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The Seasonality of Demand in Spanish Tourist Municipalities: Analysis and Determinants

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THE SEASONALITY OF DEMAND IN SPANISH TOURIST MUNICIPALITIES: ANALYSIS AND DETERMINANTS

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ABSTRACT

Seasonality in tourism consists of the disequilibrium in tourist numbers over the course of the year and has become one of the main problems for the sustainability and growth of the sector. The aim of this study, given the sparse quantitative literature on the subject, is to explore the relevance, changes over time, and explanatory factors of seasonality across a wide range of Spain's tourist destinations (124) for the period 2006–2012. The econometrical analysis is carried out based on a fixed effects panel data model that maximizes estimation efficiency. We think that some implications can be derived in terms of tourist policy.

Keywords: Tourist seasonality; Tourist destinations in Spain; Measurement.

1. INTRODUCTION

Following the development of mass tourism, tourist seasonality has become one of the main problems for the tourism sector. The first study to introduce this topic was that of Baron in 1975; subsequently, it has received increasing attention from academic research. According to one of the most accepted definitions, seasonality can be defined as the seasonal imbalance appearing in tourist flows and which can be summarized by various indicators (Butler, 1994). In particular, the literature has analysed this topic in terms of its causes, measurement techniques, effects, strategies to combat it and policy implications (Koenig and Bischoff, 2005). This study concentrates particularly on the first two of these, namely measurement and possible causes.

Specifically, and in the light of Butler's definition (1994), seasonality should be measured by means of summary indicators. Most authors, including Wanhill (1980), Lundtorp (2001), Koenig and Bischoff (2003) and Fernández and Mayorga (2008), have opted to use the Gini coefficient (Gini, 1912) as a benchmark indicator. The literature shows that its main advantages are its stability and that it is little influenced by outliers. However, a peculiarity of the Gini Index is that it gives more weight to changes in observations located around the mean. If we wish to avoid that, the literature on measuring inequality offers alternatives with different characteristics, such as Theil family indices (Theil, 1967), Atkinson family indices (Atkinson, 1970) or the Variation Coefficient (Duro, 2008 and Duro, 2016). For the Theil and Atkinson indices, the different parts of the distribution can be weighted as desired by varying a sensitivity parameter (Cowell, 1995). Duro (2016) argues that it is appropriate to simultaneously take alternative methods of measurement into account and that one should not base interpretations on a single index, whether Gini or another.

With respect to the causes of seasonality, while there are numerous studies that attempt to identify and classify factors that help explain seasonal patterns (Baron, 1975; Butler, 1994; Frechtling, 1996; Butler and Mao, 1997; Baum and Hagen, 1999; Koenig and Bischoff, 2005; Andriotis, 2005), detailed quantitative research into their nature is limited. Very diverse factors have been conceptually proposed, although typically these fall into two broad categories: natural and institutional. The first category includes climatic variables in particular, taking into account their relationship to some of the main forms of current tourist activity, such as sun and beach tourism and/or snow tourism. In contrast, institutional factors relating to the effects on flow associated with, for example, the precise programming of school and work holiday periods, national holidays and cultural events might. When categorizing explanatory factors, it is also worth highlighting the work of Lundtorp, Rassing and Wanhill (1999) which suggests that there is a need to differentiate between so-called *push-factors* and *pull-factors*. *Push-factors* group together the factors that "drive people out" of their region of origin—these are associated with the region's prevailing characteristics, such as climate, holiday periods, trends, social pressure or considerations relating to the calendar or to access (transport costs and journey time). In contrast, *pull-factors* are the attractive factors that "pull people into" the destination region—these are associated with factors such as climate, sporting seasons, or events.

Going into more detail on how explanatory factors work, the literature has, first and foremost, linked tourist flows with climate. There is an abundance of literature related to the effects of climate on tourist flows, especially in the context of the problem of climate change. Studies such as that of Amelung, Nicholls and Viner, (2007) analyse, for example, the potential implications of climate change for world tourism by using the

Tourism Climate Index (TCI) developed by Mieczkowski in 1985. Others research, such as those of Kulendran et al., (2010), Hadwen et al., (2011) and Ridderstaat et al., (2014) incorporate climatic variables. Probably the most common rule here is to use the average annual temperature and its square as proxies for the effects of climate on tourism (Maddison, 2001; Lise and Tol, 2002; Hamilton, 2004; Bigano et al., 2006; Bujosa; Rosselló, 2013). Secondly, we encounter studies that emphasize the link between seasonality and the variety of the tourist product offered by the destination (Cuccia and Rizzo, 2011; Martín et al., 2014). Finally, there are also analyses which aim to explain seasonality using economic models (Rosselló et al., 2004).

Given the need to examine the character and determinants of seasonality empirically, it is somewhat surprising that the subject has aroused so little interest in the academic literature. The current study aims are as follows. Firstly, a descriptive exploration of seasonality for a wide sample of tourist destinations in Spain (124) over the period 2006–2012, and this includes the vast majority of the country's hotel demand. This means that the results are fairly representative of the territorial situation. Moreover, a useful characterization is achieved by taking the segmentation of Martín et al., (2014) related to the type of destination. The analysis is based on hotel overnights, which is a satisfactory indicator associated with the activity and is standard in the literature (Tsitouras, 2004; Duro, 2008; Fernández amd Mayorga, 2008; Cuccia and Rizzo, 2010; Martín et al., 2014; Duro, 2016). Secondly, seasonality determinants are analysed with panel data for 2006–2012. The model used is based on factors referred to in the literature, their application being conditioned by the analysis of territorial differences and the available information. Specifically, three main factors are taken as a benchmark for explaining territorial variations in Spain's tourism seasonality: the type of product, the size of the domestic market and the climate conditions. Also some control variable has been added as the differential case traced by Canary Island and also time-dummies. Although institutional factors constitute one of the main causes of seasonal concentration levels, found in the wide literature given, in this paper are not fairly relevant because it is based on municipalities' differences. Thus, we consider that these factors affect approximately all Spanish municipalities in a similar way. Therefore, including these types of factors would seem to have little relevance in our study.

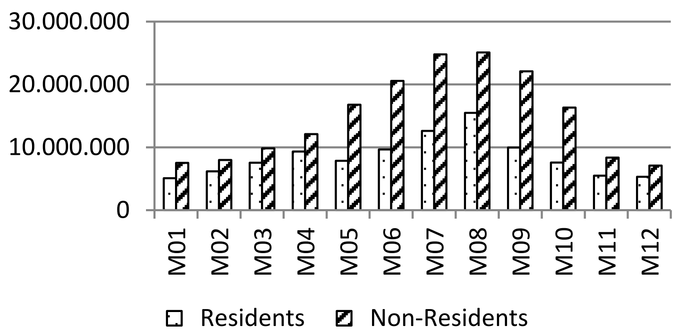
This article is organized as follows. The second section contextualizes some of the most important descriptive results about tourist seasonality in Spain as a whole and at regional and municipality level. The third section concentrates in the assessment of the relevance of some variables in explaining differences on tourist seasonality over the Spanish municipalities. Finally, a section is devoted to the major conclusions obtained.

2. SEASONALITY IN SPAIN AND ITS TOURIST MUNICIPALITIES: A DESCRIPTIVE ANALYSIS

Figure 1 shows monthly hotel overnights, which help to give an initial overview of seasonal tourist concentration. This confirms that demand is concentrated mainly into the months of June, July, August and September. Interestingly, the distribution does not change significantly from year to year. These four months continue to account for, broadly speaking, around 50% of global overnights in each year. This demonstrates a certain entrenchment in seasonality which underlines the potential relevance of inertia in behaviour patterns or of few changes in the variables that determine it and/or its effects. Moreover, it can be seen that the seasonal patterns of residents and non-residents are similar, both having higher numbers during the summer period. Nevertheless, if we go into more detail, two peaks can be seen in the annual distribution of residents, but only one in that of non-residents. Thus, residents typically produce a second demand peak during April, coinciding with Easter. However, in dynamic terms the global evolution of both major markets has been very different in terms of the year-to-year comparison. Thus, resident overnights reduced 11.3 % between 2006 and 2012, whereas non-resident stays increased by 17.5 %. International tourism increased in each of the twelve months, especially during July, August and September by more than 20 %. In contrast, resident percentages showed a decline for every month, mainly in November and December with a drop of 21.1 % and 21.8 % respectively, largely as a result of the negative impact of the economic crisis on tourist consumerism.

FIGURE 1

MONTHLY OVERNIGHTS IN SPAIN THROUGHOUT 2012



Note: The distribution of monthly overnight stays for the remaining years of the period under consideration show similar characteristics to the ones shown here. The exception was 2008, where the second demand peak for residents occurred in March, coinciding with Easter. Source: Compiled by the authors based on data from the HOS by the National Statistics Institute (INE).

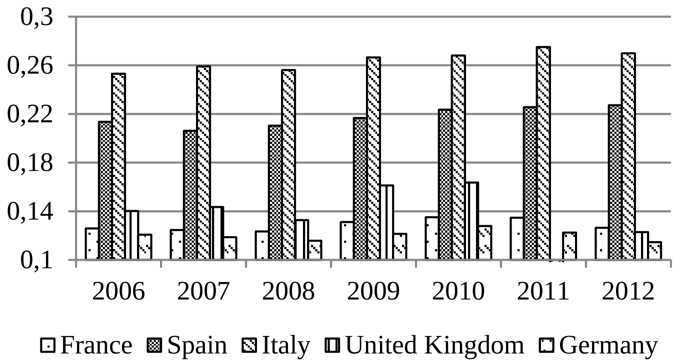
Going beyond the above visual observations, it is interesting to quantify Spanish seasonal concentration in a reasoned, rigorous and synthetic way. In this sense, we reproduce the Gini coefficient, which has been widely used in analysing the seasonality in tourism.[1] The utilization of other summary indexes (Duro, 2016) would produce fairly similar results. Specifically, it can be seen that the monthly concentration of demand is one of the greatest among the high tourist demand European Union countries (France, Italy, Germany and the United Kingdom). Spain, indeed, is second only after Italy. Furthermore, this seasonal behaviour has increased over the period (Figure 2). Spain has virtually double the values of Germany, France and the United Kingdom. In fact, if we look the changes since 2006, the monthly concentration of hotel demand in Spain has become even more pronounced.

[1] As it approaches 1 it will indicate a situation in which the variable has a very high concentration, while when the values are close to zero, we can say that the selected variable is distributed evenly over time.

This concentration does not, however, affect all the country's municipalities and/or destinations in the same way. Based on the availability of data, information was processed for 124 tourist activity locations distributed across the Iberian Peninsula, the Balearic Islands and the Canary Islands. This represented approximately 95% of the total hotel overnights registered at the main Spanish tourist centres and around 75% of the total number of hotel overnights in Spain. Here, seasonality is not measured using a synthetic index like the Gini, but rather with a partial concentration index such as the number of overnights from June to September as a proportion of the total. The reason for this change is that, for a significant number of tourist municipalities, information covering every month is not available. So that, the application of this partial measure allowed the number of tourist locations incorporated into the analysis to practically double. Using a complete index would have meant including only 72 tourist locations and excluding some of Spain’s main tourist destinations such as, for example, Calvià (Balearics), Lloret de Mar (Catalonia), Salou (Catalonia) and Sant Llorenç de Cardassar (Balearics). In any case, and as a robust test, it was confirmed that the results obtained through a partial measure and through the Gini as a synthetic index for the sample of municipalities with data, were highly correlated. For example, for coastal municipalities (capitals or non-capitals) and interior capital municipalities, the positive correlation exceeded 0.90 in all cases; for interior municipalities that are provincial capitals the correlation approached 0.80. In addition, it was confirmed that the correlations between the two measures were also elevated when we exclude from the sample those municipalities whose hotel demand is less than 80 % of global accommodation demand.

FIGURE 2

SEASONALITY IN TOURIST DEMAND AS MEASURED BY THE GINI INDEX



Note: Data used for calculating the Gini Index is based on monthly overnight stays in hotels. Source: Compiled by the authors based on information obtained from Eurostat.

As a first descriptive result it can be seen in the Table 1 that the ten tourist locations in Spain with greatest seasonality, on average, between 2006–2012 belong to the autonomous regions of the Balearic Islands, (Formentera, Sant Josep de Sa Talaia, Santa Eulalia del Rio, Ciutadella de Menorca, Sant Antoni de Portmany and Ibiza), Andalusia

(Barbate), the Principality of Asturias (Ribadesella) and Catalonia (Tossa de Mar and Cambrils). Otherwise, the lowest levels are those of the Canary Islands, (Las Palmas de Gran Canaria, Santa Cruz de Tenerife and Mogán), the Region of Murcia (Murcia), Aragon (Sallent del Gallego), Andalusia, (Seville, Cordoba and Granada), Madrid and Extremadura (Trujillo). Consequently, it would seem that seasonal behaviour mainly affects those locations situated on the coasts of the Iberian Peninsula and the Balearic Islands. For instance, Duro (2016) performed an analysis of seasonality using comprehensive synthetic indices for Spanish provinces over the period 1999–2012. The results support the thesis that most seasonality occurs in the provinces of the Balearic Islands, Girona and Tarragona (the two latter ones being coastal provinces of Catalonia) and amongst the least, the Canary Islands and Madrid. About the least affected, in our case are also some of the tourist places in the Canary Islands, coast or inland towns which are provincial capital or not. The lower values in the Canary Islands can mainly be attributed to the low variation in the annual temperature which coincides with the optimum level for its main variety of tourism.

TABLE 1
THE TEN TOURIST LOCATIONS WITH THE GREATEST/ LEAST SEASONALITY, ON AVERAGE, IN THE PERIOD 2006–2012

		TS	D			TS	D
1	Formentera (IB)	0.869	574,824	1	Palmas de Gran Canaria (CN)	0.291	1,004,553
2	Sant Josep de Sa Talaia (IB)	0.81	1,738,971	2	Sta. Cruz de Tenerife (CN)	0.297	388,504
3	Santa Eulalia del Río (IB)	0.798	1,760,891	3	Murcia (MC)	0.3	558,519
4	Barbate (AN)	0.785	134.973	4	Sallent de Gállego (AR)	0.307	225,111
5	Sant Antoni de Portmany (IB)	0.771	1,533,268	5	Mogán (CN)	0.321	2,899,452
6	Ciutadella de Menorca (IB)	0.769	1,527,011	6	Sevilla (AN)	0.331	3,389,845
7	Ribadesella (AS)	0.753	87,286	7	Madrid (MD)	0.332	14,579,823
8	Ibiza (IB)	0.751	1,328,968	8	Córdoba (AN)	0.333	1,166,281
9	Tossa de Mar (CT)	0.747	809,346	9	Trujillo (EX)	0.336	119,820
10	Cambrils (CT)	0.734	924,533	10	Granada (AN)	0.339	2,620,046

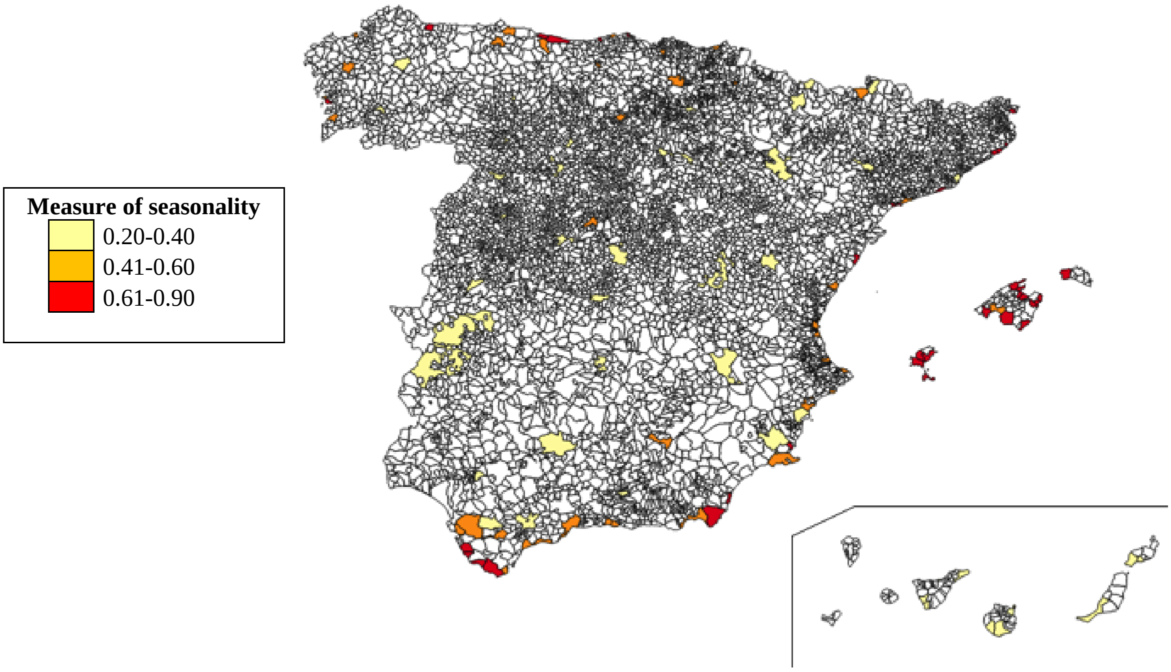
Note: TS is the measure of average seasonality for 2006–2012 obtained based on the number of overnight from June to September within the annual total; D is the average total demand for 2006–2012. IB: Balearic Islands; AN: Andalusia; CT: Catalonia; CN: Canarias; MC: Murcia Region; AR: Aragon; MD: Community of Madrid and EX: Estremadura. Source: Compiled by the authors based on the INE's HOS.

Figure 3 reproduces the precise location of the municipalities included in the analysis and it shows, for instance, that there are no problems of spatial autocorrelation because municipalities selected for analysis are randomly distributed throughout the Spanish territory. Also in this figure we have reproduced a categorization of the level of concentration by groups in a very intuitive way.

Analysing the values of partial measures of seasonality we can see that typically the more seasonality are located in the coasts and Balearics. In fact, is an interesting analytical exercise, the 124 tourist municipalities can be grouped together into the four types, coastal capitals (municipalities that are provincial capitals situated close to the coast), inland capitals (municipalities that are provincial capitals situated in the interior of the peninsula), coastal areas (municipalities that are not provincial capitals and are close to the coast) and inland areas (municipalities that are not provincial capitals and which are situated in the interior) suggested by Martín et al., (2014) . Figure 4 verifies that there are typically coastal areas which are most affected by seasonal concentration of demand while inland capitals are least affected. These results can be explained by the type of product offered and by the climate. Basically coastal areas offer a sun and beach product that is consumed predominantly during the warmer months of the year.

FIGURE 3

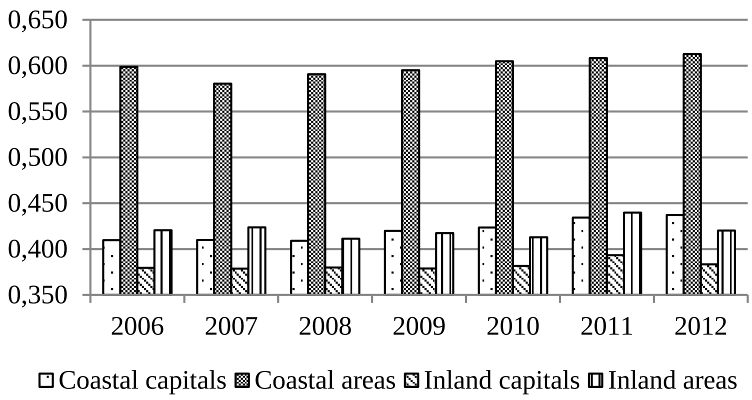
PARTIAL MEASURE OF THE SEASONALITY OF TOURIST DEMAND



Note: The partial measure of seasonality was obtained based on the number of overnight stays between June and September within the annual total. Source: Compiled by the authors based on the INE's HOS.

FIGURE 4

SEASONALITY OF TOURIST DEMAND



Note: The partial measure of seasonality was obtained based on the number of overnight stays between June and September within the annual total. The term coastal capitals groups together municipalities which are provincial capitals and close to the coast; inland capitals include provincial capitals situated inland; coastal areas groups together municipalities which are not provincial capitals and are close to the coast; inland areas include municipalities situated inland that are not provincial capitals. Source: Compiled by the authors based on data from the INE's HOS.

In contrast, inland capitals offer cultural tourism, for which the most suitable climatic conditions occur in the second quarter, or at least are more suited to year-round tourism on average. Inland areas and costal capitals show similar seasonality. Given that the coastal capitals can also offer cultural tourism, they may not suffer so severely from this problem. As for changes, the data show that seasonal concentration has increased over recent years in coastal areas and in coastal capitals and, therefore, in overall coastal municipalities. The inland capitals display a more stable pattern of change, notwithstanding a slight increase in 2011 which returned to its initial position in 2012. There is no clear tendency detectable, there were three peaks in 2007, 2009 and 2011, the last one being the most pronounced.

Lastly, with the aim of observing if seasonality levels differ according to the countries sending tourists to Spain, the following table (Table 2) has been produced showing the main markets role. The categorization of tourist locations leads to the conclusion that, in general terms, there is no global evidence that one market is especially more seasonal than any other. Thus, the French market shows the highest levels in coastal and inland capitals compared to the rest. In contrast, in the coastal and inland areas, the highest values correspond to the domestic and British markets respectively. On the other hand, the domestic and German markets are least seasonal in the case of coastal capitals, with the domestic market being least seasonal for inland areas and capitals, and the German market least seasonal in coastal areas. This result could be due to the fact that the Canary Islands represent the main destination for German tourists to Spain. Analysing the results of the coastal capitals, it is evident that all of the inbound markets became more seasonal during the period 2006–2012, especially the British and French ones. In contrast, for the interior capitals, the domestic and German markets are seen to be less seasonal. Notwithstanding, resident tourists registered a higher level of seasonality in 2011 before returning to their initial position in 2012. Similarly, France and the United Kingdom became increasingly seasonal markets.

TABLE 2

SEASONALITY ACCORDING TO COUNTRY OF ORIGIN

		2008	2009	2010	2011	2012	D
Coastal capital	Residents	0.398	0.405	0.402	0.415	0.408	11,382,101
	Germany	0.395	0.404	0.416	0.405	0.43	5,116,786
	France	0.453	0.477	0.47	0.476	0.498	1,771,206
	UK	0.427	0.437	0.422	0.428	0.474	2,304,856
Coastal areas	Residents	0.507	0.524	0.527	0.528	0.537	36,709,635
	Germany	0.384	0.38	0.386	0.381	0.393	31,464,511
	France	0.456	0.462	0.483	0.483	0.482	4,423,479
	UK	0.421	0.429	0.445	0.464	0.475	30,060,124
Inland capitals	Residents	0.381	0.38	0.379	0.391	0.374	20,438,208
	Germany	0.404	0.395	0.417	0.397	0.397	1,072,408
	France	0.47	0.486	0.47	0.502	0.5	1,477,331
	UK	0.464	0.47	0.484	0.49	0.492	1,168,019
Inland areas	Residents	0.375	0.37	0.359	0.368	0.353	1,901,036
	Germany	0.379	0.455	0.462	0.471	0.469	48,457
	France	0.404	0.401	0.403	0.443	0.379	88,783
	UK	0.408	0.522	0.476	0.466	0.476	62,297

Note: The seasonality measure is obtained from the number of overnight stays from June to September within the annual total, its use being justified in the following section. The measure has been produced using information from 72 tourist destinations due to the lack of available data. The tourist locations selected, centred on coastal and inland capitals, represent more than 95 % of the total demand across all of the 124 locations across these zones. In contrast, the locations situated in inland and coastal areas only represent around 50 % and 65 % of the demand, respectively. Because of this restriction, the conclusions arrived at for these last two groups should only be taken as an indicative. D: total average demand for the period 2008–2012. Source: Compiled by the authors based on data from the INE’s HOS.

3. DETERMINANTS OF TERRITORIAL VARIABILITY IN THE SEASONAL CONCENTRATION OF DEMAND IN SPAIN

3.1. Methodological aspects

This section analyses the determinants of seasonality for a wide range of tourist locations in Spain in order to obtain some general explanatory patterns in a quantitative way. The multi-destination nature of the paper applies to the period 2006–2012. The variable analysed is once again hotel demand, in particular the number of overnight stays. The seasonality measure, which is effectively a seasonal concentration, is calculated on a monthly basis as in the previous sections.

Specifically, the focus for selecting the variables to include in the model includes three variables as basic determinants of the seasonality previously referred to: product, inbound market and climate. Although institutional reasons constitute one of the main causes of seasonal concentration levels, to include this would seem to have little relevance, given that these parameters could be expected to affect all of the destinations in more or less the same way in a given year. Note that the core of our approach is to explain territorial variability, so we need to identify variables that can demonstrate such variability.

With regard to the first variable, the type of product offered, the same grouping criterion has been used as in the previous descriptive section, supported by the existing mix of tourism in Spain. Thus, information about the main tourist locations has been grouped into four types: coastal capitals, inland capitals, coastal areas and inland areas. In general terms, each of these groups, and the municipalities within them, offers different types of tourist products. Thus, the coastal capitals are basically associated with sun and beach tourism and cultural tourism; the coastal areas just with sun and beach tourism; the inland capitals base themselves particularly on cultural tourism products and inland areas on rural tourism. This differentiation allows us to take into account the relevance of the product, or the specialization of the product, in relation to the differences in seasonality. This structuring has, for example, been used as proxy product by Martín, et al., (2014). Note that this variable would be fixed in time. In any case, as evidenced later, this choice seems pretty consistent since the panel data used basically shows much more variability along the cross-sectional units (i.e. municipalities) than a long time.

The second variable, the inbound market, was determined based on identifying the origin of the tourists. The weight of the domestic market has been selected synthetically. In this way, we can see whether a different general seasonal pattern exists in terms of the large inbound market (i.e. the domestic versus the international market). This contrast may be useful in developing promotional policies and strategies. In studies such as that of Lim and McAleer (2001), for example, this type of variable is incorporated to examine if there are differences in the seasonal arrival patterns of tourists from Hong Kong, Malaysia and Singapore into Australia.

Finally, and with respect to the climate variable, the most common and synthetic line has been pursued which consists of incorporating temperature and its square as proxies for the effects of climate on tourist flow. The idea behind this non-linear relationship between average temperature and seasonality is the anticipation that people do not want climates that are too hot or too cold. This means that a high average temperature would increase seasonality, but that a threshold would exist beyond which temperature increases would generate a lowering in concentration.

The basis for the empirical model proposed in the analysis is the following:

$$ln\ ts = \beta_0 + \beta_1\ coast_i + \beta_2\ kc_i + \beta_3\ ki_i + \beta_4\ inland_i + \beta_5\ ln\ dn_{it} + \beta_6\ tm_{it} + \beta_7\ tm\_2_{it} + \beta_8\ tv_{it} + \beta_9\ canarias_i + u_{it} \quad (1)$$

In relation to the variables included in (1), and therefore those of the basic specification, there are two additional comments of interest in addition to what is already known. First, the model includes time variables to assimilate the effects of global trends in seasonality;

second, the specification includes a dummy variable to cover the specifics of the Canary Island municipalities in order to capture their climatic peculiarity which is not captured by variable temperature (specifically, the low level of seasonal variation throughout the year). Table 3, briefly describes of the variables used in this study.

Data for 124 municipalities and the years of 2006–2012 are combined in a panel model with fixed effects. This approach has a variety of advantages. Fundamentally, degrees of freedom are increased and, hence, the robustness of the estimates. In particular, it limits the problem of omitted variables and reduces multicollinearity bias (Hsiao, 2003). The model was estimated both as a fixed effects model and as a random effects model. To differentiate between them, a Hausman specification test was performed.[2] This test suggests, in particular, the greatest consistency of fixed effect estimates, due to the existence of a correlation between the error term and the explanatory variables; but the application of a fixed effects model implies dispensing with those variables that remain constant over time, in our case the type of destination variable. Therefore, the estimation method proposed is that of Hausman and Taylor (1981), which is an estimator of instrumental variables that allows coefficients to be estimated for those regressors that that do not have inter-seasonal variations.

TABLE 3

DESCRIPTION OF THE VARIABLES

Variable	Description	Average	Std. Dev.	Min.	Max.
ts	Measure seasonality for overnight stays in hotel establishments	0.506	0.150	0.242	0.887
dn	Number of overnight stays in hotel establishments by residents	579,492	857,974	11,495	7,164,027
tm	Average annual temperature	16.870	2.700	10.100	22.400
canarias	Tourist location belonging to the Canary Islands (= 0 if not belonging, and 1 if belonging to the Islands)				
Product variable					
kc	Coastal capital (= 0 if not a coastal capital, and 1 if it is a coastal capital)				
ki	Inland capital (= 0 if not an inland capital, and 1 if it is an inland capital)				
inland	Inland area (= 0 if not inland, and 1 if it is an inland)				
coast	Coastal area (= 0 if not a coastal area and 1 if it is a coastal area)				
Time variable					
tv	Time dummies				

[2] This test evaluates the null hypothesis that the coefficients of the fixed and random effects models are the same.

Note also that, *de facto*, the panel data used for the characteristics of the concentration variable have a strong cross-sectional component, given the reduced temporal variability of the concentration in comparison with the territorial (cross-section) differentiation.[3] Thus, the panel model is actually seen as the union of different cross-sectional waves.

3.2. Main results

The main results and the different estimations in order to check the robustness of the model are provided in Table 4. Specifically, the estimation shown in the one column contains the 124 tourist municipalities. The second column has been developed taking into account only those municipalities whose hotel demand exceeds 80% of the total accommodations demand. The equation (3) is estimated without considering the inner areas given that they offer less correlation coefficient between our partial concentration measure and a comprehensive measure like the Gini. Finally, the model (4) is the combination of model (2) and (3) therefore does not consider demand for hotel municipalities with less than 80% and inland areas. No significant differences between the coefficients of the various estimates are observed. It can be seen initially that the model works quite satisfactorily, the Wald test denotes the significance joined models. The portion of the variance that is explained by the tourist municipalities is high, clearly more than a 90% in all the models.

From the detailed results for the different explanatory variables, the following points of interest emerge:

First, the coefficients estimated for the time-variable are positive, significant and generally show an increase for the years from 2009 until 2012. *Ceteris paribus*, this result indicates a global advance in concentration, with respect to 2006 as base year. Thus, and going beyond the variables included as determinants of territorial variability of the seasonal concentration of tourist activity, there seems to be a worsening imbalance, throughout the tourist municipalities of the sample, and over the period analysed.[4] A possible justification for these results may be formulated tentatively in terms of general tourist behaviour in the face of the crisis. Given the global economic context, people may have typically tended to reduce demand outside the summer or central months (when there may be less necessary), while nevertheless continuing with travel in the summer period at least (minimum consumption). Rosselló et al., (2004) had, in fact, already discovered this inverse relationship between income and seasonality for the British and German markets in the specific case of the Balearic Islands.[5]

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[3] The average standard deviation of the concentration in cross-section units approaches a value of 0.15 whilst the average standard seasonal deviation, throughout all of the cross-sections, was 0.02.

[4] In addition, an alternative specification was estimated where, instead of time dummies, a tendency variable was included. Using this, the results obtained effectively supported the significance of this variable with a positive coefficient (+0.007).

[5] Obviously it would be interesting to compare the effect of demand variables, such as income and prices, on the observed seasonality. However, the data and objectives of the study do not allow for this analysis. The article analyses territorial differences in seasonality and therefore the models typically have to include variables of a territorial nature. If the focus of the analysis, instead of being multi-destination as in the paper, were multi-market (and based on one destination) then it would be possible to carry-out this analysis.

TABLE 4

RESULTS OF THE ESTIMATION

	(1)		(2)		(3)		(4)	
TVexogenous								
tv2007	–0.005		-0.002		-0.009	*	-0.006	
	(0.005)		(0.006)		(0.005)		(0.005)	
tv2008	–0.001		0.002		0.002		0.006	
	(0.005)		(0.006)		(0.006)		(0.006)	
tv2009	0.010	*	0.011	*	0.015	**	0.016	***
	(0.006)		(0.006)		(0.006)		(0.006)	
tv2010	0.019	***	0.020	***	0.024	***	0.026	***
	(0.007)		(0.006)		(0.005)		(0.006)	
tv2011	0.038	***	0.041	***	0.040	***	0.044	***
	(0.006)		(0.007)		(0.006)		(0.006)	
tv2012	0.029	***	0.032	***	0.033	***	0.037	***
	(0.008)		(0.008)		(0.007)		(0.007)	
tm	0.048	**	0.052	***	0.042	***	0.046	***
	(0.021)		(0,020)		(0.015)		(0.018)	
tm_2	–0.002	***	-0.002	***	-0.001	***	-0.002	***
	(0.001)		(0,001)		(0.001)		(0.001)	
TVendogenous								
ln_dn	–0.021		-0.018		-0.013		-0.008	
	(0.018)		(0.018)		(0.017)		(0.018)	
TIexogenous								
kc	–0.314	***	-0.296	***	-0.318	***	-0.304	***
	(0.042)		(0.055)		(0.043)		(0.052)	
ki	–0.481	***	-0.456	***	-0.487	***	-0.466	***
	(0.038)		(0.049)		(0.031)		(0.040)	
interior	–0.437	***	-0.471	***				
	(0.075)		(0.062)					
canary	–0.453	***	-0.421	***	-0.453	***	-0.420	***
	(0.041)		(0.045)		(0.039)		(0.045)	
constant	–0.585	**	-0.684	**	-0.621	***	-0.748	***
	(0.275)		(0.301)		(0.229)		(0.274)	
Method			Hausman-Taylor					
Rho	0.921		0.910		0.931		0.931	
sigma_u	0.155		0.149		0.151		0.154	
sigma_e	0.045		0.047		0.041		0.042	
Num. Obs	832		721		757		646	

Note: *denotes a 10 % significance level, ** 5 % and *** 1 %. Standard errors in parenthesis and estimates corrected for heteroscedasticity.

Second, the estimates obtained show that the tourist product dummies act as a significant determinant factor in the territorial differences of tourist activity. Effectively, coastal capitals in a uniform manner (sun and beach tourism and cultural tourism) and inland municipalities, whether capitals or not, have, *ceteris paribus*, a lower concentration than non-capital coastal municipalities, in line with the descriptive statistics shown in the second section. Observe that, comparatively, the coefficient for coastal capitals is fairly close to inland areas. Specifically, and in terms of order, it is the inland capital municipalities that globally present fewer concentrations, followed closely by inland municipalities and then capital municipalities in coastal areas.

Third, the results indicate that the domestic market factor does not have a significant impact on territorial differences of concentration. So, having more domestic market does not necessarily reduce concentration and this can be attributed to the existing heterogeneity at a territorial level. As the attached Table 5 shows, the partial concentration indicator for domestic market goes from 0.76 in Cambrils (Catalonia) to 0.33 in Barcelona (Catalonia) and Las Palmas de Gran Canarias (Canary Islands). In fact, after a parametric hypothesis bilateral and unilateral test was obtained that the hypothesis of equality in the indices between the domestic and international markets cannot be rejected. Therefore, given the evidence obtained would seem to make little sense to act globally to promote the domestic market each year in the destinations as a measure to combat seasonality and rather should implement specific strategies to reduce seasonality.

Fourth, the results indicate that climate, specifically the average temperature, acts as a determinant factor of seasonality, and of its inter-municipal variability. In particular, there is a significant non-linear relationship between average temperature and concentration, as shown by the statistical significance of the coefficient of the average temperature squared. Therefore, an increase in average temperature results in an increase in concentration up to a certain point, at which it starts to reduce due to the dissatisfaction generated by high temperatures (although the scale of the reduction is very low). In any case, given the magnitude of the coefficients, the ascending part of the relationship dominates and therefore there is mainly a positive relationship between temperature and concentration along the sample. Other studies, Maddison (2001) for the United Kingdom and Bujosa and Rosselló (2013) for Spain, have discovered this inverted 'U' relationship between average temperature and tourist demand and between average temperature and seasonality respectively. Notwithstanding this, in other studies, such as Lise and Tol (2002) for the Netherlands, and Hamilton (2004) for Germany, a positive but linear relationship was found between tourist demand and average temperature.

Lastly, the negative and significant coefficient of the dummy variable *Canary* shows us that a tourist location situated on these islands exhibits, *ceteris paribus*, a generally lower seasonality compared with the rest of the locations situated throughout the Iberian Peninsula and the Balearic Islands. Specifically, the municipalities situated in these islands have a lower concentration than the rest simply and solely because of their location. In fact, the percentage of visits to the Canary Islands during the summer season only represents around 30 % of the total. Basically, the variable assimilates the low variation, over the course of the year, of the monthly temperature from its average of 21ºC.

On the other hand, and in terms of the specification, one might suspect the existence of omitted variables correlated with regressors, which can bias the estimates. Although it is not obvious what potential variables to add in a study of this nature, a reasonable procedure to deal with this, and other errors in specification is to carry out a Ramsey test (RESET), as suggested by Ramsey and Schmidt (1976).[6] Applying the Ramsey test to

[6] This test consists of estimating a regression in which the prediction of the explanatory variable value arising from the original model is squared and incorporated into the model. The test is based on the significance of the coefficient of this new variable and is designed for cross-sectional models. In our case, such considerations are relevant, given that a major part of the variability between observations is cross-

each annual cross-section of the sample, and to the model of fixed effects, did not throw up significant results in any of the cases. So, this does not seem to be a particularly important problem for the previous estimates.[7]

TABLE 5

TEN TOURIST LOCATIONS WITH THE GREATEST/LEAST SEASONALITY IN THE DOMESTIC MARKET, ON AVERAGE, IN THE PERIOD 2006–2012

		TS	D			TS	D
1	Cambrils (CT)	0.761	486,257	1	Murcia (MC)	0.294	459,192
2	Tarifa (AN)	0.758	159,044	2	Sevilla (AN)	0.294	1,619,592
3	Nijar (AN)	0.718	108,639	3	Granada (AN)	0.301	1,405,928
4	Sanxenxo (GA)	0.708	682,571	4	Córdoba (AN)	0.303	735,522
5	Sant Llorenç des Cardassar (IB)	0.699	138,822	5	Vielha (CT)	0.304	338,029
6	Llanes (AS)	0.698	192,405	6	Sta. Cruz de Tenerife (CN)	0.305	310,107
7	Estepona (AN)	0.659	297,820	7	Madrid (MD)	0.307	6,795,206
8	Pájara (CN)	0.658	411,749	8	Lloret de Mar (CT)	0.311	996,247
9	Peñíscola (VC)	0.635	1,340,778	9	Barcelona (CT)	0.333	2,932,297
10	Mogán (CN)	0.635	221,922	10	Palmas de Gran Canaria (CN)	0.333	584,216

Note: TS is the measure of average seasonality for 2006–2012 derived from the number of overnight stays from June to September within the annual total; D is the average total demand for 2006–2012; CT: Catalonia; AN: Andalusia; GA: Galicia; IB: Balearic Islands; AS: Principality of Asturias; VC: Valencian Community; CN: Canarias; MC: Murcia Region and MD: Community of Madrid. Source: Compiled by the authors based on data from the INE's HOS.

4. FINAL CONSIDERATIONS

The main purpose of the article is to concentrate on the measurement of tourist seasonality and evaluate its determining factors. To do this, we evaluated a large sample of tourist municipalities in Spain (124) which together form the bulk of the county's tourist demand. Specifically, the demand variable used is hotel overnight stays, the indicator widely used in the literature, and the data was primarily taken from the Spanish National Statistics Institute, notably its Hotel Occupancy Survey. The variable measuring seasonality had to be a partial one (hotel overnight stays from June to September as part of the total) due to the unavailability of some of the monthly data for a large number of tourist municipalities.

sectional rather than seasonal. They can be implemented in the same way for a panel by adding this squared variable.

[7] Alternative estimations were undertaken, nevertheless, with a lagged dependent variable without producing either substantially better or qualitatively different results to those detailed in the main text. Also, and although the Hausman test suggests using a fixed effects model rather than a random one, the results were largely the same, except that the variable of the domestic market has a reducing impact on seasonality, although this is of a very limited magnitude.

In summary, the work adds value, with respect to the current situation, in several areas. Firstly, it focusses on measuring tourist seasonality, a line of research established by Koenig and Bischoff (2003) as a priority, but one with little evidence up to now; secondly, it uses an empirical analysis at an unusually detailed level in Spain; i.e. by tourist municipalities; and thirdly, it examines an initial model of determinants of municipal seasonality by using panel data with fixed effects for the period 2006–2012. The variables whose significance is examined are determined by suggestions in the literature, the model studied (multi-destination and hence essentially analyses of regional differences) and by data availability. In particular, the following factors were included: time dummies, type of destination, volume of the domestic market, temperature and the specific factor of the Canary Islands. As it have been seen through all this paper, despite that institutional reasons constitute one of the main causes of seasonal concentration levels, the fact of including this type of factors seem to have little relevance in this paper, given that these parameters could be expected to affect all of the Spanish destinations approximately in a fairly similar way.

The main results of the analyses can be summarized as follows:

First, Spain, as a nation, has a seasonal concentration of high demand greater than its neighbouring countries, and this has not improved in recent years (in fact, it has worsened since 2006). Consequently, an analysis of this problem takes on even more importance, as does the need to implement policies to combat it. In this respect, the literature refers to the importance of product, market segmentation and/or pricing policies (Weaver and Oppermann, 2000; Koenig and Bischoff, 2003).

Second, measuring the concentration allows us to state that the area most strongly affected by this seasonality are clearly the coastal non-capital destinations, whereas inland capitals are the destinations least affected. In fact, this seasonal concentration has even increased in recent years in all coastal municipalities, whether they are capitals or not. Inland capitals, meanwhile, demonstrate a generally consistent change, while no clear trend can be observed in inland areas. So the case of coastal non-capital areas in Spain is especially problematic, that is, high level of seasonality and with an upward trend.

Third, the model estimates allow us to conclude that effectively the type of destination, associated with the type of product mainly offered, is very important when it comes to explaining regional differences in concentration. In agreement with the previous analysis, coastal non-capital municipalities are typically more seasonal than coastal or inland capitals and coastal capital ones.

Fourth, it has been noted that the size of the domestic market does not have a significant differential overall impact on concentration. Therefore, it cannot be reliably concluded that a bigger domestic market correlates with lower observable seasonality. Consequently, the case profile is very diverse within the different regions and areas. Indeed, the seasonality of residents may be greater in many cases than that of non-residents. This means that promoting domestic tourism as a lever for reducing seasonality may not be effective overall, so it would be necessary to concentrate on specific programmes for reducing seasonality rather than on global promotional programmes.

Fifth, the estimates demonstrate a non-linear relationship between the average temperature and seasonality; however, the ascending part of the relationship dominates.

Sixth, the time dummy variable produced significant and increasing figures over time, suggesting a structural context of growth in concentration above and beyond the destination and its characteristics. It is possible that one of the reasons for this result can be attributed to the effects of the economic crisis on travel, which may have acted to favour seasonal concentration (peak-seasons satisfying more basic needs and travelling in off-peak seasons satisfying complementary needs). Whatever the case, the model used does not permit the relevance of this mechanism to be tested with any degree of precision.

Finally, the Canary Islands factor is very powerful, and therefore the driving force behind the annual climate variability.

It can be concluded that tourist seasonality continues to be a problem in Spain and for a large proportion of its tourist municipalities. Given the social, environmental and economic costs that this entails, it is an absolute priority that policies to combat this seasonality are given precedence in the country's tourism strategy. Regional Strategic Tourism Plans must prioritise related measures. In this respect, there is a need for a great deal more knowledge about the case profiles, determinants and policy assessments at an international level. Territorial sustainability in the growth of tourism demands no less. Anyway, high doses of patience are also needed to combat seasonality due to its extensive existing temporary inertia and the institutional difficulties that hinder a significant decrease.

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REFERENCES

AMELUNG, B, NICHOLLS, S., and VINER, D. (2007): «Implications of global climate change for tourism flows and seasonality», *Journal of Travel Research*, 45(3), pp. 285-296.

ANDRIOTIS, K. (2005): «Seasonality in Crete: problem or a way of life? », *Tourism Economics* 11(2), pp. 207–224.

ATKINSON, A. (1970). «On the measurement of inequality», *Journal of Economic Theory* 2(3), pp. 244-263.

BARON, RV. (1975): *Seasonality in Tourism – A Guide to the Analysis of Seasonality and Trends for Policy Making.* The Economist Intelligence Unit Ltd: London.

BAUM, T., and HAGEN, L. (1999): «Responses to seasonality: the experiences of peripheral destinations». *Journal of Tourism Research* 1(4),pp. 299–312.

BIGANO, A., HAMILTON, JM., and TOL, RS. (2006). «The impact of climate on holiday destination choice». *Climatic Change* 76(3-4), pp. 389-406.

BUJOSA, A., and ROSSELLÓ, J. (2013): «Climate change and summer mass tourism: the case of Spanish domestic tourism», *Climatic change* 117(1-2), pp. 363-375.

BUTLER, R. (1994): Seasonality in tourism: issues and problems. In Tourism: *The State of the Art*, Seaton AV(ed.). Wiley: Chichester; 332–340.

BUTLER, R. (2001): *Seasonality in tourism: issues and implications.* In: *Seasonality in Tourism*. Pergamon; 5-22

BUTLER R., and MAO B. (1997): Seasonality in tourism: problems and measurement, Murphy P (ed.). *Quality Management in Urban Tourism*, Wiley: Chichester; 9–23.

COWELL, F. (1995): *Measuring Inequality,* Second Edition. New York: Prentice Hall.

CUCCIA, T., and RIZZO I. (2011): «Tourism seasonality in cultural destinations: Empirical evidence from Sicily», *Tourism Management* 32(3), pp. 589-595.

DURO, JA. (2008): «La concentración temporal de la demanda turística en España y sus regiones: un análisis empírico a partir de índices de desigualdad», *Revista de análisis turístico* 6(2), pp. 35-48.

DURO, JA. (2016): «Seasonality of hotel demand in the main Spanish provinces: measurements and decomposition exercises», *Tourism Management* 52, pp.52-63.

FERNÁNDEZ, A., and MAYORGA, MC. (2008) «Seasonal concentration of the hotel demand in Costa del Sol: A decomposition by nationalities», *Tourism Management* 29(5), pp. 940-949.

FRECHTLING, DC. (1996): *Practical tourism forecasting*. Butterworth-Heinemann: Oxford.
GINI, C., (1912): Variabilità e mutabilità, C.Cuppini, Bologna.

HADWEN, W., ARTHINGTON, A., BOON, P., TAYLOR, T., and FELLOWS, C. (2011): «Do climatic or institutional factors drive seasonal patterns of tourism visitation to protected areas across diverse climate zones in Eastern Australia?», *Tourism Geographies* 13(2), pp. 187–208.

HAMILTON, J. (2004): Climate and the destination choice of German tourists. *Fondazione ENI Enrico Mattei.*

HAUSMAN, JA., and Taylor, WE. (1981): «Panel data and unobservable individual effects», *Econometrica: Journal of the Econometric Society*; 1377-1398.

HSIAO, C. (2003): *Analysis of panel data*, Vol. 34, Cambridge university press.

KOENIG, N., and BISCHOFF, E. (2005): «Seasonality research: The state of the art», *International Journal of Tourism Research* 7(4-5), pp. 201-219.

KOENIG, N., and BISCHOFF, E. (2003): «Seasonality of tourism in Wales: a comparative analysis», *Tourism Economics* 9(3), pp. 229-254.

KULENDRAN, N., and DWYER, L. (2010): *Seasonal variation versus climate variation for Australian Tourism*. CRC for Sustainable Tourism Pty Limited.

LIM, C., and MC ALEER, M. (2001a): «Monthly seasonal variations: Asian tourism to Australia», *Annals of Tourism Research* 28(1), pp. 68-82.

LIM, C., and MCALEER, M. (2001b): «Forecasting tourist arrivals», *Annals of Tourism Research* 28(4), pp. 965-977.

LISE, W., and TOL, RS. (2002): «Impact of climate on tourist demand», *Climatic change 55*(4), pp. 429-449.

LUNDTORP S. (2001): Measuring Tourism Seasonality. In *Seasonality in Tourism*, Baum T, Lundtorp S (eds). Pergamon: Oxford; 23–50.

LUNDTORP, S., RASSING, CR., and WANHILL, SRC. (1999): «The off-season is 'no season': the case of the Danish island of Bornholm», *Tourism Economics* 5(1), pp. 49–68.

MADDISON, D. (2001): In search of warmer climates? The impact of climate change on flows of British Tourists. In D. Maddison (Eds.): *The amenity value of the global climate*. Earthscan: London; 53-76.

MARTÍN, JM., DE DIOS JIMÉNEZ, J., and MOLINA, V. (2014): «Impacts of seasonality on environmental sustainability in the tourism sector based on destination type: an application to Spain's Andalusia region», *Tourism Economics* 20(1), pp. 123-142.

MIECZKOWSKI, Z. (1985): «The tourism climatic index: a method of evaluating world climates for tourism», *Canadian Geographer* 29(3), pp. 220-233.

RAMSEY, JB., and SCHMIDT P. (1976) «Some further results on the use of OLS and BLUS residuals in specification error test», *Journal of the American Statistical Association* 71(354), pp.389-390.

RIDDERSTAAT, J., ODUBER, M., CROES, R., NIJKAMP, P., and MARTENS P. (2014) «Impacts of seasonal patterns of climate on recurrent fluctuations in tourism demand: Evidence from Aruba», *Tourism Management* 41: 245-256.

ROSSELLÓ, JA., RIERA, A., and SANSÓ A. (2004): «The economic determinants of seasonal patterns», *Annals of Tourism Research* 31(3), pp. 697–711.

THEIL, H. (1967): *Economics and information theory* (Vol. 7). Amsterdam: North-Holland.

TSITOURAS, A. (2004): «Adjusted Gini coefficient and 'months equivalent' degree of tourism seasonality: a research note», *Tourism Economics* 10(1), pp. 95-100.

WANHILL, SR. (1980): «Tackling seasonality: a technical note», *International Journal of Tourism Management* 1(4), pp. 243–245.

WEAVER, D., and OPPERMANN, M. (2000): *Tourism Management*. John Wiley and Sons.