

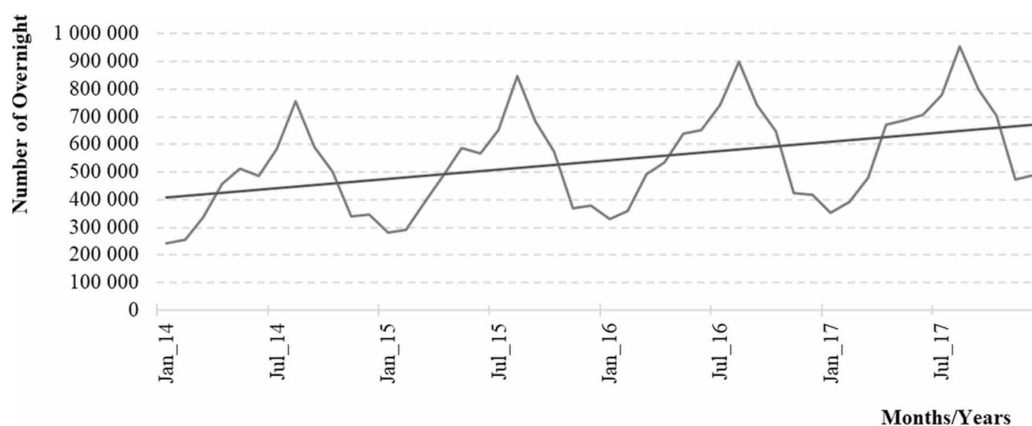


Table 1. Share of the main markets in northern Portugal.

Markets	2014	2015	2016	2017
Spain	11,6%	12,1%	12,3%	12,0%
France	8,0%	8,5%	8,8%	7,8%
United Kingdom	3,0%	3,5%	3,7%	3,7%
America	8,6%	8,0%	8,8%	10,7%
Germany	4,3%	4,5%	4,6%	4,6%
Portugal	48,1%	46,8%	44,7%	42,3%
Others	16,4%	16,6%	17,0%	18,9%
Total	100,0%	100,0%	100,0%	100,0%

Table 2 presents some indicators that allow the analysis of overnight stays in the northern region of Portugal. The calculations made were based on the monthly overnight stays for the period under analysis (2014-2017). For the northern region of Portugal, the maximum number of overnight stays was in August and the lowest in January. As already mentioned, this profile is typical of coastal countries, due to the climatic conditions that Portugal, and this particular region, enjoys. The monthly average increases over the years, which allows to state that there was a positive variation of around 12% for the 4 years under review. Looking at the values presented for CV, SR and SI, they can be considered worrying values. They are in the threshold but still below the theoretical reference. Undoubtedly, to minimize this situation, overnight stays should be decentralized over the different months. That is, to provide greater distribution throughout the year, there is a need to promote and implement different action policies.

The analysis for the North region of Portugal continue with the presentation of the Lorenz curve, for the period under analysis. The Lorenz curve (Figure 4) shows the distribution of the overnight stays for each year. The unequal distribution of overnights has yielded the curve. Due to the intense concentration of tourist arrivals in the top-performing months of the year, the gap between the line of equality and the Lorenz curve is high, pointing out inequality distribution and seasonal concentration. The shape of the Lorenz curve, within the observed period, is consistent and is pointing to the stability of seasonal

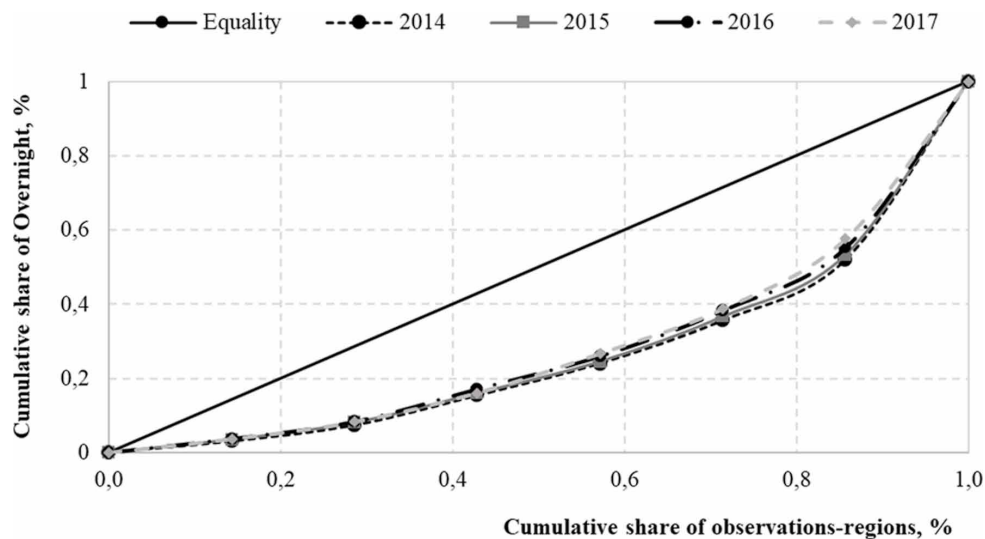
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Table 2. Summary of the descriptive statistics for northern Portugal.

	2014	2015	2016	2017
Overnight stays	5 400 591	6 103 053	6 878 367	7 480 137
<i>Maximum_{monthly}</i>	754 166	845 300	897 070	952 717
<i>Minimum_{monthly}</i>	243 282	279 424	328 250	353 181
<i>Average_{monthly}</i>	450 049	508 588	573 197	623 345
<i>SD_{monthly}</i>	152 195.0	172 509.8	175 548.6	183 986.4
<i>CV</i>	0.338	0.339	0.306	0.295
<i>SR</i>	1.676	1.662	1.565	1.528
<i>SI</i>	0.597	0.602	0.639	0.654

Note: SD-Standard Deviation; CV- Coefficient of Variation; SR-Seasonality Ratio; SI-Seasonality Indicator.

Figure 4. Lorenz curve for the overnights for North region of Portugal (2014-2017).



concentration of tourist activities. However, from 2014 to 2017, there has been a decrease in unevenness, that is, in concentration. The curves closest to the equality line are the one presented for 2016 and 2017.

Table 3 presents some indicators for the 8 regions that make up the northern region of Portugal. These indicators provide an overview of interregional behaviour. As for the region, as a whole, the 8 regions follow the same profile. In all regions, except the Douro region, there has been a gradual increase in the number of overnight stays in hotels. The region with the largest market share is the *Area Metropolitana do Porto*, with a very significant percentage, which averages around 76%. The region is followed by the *Cávado* and *Alto Minho* regions, with 7% and 6%, respectively. The region with a very low weight is *Terras de Trás-os-Montes* region with an average market share of 0.7%. This information shows that the regions that are most preferred due to big urban and coastal centres have relatively low market shares. Regarding the main markets, it can be said that in all regions the Top-3 are the same as those already shown for Northern Portugal, that is, in descending order, Portugal, Spain and France. The American

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Table 3. Summary of the descriptive statistics for the 8 regions of the northern Portugal.

NUT III	2014	2015	2016	2017	NUT III	2014	2015	2016	2017
<i>Alto Tâmega</i>					<i>Área Metropolitana do Porto</i>				
<i>Overnight stays</i>	42 592	58 104	66 628	79 489	<i>Overnight stays</i>	4 162 882	4 645 322	5 268 933	5 628 977
<i>Market share</i>	0.8%	1.0%	1.0%	1.1%	<i>Market share</i>	77.1%	76.1%	76.6%	75.3%
<i>Maximum_{monthly}</i>	5 891	7 785	8 769	14 794	<i>Maximum_{monthly}</i>	580 779	644 809	686 415	726 028
<i>Minimum_{monthly}</i>	1 800	2 655	2 991	2 944	<i>Minimum_{monthly}</i>	188 154	212 089	251 873	269 059
<i>Average_{monthly}</i>	3 549	4 842	5 552	6 624	<i>Average_{monthly}</i>	346 907	387 110	439 078	469 081
<i>SD_{monthly}</i>	1 251.7	1 604.5	1 773.7	3 137.2	<i>SD_{monthly}</i>	117 108.9	131 777.9	134 105.8	146 035.3
<i>CV</i>	0.353	0.331	0.319	0.474	<i>CV</i>	0.338	0.340	0.305	0.311
<i>SR</i>	1.660	1.608	1.579	2.233	<i>SR</i>	1.674	1.666	1.563	1.548
<i>SI</i>	0.603	0.622	0.633	0.448	<i>SI</i>	0.597	0.600	0.640	0.646
<i>Cávado</i>					<i>Ave</i>				
<i>Overnight stays</i>	349 399	406 077	471 775	552 345	<i>Overnight stays</i>	209 811	207 173	235 006	274 852
<i>Market share</i>	6.5%	6.7%	6.9%	7.4%	<i>Market share</i>	3.9%	3.4%	3.4%	3.7%
<i>Maximum_{monthly}</i>	48 286	55 464	60 868	67 350	<i>Maximum_{monthly}</i>	29 595	28 801	30 749	34 198
<i>Minimum_{monthly}</i>	15 789	18 849	22 718	25 767	<i>Minimum_{monthly}</i>	9 292	9 333	11 077	12 168
<i>Average_{monthly}</i>	29 117	33 840	39 315	46 029	<i>Average_{monthly}</i>	17 484	17 264	19 584	22 904
<i>SD_{monthly}</i>	9 736.8	11 285.1	11 915.5	12 787.1	<i>SD_{monthly}</i>	6 021.9	5 954.7	6 116.9	6 597.2
<i>CV</i>	0.334	0.333	0.303	0.278	<i>CV</i>	0.344	0.345	0.312	0.288
<i>SR</i>	1.658	1.639	1.548	1.463	<i>SR</i>	1.693	1.668	1.570	1.493
<i>SI</i>	0.603	0.610	0.646	0.683	<i>SI</i>	0.591	0.599	0.637	0.670
<i>Alto Minho</i>					<i>Douro</i>				
<i>Overnight stays</i>	306 971	376 212	389 410	478 689	<i>Overnight stays</i>	190 980	225 356	258 214	255 000
<i>Market share</i>	5.7%	6.2%	5.7%	6.4%	<i>Market share</i>	3.5%	3.7%	3.8%	3.4%
<i>Maximum_{monthly}</i>	42 079	50 765	49 391	58 062	<i>Maximum_{monthly}</i>	27 795	32 002	35 421	33 025
<i>Minimum_{monthly}</i>	14 157	17 951	19 260	23 315	<i>Minimum_{monthly}</i>	8 177	10 148	11 514	10 950
<i>Average_{monthly}</i>	25 581	31 351	32 451	39 891	<i>Average_{monthly}</i>	15 915	18 780	21 518	21 250
<i>SD_{monthly}</i>	8 324.4	10 074.6	9 357.9	10 628.7	<i>SD_{monthly}</i>	5 693.7	6 536.0	7 079.8	6 317.8
<i>CV</i>	0.325	0.321	0.288	0.266	<i>CV</i>	0.358	0.348	0.329	0.297
<i>SR</i>	1.645	1.619	1.522	1.456	<i>SR</i>	1.746	1.704	1.646	1.554
<i>SI</i>	0.608	0.618	0.657	0.687	<i>SI</i>	0.573	0.587	0.607	0.643

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Table 3. Continued

NUT III	2014	2015	2016	2017	NUT III	2014	2015	2016	2017
<i>Alto Tâmega</i>					<i>Área Metropolitana do Porto</i>				
<i>Terras de Trás-os-Montes</i>					<i>Tâmega e Sousa</i>				
<i>Overnight stays</i>	37 072	52 877	45 188	54 143	<i>Overnight stays</i>	100 884	131 932	146 647	159 625
<i>Market share</i>	0.7%	0.9%	0.7%	0.7%	<i>Market share</i>	1.9%	2.2%	2.1%	2.1%
<i>Maximum_{monthly}</i>	4 993	7 192	5 746	13 172	<i>Maximum_{monthly}</i>	14 748	18 482	19 711	19 661
<i>Minimum_{monthly}</i>	1 683	2 408	2 090	2 018	<i>Minimum_{monthly}</i>	4 230	5 991	6 727	6 960
<i>Average_{monthly}</i>	3 089	4 406	3 766	4 512	<i>Average_{monthly}</i>	8 407	10 994	12 221	13 302
<i>SD_{monthly}</i>	1 033.2	1 494.2	1 178.2	2 931.7	<i>SD_{monthly}</i>	3 074.4	3 836.9	3 952.3	4 028.4
<i>CV</i>	0.334	0.339	0.313	0.650	<i>CV</i>	0.366	0.349	0.323	0.303
<i>SR</i>	1.616	1.632	1.526	2.919	<i>SR</i>	1.754	1.681	1.613	1.478
<i>SI</i>	0.619	0.613	0.655	0.343	<i>SI</i>	0.570	0.595	0.620	0.677

market, namely Brazil, has been growing in all regions in a sharp way. In addition, seasonality is manifested by high peaks in the summer months, namely August, and low values in the winter months, such as December, January and February, for all regions and every year.

Continuing to observe the values presented in Table 3, and comparing the month with the highest tourist overnight stays, August, and the lowest tourist overnights, January, enormous uneven proportions are identified. This evidence shows the levels of concentration and seasonality that continue to exist. According to the calculated seasonality ratio and seasonality indicator each region is experiencing seasonality problems, almost on the threshold of extreme seasonality, as it can be verified by the values of the seasonality indicators. In 2017, *Alto Tâmega e Terras de Trás-os-Montes* regions already presented perturbing values, since the value presented for the seasonality ratio is higher than 2 and for the seasonality indicator is smaller than 0.5. Both values indicate extreme seasonality.

The last applied measurement method is the Gini index. As presented in Table 4, Gini index, in the period under analysis, is very high, express the seasonal concentration of tourist flows and correspondingly unequal distribution. With the exception of *Área Metropolitana do Porto*, where there is a more adequate and balanced distribution over the months, all other regions of northern Portugal have high values (greater than 0.5 indicating extreme seasonality). Regional tourism destinations that need more attention are *Terras de Trás-os-Montes* ($GI_{Average}=0.74$) and *Alto Tâmega* ($GI_{Average}=0.72$). However, from 2016 to 2017, the indicator declined in almost all regions. This satisfactory situation may be the consequence of the policies implemented in the different municipalities where it is intend to implement a more equal distribution regarding the northern region of Portugal.

CONCLUSION

With tourism gaining global importance and presenting increasingly greater volatility, there is the need to study its evolution over time. One of the main problems intrinsically linked to this economic activity is the seasonality, which can have economic, social and environmental repercussions and is considered

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Table 4. Gini Index Evolution, 2014-2017.

Regions (NUT III)	Years				Evolution of Gini Index (2014-2017)				Average	SD	CV
	2014	2015	2016	2017	2014	2015	2016	2017			
North	0.465	0.452	0.432	0.425					0.444	0.018	0.042
AMin	0.578	0.571	0.584	0.567					0.575	0.008	0.013
AMP	0.400	0.378	0.356	0.350					0.371	0.023	0.062
Cáv	0.579	0.577	0.563	0.548					0.567	0.014	0.025
Ave	0.556	0.563	0.538	0.563					0.555	0.012	0.021
ATâm	0.739	0.731	0.709	0.704					0.721	0.017	0.023
T&S	0.624	0.606	0.600	0.591					0.605	0.014	0.023
Dou	0.599	0.586	0.560	0.553					0.575	0.022	0.038
TTM	0.753	0.719	0.739	0.736					0.737	0.014	0.019

Note: Alto Minho (AMin); Área Metropolitana do Porto (AMP); Alto Tâmega (ATâm); Ave (Ave); Cávado (Cáv); Douro (Dou); Tâmega e Sousa (T&S); and Terras de Trás-os-Montes (TTM).

one of the main direct causes of overtourism. Seasonality is one of the main phenomena affecting tourism. It depends on the characteristics of both tourism demand and tourism destinations in terms of location and services supplied. Analysing seasonal patterns helps to understand and predict their impacts on tourism production and consumption (Turrión-Prats, & Duro, 2018), facilitating the formulation and implementation of strategic and destination development policies.

The main purpose of this chapter was to describe a method to find and analyse tourism distribution in time and space, in the North region of Portugal, to identify and understand existing seasonality. For that, the current and official data of the National Statistics of Portugal (INE) was considered for all 8 regions that belong to the North region of Portugal, over the period 2014-2017. Four indicators were calculated, seasonality ratio, seasonality indicator, coefficient of variation seasonal and the Gini index complemented by the Lorenz curve. For the North region of Portugal, it was important to understand how seasonality varies in the 8 different regions that compose it.

The results were consistent, allowing to conclude about the high concentration. The region with the largest market share is the *Area Metropolitana do Porto*, with a very significant percentage (76%), followed by the *Cávado* and *Alto Minho* regions, with 7% and 6%, respectively. *Terras de Trás-os-Montes* is the region with the lower average market share (just 0.7%). This results shows the regions that are ultraperipheral regarding big urban and coastal centres have relatively low market shares. Regarding the main markets, it can be said that in all regions the Top-3 markets are Portugal, Spain and France.

The Gini Index applied in this chapter allowed to calculate the level of distribution of several tourism indicators among North Portuguese regions to understand that the phenomena of seasonality - that

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here it is believed has a strong tie with the overtourism - is indeed a reality and which regions are being suffering from it over the period in analysis. The knowledge and understanding of the reality and its (no)evolution over time allows to identify and recommend the most adequate public (both national and regional) policies to combat the problems caused by seasonality and consequently overtourism and the ones that are the most appropriate to generate sustainability on the tourism sector in all the regions that compose the North of Portugal. If the public policies are fundamental to address both issues mentioned above it is also important that the private agents and the communities, in general, understand the problem and how to overcome it in order it could be possible the tourism sector generates employment and income for all the regions in an equality way. The seaside and the proximity to the most important means of transportation – as the airport, the cruise port or the second most import railway station in the country – influences the existence of overtourism in some regions of the North of Portugal, namely the ones nearest the city of Oporto. However, all the northern region presents a multiplicity of tourism supply that should be more well-known, explored and publicized.

The diversification of tourism supply, namely with a focus on the outdoor tourism for which the less developed North regions are well prepared with the beautiful and almost unexplored landscapes, the cultural and religious heritage and the tasty gastronomy, could be a suitable and sustainable solution for a better distribution of tourism indicators over the entire northern region. The offer of an outdoor tourism plan according with the most suitable rules and supplied adequately by public and private agents is a solution that needs extensively knowledge, proper analysis and public investment on more depressed and less touristic demanded regions. More measures of spatial planning, based on well-defined policies and indicators, like the one here proposed by the application of the Gini Index, will allow a suitable management of all forms of tourism supply and consequently may allow the generation of spillover effects like the tourism sustainability - by avoiding or mitigating the negative impacts of seasonality and overtourism on the territory and populations - the raise of economic productivity, the enhancement of positive social impacts (namely the maintenance of populations in less populated regions) and the environmental protection.

In considering the persistent nature of seasonality in the tourism market, its measurement and analysis are still challenging issues in nowadays tourism research. It is believed that calculating and presenting a robust innovative measurement of tourism seasonality is important to develop/evaluate seasonal public policies and private business alternative strategies. Analysing the distribution of visitors at destinations is valuable for a deeper understanding of seasonality in tourism since gives planners and managers of tourism destinations data that is appreciated when planning services and infrastructures.

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ENDNOTE

- ¹ Nomenclature of Territorial Units for Statistics (NUT).