EMPIRICAL ESSAYS ON SEASONALITY IN TOURISM

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I STATE that the present study, entitled “Empirical essays on seasonality in tourism”, presented by Judith Turrión Prats for the award of the degree of Doctor, has been carried out under my supervision at the Department of Economics of this university.

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Doctoral Thesis Supervisor

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CONTENTS

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CHAPTER 1
INTRODUCTION

1.1 Why is it important to analyse seasonality in tourism?

Tourism has become a key factor for socio-economic development in many countries, contributing approximately 10% of the world's GDP in 2015. This sector is one of the fastest growing in the world over the last six decades. For instance, the number of international tourist arrivals reached 1,186 million in 2015, up from 25 million in 1950. In the same way, according to data from the World Tourism Organization (UNWTO), international tourism receipts increased from US$ 2 billion in 2008 to US$ 1,260 billion in 2015. This flow of foreign currency is an important source of income because it has a positive impact both for agents directly involved with the tourism activity and also, thanks to the so-called multiplier effect, for other sectors of the economy. This results from the interdependence of economic sectors, which implies that a proportion of the revenue received directly by companies in the tourism sector filters through to those other sectors that provide them with goods and services. Tourism has many benefits that include promoting economic growth and development, stimulating local trade and industry, improving international relations, and encouraging cultural heritage protection (Goeldner, Ritchie, and McIntosh, 2000).

However, in the vast majority of tourist destinations arrivals are not distributed uniformly over the year, but are very concentrated into certain periods. This imbalance, known as seasonality, has become one of the most distinctive features of tourism. Based on Butler's definition (1994) seasonality is 'temporal imbalance in the phenomenon of tourism, which may be expressed in terms of dimensions of such elements as number of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment and admissions to attractions'. The causes of this imbalance have been widely discussed in the literature. Researchers conceptually propose very diverse determinants focused mainly on natural and institutional factors (Allcock, 1994; Calantone and Johar, 1984; Commons and Page, 2001; Connell, Page, and Meyer, 2015; Higham and Hinch, 2002). The first type includes variables of a climatic nature, whereas

institutional factors refer to school or working holiday periods or cultural events. However, other studies emphasize the link between seasonality and other variables such as tradition or inertia (Butler 1994), the variety of the tourist products offered by the destination (Cuccia and Rizzo, 2011; Martín, Jiménez Aguilera, and Molina Moreno, 2014) or economic factors (Rosselló, Riera, and Sansó, 2004).

Seasonality is noted as a problematic issue for the tourism industry mainly in large scale and well-established destinations. In such destinations it constitutes a major threat to continuous economic development, sustainable growth, tourist loyalty, and brand management. A widely shared point of view in the research literature is that seasonality has damaging rather than positive outcomes (Butler, 2001), and that may be encapsulated in four aspects (Martín et al., 2014). The economic effects fundamentally arise from the inefficient use of resources and infrastructure in off-peak periods implying a loss of profits (Mathieson and Wall, 1982; Williams and Shaw, 1991; Getz and Nilsson, 2004). By contrast, in high season, there are periods of saturation that can affect service quality and tourist satisfaction thus, from a marketing perspective, endangering the maintenance of a positive long-term relationship with tourists (Jang, 2004). Seasonality affects employment principally due to the difficulties in recruiting and retaining staff (Ashworth and Thomas, 1999; Krakover, 2000). There are also negative effects on the environment, for example, the increase in walkers and vehicles can affect wildlife and the ecosystem (Grant, Human, and Le Pelley, 1997). Finally, negative social effects arise which include congestion generated by population increases and significant increases in the price of goods and services (Murphy, 1985).

Consequently, policymakers and managers of tourism enterprises have designed strategies focused on mitigating this imbalance or on removing its negative consequences (Andriotis, 2005; Butler and Mao, 1997; Capó, Riera, and Rosselló, 2007; Weaver and Oppermann, 2000). Tackling the imbalance has become one of the most common objectives in tourism development plans. Nevertheless, it is still one of the least understood aspects of the field (Jang, 2004) and further research on the topic seems necessary. A better understanding of seasonality, and of its causes, should be useful for destination marketers and planners when developing mitigation strategies.

1.2 Research questions and thesis structure

In one survey, Koenig-Lewis and Bischoff (2005) identified the main areas for tourism seasonality research as being: the definition of the phenomenon, its measurement, causes, impacts, the policy implications and an analysis of consumer behaviour. The purpose of this thesis is to measure seasonality and identify its determinants using econometrics models (Difference and System GMM), as well as to explore the contribution of the origin of the tourists to seasonality through a decomposition inequality method proposed by Shorrocks (1982). Seasonality is understood as the monthly concentration of demand, that is, as a temporary inequality in the annual distribution of flows, according to the Butler's (1994) definition.

Previous work in the field primarily follows a theoretical approach and quantitative research is limited. In an attempt to partially address perceived gaps in the literature, we chose a quantitative approach. In this spirit, the first study of the current dissertation is to analyse the determinants of seasonality, a line of research for which there is currently little quantitative evidence. Most researchers have focused on modelling global tourism demand, but relatively little research has used econometric methods to study the monthly concentration of demand. Among the results of this first study, one is particularly significant. It suggests that the phases of the economic cycle, specifically crises, could have an effect on seasonality. This finding led us to ask ourselves what is the effect of a crisis on the monthly concentration. Economic theory says that changes in consumer income may affect the demand (for example, a decrease in income leaves consumers with lower spending power). However, what is the effect of economic crises (huge decreases) on the monthly concentration? Examining this issue led us to introduce factors of an economic nature into our models. It also led to the question of whether tourists from diverse markets showed different sensitivities to changes in these variables.

The core general research questions that guided this study can be stated as follows:

- How has seasonality changed in the recent years?
- Are there any significant changes market by market?
- Can economic crises influence monthly concentration?

- Which natural and economic factors can be used to explain seasonality in tourism?
- Do different countries of origin show different sensitivities to changes in the determinants of seasonality?
- Are there any significant changes market by market?
- What is the degree of monthly concentration worldwide and what is the role of countries and regional groups?
- Can these results be useful for guiding policies?

This thesis tries to answer these (and related) questions using aggregate modelling that may not consider certain factors relevant to specific territories. However, the models seem to yield results that are relevant globally and statistically consistent. The research also seems particularly relevant for several conceptual, methodological reasons:

Firstly, following Butler's definition (1994), summary indicators have been used in order to measure monthly concentration. Specifically, we mainly, but not exclusively, use the Coefficient of Variation (CV), a measure that is still underutilized despite its advantages. Nevertheless, as a robustness exercise, all our models have also been re-estimated using the Gini index, the most commonly used indicator in the academic literature. Overall, there is no significant differences in the results.

Secondly, this dissertation focuses on measuring and analysing the determinants of seasonality, a line of research for which there is currently little quantitative evidence. Most researchers have focused on modelling global tourism demand, but few have developed empirical models for the monthly concentration of demand. In particular, this thesis examines the causes of monthly concentration at different levels (local, regional, and national) combining both natural and economic factors.

Thirdly, the methodologies used for measuring and analysing seasonality, such as dynamic panel data estimators are, in most cases, underutilized for analysing this topic and may be useful in future research. The use of panel data improved our econometric specifications and parameters estimations due, for example, to it containing more degrees of freedom and more sample variability than cross-sectional data. It also allowed us to reduce multicollinearity and to control unobserved heterogeneity (Hsiao, 2014).

Difference GMM (Arellano and Bond, 1991) and System GMM (Roodman, 2006) have been used, among other estimation techniques.

Specifically, this dissertation consists of seven chapters, devoted mainly to the areas of research related measurement and possible determinates of seasonality in tourism. The first chapter introduces the thesis and the second contains a literature review. The third chapter offers an analysis of territorial seasonality in Spain at the municipality level. Chapter 4 analyses measurement and determinants of seasonality in tourism for of Spain and Catalonia. Chapter 5 investigates the possibility that the markets of origin show behave differently in response to variations in some of the main determinants of seasonality. Chapter 6 analyses tourism seasonality worldwide. Finally, Chapter 7 provides a summary of the main findings and policy implications from the previous chapters. We should mention that material from some of these chapters have been previously published in international journals and others are in the process of evaluation (resubmission).

The geographical scope of the analysis carried out in this thesis is primarily Spain (Chapter 3, 4, and 5). This country is chosen as the main case study because it is one of the most important destinations in the world (lying in third place in international tourist arrivals, and second in terms of tourism earnings). Its tourism sector represented more than 11% of GDP in 2015, and 13% of the workforce, according to data from the Instituto Nacional de Estadística (INE). Among European Union countries with high tourist demand, Spain is second only to Italy in its degree of seasonality, and increasing seasonality has been noted in recent years. In the fourth chapter, we also analyse the case of Catalonia because this is the primary regional destination in Spain with respect to international tourism, with over 25% of the total annual flows received for the entire country (data from the Instituto de Estudios Turísticos, 2014).

Most of the chapters are focused on the study a single destination. Nevertheless, we wanted to perform an analysis of seasonality worldwide. So, in Chapter 6, the investigation includes 36 countries chosen from the top 50 tourist destinations, representing more than 70% of the total international tourist arrivals among these 50 destinations.

In most of the chapters, the number of international tourists has been chosen as demand indicator (with the exception of Chapter 3 where the number of overnight stays is used). This is common practice in such studies, it because this measure adequately reflects the pressure on territorial resources. Except for Chapter 3, which also includes domestic tourism, most of work is, with considerable justification, concentrated on the international market. Firstly, international tourism is very important for the Spanish economy and the country plays a very important role in the world context. For example, Spain ranks first in Europe and second worldwide in tourism earnings; it also ranks third worldwide in terms of international tourist arrivals according data from the World Tourism Organization (2014). Secondly, some partial evidence shows that the international component accounts for the most part of the overall seasonality in Spain. Specifically, Duro (2016) found that, when hotel demand is used as an indicator, the foreign market explained about 70% of the overall seasonality. This weight is even higher in the case of main tourist Spanish provinces, such as Balearic Islands, 95%; Barcelona, 92%; Santa Cruz Tenerife 81%; Madrid, 75% (see Duro, 2016).

In the following sections, we give an overview of each chapter, stressing the importance of its aim, the methodological aspects, and the implications of the main results.

Brief summary of Chapter 2 'A review of the literature'

The second chapter reviews the literature. Specifically, we discuss in more detail the main areas of research in tourism seasonality: definition, measurement, causes, impacts, and policy implications (Koenig-Lewis and Bischoff, 2005). This chapter concludes that significant gaps still exist in research in this topic, mainly relating to a paucity of detailed quantitative research and the lack of a sound theoretical framework.

Brief summary of Chapter 3 'Determinants of territorial seasonality'

The aim of the Chapter 3 is to explore the relevance, changes over time, and explanatory factors of seasonality across a wide range of Spain's tourist destinations (124 municipalities) and for the period 2006–2012. The econometric analysis is carried out based on a mixed effects panel data model. This empirical approximation include those

determinants that allow us carry out a local comparison. Several tourist policy implications are derived.

A part of this chapter has been accepted for publication in the Journal of Tourism Analysis. We are grateful to the financial support by the project ECO2013–45380–P (Ministry of Economy and Competitiveness, Spanish government) and the valuable comments of the editor and anonymous reviewers.

Brief summary of Chapter 4 'The relevance of the economic factors'

In the previous chapter, the results indicate a global increase in concentration during the crisis period. This result may be explained in terms of general tourist behavior in the face of the global crisis. People may have typically tended to reduce demand in the off-season but continue travelling over the peak season. Because perhaps tourists who travel during peak seasons are satisfying more basic needs, while those travelling during off-peak seasons are satisfying complementary ones. In Chapter 3, the structure of the model used does not allow us to address this hypothesis. For this reason, in Chapter 4 the traditional model of tourism demand has been used primarily as a reference, focusing on a specific inspection of the main economic determinants (income and prices). In particular, this chapter seeks to provide more information on international tourism seasonality in Spain (one of the biggest international world destinations) and Catalonia (the most important Spanish region with respect to arrivals of non-residents). The results contain some specific points of interest both from the methodological (measuring a decomposing seasonality according to synthetic indicators and markets and analysing them through aggregate dynamic panel data models), and the marketing and public policy points of view.

A part of this chapter has been published in Journal of Destination Marketing & Management (case of Spain) and another one in the Journal of Tourism Economics (case of Catalonia). We are grateful to the financial support by the project ECO2013–45380–P (Ministry of Economy and Competitiveness, Spanish government) and the comments of the editor and anonymous reviewers.

Brief summary of Chapter 5 'Differences in behaviour patterns between markets'

Based on the literature and on evidence in the last chapter, it seems that different patterns of tourism demand may exist between markets. In this chapter, we tried to corroborate this hypothesis. We chose the main three markets of origin in Spain (the United Kingdom, Germany, and France) due to their significant contributions and because they explain two-thirds of the seasonality of international tourism found in our previous analysis. We developed a provincial panel data set for the period 2006–2015 and applied a dynamic estimator (System GMM called Xtabond2). In this case, the model also combines natural (home, climate, and destination) and non-natural (economic factors) as explanatory variables. Empirical results show that the main markets of origin seem to have different sensitivities to changes in the explanatory factors of seasonality. These results facilitate the design of appropriate market-specific policies for the mitigation and correction of seasonality in tourism.

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Brief summary of Chapter 6 'Tourism seasonality worldwide'

As far as we are aware, the homogenous international measurement of tourism seasonality on a worldwide scale carried out in this chapter, has never previously been attempted. The analysis obtains evidence on the global seasonality and allows a comparative analysis of the role of countries and significant regional groups, as well as how they have changed since the beginning of the global economic crisis. In addition, we propose a model of international seasonality, estimated with a panel data set, and using economic variables, geographical location, and time and regional controls as determinants. The results of this study may be useful from both theoretical and practical points of view, helping us to arrive at general conclusions on which to base tourism policy decisions.

A version of this chapter in the first revision phase with "Current Issues in Tourism". We are grateful the support given by the Ministry of Economy and Competitiveness of the Spanish Government through its project ECO 2016-79072-P and the Research Promotion

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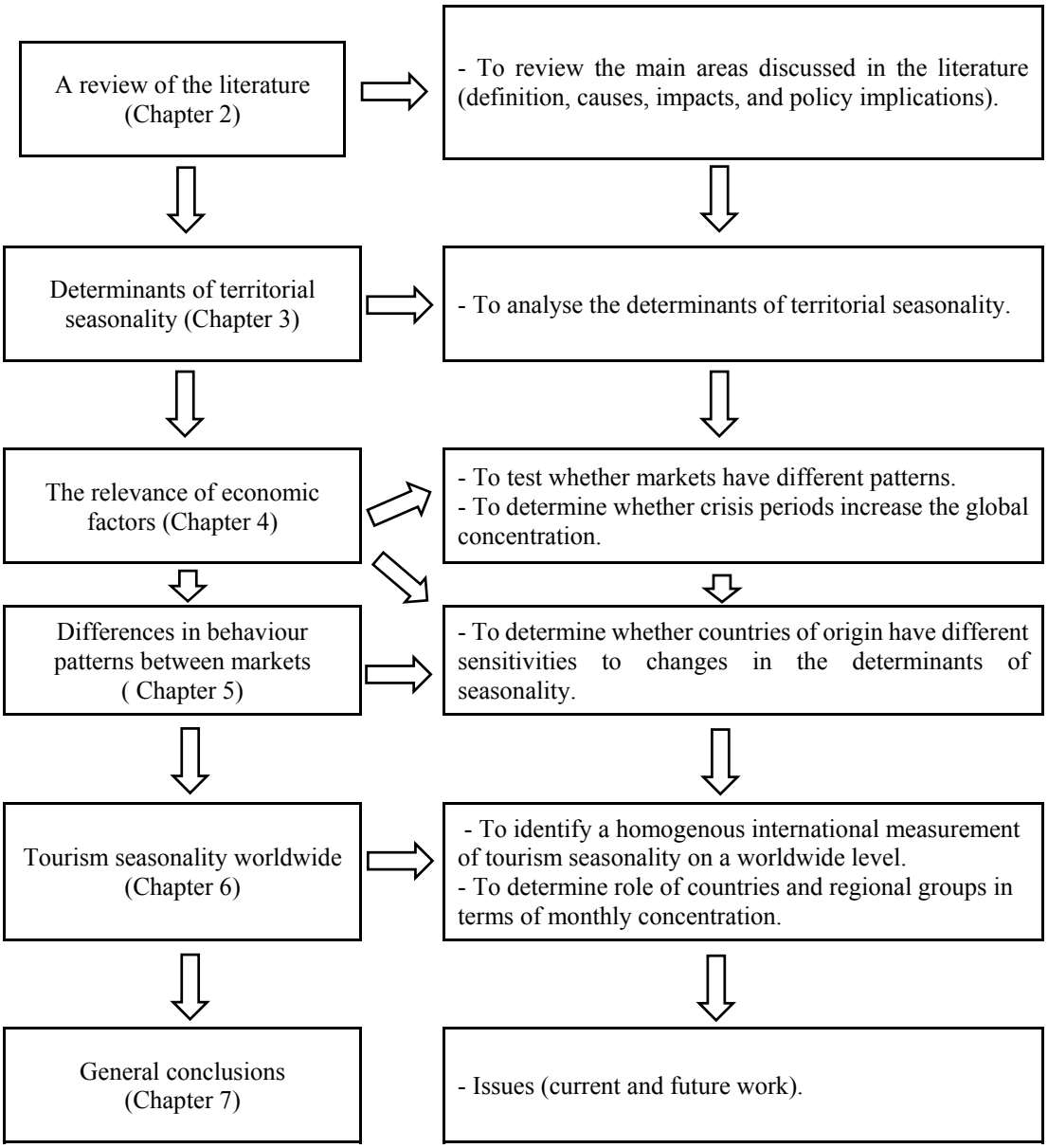
Brief summary of Chapter 7 'General conclusions'

This chapter presents the main general conclusions deriving from this thesis, with special emphasis on the general implications.
The structure and research objectives of the thesis are diagrammed in Figure 1.

Figure 1. Flow diagram of the structure and content of the thesis.



Source: derived by the authors.

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CHAPTER 2
A REVIEW OF THE LITERATURE

Overview. Since the 1970s, after the emergence of mass tourism, seasonality has become one of the main problems of the tourism sector. The first work introducing this topic was Bar-On in 1975 entitled 'Seasonality in tourism: a guide to the analysis of seasonality and trends for policy making' and since then academic research in the field steadily increased. The purpose of this chapter is to explore the main research areas, those of: measurement, causes, impacts, and policy implications. We conclude that there are still large gaps that need to be filled. In summary, the literature shows, firstly, the need for a comprehensive framework regarding data and measurements that should be taken into account when analysing seasonality. Secondly, researchers have attempted to identify and classify the determinants of seasonality in tourism. However, most authors do this from a theoretical or conceptual perspective although, as Hinch and Jackson (2000) and Lundtorp (2001) point out, no scientific theory of tourism seasonality exists. Much additional detailed quantitative research is required by destination marketers and planners who often have problems in extrapolating current theory to their practice.

Keywords: seasonality in tourism; measurement; determinants; impacts; policy implications.

2.1. Introduction

Since the seventies, and after the development of mass tourism, seasonality has become one of the main problems of the tourism sector. The seminal analysis of the seasonal dimension of tourism was carried out by Bar-On (1975). From this pioneering study, academic research has clarified what are the areas for concern, especially with respect to consolidated destinations. The economic aspects mainly cited are to do with the economic inefficiency caused by periods of the congested use of resources, followed by periods of low use (Williams and Shaw, 1991). Other studies consider the impact on the workforce (Yacoumis, 1980) and how these highs and lows affect their motivation and productivity, as well as the environmental (Manning and Powers, 1984) and social impacts, ranging from problems with traffic volumes, to civil security and the well-being of residents (Sastre, Hormaeche, and Villar, 2015).

It is thus logical that researchers have focused their attention on the above phenomena. An excellent survey by Koenig-Lewis and Bischoff (2005) establishes some of these areas of research (the definition itself, the measurement aspects, the analysis of the causes, the consequences and impacts, the implications for policy). This chapter is structured according to these priority areas of research. Specifically, the chapter is divided into the five sections. The second section examines some of the definitions of seasonality proposed by academics. The third section reviews the determinants of seasonal demand variations. The fourth section details the measurements used to quantify the concentration. Finally, the chapter concludes with a summary of the impacts and policy implications of seasonality.

2.2 Definition

One of the most extended definitions is proposed by Butler in 1994, who described seasonality as the 'temporal imbalance in the phenomenon of tourism, which may be expressed in terms of dimensions of such elements as number of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment and admissions to attractions'. Some of the main definitions of the tourism seasonality are summarized in Table 1.

Table 1. Definitions of tourism seasonality.

Author	Definition
Moore (1989)	Seasonality can be defined as 'movements in a time series during a particular time of year that recur similarly each year'.
Hylleberg (1992)	Seasonality is 'the systematic, although not necessarily regular, intra-year movement caused by changes in the weather, that calendar, and timing of decisions, directly or indirectly through the production and consumption decisions made by the agents of the economy. These decisions are influenced by the endowments, the expectations and the preferences of the agents, and the production techniques available in the economy'.
Allcock (1994)	Seasonality is 'the tendency of tourist flows to become concentrated into relatively short periods of the year'.
Butler (1994)	Seasonality is 'temporal imbalance in the phenomenon of tourism, which may be expressed in terms of dimensions of such elements as number of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment and admissions to attractions'
Higham and Hinch (2002)	Seasonality is 'systematic fluctuations in tourism phenomena throughout the year'.

Source: derived by the authors.

The review of the definitions shows that the most common approach is from the demand perspective, given that seasonality in tourism can be mainly related to the variations in tourist demand. Nevertheless, some authors also define seasonality from the supply perspective. In this sense, according to López and López (2006), seasonality is the temporary imbalance that arises in sectorial activity, when the commercialization of tourism products is concentrated in one or several periods.

Although researchers have described seasonal variations, there is no commonly accepted concept of this imbalance (Koenig-Lewis and Bischoff, 2005). Most of the definitions describe seasonality in general terms and take into account its causes. In addition, the way in which it is defined has changed little over time. The main point of agreement between the existing definitions is that seasonality is 'the systematic intra-year movement'. Therefore, one of the features of seasonality is its regularity. Several authors also agree that this imbalance occurs each year, more or less, with the same timing and magnitude (Bar-On, 1999). Nevertheless, as Koenig-Lewis and Bischoff (2005) correctly point out 'there is a lack of quantifiable definitions stating when tourism seasonality occurs'. Among the few studies that have considered this aspect is that of Lim and McAleer (2001) who consider tourist seasons as 'months for which the corresponding average indices

exceed 1.0, which means that the seasonal factors increase tourist numbers above the trend and cyclical components'. In addition, these authors also consider that other important gaps in the literature are those related to 'how tourism seasons can be differentiated, and how seasonality can be compared between different regions and years'. Regarding the definitions of the season for example, Uysal, Fesenmaier, and O'Leary (1994) defined the concentration in the United States based on the quarterly calendar. In contrast, some researchers as Allcock (1994) stated that considering time to be invariably structured into the different seasons of the year (winter, spring, summer, and fall) is not workable. According Butler and Mao (1997), we can identify three seasonal patterns: one-peak, two-peak, and non-peak. The vast majority of destinations show a one-peak demand distribution, which is perhaps the worst-case scenario, with the most damaging impacts of concentration. In fact, it is considered that generating additional seasons may be a way to reduce seasonality.

Following authors such as Higham and Hinch (2002) and Butler (1994), for the purpose of this thesis, seasonality in tourism is defined as a disequilibrium in tourism demand levels (e.g.in terms of both number of tourists and overnight stays) over the course of the year, which can be measured by summary indicators as discussed in the next section. So, our referential indicators are related to the inequality dimension.

2.3 Measurement

In order to analyse seasonality, we must first be able to quantify it appropriately. For this, we need to have data and some measurement techniques. However, as yet there is no general agreement as to what information and methods should be used. With respect to data, researchers have opted to use variables such as tourist arrivals (Duro, 2016; Lundtorp, 2001; Rosselló, Riera, and Sansó, 2004; Tsitouras, 2004; Wanhill, 1980), overnights (Cuccia and Rizzo, 2011; Duro, 2016; Fernández-Morales and Mayorga-Toledano, 2008) or average spending per person (Koc and Altinay, 2007). Another important aspect that we should highlight is that seasonality is defined and analysed on an annual basis and, for that, most of studies use monthly data. Nevertheless, we can find other kinds of seasonality, for example weekly or daily variations. In this sense, Rosselló and Sansó (2017) stress that these variations may be more associated with institutional or social causes. For example, the number of weekends in a month or the date of Easter can

influence the distribution of tourists. Nevertheless, disparities over the course of the year may be primarily due to climate or other social determinants.

Various methods have been developed to quantify and compare seasonal patterns, such as financial portfolio theory (Jang, 2004) and principal components analysis (Jeffrey and Barden, 1999). Nevertheless, time-series analysis stands out, given that is the most common technique used by researchers (Donatos and Zairis, 1991; González and Moral, 1996; Kim, 1999; Kulendran, 1996; Pegg, Patterson, and Gariddo, 2012; Sorensen, 1999; Sutcliffe and Sinclair, 1980). The primary aim of this type of analysis is to improve forecasting accuracy, rather than to analyse seasonality (Rosselló and Sansó, 2017). In these sense, a variety of scalar measures have been developed to quantify and compare seasonal patterns. Using the definition of Butler (1994) as a reference, seasonality can also be described by means of summary indicators that synthesize the degree of dispersion of a distribution by means of a scalar. Examples include the 'average monthly seasonal factors' (estimated using the moving average approach), the 'seasonal range' (difference between the highest and the lowest value of monthly indices), 'seasonality ratio' (based on the definition of Yacoumis, 1989 this ratio is the highest seasonal value divided by lowest), 'peak seasonal factor' (highest monthly seasonal factor), 'coefficients of seasonal variation' (obtained by calculating the standard deviation of the seasonal indices for the year), 'amplitude ratios', 'similarity indices', 'coefficient of variation', and 'concentration indices'(Koenig-Lewis and Bischoff, 2005).

Although some of these measures can easily be calculated, they also have disadvantages such as they not taking into account the changes occurred in all observations of the distribution, being influenced by extreme values, and by not considering the skewness of the distribution (e.g. the 'seasonality ratio' and the 'coefficient of seasonal variation'). Among the measures, the Gini index (Gini, 1912), stands out as being one of the most used by researchers (Wanhill, 1980; Lundtorp, 2001; Rosselló et al., 2004; Tsitouras, 2004; Koenig-Lewis and Bischoff, 2005; Fernández-Morales and Mayorga-Toledano, 2008; Wen and Sinha, 2009; Martín Martín, Jiménez Aguilera, and Molina Moreno, 2014; Fernández-Morales, Cisneros-Martínez, and McCabe, 2016; Lau, Koo, and Dwyer, 2017). This is mainly due to some of its specific characteristics, for example stability, low dependence on the changes in the peak months, and lack of sensitivity to outliers. Nevertheless, the Gini Index has a specific disadvantage in that it gives more weight to

changes in observations located around the mean (Cowell, 1995). To address this issue, the literature offers some useful alternative inequality measures, such as Theil family of indices (Theil, 1967), the Atkinson family of indices (Atkinson, 1970), and the coefficient of variation (Duro, 2016).

All of these alternative measures satisfy the following basic axioms suggested by literature: scale-independence (this implies that the measure is not affected by equiproportional changes in all observations); population-independence (it corroborate that measure is not altered by equiproportional changes in the number of observations of each variable); and obeying the transfers-principle (which states that any transfer from an observation with a higher level to one with a lower level, that does not reverse the relative rankings, should reduce the value of the measure). However, the difference between these indicators arises from their treatment of the changes produced in the units (for example, months) that make up the (inter-monthly) distribution of the annual activity (Duro, 2016).

Table 2 shows the most common inequality measures used in the academic literature. In the case of Gini Index, the weights are dependent on the position of the observations in the ranking, being very sensitive to changes emerging in the sections with the highest concentration of observations and, therefore, typically around the mean of the distribution (Duro 2016). On the other hand, the Theil and Atkinson Indices are sensitive to the observations located at the extremes of the distribution. Note that the different treatment performed by each measure can lead to differences in results. Therefore, when there is no reason to favour any part of the distribution, it seems that neutral measures may be a good option, and this is the case for the coefficient of variation. In this thesis our basic seasonality indicator will be the coefficient of variation, rather than the Gini Index, mainly because of the uniform treatment it gives to units (for example, months). It is insensitive to the place where the monthly changes occur, and so treats those changes that occur in different months homogenously, regardless of their location on the ranking.

Table 2. Summary of some common measures to quantify seasonality in tourism.

Measure	Formula	Basic axioms	Sensitivity
Gini Index	$G = \frac{1}{2\mu}\sum_i \sum_j p_i\, p_j |y_i - y_i|$	Yes	Sensitive to central observations
Coefficient of Variation	$CV = \frac{\sigma}{\mu}$	Yes	Neutral
Theil Indices	$T\,(\beta = 0) = \sum_i p_i \log\left(\frac{\mu}{y_i}\right)$ $T\,(\beta = 1) = \sum_i p_i \left(\frac{y_i}{\mu}\right) \log\left(\frac{y_i}{\mu}\right)$	Yes	Sensitive to the extremes of the ranking
Atkinson Indices	$A\,(\varepsilon) = 1 - \left[\sum_i p_i \left(\frac{y_i}{\mu}\right)^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}}$	Yes	Sensitive to the extremes of the ranking

Note: In Gini Index, p_i and p_j are the relative weights of the observations (months, four-month period…); y_i is the variable for observations; μ is the annual mean. For the Theil Indices, β calculates the sensitivity of the statistic with respect to the place where changes occur, so that the lower this parameter, the greater the sensitivity to changes in the lower part of the ranking. Among the most used of the Theil Indices are those for β=0 and β=1. Finally, for the Atkinson Indices, ε is the parameter that measures the degree of relative aversion to inequality.

Some of the summary measurements have the especially attractive property of allowing their decomposition by groups, or by additive sources (Duro, 2008). This methodology may be useful for analysing the role of different market in terms of concentration. Here, for instance, an additive decomposition can be performed which involves disaggregating seasonality as a sum of the weights attributable to each market. This will depend on the specific seasonality and weight of the market in question in relation to overall demand.

Various authors propose using an additive decomposition of the Gini coefficient (Cisneros-Martínez and Fernández-Morales, 2016; Fernández-Morales, 2003; Fernández-Morales et al., 2016; Fernández-Morales and Mayorga-Toledano, 2008; Halpern, 2011). Although different ways of decomposing the Gini Index exist, authors such as Fernández-Morales and Mayorga-Toledano (2008) use the following approach

first proposed by Lerman and Yitzaki (1985), expressed in both absolute and relative terms:

$$G = \sum_{k=1}^{K} S_k R_k G_k \quad (1)$$

$$RME_k = \frac{\frac{\partial G}{\partial e^k}}{G} \sum_{k=1}^{K} S_k \left(\frac{R_k G_k}{G}\right) - 1 \quad (2)$$

where S_k is *k's* annual share of the annual value of the times series ($Y = Y^1 + \ldots + Y^k$), R_k is Cov $(Y^k, F)/(Y^k, F^k)$ and F are the distribution functions of Y, and G_k is the annual Gini Index of component k. The first equation gives the contribution of each component to the overall seasonal concentration. The second shows the marginal effect of a change in any of the components over the total Gini Index. This may be a useful tool in the design of marketing policies since seasonality may successfully be mitigated by applying promotional strategies in those components (e.g. markets) with a small relative contribution to the total concentration. The literature is not unanimous on this decomposition because, in this case, the contribution of each component to the total depends strictly on the way the interaction effects are allocated among contributions (Goerlich, 1998). For example, Duro (2016) suggests the use of Theil index, because it allows easy groups decomposition while emphasizing the appealing features of Shorrocks' variance decomposition method (1982). Shorrocks (1980) states that, under certain assumptions, the natural decomposition of the variance is a rule validly applicable to all inequality measures. If k equals markets, the contribution of each market to the overall monthly concentration is described by the following formula, which is applicable to all summary indices:

$$C_k = \frac{Var\,(M_k) + \sum_{j \neq k} Cov\,(M_k, M_j)}{Var\,(M)} = \sum_j Cov\left(M_k, M_j\right) = Cov(M_k, M) \quad (3)$$

Thus, the relative weight of each market in terms of overall seasonality (or monthly concentration) is a result of its own concentration, of the relative weight of the market as part of the overall annual demand, and of its correlation with other markets. In Chapter 4, we apply this decomposition given that we are interested in decomposing by sources (i.e. additive decomposition), motivated by the desire to explore the role of the source markets as contributors towards international global seasonality.

In a recent paper, Rosselló and Sansó (2017) have underlined the possibilities for decomposition by groups of two synthetic measures, like the Entropy (i.e. the Theil index with β=0) and relative redundancy, calculated from Theil. An interesting property of the former is that, unlike Gini coefficient, it can be decomposed due to its additive nature. At a more detailed level, they define Entropy as

$$H = -\sum_{t=1}^{n} p_t \log p_t = \sum_{t=1}^{n} p_t \log \frac{1}{p_t} \quad (4)$$

Where $X=\sum_{t=1}^{n} x_t$ is the amount of annual tourist activity at any given time (t) and n is daily (365) or monthly (12) data. Therefore, $p_t = {x_t}/{X}$ is the proportion of tourism activity at the time t.

These authors stated that with time series, we may carry out a temporal decomposition between groups defined as

$$H\ (X_1, \dots X_m) = \sum_{\tau=1}^{m} \frac{X_\tau}{X} \log \frac{1}{{X_\tau}/{X}} \quad (5)$$

Where within-group entropy is

$$H\ (X_\tau) = \sum_{x_\tau \in A_\tau} \frac{x_t}{X_\tau} \log \frac{1}{{x_t}/{X_\tau}} \quad (6)$$

Finally, the total entropy can be expressed as the entropy between groups and the weighted sum of entropies within groups:

$$H = \sum_{\tau=1}^{m} \frac{X_\tau}{X} \mathrm{H}(X_\tau) + H(X_1, \dots, X_m) \quad (7)$$

As we have seen, Entropy is an easy measure to calculate and to decompose. It can also be a powerful tool to analyse and manage seasonality because it allows analysis of the tourist flows at any time level (intra- or inter- weekly and monthly) for any tourist segment.

To conclude this section, we note that, although several approaches for measuring seasonality in tourism have been proposed, only a few studies discuss their advantages and disadvantages and compare these measures in regard to their merits and limitations (Butler, 1994; Koenig-Lewis and Bischoff, 2005). For example, the first study that

compares different measurement techniques was that of Wanhill (1980). Subsequent to this study, other works that applied different measures to seasonality have appeared, one example being Lundtorp (2001) who analysed Danish hotel nights. Duro (2016) reviewed the properties of some of the available indicators of temporary inequality, highlighting, among other aspects, their different sensitivity to changes in the temporal distribution. He also argued that it is appropriate to simultaneously take alternative methods of measurement into account and that one should not base interpretations on any single index. Koenig-Lewis and Bischoff (2005) agree that the choice of a specific measure should depend on the research question, and on the required degree of detail.

2.4 Causes

Diverse factors have been proposed as the main determinants of seasonality in tourism (see Table 3). A very popular synthetic structure specifies two broad categories: natural and institutional (Bar-On, 1975; Allcock, 1994; Commons and Page, 2001; Connell, Page, and Meyer, 2015; Higham and Hinch, 2002). 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. The second includes 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. In addition to these two, 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.

In this section, because this thesis is based mainly on intra-annual variations, and these are often due to climate or other social factors, whereas intra-monthly and intra-weekly are due principally to institutional factors (Rosselló and Sansó, 2017), we concentrated on climate and economic factors. Regarding natural factors, note that several studies have demonstrated that climatic and weather factors (temperature, precipitation, wind, or

daylight) affect the choice of tourist destination. Kozak (2002) finds that good weather is one of the most important factors for German and British tourists when considering travelling to Mallorca or Turkey. One British survey found that 73% of those questioned think that pleasant weather is a key factor when travelling abroad (Mintel International Group, 1991).

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 (Lise and Tol, 2002; Amelung, Nicholls, and Viner, 2007; Bujosa and Rosselló, 2013). Studies such as Amelung et al. (2007) analyse for example, the potential implications of climate change for world tourism by using the Tourism Climate Index (TCI). This Index, which was developed by Mieczkowski in 1985, is one of the best-known climate indices for assessing the factors of destination climate comfort and attractiveness. The TCI is calculated using various climatic variables, which are included in the formula according to the relative importance that they have in an average tourist's wellbeing when visiting a destination. This index also is used by Goh, Law, and Mok (2008) to compare seasonal tourism from United States and the United Kingdom to Hong Kong. Their results show that natural determinants explain the variability of monthly tourist arrivals better than economic factors (see also Goh, 2012).

Introducing different climate variables into the models is also common in the literature. For instance, some authors have used the temperature, especially the average temperature, and its square as proxies to measure the impact of climate on tourism (c.f. Maddison, 2001; Lise and Tol, 2002; Hamilton, 2004; Bigano, Hamilton, and Tol, 2006; Bujosa and Rosselló, 2013). Bigano, Goria, Hamilton, and Tol (2005) observe that temperature and precipitation have an impact on seasonal tourism demand in Italy (except for winter sports destination). Furthermore, their results show that the impact of these variables depends on the region type. Cai, Ferrise, Moriondo, and Nunes (2010) also detect different effects according to the type of product offered by municipalities. Studies such as those of Kulendran and Dwyer (2010) and Hadwen, Arthington, Boon, Taylor, and Fellows (2011) analyse the effect of climatic variables on seasonal tourism demand using variables such as maximum and minimum temperatures, humidity levels, rainfall, and sunshine hours. Kulendran and Dwyer (2010), find that the influence of these variables varies according to tourist nationality.

However, an important point is that few studies have taken into account is the impact that the climate in the region of origin has on the decision to travel abroad. For example, Ridderstaat, Oduber, Croes, Nijkamp, and Martens (2014) inspect the joint effects of home climate and destination climate on tourist arrivals and they observe that some climatic variables of origin (United States and Venezuela) and destination (Aruba), have a significant effect on tourism demand—these variables include rainfall, temperature, wind, and cloud coverage. In a recent work, Li, Song, and Li (2017), using a model that links climate and seasonal tourism demand from Hong Kong and 19 of the major tourist cities in Mainland China, detect that home climate, destination climate, and their differences, have an impact on tourist arrivals. Furthermore, Eugenio-Martin and Campos-Soria (2010, 2011) have found that climate in the region of origin is a significant determinant, which means that tourists who live in regions with better climates make more domestic trips than they do abroad. Less favourable weather conditions can also act as a push factor for tourism demand (see, for example, Lise and Tol, 2002). Authors such as Hill (2009), find that the number of trips abroad from the United Kingdom increased during the rainier seasons, despite the economic and financial crisis of 2008–2009. Saverimuttu and Varua (2014) also observe that travel from United States to the Philippines increases when the weather in the United States is colder.

The literature has recently suggested the importance of certain other causes and has given them significant attention. These are the scheduled school, workers' holiday periods, programmed festivals or cultural events, and the type of tourist product offered by the destination (Cuccia and Rizzo, 2011; Martín Martín et al., 2014), as well as the market structure (Fernández-Morales, Cisneros-Martínez, and McCabe, 2016), or economic variable (Rosselló et al., 2004). Rosselló et al. (2004) analysed the relationship between seasonality and economic determinants for the Balearic Islands with respect to their two main markets, the British and the German. Their results showed that income, prices, and nominal exchange rates had significant impacts on tourism seasonality. Turrión-Prats and Duro (2016) analysed tourism seasonality from a market-side perspective for Spain as a whole, and found that inertial and economic factors are also significant explanatory determinants.

Regarding the determinants of tourism seasonality, we consider that, although researchers may have identified the causes of seasonality (Bar-On, 1975; Butler, 1994; Frechtling,

1996; Butler and Mao, 1997; Baum and Hagen, 1999), they have done so on a very speculative basis (Hinch and Jackson, 2000). It thus seems that greater efforts should be made to establish a more comprehensive theoretical framework. It is also necessary to corroborate this theoretical framework with empirical research that allows, among other things, one to observe the relative strength of each factor and the relative influence of ones versus other factors.

Table 3. An overview of the determinants of tourism seasonality suggested in the literature.

	Bar-On (1975)	Hartmann (1986)	Butler (1994)	Butler and Mao (1997)	Baum and Hagen (1999)	Lundtorp, Rassng, and Wanhill (1999)	Frechtling (2001)	Rosselló, Riera, and Sansó (2004)	Capó, Riera, and Rosselló (2007)	Cuccia and Rizzo (2011)	Turrión-Prats and Duro (2017)
Natural (climate/weather)	✓	✓	✓		✓		✓				
Institutional	✓	✓	✓								
Sociological	✓										
Physical and Socio/cultural Factors in Tourism Generating and Receiving Areas				✓							
Social Customs/Holidays, Business Customs					✓		✓				
Calendar Effects	✓				✓		✓				
Social Pressure and Fashion			✓								
Sporting Seasons			✓								
Economic Factors	✓							✓			✓
Inertia and Tradition			✓								✓
Supply-side Constraints					✓				✓		
Tourism Product										✓	
Push Factors (institutional, calendar, inertia and tradition, social pressure and fashion, access (transport costs, time, climate in generating area) and Pull Factors (climate in receiving area, sporting season and events)						✓					

Source: derived by the author

2.5 Impacts and policy implications

The first study of Bar-On (1975) captured the essence of the problem, specifically he stated that seasonality 'implies an incomplete and unbalanced utilization of the means at the disposal of the economy, and this is similar to the imbalance of the business cycle, where the economy is either overheated or running under full potential at different phases of the cycle'. Since this first study, most of the academic literature has considered this disequilibrium to be a major issue for the tourism industry because, with the growth of mass tourism, the number of tourism companies has increased as a result the ability to adapt to changes in demand has decreased. In particular, most authors consider that seasonality in this sector has damaging consequences in economic, labour, environmental, and social terms. Manning and Powers (1984) explain the negative impacts as 'Uneven distribution of use over time (peaking) is one of the most pervasive problems with outdoor recreation and tourism, causing inefficient resource use, loss of profit potential, strain on social and ecological carrying capacities, and administrative scheduling difficulties'. These effects are explained in a more detailed way below.

Firstly, economic negative effects of seasonality occur mainly due to inefficient use of resources and assets during periods of lower activity (Sutcliffe and Sinclair, 1980; Manning and Powers, 1984; Williams and Shaw, 1991). Due to reduced profits, firms are unable to maintain their fixed costs, which represent an important proportion of their total costs, during the off-season. In addition, this profit instability is one of the main problems that affects access to capital, due to the high-risk level of some investments (Butler, 1994). In contrast, during the high season there is an over-use of infrastructures, affecting service quality and consumer satisfaction (Sutcliffe and Sinclair, 1980; Manning and Powers, 1984; Rosselló et al., 2004).

Secondly, seasonality in tourism, as in other sectors, affects employment. Seasonal changes in the sector's workforce requirements give rise to fluctuations in the local employment levels. Firms have little incentive to train temporary workers due to the difficulty of contracting (because for individuals temporary contracts tend to be less attractive) and retaining this type of personnel (Yacoumis, 1980; Murphy, 1985). Consequently, they may employ staff with a low level of professional qualification and

offer them temporary contracts. All of this makes the maintenance of a quality service more difficult (Ashworth and Thomas, 1999; Baum, 1999; Krakover, 2000).

Thirdly, environmental effects, such as overexploitation of resources, the physical erosion of footpaths and other natural areas, the accumulation of waste, and the disturbance of wildlife (Manning and Powers, 1984), occur during the high season due to the massive concentration of tourists in limited areas. It is paradoxical that tourist activity damages those natural resources on which it depends for its very existence.

Finally, there are the well-known social effects, mainly the negative impacts on their local community of the influx of tourists at a certain time and place. Some of the problems that it entails are, for example those related to traffic congestion, saturation of public services (Sastre, Hormaeche, and Villar, 2015), increases in services and goods prices, difficulties in the provision of basic goods like water (Hartmann, 1986; Kuvan and Akan, 2005), and crime (Mathieson and Wall, 1982).

Nevertheless, 'seasonality is not necessarily bad for everyone' (Murphy, 1985). Some researchers have paid attention to its possible potential benefits. For instance, on the one hand, in the off-season, ecological (Butler, 1994; Hartmann, 1986) and sociocultural (Mathieson and Wall, 1982; Hartmann, 1986) recovery happens, as well as maintenance and reform of tourist infrastructures (Grant, Human, and Le Pelley, 1997). In particular, Hartmann (1986) argues that one of the most powerful reasons is that 'dead season [is] the only chance for social and ecological environment to recover totally. A dormant period for the host environment is simply a necessity in order to preserve its identity'. On the other hand, in periods of greater demand, temporary workers such as students or artists can be incorporated into the labour market (Mourdoukoutas, 1988). In addition, in Lundtorp et al. (1999) found that some workers in Denmark think that 'having a two or three month lay-off out of season is a bonus rather than a hardship'. Getz, Carlsen, and Morrison (2004) discuss this dilemma in more detail.

To minimize the negative impacts of this phenomenon, researchers have proposed different strategies. These actions can be carried out by individuals or the business and public sector. For example, in case of Spain, as early as the 1980s, Sutcliffe and Sinclair (1980) proposed a series of alternatives to reduce seasonality which continue in many

regional and local policy programs. The proposed measures are the development of products based on cultural events and sports; promotion of business tourism; and offering more affordable vacation packages for pensioners during the off-season.

In general terms, and based on the existent literature, the strategies might be grouped as follows:

The first of these is related to product diversification through the creation of different tourism products for different seasons. Within this, the most common strategy for combatting seasonality is to stage events and festivals. This allows the tourist season to expand, to increase, and diversify the appeal of the destinations and to attract tourists to new locations (Getz, 2008). Some authors, such as Brännäs and Nordström (2006) in a study for Sweden, have found that festivals and special events had a positive net effect, due to the average visitor staying longer during festival periods.

To achieve organizational goals, an essential element is to determine the needs and wants of target markets (Kotler, 1984; Middleton, 1992). Related to this, the second strategy is that of market segmentation and the consequent identification of different demand motives. This coordinates supply and demand in a more effective way. Owens (1994) suggests market segmentation with new product developments in order to stretch the seasons in Canada. Considering that tourists who mainly travel in the off-season have been attracted for reasons other than the beaches (Baum and Hagen, 1999). Spotts and Mahoney (1993) compare tourists to Michigan in the fall with those in the summer and find that the types are distinct. They state that, to attract visitors in the off-peak season, it is necessary to establish alternative fall marketing strategies and matching tourism products and services offered with a seasonal motivation. Hence, a destination's marketers and managers should consider that these new visitors probably need products and facilities quite different from the existing ones. Accordingly, it is essential to understand visitors' values and preferences to decide how and what experiences and services should be offered (Wang, 2011). When destinations detect seasonal patterns in their markets and can attract compatible segments, this helps to maximize their total yield (O'Brien, 1996). Furthermore, segmenting markets can be competitively advantageous for all agents who participate in the sector (Sausen, Tomczak, and Herrmann, 2005; Smith, 1956).

The third strategy is to apply differential pricing strategies (such as price reductions) during the off-season. On the one hand, some authors believe that this tool has positive effects, for instance, Manning and Powers (1984) present an approach for evaluating the effects of price differentiation, and they found that this strategy helped to encourage the tourism market in the low season. In some regions, to encourage tourism enterprises to apply this plan, publicly-funded incentives, for example tax reductions, are offered to tourism enterprises. On the other hand, another group of researchers, such as Baum and Hagen (1999) find that aggressive pricing during off-season may damage the overall reputation of the destination.

Table 4 summarizes the supply-side responses to seasonality performed by business and the public sector. The vast majority of actions try to increase the number of tourists during low season, although methods are also proposed for the cases where there are structural restrictions, and we must accept the existence of this imbalance.

Table 4. Supply-side responses to seasonality.

Business responses	**Public sector policy measures**
To boost off-season demand	*To boost off-season tourism*
- Seasonal pricing	- Labour focus incentives (e.g. training)
- Market segmentation	- Staggering academic holidays
- Product diversification	- Business support services such as marketing, financial planning
- Promotional activity	- Participation in seasonal extension programmers (e.g. Destination events strategy)
- Distribution mix	- Fiscal incentives
- Service level diversification	- Subsidization of transport services
Acceptance of seasonality	*Acceptance of seasonality*
- Offer reduced capacity	- Environmental regeneration
- Full seasonal closure	- Focus business support on existing seasonal trading pattern
- Temporary seasonal closure (e.g. during lowest revenue period)	- Support off-season community initiatives (e.g. local arts festivals)

Source: Goulding, Baum, and Morrison (20) (adapted from Goulding and Hay, 2001).

To sum up, the literature review shows that, despite the interest in studying the impacts and implications of tourism seasonality, no clear conclusions have yet been arrived at. This is largely because existing work in the field is based on anecdotal experience, supposition, and assumption, with little quantitative research that allows one to corroborate these assertions (Hinch and Jackson, 2000). In this sense, Baum and Hagen (1999) highlight that there are few studies that evaluate the impacts of the strategies to even out the peaks and thoughts for considerable period of time. Nevertheless, in practical terms, longitudinal studies are necessary, because these can be very useful for destination marketers and planners in order to evaluate which are the most efficient mitigation strategies in a destination.

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CHAPTER 3

DETERMINANTS OF TERRITORIAL SEASONALITY*

Overview. Given the need for quantitative literature on the subject, the primary focus of the present chapter is an exploration of the explanatory factors of seasonality across a wide range of Spain's tourist destinations (124) for the period 2006–2012. The econometrical analysis is based on a mixed effects panel data model. The main results can be summarized as follows: first, ceteris paribus, a global time increase in seasonality is observed in a country with a fairly high seasonality; second, analysis shows that the areas most affected by seasonal concentration are coastal non-capital municipalities, in clear contrast to, for example, inland municipalities and even coastal capital areas; third, the size of the domestic market does not have a significant global effect on the variations in territorial concentrations. In fact, the results do not confirm the hypothesis that the domestic market has a global different level of seasonality than the international market; finally, a non-linear relationship (but basically positive) is observed between average temperature and seasonality. We think that, given this evidence, some implications can be derived in terms of tourist policy.

Keywords: tourism seasonality; tourist destinations in Spain; tourist Demand; determinants; measurement.

* A part of this chapter has been the basis of the publication in Tourism Analysis and as working paper of Research Centre on Industrial and Public Economics, CREIP.

3.1 Introduction

Following the development of mass tourism, tourism seasonality has become one of the main problems for the tourism sector in popular destinations. While, there are numerous studies that attempt to identify and classify factors that help to explain seasonal patterns (Andriotis, 2005; Bar-On, 1975; Butler and Mao, 1997), detailed quantitative research into their nature is limited. For this reason, the present chapter attempts to analyse this imbalance and its empirical determinants in Spain, which is characterized by a strong monthly concentration of demand that even increasing in recent years. For instance, the Gini Index (Gini, 1912), an indicator typically used for the synthetic measurement of seasonality, has grown since 2006 (as we can see in more detail in the following section).

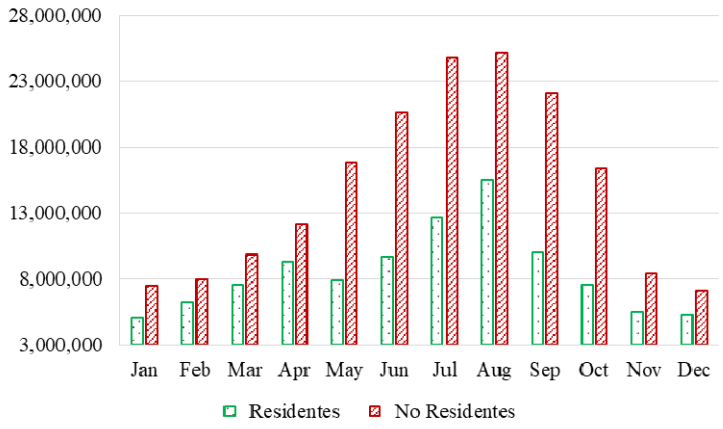
Using Spanish municipalities as basic units of analysis, the current chapter contributes to the sparse empirical analysis on determinants, specifically, to the following aspects. Firstly, the analysis focuses in the local field at an unusually detailed level, 124 municipalities (Annex A); secondly, mixed effects panel data models are employed for the period 2006–2012, these being a good tool for extracting information from data; thirdly, a plausible list of determinants is used, considering the type of analysis (local comparison) and the available data. Specifically, three main factors are taken as a benchmark: a proxy for the type of product, the size of the domestic market, and the climatic conditions. In addition, a control variable is added for the special case of the Canary Islands as well as some time-dummies, which allow testing for global changes in seasonality over the period. The findings of this research are expected to assist in further understanding the causes of seasonality and could be useful for destination marketers and planners in designing future management and marketing strategies for optimizing the impacts of seasonality.

The main part of the chapter follows and consists of three sections: contextualization of the most important descriptive results about tourism seasonality in Spain, an empirical model, and concluding remarks.

3.2 A case study for Spanish tourist municipalities

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, 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.

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.

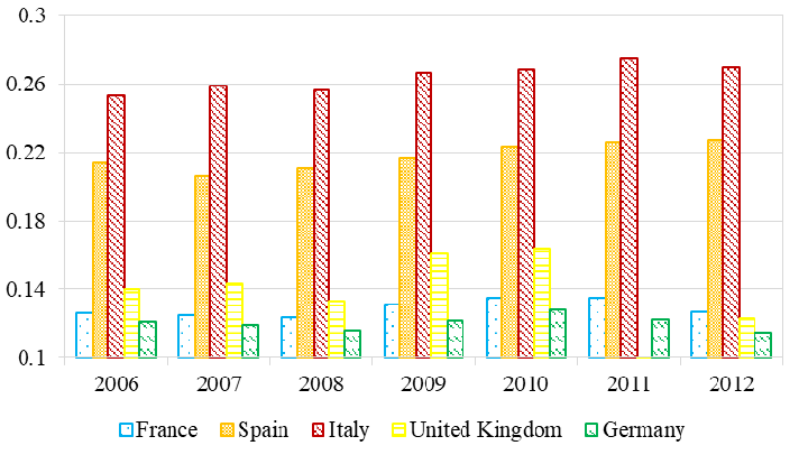
Source: Compiled by the authors based on data from the Instituto Nacional de Estadística (INE).

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 result of the negative impact of the economic crisis on tourist consumerism.

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 indicators (Duro, 2016) would produce 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.

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.

This concentration does not 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

[1] As it approaches one 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.

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 robustness 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 inland 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.

As a first descriptive result, the Table 1 shows that the ten tourist locations in Spain with greatest seasonality, belong to the following autonomous regions: Balearic Islands, (Formentera, Sant Josep de Sa Talaia, Santa Eulalia del Rio, Ciutadella de Menorca, Sant Antoni de Portmany, and Ibiza), Andalusia (Barbate), 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 latter two being coastal provinces of Catalonia) and amongst the least, the Canary Islands and Madrid. The least affected also include some of the tourist places in the Canary Islands, coast or inland towns, whether a 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	Gran Canaria (CN)	0.291	1,004,553
2	St. Josep de Sa Talaia (IB)	0.810	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)	0.300	558,519
4	Barbate (AN)	0.785	134,973	4	Sallent de Gállego (AR)	0.307	225,111
5	St. 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

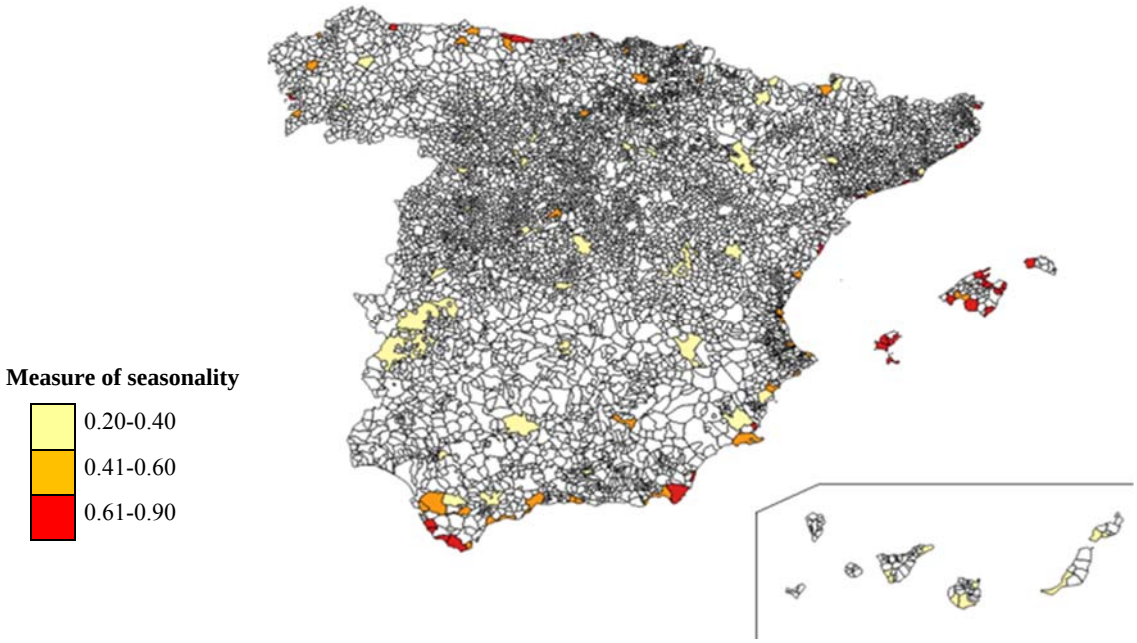
Note: TS is the measure of average seasonality for 2006–2012 obtained based on the number of overnight from June to September within the annual total; D is the average total demand for 2006–2012. IB: Balearic Islands; AN: Andalusia; CT: Catalonia; CN: Canarias; MC: Murcia Region; AR: Aragon; MD: Community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

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.

As an interesting analytical exercise, the 124 tourist municipalities can be grouped in the following categories: 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 Martín, Jiménez Aguilera, and

Molina Moreno (2014) in an analysis of the Andalucía region (South of Spain). Figure 4 verifies that it is 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. Fundamentally, 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.

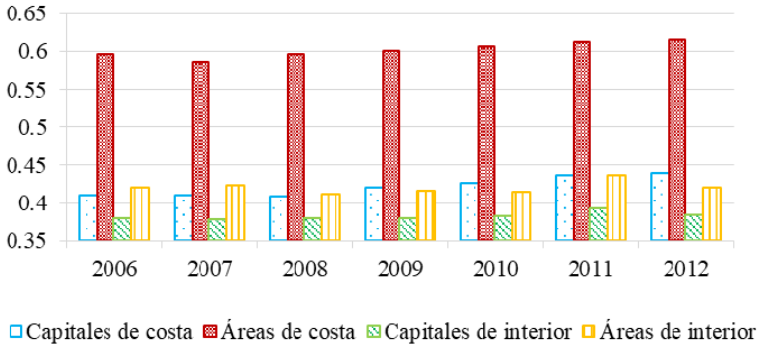


Note: The partial measure of seasonality was obtained based on the number of overnight stays between June and September within the annual total.

Source: Compiled by the authors based on the Instituto Nacional de Estadística (INE).

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.

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 divided by 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 Instituto Nacional de Estadística (INE).

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 any 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 because 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 inland 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 divided by 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 Instituto Nacional de Estadística (INE).

3.3 Empirical model

3.3.1 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 study 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 other factors could be added, given the approach (territorial comparisons and short-term variability) and the data, the factors considered constitute a reasonable basis for the empirical analysis. There are, for example, institutional factors such as holiday periods that would seem to have little relevance to the study, given that these parameters could be expected to affect all the Spanish destinations in a similar way in any given year. Nevertheless, testing for the possible omission of relevant variables is carried out.

Specifically, the model includes as determinants the following variables:

Firstly, to create the variable for type of product offered, the tourist locations are grouped into four types: coastal and inland capitals (municipalities that are provincial capitals situated either close to the coast or inland) and, coastal and inland areas (municipalities close to the coast or inland, but which are not provincial capitals). In general, each of these groups offers different types of tourist products. Principally, the coastal capitals are associated with both, sun and beach and cultural tourism; the coastal areas with sun and beach tourism only; the inland capitals focus particularly on cultural tourism products and the 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.

The second variable, the weight of the domestic market, is selected as a global proxy to test the relevance of market structure. One may thus investigate whether a different general seasonal pattern exists in terms of the large inbound market (i.e. the domestic versus international market). This contrast may be useful in developing promotional policies and strategies. Studies such as Lim and McAleer (2001) also examine if there are differences in the seasonal patterns of tourist arrivals from Hong Kong, Malaysia, and Singapore into Australia.

Finally, in respect to the climate variable, the most common line of analysis is to incorporate a quadratic temperature effect (Bujosa and Rosselló, 2013). The motivation for this non-linear relationship between average temperature and seasonality is the

expectation 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.

In relation to the variables included in the following equation (Equation 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 also 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 Islands 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).

The empirical base model for the analysis is the following:

$$ln\ ts_{i,t} = \beta_0 + \beta_1\, kc_i + \beta_2\, ki_i + \beta_3\, inland_i + \beta_4\, ln\ dn_{i,t} + \beta_5\, tm_{it} + \beta_6\, tm^2_{\ i,t} + \beta_7\, tv_t + \beta_8\, canary_i + a_i + \varepsilon_{i,t} \quad (1)$$

In Equation (1) $ts_{i,t}$ is the measure of seasonality in the municipality *(i)* and the year *(t)*. Here the those regressors that are potentially correlated with a_i are given as endogenous variables.

Table 3, briefly describes of the variables used in this study. The data source is Instituto Nacional de Estadística (INE, 2006-2012).

Table 3. Description of the variables.

Variable	Description	Mean	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
canary	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				

Data for 124 municipalities and the years of 2006–2012 are combined in a panel model with mixed 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, 2014). The model was estimated both as a fixed effects model and as a random effects model. To differentiate between them, a Hausman specification test (Hausman, 1978) 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 coefficient estimation for those variables that do not have inter-seasonal variation. Nevertheless, it does so assuming that

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

some specified regressors (exogenous variables) are uncorrelated with the fixed effect (Cameron and Trivedi, 2010).

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.

3.3.2 Main empirical results

The main results and the different estimations for checking the robustness of the model are given in Table 4. The first column shows the model estimation using all the 124 tourist municipalities; the second column considers only those municipalities whose hotel demand exceeds 80% of the total accommodation demand; in the third the inland areas are removed since, in previous tests, they show a lower correlation between the partial measure and the Gini Index; finally, the fourth is the combination of the second and third. The coefficients of the various estimations do not show significant differences.

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). Applying the Ramsey test to each annual cross-section of the sample, and to the model, did not throw up significant results in any of the cases. Therefore, this does not seem to be a particularly important problem for the previous estimates.[4]

[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] 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 (Annex B), 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.

Table 4. Results of the estimation.

	Model 1	Model 2	Model 3	Model 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)	-0.02	(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)
Inland	–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)
Wald test	609.02 (13)*	353.33(13)***	832.66(12)***	520.76(12)***
Rho	0.921	0.910	0.931	0.931
Num. Obs	832	721	757	646

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

In the light of these results, the following points of interest may be noted:

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. 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). These results may be explained in terms of general tourist behaviour in the face of the global crisis. People may have typically tended to reduce demand in the off-season but continue travelling over the summer (see Rosselló, Riera, and Sansó, 2004; Turrión-Prats and Duro, 2017, 2016). In this chapter, 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 study 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 study, were multi-market (and based on one destination) then it would be possible to carry-out this analysis.

Second, the estimates show that coastal capitals and inland municipalities, whether capitals or not, have a lower concentration than non-capital coastal municipalities (typically over 30% less), regarding the base dummy variable. Observe that, comparatively, the coefficient for coastal capitals is close to that of inland areas.

Third, the results indicate that, perhaps due to the existing heterogeneity at a territorial level, a more domestic market does not necessarily reduce concentration. 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). The measure of seasonality for the rest of municipalities can be seen in the Annex C. In fact, a parametric bilateral and unilateral hypothesis test shows that the hypothesis of equality in the partial concentration measure 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.

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	St. 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	297.82	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 Instituto Nacional de Estadística (INE).

Fourth, the results show that there is a non-linear relationship between average temperature and concentration. Thus, an increase in average temperature, results in an increase in concentration up to a certain level, beyond which it starts to reduce due to the dissatisfaction generated by high temperatures (Bujosa and Rosselló, 2013; Maddison, 2001). The ascending part of the relationship however dominates. Specifically, the estimates suggest that a temperature increase of 1 degree can increase seasonality by some 5%. Lise and Tol (2002) and Hamilton (2004), find a positive, but linear, relationship between tourist demand and average temperature.

Lastly, the dummy variable *canary* shows us that, ceteris paribus, these islands generally exhibit lower seasonality due to their location. 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. The variable assimilates the low variation, over the course of the year, of the monthly temperature from its average of 21ºC.

3.4 Concluding remarks

The primary purpose of the article is to evaluate the main factors explaining seasonality differences across a wide range of Spanish tourist destinations for the period 2006–2012. 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, an 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.

This work seems particularly relevant for several reasons:

Firstly, it focuses on analysing the determinants of seasonality, a line of research for which there currently is little quantitative evidence. Most of the researchers have focused on modelling global tourism demand but just little research has used an empirical model for the monthly concentration of the demand. Even though, this imbalance constitutes one of the main problems for tourism sector, especially in the large-scale and well-established destinations. Destinations have carried out strategies with the purpose of mitigate the problem but few of them have achieved its aim. Hence, a better understanding of monthly concentration is required in order to design effective strategies and this work could contribute to it.

Secondly, it uses an empirical analysis at an unusually detailed level in Spain (124 municipalities). This allows us to use the location of municipalities as a proxy of the touristic product and it increases the empirical efficiency.

Thirdly, it examines an initial model, which combines diverse determinants of municipal seasonality (adapted to a territorial analysis) by using panel data with a mixed effects model. Panel data analysis has been rarely used in previous empirical research related with seasonality despite its advantages (combining cross-sectional and longitudinal data and maximizes estimation efficiency). In this regard, we propose a methodology related to the analysis of seasonality’s determinants, which may be useful in future analysis.

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 (Koenig-Lewis and Bischoff, 2005).

Second, the estimates suggest a growth in concentration, mainly from 2006 to 2011, of a structural nature. Intuitively, one might partially attribute this to the effects of the economic slowdown and 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.

Third, the type of product (or destination) mainly offered is very relevant in explaining regional differences in temporal demand concentration. According to the results of the estimation and the previous analysis, coastal non-capital municipalities are, ceteris paribus, usually noticeably (over 30%) more seasonal than coastal or inland capitals and inland areas.

Fourth, the size of the domestic market does not make a significant difference to the 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. Promoting domestic tourism as a way of reducing seasonality may not be effective overall; consequently, it would be necessary to concentrate on specific programs for reducing seasonality rather than on global promotional programs.

Fifth, the estimates demonstrate a non-linear relationship between the average temperature and seasonality; however, the ascending part of the relationship dominates. Finally, the Canary Islands factor is a very powerful variable and the driving force behind the reduced annual climate variability.

This work of course has certain limitations. One of the main weaknesses is that the indicator available to build the models, hotel overnights, is available only for the four months of June, July, August, and September. The work might be extended to investigate the motivations behind seasonal holidays, or the role of income level and perceived price differences. Also, the results provide some evidence on the preferences of the main foreign nationalities, so one might consider taking into account distances/seasonal accessibility to the municipalities. For instance, the flying distance to the Canary Isles (as compared to Spain mainland) might be added as a dummy variable to estimate whether this is significant.

It can be concluded that tourism seasonality continues to be a problem in Spain generally, and in its destinations. Given the social, environmental and economic costs entailed, it is an absolute priority that policies to combat seasonality be given precedence, Regional Strategic Tourism Plans must prioritize related measures. In this respect, there is a need for a great deal more knowledge regarding case profiles, determinants and policy assessments; sustainability in the growth of tourism demands no less. Combatting seasonality is a long-term project due to its extensive existing temporary inertia and the institutional difficulties that hinder a significant decrease.

Annex

A. Tourist locations included in the study.

Coastal Capitals

Alicante	Donostia- San Sebastian	Santander
Almería	Malaga	Sta. Cruz de Tenerife
Barcelona	Murcia	Tarragona
Castellón de la Plana	Palma de Mallorca	Valencia
A Coruña	Las Palmas de Gran Canaria	

Coastal Areas

Adeje	Estepona	Ribadesella
Alcúdia	Formentera	Roquetas de Mar
Algeciras	Fuengirola	Roses
Almuñécar	Gandía	Salou
Arnuero	Gijón	San Bartolomé de Tirajana
Arona	Grove	San Javier
Barbate	Ibiza	Sant Antoni de Portmany
Benalmádena	Jerez de la Frontera	Sant Josep de Sa Talaia
Benicasim/Benicàssim	Llanes	Sant Llorenç de Cardassar
Benidorm	Lloret de Mar	Santa Eulalia del Río
Calella	Llucmajor	Santa Margalida
Calviá	Marbella	Santanyí
Cambrils	Mogán	Sanxenxo
Capdepera	Mojácar	Sitges
Cartagena	Muro	Son Servera
Castell- Platja d´Aro	Nerja	Suances
Chiclana de la Frontera	Níjar	Tarifa
Ciutadella de Menorca	Pájara	Tías
Conil de la Frontera	Peñíscola	Torremolinos
Denia	Pollença	Tossa de Mar
El Puerto de Santa María	Puerto de la Cruz	Vigo
Elche	Ribadeo	Yaiza

Inland Capitals

Albacete	Lleida	Segovia
Ávila	Logroño	Seville
Badajoz	Lugo	Soria
Bilbao	Madrid	Teruel
Burgos	Mérida	Toledo
Cáceres	Ourense	Valladolid
Ciudad Real	Oviedo	Vitoria-Gasteiz
Cordoba	Palencia	Zamora
Cuenca	Pamplona/Irun	Zaragoza
Granada	Salamanca	
Leon	Santiago de Compostela	

Inland Areas

Albarracín	Cazorla	Santillana del Mar
Arcos de la Frontera	Jaca	Trujillo
Benasque	Plasencia	Vielha e Mijaran
Benavente	Ronda	
Cangas de Onís	Sallent de Gállego	

B. Results of the estimation of the determinants of seasonality using panel data, random effects, 2006–2012.

Results of the estimation	
TVexogenous	
tv2007	(0.0606)
	-0.00522
tv2008	(0.00492)
	-0.00125
tv2009	(0.00564)
	0.00975
tv2010	(0.00638)
	0.0189***
tv2011	(0.00607)
	0.0380***
tv2012	(0.00662)
	0.0277***
Tm	0.0480**
	(0.0199)
tm_2	-0.00158***
	(0.000583)
TVendogenous	
ln_dn	-0.0342***
	(0.0125)
TIexogenous	
Kc	-0.306***
	(0.0436)
Ki	-0.475***
	(0.0305)
Inland	-0.444***
	(0.0606)
Canary	-0.439***
	(0.0380)
Constant	-0.418*
	(0.232)
Wald test	504.66(13)***
Rho	0.913
Num. Obs	832

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

C. Monthly concentration by residents (R) and non-residents (NR).

	2006		2009		2012	
	R	**NR**	**R**	**NR**	**R**	**NR**
Adeje	0.535	0.337	0.479	0.321	0.458	0.327
Albacete	0.362	0.448	0.349	0.336	0.352	0.401
Albarracín	0.533	0.489	0.651	0.651	0.489	0.533
Alicante/Alacant	0.452	0.425	0.487	0.465	0.475	0.504
Almería	0.474	0.431	0.544	0.540	0.615	0.535
Arcos de la Frontera	0.342	0.362	0.385	0.385	0.362	0.342
Arona	0.426	0.333	0.564	0.312	0.462	0.332
Ávila	0.416	0.385	0.398	0.449	0.390	0.405
Barcelona	0.330	0.386	0.350	0.407	0.327	0.421
Benalmádena	0.573	0.426	0.654	0.450	0.614	0.449
Benasque	0.540	0.516	0.791	0.791	0.516	0.540
Benavente	0.462	0.442	0.401	0.401	0.442	0.462
Benidorm	0.465	0.378	0.480	0.384	0.456	0.435
Bilbao	0.382	0.449	0.359	0.436	0.397	0.461
Burgos	0.407	0.539	0.394	0.510	0.396	0.561
Cáceres	0.354	0.288	0.360	0.425	0.330	0.366
Calvià	0.468	0.633	0.398	0.642	0.385	0.693
Cambrils	0.751	0.674	0.753	0.689	0.778	0.745
Cangas de Onís	0.593	0.611	0.686	0.686	0.611	0.593
Capdepera	0.538	0.712	0.672	0.738	0.574	0.752
Cartagena	0.488	0.405	0.488	0.439	0.574	0.431
Castellón de la Plana	0.416	0.376	0.411	0.363	0.473	0.456
Cazorla	0.392	0.405	0.521	0.521	0.405	0.392
Córdoba	0.309	0.362	0.304	0.379	0.280	0.394
Coruña (A)	0.407	0.493	0.436	0.464	0.451	0.484
Cuenca	0.374	0.433	0.374	0.508	0.361	0.428
Dénia	0.581	0.384	0.597	0.511	0.560	0.554
Donostia/San Sebastián	0.415	0.517	0.403	0.534	0.389	0.557
Estepona	0.599	0.568	0.632	0.478	0.729	0.538
Fuengirola	0.545	0.389	0.498	0.438	0.679	0.446
Gandia	0.504	0.419	0.487	0.299	0.600	0.427
Gijón	0.483	0.453	0.474	0.497	0.515	0.551
Granada	0.306	0.363	0.297	0.377	0.288	0.389
Grove (O)	0.629	0.579	0.588	0.605	0.596	0.651
Jaca	0.574	0.481	0.552	0.552	0.481	0.574
Jerez de la Frontera	0.401	0.339	0.456	0.363	0.464	0.358
León	0.376	0.524	0.387	0.492	0.372	0.514
Llanes	0.663	0.629	0.681	0.749	0.752	0.783
Lleida	0.351	0.385	0.335	0.346	0.329	0.389
Lloret de Mar	0.313	0.652	0.312	0.641	0.339	0.708
Logroño	0.392	0.408	0.384	0.446	0.378	0.430
Madrid	0.302	0.352	0.300	0.347	0.307	0.360
Málaga	0.383	0.430	0.392	0.425	0.409	0.436
Marbella	0.493	0.489	0.584	0.519	0.618	0.536
Mogán	0.601	0.318	0.669	0.277	0.668	0.302
Mojácar	0.498	0.496	0.623	0.592	0.698	0.489
Murcia	0.314	0.331	0.282	0.323	0.284	0.324
Nerja	0.667	0.428	0.603	0.436	0.607	0.417
Níjar	0.693	0.480	0.743	0.590	0.714	0.568

Oviedo	0.421	0.444	0.428	0.473	0.400	0.477
Pájara	0.683	0.385	0.575	0.366	0.615	0.365
Palma de Mallorca	0.374	0.549	0.465	0.544	0.366	0.600
Palmas de Gran Canaria	0.331	0.252	0.348	0.257	0.332	0.175
Pamplona/Iruña	0.363	0.466	0.358	0.489	0.388	0.508
Peníscola/Peñíscola	0.609	0.449	0.609	0.380	0.692	0.377
Plasencia	0.388	0.474	0.429	0.429	0.474	0.388
Puerto de la Cruz	0.532	0.226	0.470	0.203	0.427	0.251
Puerto de Santa María (El)	0.548	0.382	0.556	0.373	0.514	0.406
Ronda	0.419	0.377	0.393	0.393	0.377	0.419
Roquetas de Mar	0.540	0.465	0.543	0.409	0.545	0.633
Salamanca	0.351	0.439	0.362	0.424	0.361	0.457
Sallent de Gállego	0.608	0.497	0.446	0.446	0.497	0.608
Salou	0.643	0.728	0.641	0.731	0.585	0.781
San Bartolomé de Tirajana	0.507	0.333	0.506	0.318	0.544	0.324
Sant Llorenç des Cardassar	0.804	0.622	0.737	0.675	0.743	0.707
Santa Cruz de Tenerife	0.310	0.262	0.284	0.272	0.318	0.249
Santander	0.496	0.517	0.486	0.504	0.472	0.550
Santiago de Compostela	0.414	0.489	0.428	0.512	0.414	0.532
Sanxenxo	0.727	0.716	0.712	0.689	0.708	0.759
Segovia	0.390	0.432	0.407	0.491	0.392	0.485
Sevilla	0.293	0.338	0.292	0.370	0.287	0.384
Soria	0.409	0.464	0.420	0.431	0.392	0.472
Tarifa	0.675	0.629	0.761	0.610	0.805	0.635
Tarragona	0.431	0.601	0.436	0.549	0.428	0.582
Teruel	0.443	0.408	0.402	0.464	0.389	0.495
Toledo	0.363	0.404	0.357	0.393	0.338	0.418
Torremolinos	0.476	0.459	0.529	0.477	0.502	0.482
Trujillo	0.395	0.392	0.334	0.334	0.392	0.395
Valencia/València	0.357	0.373	0.350	0.448	0.371	0.456
Valladolid	0.356	0.373	0.322	0.448	0.344	0.446
Vielha e Mijaran	0.300	0.255	0.275	0.275	0.255	0.300
Vitoria-Gasteiz	0.384	0.404	0.361	0.437	0.392	0.497
Zamora	0.393	0.528	0.417	0.416	0.378	0.444
Zaragoza	0.323	0.390	0.335	0.415	0.327	0.373

Note: The partial measure of seasonality was obtained based on the number of overnight stays between June and September within the annual total.

Source: Derived by the authors from Instituto Nacional de Estadística (INE) data.

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CHAPTER 4
THE RELEVANCE OF ECONOMIC FACTORS*

Overview. In this chapter, we propose three methodologies for measuring and analysing tourism seasonality from a market-side perspective and we empirically implement them for Spain as a whole. Firstly, seasonality is analysed by means of monthly concentration indicators and the coefficient of variation is especially recommended; secondly, the role of markets is explored through an additive inequality decomposition technique; thirdly, the primary economic determinants of tourism seasonality are assessed through a dynamic panel data model. The main results are as follows: firstly, seasonality in Spain has clearly worsened since 2008, coinciding with a strong growth in overall demand; secondly, three markets generate two-thirds of the seasonality, with the pattern of the UK tourists of especial concern; thirdly, aggregate demand models suggest that prices, exchange rates and especially income levels are significant explanatory factors.

In addition, this chapter includes an analysis of the situation in Catalonia, the most important Spanish region with respect to international tourism. Results show the significance of inertial and economic factors as well as behavioural differentials for some of the main source markets.

We believe that the methodologies used in this chapter, and the region-specific results obtained, are broadly applicable to marketing and tourist public strategies.

Keywords: seasonality; markets; dynamic panel data models; Spanish tourism; Catalonia.

* Part of this chapter formed the basis of a publication in Journal of Destination Marketing & Management (case of Spain) and another in Tourism Economics (case of Catalonia). In addition, both have been published as working papers of the Research Centre on Industrial and Public Economics, CREIP.

4.1 Introduction

In this chapter, our primary methodological and empirical interest lies in understanding the role of source markets as a tool for making marketing policy recommendations. A better understanding of the specific role of seasonal patterns in markets of origin would be useful for destination marketers and planners in strategy development, given that it would allow the identification of the most responsive origins.

Our contribution to this analysis is twofold. In the first place, we propose analysing seasonality by market through inequality techniques. Here, we use the coefficient of variation, an aggregate measure that is little used in the literature despite its advantages.[7] We applying the Shorrocks' method (Shorrocks, 1982) to decompose it by sources (e.g. markets). Such decomposition by sources (i.e. additive decomposition of seasonality) has already been carried out by Duro (2016), Fernández-Morales (2003), Fernández-Morales, Cisneros-Martínez, and McCabe (2016) and Fernández-Morales and Mayorga-Toledano (2008). Duro (2016) is the main reference for the current study, but there the Shorrocks-decomposition is applied to a selection of Spanish provinces and to hotel demand, which is a more restrictive tourist demand indicator. In the other three analyses, an additive decomposition by markets is also carried out, but using the Gini Index. In the second place, given the existence of measurements of monthly concentration by markets and years for Spain, a panel data model will be employed, with the aim of exploring the relevance of reasonable explanatory factors.

The results obtained are helpful in two ways when designing marketing strategies. Firstly, the list of explanatory factors is determined by the tourist representative consumer theory and therefore variables such as income and prices types play a central role (Crouch, 1994a, b). This is because, in the previous chapter, the results suggest a global increase in concentration during the crisis period. 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. A possible justification for these results may be formulated tentatively in terms of general tourist behaviour in the face of the crisis. Given

[7] For more information regarding this indicator, see Chapter 2 (Section 3).

the global economic context, people may typically have tended to reduce demand outside the summer or central months (when travel may be less necessary), while nevertheless continuing to travel at least during the summer period (minimum consumption). Nevertheless, the aim of the previous chapter was to examine territorial differences in monthly concentration, and therefore the structure of the model used did not allow us to check the hypothesis that the crisis worsened the monthly concentration. In addition, data regarding Hotel Price Index were only available at national level and by Autonomous Communities. In contrast, the new approach shows in this chapter allows us to address this issue.

Secondly, given the expected formation of habits, we proposed, with seemingly satisfactory results, a specific dynamic panel data model, which was estimated based on the DIFF-GMM technique (Arellano and Bond, 1991). That study was innovative in offering a series of largely underutilized methodologies for measuring and analysing seasonality from the market-side, which may be valuable for other analyses and cases.

These exercises were empirically applied to Spain. In particular, we took the whole country as the field of analysis for various reasons: firstly, because a large proportion of foreign tourists who visit Spain move around once they arrive in the country, so it seems reasonable to analyses these flows as a whole. Secondly, as a more practical reason, it should be noted that we only have acceptably complete monthly details of foreign tourists, broken down by source markets, for the country as a whole. The analysis was conducted for the period 2000–2014.

As an additional empirical exercise, in the last section of this chapter, we analyse tourism seasonality in the Spanish region of Catalonia. Our purpose is to extract information and knowledge that may be used, not only to gather further data on this phenomenon, for a destination that has received little attention in the research literature, but also as a guide for designing correctional and/or mitigating policies. In this case, we also selected Catalonia as a whole, because those tourists who visit this region tend to move through different internal tourism destinations in the search for different aspects in the tourist

experience.[8] This differs from the analysis of Spain in that the temporary concentration is analysed with a partial indicator, as in Chapter 3, due to the lack of data for all months of the year.

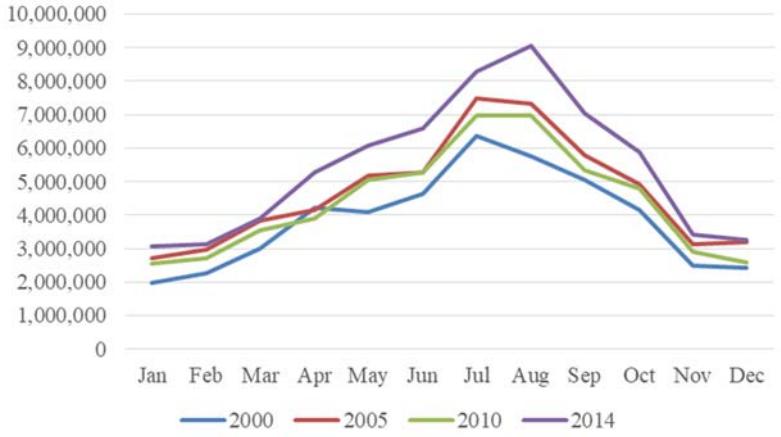
The chapter is organized in the following way. The second section reviews some of the main methodological aspects associated with the measurement of seasonality by markets and the econometric model with which to approach the analysis of explanatory factors. The fourth section gathers the main results obtained from Spain and the final section contains the main conclusions drawn from the analyses of seasonality in Catalonia.

4.2 A case study for Spain

Tourism is an important sector of the Spanish economy, according to the Statistics on Tourist Movement on Borders (FRONTUR), conducted by the Instituto de Estudios Turísticos (IET), the number of international tourist arrivals throughout 2014 was 65 million. Nevertheless, tourists are not distributed uniformly throughout the year. Typically, they are concentrated between June and September, indicative of the country's predominantly sun and beach model of tourism. In this case, it is worth clarifying the type of monthly distribution of tourism demand and how it changes. Figure 1 shows the distribution of monthly demand for four years selected from the period. Firstly, an upward trend can be seen across the whole distribution, indicative of the global expansion of flows. Secondly, from 2000 to 2005 there was a differential increase in demand in the first three months of the year, a result that explains the likely fall in overall monthly concentration. Since 2005, there has been hardly any variation in demand in these months, which could indicate a halt in the positive change over this period. Thirdly, and in compensation for the halt, demand grew, particularly in months such as May, September and October. Fourthly, there has been a large increase in demand in the summer months, especially for the month of August (compare 2005 and 2014) which, all else being equal would have contributed to diminishing concentration. Since a different indicator for the different months would hinder preliminary assessment, an aggregate index, which averages out all these changes, is required.

[8] Given that the analyses of Catalonia and Spain were carried out at different times of time, heterogeneities can be found. In any case, we have preferred to combine both works in this chapter due to their methodological similarities (use of dynamic market panels) and avoid repetitions.

Figure 1. Monthly distribution of international tourists in Spain, selected years period 2000-2014.



Source: own elaboration from Instituto de Estudios Turísticos (IET).

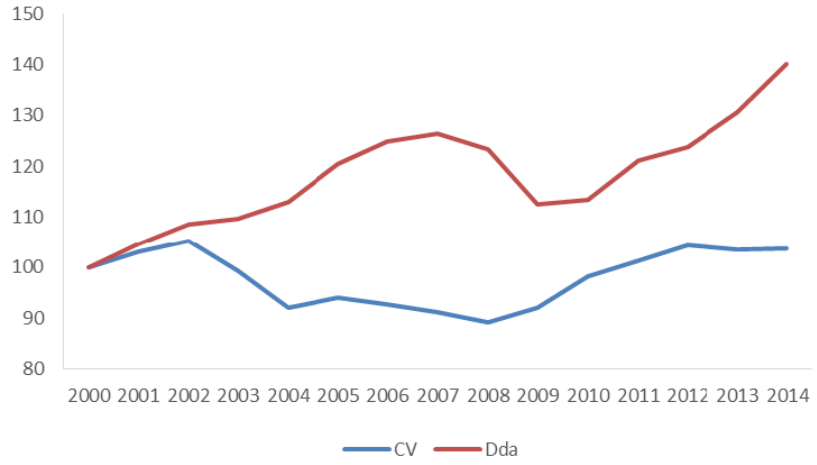
Based on Butler's definition (1994), measurements of seasonality would be the same as using inequality measures. The literature on inequality measurement (Cowell, 1995) provides a methodological reference for this analysis. The tourism seasonality literature typically uses the Gini Coefficient as a reference measure, because its characteristics are suitable (Lundtorp, 2001; Wanhill, 1980). As explained by Duro (2016), while this measure is interesting, it is not the only attractive one—from certain points of view, other measurements such as the Coefficient of Variation (CV) would be especially valuable. [9]

Therefore, we have decided to calculate the monthly concentration of foreign tourists arriving in Spain during the period 2000–2014, using the coefficient of variation as a benchmark measure. Figure 2 shows the change in annual global demand, with the aim of obtaining indications of a possible connection between the global tourism cycle (and, if desired, the economic cycle) and the monthly concentration of international demand in Spain. The data indicate that the monthly concentration declined up to 2008, after which it began an upward trend. In fact, since 2008 the level of concentration grew by 13%, while overall demand increased by a significant 25%. The decrease in seasonality in recent times, coinciding with the increase in demand, contrasts with the previous pattern. In real terms, between 2002 and 2008, seasonality fell by 15% while demand increased by 14%. Therefore, in recent years, growth has been particularly unbalanced at a time

[9] For more information about these measurements, see Chapter 2 (Section 3).

when the increase in global demand has reached nearly 13 million tourists. Consequently, concern in Spain about this phenomenon seems logical.[10]

Figure 2. Tourism seasonality and global demand in Spain, 2000-2014.



Note: series are indexes according to the initial value (2000=100).

Source: own elaboration from Instituto de Estudios Turísticos (IET).

In Table 1, results are given for monthly concentrations during selected years from the period and include available details on source markets. In Figure 3, the annual development is shown separated out by the principal markets the United Kingdom (23% of overall demand in 2014), France (16%), Germany (16%), Italy (6%), the Netherlands (4%) and Belgium (3%). The three leading markets account for 55% of the total number of tourists for the year.[11] The same exercise is repeated for the other markets in Figure 4. Note that France (one of the main source markets) also appears to be one of the most concentrated, along with the United Kingdom, Ireland and the rest of Europe. Countries with less concentration are the Nordic countries, the rest of the Americas and the rest of the world. Figures 3 and 4 show the annual changes each one of them. Firstly, and concentrating on the largest markets, we should highlight the progress of the French

[10] Throughout the whole section, the coefficient of variation will be used as a benchmark indicator to measure monthly concentration. Using the Gini coefficient as an alternative indicator gives qualitatively similar results in global terms. Any results required are available by direct request to the authors.

[11] Bilateral contrasts were carried out on the equality of means (very approximately given the short time series available) to test the hypothesis that the seasonality of these main source markets were the same. The results indicated a general rejection of this hypothesis, except in the cases of France and Belgium, on the one hand, and Italy and the Netherlands on the other. The authors can provide calculations in response to any requests.

market, which shows a significant reduction in its monthly concentration since 2000 (a fall of 20% in the CV), which is welcome. On the other hand, a decrease followed by an increase can be seen in markets such as the Dutch, Belgian, German, Italian and British. In the British case, the increase has been significant and continuous since 2005. Its CV has increased some 36% from that year, representing the biggest increase of all the markets. In the case of the German market, which is one of the most stable, there has also been growth in recent years. In the Italian market, there was a severe decline up to 2009, coinciding with the crisis, whereupon it went back to continuous growth. In the case of Belgium, the initial downward trend is pronounced with a 32% in the CV until 2010, and with the Dutch the rise since 2009 gives way to a reduction from 2011. Secondly, with respect to the remaining markets (See Figure 3), in the case of Ireland and Portugal the fall and rise pattern is repeated; quite a stable pattern can be identified in the case of Switzerland and for the rest of Europe and the USA there has been growth since 2004.

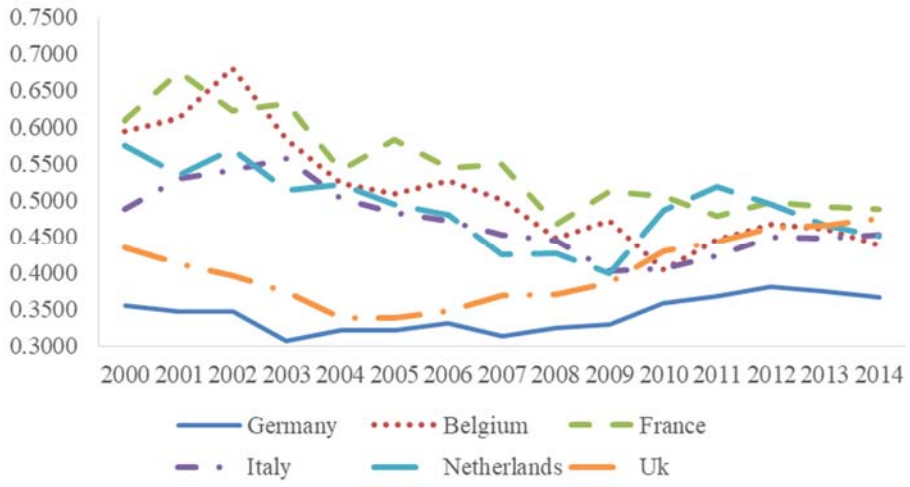
In summary, therefore, we observe some markets with a declining trajectory until the middle of the last decade and then the advent of the crisis and subsequent growth, which in some cases started earlier than in others. At the risk of over-generalization, the initial declines may be associated with the global economic boom, changes in travelling patterns and the rise of low-cost airlines and secondary airports. Conversely, the recent reductions may be more related to the effects of the crisis on tourism consumption, acting to reduce demand outside basic months and therefore outside the summer period. The results of the econometric model provide greater insight into the effect of income.

Table 1. Monthly concentration by markets in Spain, selected years over 2000-2014.

	2000	2005	2010	2014
Belgium	0.5944	0.5099	0.4047	0.4386
France	0.6088	0.5833	0.506	0.4878
Germany	0.3544	0.3206	0.3576	0.3669
Ireland		0.4507	0.4905	0.5081
Italy	0.4885	0.4831	0.4064	0.4529
Netherlands	0.5754	0.4953	0.4874	0.4519
Nordic countries		0.1539	0.2189	0.2118
Portugal	0.4228	0.3186	0.289	0.4012
Switzerland	0.416	0.4097	0.4194	0.4167
United Kingdom	0.4345	0.3382	0.4304	0.4754
United States	0.3245	0.3356	0.3743	0.4345
Rest America	0.315	0.1811	0.3618	0.2938
Rest Europe	0.2272	0.3202	0.3374	0.4829
Rest World	0.4002	0.3739	0.3613	0.2971
Total	0.3724	0.3501	0.3658	0.3858

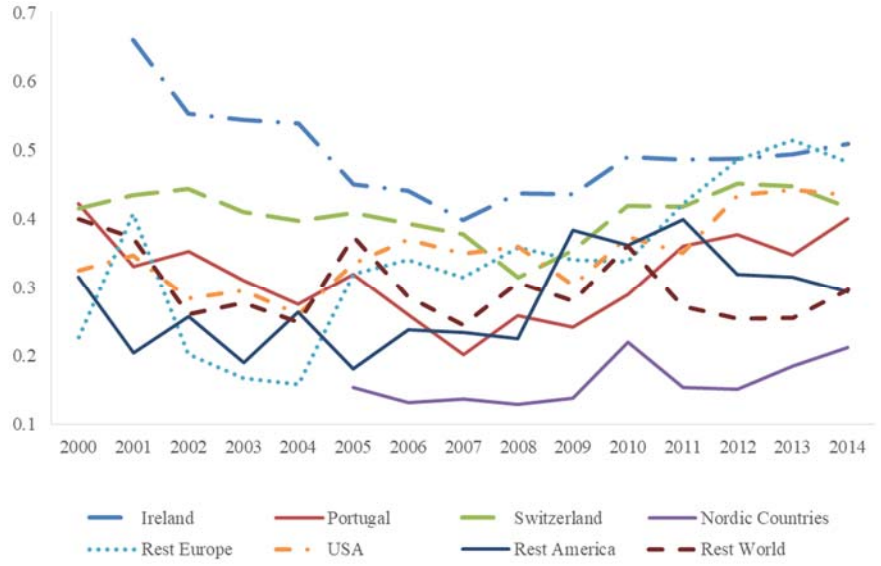
Source: own elaboration from Instituto de Estudios Turísticos (IET).

Figure 3. Monthly concentration in large individual markets, 2000-2014.



Source: derived by the author from the Instituto de Estudios Turísticos (IET).

Figure 4. Monthly concentration in the rest of markets, 2000-2014.



Source: derived by the author from the Instituto de Estudios Turísticos (IET).

4.2.1 Methodology

An especially attractive property of at least some of the summary measurements is their capacity for decomposition into parts. We are interested in decomposing by sources (i.e. additive decomposition), given the desire to explore the role of the source markets as contributors towards international global seasonality.[12] As different authors have already taken pains to demonstrate, this type of decomposition is ambiguous and complicated (Goerlich, 1998). Although methods have been developed to decompose the Gini index, they remain debatable (Fernández-Morales, 2003; Fernández-Morales et al., 2016; Fernández-Morales and Mayorga-Toledano, 2008).[13] Shorrocks' method (1980) is a natural decomposition of the variances that can be apply to all inequality indices under certain assumptions. In particular, if *k* equals markets, the contribution of each market to the overall monthly concentration would be the result its own concentration, of the relative weight of the market as part of the overall annual demand, and by its correlation with other markets. Shorrocks' decomposition can be expressed as:

[12] The additive (or by source) decomposition of seasonality is given, automatically, by the ability to detail the monthly tourism demand as a sum of components. There are multiple possibilities for doing this although in this work we focus specifically on breakdown by markets. As we remark in the main text, other authors have used this same approach in its different empirical analysis.

[13] Further information can be found in Chapter 2 (Section 3).

$$ts_k = \frac{Var(M_k)+\sum_{j\neq k} Cov(M_k,M_j)}{Var(M)} = \sum_j Cov(M_k, M_j) = Cov(M_k, M) \quad (1)$$

In addition to the exercises of seasonality measurement and its decomposition, it is also interesting to analyse the determinants using econometrical methods, which allow expanding the explanatory factors beyond this restrictive algebraic decomposition. The conceptual literature has shown us that the climatic factor, school and labour holidays and special events have been some the most extended causes of seasonality levels. However, when the focus is put on analysing the short and medium term, for example, in terms of variations of seasonality, or when the analysis is carried out for a single destination (as in our case), the use of economic factors as the main determinants may be reasonable. Economic Theory, and demand models offer a good conceptual reference. Identifying which economic determinants have an impact on seasonality would help to the public and private sector better anticipate future trends in the distribution of intra-year arrivals (Rosselló, Riera, and Sansó, 2004). Therefore, it could improve management tourism inputs, for instance of employees. The main determinants of tourism consumption are known to be tourist income and prices (Crouch, 1994a, b; Garín-Muñoz, 2006; Garín-Muñoz and Montero-Martín, 2007; Serra, Correia, and Rodrigues, 2014; Witt and Martin, 1987). In the case of seasonality, there are no clear hypotheses about the expected effect, and therefore the empirical analysis could help to obtain some conclusions (Rosselló et al., 2004). In addition to these two variables, it would be reasonable to extend the equations to include other control factors. Specifically, and per an analysis of the literature, the list of variables selected is as follows:

Firstly, the inclusion in the model of past values of the dependent variable in seasonality would capture the formation of habits and interdependent preferences. Due to the lower uncertainty and the transfer of information, and hence the relevance of the inertia factor in the context of the seasonal choice of trip throughout the year (Butler, 1994). Note that in this case, that this point would indicate the presence of a certain level of automaticity in the imbalance and its dynamics and in turn, to some extent, this would indicate difficulties in varying a part of the concentration. Lagging the dependent variable is a typical feature of annual demand models (Garín-Muñoz, 2006; Witt and Martin, 1987) and, consequently, it would seem reasonable to extend its use in determining monthly

concentration. Indeed, the failure to consider this variable in the models could overestimate the values of the rest (Morley 1998).

Secondly, income is potentially a variable not only of interest for determining the trip itself but also, and this is our main interest, for determining specifically when it takes place. There is no prior hypothesis on the significance of this indicator. It might be thought, beyond the intrinsic characteristics of each market, that the indicator could be related to the profile of the average visitor and their level of consumption at different times of the year. Markets with profiles that tend towards mid-to-low market segments in the summer months may well exhibit negative income elasticity in respect to monthly concentration. Thus, periods of crisis would have a noticeable effect on these profiles (higher likelihood of unemployment and loss of earnings), which would affect the demand for the central months to a greater degree and, consequently, reduce the concentration. Empirical estimates, beyond their intrinsic interest, offer indirect evidence of this situation. This study takes GDP based on PPP (Purchasing Power Parity) per capita as a proxy indicator of the source markets. The use of the variable in its distinct versions, constant or current prices or in per capita terms, is normal in the investigations of tourist demand models due to the difficulties in obtaining direct income data (Ledesma-Rodríguez, Navarro-Ibáñez, and Pérez-Rodríguez, 2001; Garín-Muñoz and Montero-Martín, 2007; Song and Witt, 2000).

Thirdly, the price variable coincides with a relative measurement that relates the Consumer Price Index in the country of destination to the Consumer Price Index in the country of origin, this being possibly the price measurement most often applied in research literature. It may be a matter of discussion as to whether to use a price index for specifically tourist-orientated goods, or one of a more general nature. It might seem more appropriate to use basically, those goods and services that are specifically used by tourists. One must keep in mind that a tourist-orientated product covers different factors (travel insurance, the goods and services purchased at destination, transport costs, etc.) and as a result, determining an overall price is a complicated task. However, although it may appear conceptually more convenient to use tourist prices, in our case this has not been possible due to a lack of information. Authors such as Daniel and Ramos (2002), Garín-Muñoz and Montero (2007) and Garín-Muñoz (2009), among other, have also opted to

include overall price indexes as a proxy for the relative cost of living in the country of destination.

Fourthly, the specification includes the exchange rate since it is one of the major factors in the determination of tourist arrivals. This is included as a separate explanatory variable, and hence it is not considered jointly with the prices variable for the relevant markets (relevant for USA, UK and Switzerland markets). Scholars like Croes and Vanegas (2005), Falk and Vieru (2016), Ledesma-Rodríguez et al. (2001), Mangion, Durbarry, and Sinclair (2005), Rosselló et al. (2004), Rosselló, Aguiló, and Riera (2005) or Webber (2001) have also use this separated variable in their models. Two reasons for separating them are that, firstly, exchange rates and prices can move in opposite directions and secondly, exchange rates are a very visible variable to tourists and therefore the effect on demand in response to exchange rate changes might be more intense and diverse than that motivated by relative prices (Stabler, Papatheodorou, and Sinclair, 2009).

Finally, following standard practice in the literature, and based on the reaction of differential demand to variations in transport costs, oil prices are considered separately (Garín-Muñoz, 2006; Ledesma-Rodríguez et al., 2001). The ideal scenario would have been to have a complete estimate of these prices but, given the lack of information, they are taken as a proxy.

Therefore, the basic equation is the following, expressed, as is customary, in a double log model to obtain elasticity:

$$Ln\ TS_{i,t} = \beta_0 + \beta_1 Ln\ TS_{i,t-1} + \beta_2 Ln\ RP_{i,t} + \beta_3 Ln\ GDP_{i,t} + \beta_4 Ln\ EX_{i,t} + \beta_5 Ln\ TC_{i,t} + v_{i,t} \quad (2)$$

where $TS_{i,t}$ is the monthly concentration of market *(i)* in year *(t)*; $TS_{i,t-1}$ is the out-of-phase variable; $RP_{i,t}$ is the ratio of consumer prices between Spain and market k in year t; $GDP_{i,t}$ is the GDP per capita in market k and year t; $EX_{i,t}$ is the average exchange rate against the euro of the currency of market k in year t and $TC_{i,t}$ are the average import prices of oil in market *i* and year *t*.

It is important to underline that panel data is applied to a dynamic model. This type of models permits us to tackle the probable relevance of inertia or habit formation as a factor

that explains the levels and the growth of this imbalance in tourism. Two forms are used in the literature analysed to carry out estimates with endogenous variables; either by using an Instrumental Variables (IV) approach or the Generalized Method of Moments (GMM). The former makes it difficult to find proxies that meet the appropriate characteristics used as instruments of the variables. Therefore, the choice of the method to be used must be based on the type of instruments available. Nevertheless, when wishing to use the lagged dependent variable, as an explanatory variable, the preferred option would be GMM. In fact, the inclusion of the lagged dependent variable, as an explanatory variable in an equation, in both the Within Groups (WG) estimator and the random effects estimators are biased and inconsistent (Garín-Muñoz, 2007), except when the number of periods is large (Baltagi, 1995). The Ordinary Least Squares (OLS) estimator would be also biased if destinations-specific effects were significant. Therefore, the solution to these problems is to use the Generalized Method of Moments approach (GMM).

As a first test, we use unit root test proposed by Im, Pesaran, and Shin (2003). The null hypothesis is the non-stationarity of the series. Based on the results, we determine that data differentiation is needed.[14] Given this situation, we decided to use the GMM–DIFF method (Arellano and Bond, 1991), which uses lagged dependent variables as instruments to create consistent and efficient estimates. The use of this procedure with respect to differences also helped us to eliminate the problem of non-stationarity (because by differencing data, we can eliminate the trend and get no spurious results and increases the certainty about regression coefficients and their standard errors) and allowed us to obtain short and long-term elasticities. This method may be used in a one-step or two-step mode, depending on the weighting matrix being used. In our case, we selected the one-step option (in the robust standard errors option) as it is preferable for inference on coefficients, especially in small samples like ours (Arellano and Bond, 1991). With respect to the instruments we used the delays of the dependent variable with a maximum of two periods for reducing biases due to the existence of many instruments with respect to sample size (Alonso-Borrego and Arellano, 1999). Consequently, the final basic equation is as follows:

$$ln\ ts_{i,t} = \beta_0 + \beta_1\ \Delta Lln\ ts_{i,t-1} + \beta_2\ \Delta ln\ rp_{i,t} + \beta_3 Ln\ \Delta gdp_{i,t} + \beta_4 ln\ \Delta ex_{i,t} + \beta_5 ln\ \Delta tc_{i,t} + v_{i,t} \quad (3)$$

[14] Any results required are available by direct request to the authors.

The validity of the specification will be analyses using the first- and second-order serial correlation test and the Sargan test on over-identifying restrictions (Sargan, 1958). This method has been used, for example, for the analysis of tourism demand in works such as those of Garín-Muñoz (2006) or Garín-Muñoz and Montero-Martín (2007). As far as we know, the use of this particular methodology for the empirical analysis of tourism seasonality is new. There is an extensive literature explaining global demand, but little for analysing its time distribution. The most closely relate work is Rosselló et al. (2004), although there are many differences in terms of the specific method and, of course, in the field of study (in this case, the Balearic Islands). Note that Equation 3 does not include natural or institutional factors (Hadwen, Arthington, Boon, Taylor, and Fellows, 2011). Two reasons should be mentioned. First, in terms of theory, given that there are other possibilities, we wish to base ourselves on the main theoretical model that we use for explaining tourism demand by consistency. Second, given that we wish to explain different behaviour of markets such as those included in the same destination (e.g. the whole of Spain) and over a relatively short period, it is expected that the factors have little, or no, explanatory force. Third, given that the model is specified in terms of differences, it is reasonable that economic factors be especially relevant.

In implementing the model for Spain, the data for ten individual markets were considered (Belgium, France, Germany, Ireland, Italy, Netherlands, Portugal, United Kingdom, United States and Switzerland). These represent almost 80% of the overall demand for the period of 2000–2014. The total sample contains 109 observations. The data for explanatory variables comes from the OECD.[15] The demand indicator used in the empirical analysis is the number of international tourists received across the entire country by month, year and source market between 2000 and 2014. Information concerning this indicator comes from the Instituto de Estudios Turísticos (IET), specifically the survey of tourist movements at frontiers (FRONTUR). This provides data for international demand as a whole, not just what is channelled through regulated accommodation. This seems appropriate, given the difficulties relating to direct surveys

[15] Given the limited sample used, particularly if the cross-section dimension is compared to the time dimension, in order to apply GMM models the results must be taken with caution. Various robustness tests (for example restricting the period to reduce the number of instruments) were performed, obtaining similar empirical results. Any results required are available by direct request to the authors.

of non-regulated accommodation in Spain and, as a population parameter, it seems to be closer to the pressure such demand exerts on tourism resources and the region.

4.2.2 Main Results

4.2.2.1 Decomposition

After analysing the situation in Spain, it is worth considering the specific importance of each source market it terms of monthly concentrations for the country overall. It is reasonable to suggest that this contribution basically depends on two parameters: the weight of the market as part of overall demand, and its individual level of monthly concentration. Specifically, we need an additive decomposition rule to apply to concentration. That being the case, one possibility is to use Shorrocks' rule (1982), which establishes that the aforementioned weight can be approximated through the weight of its individual variance and factorial covariations from the overall variance (natural law of variance). Duro (2016), for example, uses this decomposition in the case of provincial Spain. Table 2 shows these relative contributions for the sub-period 2005–2014, which is where we have observations for all the source markets. This period allows us to clarify the role of the distinctive markets in a period dominated generally by the reduction and subsequent growth in monthly concentration as previously seen.

The results indicate some interesting points:

Firstly, three markets contribute to explaining two-thirds of the monthly concentration of international tourism demand in Spain. The market that makes the greatest contribution is the United Kingdom, with 28% of the total, followed by France with almost 19% and Germany with 15%. Note that the weight of the British market stems, not only from its size in the annual global demand, but also from its relatively high concentration, given that its proportion of global demand is lower than its synthetic concentration of 23%. The explanatory weight of the French market is also greater, due to its high comparative seasonality, than the corresponding weight of demand. Due to this superiority of these three markets, it would be necessary to focus the efforts in these countries especially, in order to mitigate the monthly concentration of foreign demand in the country. This

preponderance of the three markets points towards needing to make efforts to mitigate the monthly concentration of foreign demand in the country.

Secondly, in relation to the above markets, it is worth highlighting the reduction in the relative contribution of the French market, which reduced from 25% in 2005 to 19% of the total monthly concentration in 2014. This reduction is essentially due to the drop in its individual concentration mentioned earlier. Given the success of this change and its high relative explanatory weight, it would seem important that this market should be a focus of attention in tourism policies.

Thirdly, the change in the weight of the British market is particularly worrying since, driven by its growing concentration its relative contribution has slightly increased from 27% to 28% although its weight within the annual overall demand has dropped considerably, from 29% to 23%. In this respect, something has either not been done, or not been done properly, to combat the seasonal concentration of this market over these years. The combination of decreasing overall demand and growing concentration shows that those tourists who used to travel in low season months are no longer coming, which possibly indicates a decline in the average economic profile of these visitors. Whatever the circumstances, it should be a priority not only to increase annual numbers but also to clearly mitigate the seasonal concentration of this market. Co-ordination and co-operation across public and private sector is necessary to strengthen the implementation of the policies such as promotional strategies to encourage the travels during the year and marketing of attractive packages for low and shoulder season.

Fourthly, mention must be made of the increase in the global tourist concentration in Spain associated with markets from the rest of Europe, which in this period corresponds essentially to the Russian market. The change in its relative contribution to the concentration has led to a doubling of its weight, from 4.3% in 2000 to 8.5% in 2014. In to a growing individual concentration, it is necessary to highlight the increase in its relative weight within overall demand. Even though it may seem a good idea to boost these markets, the point is that they further exacerbate seasonal imbalance.

Finally, the results for northern European countries indicate that their contribution to the concentration is not only very small, especially when compared to their weight in the

overall annual demand, but that it is even negative in the first years of the analysis. Note that this behaviour is due to their small individual monthly concentration and the compensatory nature of monthly demand compared to the other markets. Consequently, these markets would be good candidates for the fostering of annual demand given their more balanced nature. Intensifying promotional campaigns in these countries could improve tourism seasonality rates in this destination.

Table 2. Decomposing seasonality by markets in Spain, 2005-2014.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Belgium	4.50%	4.30%	4.00%	3.50%	4.00%	3.20%	3.20%	3.20%	3.40%	3.50%
	(3.3%)	(3.1%)	(2.9%)	(2.9%)	(3.1%)	(3.1%)	(3.1%)	(3.0%)	(3.1%)	(3.4%)
Germany	15.10%	15.70%	15.00%	16.30%	15.60%	15.30%	14.90%	15.00%	15.00%	14.70%
	(17.7%)	(17.5%)	(17.2%)	(17.6%)	(17.1%)	(16.7%)	(16.0%)	(16.2%)	(16.2%)	(16.0%)
Ireland	2.90%	3.10%	3.10%	3.70%	3.50%	2.90%	2.80%	2.40%	2.50%	2.40%
	(2.4%)	(2.6%)	(2.8%)	(2.9%)	(2.8%)	(2.2%)	(2.3%)	(2.1%)	(2.1%)	(2.0%)
Italy	6.70%	6.70%	7.20%	6.50%	6.30%	6.50%	6.90%	6.50%	5.70%	6.20%
	(5.3%)	(5.8%)	(6.2%)	(5.9%)	(6.1%)	(6.6%)	(6.7%)	(6.2%)	(5.3%)	(5.7%)
Netherlands	5.80%	5.60%	5.10%	5.10%	4.50%	5.70%	6.60%	5.40%	4.90%	4.60%
	(4.4%)	(4.4%)	(4.3%)	(4.3%)	(4.0%)	(4.3%)	(4.9%)	(4.5%)	(4.3%)	(4.3%)
Nordic countries	-0.60%	-0.20%	0.10%	0.50%	1.00%	1.70%	0.50%	0.90%	1.80%	1.70%
	(5.1%)	(5.3%)	(5.9%)	(6.3%)	(6.4%)	(6.8%)	(6.9%)	(7.3%)	(8.0%)	(7.8%)
France	24.70%	22.90%	22.90%	18.70%	21.20%	19.60%	17.80%	18.00%	17.80%	18.90%
	(15.9%)	(15.7%)	(15.3%)	(14.2%)	(15.2%)	(15.4%)	(14.9%)	(15.5%)	(15.7%)	(16.3%)
Portugal	3.00%	2.40%	2.10%	2.50%	2.60%	2.70%	2.90%	2.90%	2.30%	2.80%
	(3.6%)	(3.8%)	(4.1%)	(3.9%)	(4.0%)	(3.6%)	(3.3%)	(3.2%)	(2.8%)	(2.9%)
Switzerland	2.10%	2.50%	2.50%	1.90%	2.10%	2.40%	2.50%	2.70%	2.70%	2.40%
	(2.1%)	(2.4%)	(2.3%)	(2.2%)	(2.2%)	(2.2%)	(2.4%)	(2.5%)	(2.5%)	(2.5%)
United Kingdom	26.60%	27.40%	29.30%	30.30%	28.10%	27.30%	27.90%	27.80%	28.10%	27.90%
	(28.8%)	(27.9%)	(27.8%)	(27.6%)	(25.5%)	(23.6%)	(24.2%)	(23.7%)	(23.6%)	(23.1%)
United States	1.20%	1.50%	1.60%	1.90%	1.60%	1.50%	1.50%	2.10%	1.70%	1.90%
	(1.6%)	(1.6%)	(1.8%)	(2.0%)	(2.0%)	(2.2%)	(2.0%)	(2.2%)	(2.0%)	(1.9%)
Rest America	1.10%	1.60%	1.30%	1.30%	2.80%	2.60%	3.00%	2.40%	2.10%	1.80%
	(2.4%)	(2.5%)	(2.2%)	(2.2%)	(2.8%)	(2.8%)	(3.1%)	(3.3%)	(3.1%)	(2.9%)
Rest Europe	4.30%	4.80%	4.20%	6.00%	5.60%	6.10%	7.20%	8.40%	9.60%	8.50%
	(4.9%)	(5.1%)	(4.8%)	(5.8%)	(6.0%)	(7.1%)	(6.6%)	(6.9%)	(7.4%)	(7.0%)
Rest World	2.50%	1.70%	1.60%	1.70%	1.40%	2.60%	2.20%	2.10%	2.20%	2.70%
	(2.7%)	(2.3%)	(2.4%)	(2.2%)	(2.7%)	(3.4%)	(3.3%)	(3.7%)	(3.9%)	(4.3%)

Note: Relative weights, in terms of yearly global demand, in brackets.

Source: derived by the author from the Frontur Survey (IET).

4.2.2.2 Searching for the empirical determinants

We model the annual tourism seasonality in Spain using the monthly inequality of foreign tourists and the coefficient of variation based on Model 3 in the previous section. Estimation is carried out using the Stata program and a dynamic model such as GMM-DIFF. The model allows us to combat some of the main estimated biases characteristic of dynamic specifications, as well as obtaining short- and long-term elasticities. The long-term elasticities were calculated based on the assumption of long-term balance ($\text{Ln } CV_{i,t} = \text{Ln } CV_{i,t-1}$) and, therefore, are the result of dividing each of the short-term coefficients by $(1- \beta_1)$. Table 3 shows the main results obtained. The model is highly significant and the tests of the diagnosis are positive, as per the autocorrelation coefficients of the Sargan Test. However, the number of observations is low so the results should be interpreted with caution.[16] It will be interesting to flesh them out them later when more information is available. Based on the results, the following points of interest can be noted:

Firstly, the past typically has a significant influence on present-day seasonality. Based on the estimates obtained, for every 1% increase in the seasonality of the previous year, the seasonality of the present year rises by an average of almost 0.5%. This indicates a significant inertia in the short-term changes in seasonality (Lanquar, 2001).

Secondly, prices are significant. The results indicate that a relative increase in prices would contribute, all other things being equal, to reducing seasonality (a result also found in Rosselló et al., 2004 for the Balearic Islands). This result indicates that differential inflation would move travel outside the months of highest demand. An argument could thus be made for a high-price strategy, although clearly this would be conditional on its typically negative effect on overall demand (Garín-Muñoz, 2006). Price increases may temporarily redistribute flows, which can be positive in our context, but also might reduce the annual global demand, which in turn would depend on the global price-elasticity and the specific behaviour.

[16] Although, papers like Garín-Muñoz (2006, 2009) have also used a similar sample with a similar methodology but, in that case, implemented for explaining global yearly tourist demand.

Thirdly, the income elasticity of monthly concentration is high and negative. Indeed, this coefficient is the largest of all those analyses: 1.4 in the short-term and 2.6 in the long-term. Consequently, the economic growth of the source markets would be associated, all other things being equal, with reductions in the monthly concentration and, therefore, greater demand in non-high season months. Thus, demand in non-summer months would be regarded as a luxury good. Consequently, an increase in income in the more important economies would not only be positive in terms of annual demand, but also in terms of seasonal distribution. However, by the same token, any crises would worsen everything. A crisis not only reduces the overall level of tourists by market, but also concentrates them more during the year. Crises tend to withdraw tourists from the non-high season months, thus contributing to increasing the weight in summer months in Spain. In terms of policy, this result suggests that in recessive markets or economies, or those with macroeconomic weaknesses, it is necessary to step up the introduction of anticipatory policies to increase demand in months with less activity. Furthermore, given that markets can experience different cycles, it would be interesting to diversify not only in terms of the overall annual demand (Garín-Muñoz, 2006), but also in terms of its monthly distribution.

Fourthly, the exchange rate, as an explanatory differential variable, seems important. The results point to a rise in the value of foreign currency increasing the seasonal concentration in the sensitive markets. This may indicate that exchange-rate fuelled improvements in the purchasing power of important foreign markets, such as the British market, gives rise to tourists who would not have visited Spain under other circumstances, and who take their holidays in the months of greatest demand. In conjunction with the previous result regarding the income-concentration link, we can initially state that changes in currency values primarily encourages low-to-medium income profile visitors, who provide the main demand in high season months.

Finally, the cost of transportation is a significant factor although to a very limited extent.[17]

[17] The results of the estimations using the Gini coefficient as an alternative measure of seasonality do not differ significantly. The results are available on request from the authors.

Table 3. Dynamic Model Results, 2000-2014.

Variable	Arellano and Bond (1991)
ln $ts_{i,t-1}$	0.458***
	(0.078)
ln rp	-1.018**
	(0.489)
ln gdp	-1.430**
	(0.565)
ln ex	0.385***
	(0.092)
ln tc	0.137***
	(0.046)
Constant	13.862**
	(5.797)
Autocorrelation	
m_1	-2.451
m_2	1.172
Sargan Test	50.082
Wald Test	134.65
Observations	109
Long term param	
ln rp	-1.88
ln gdp	-2.64
ln ex	0.71
ln tc	0.25

Note: Dependent variable: Logarithm of C.V. of monthly tourist *denotes a significance level of 10%, ** of 5% and *** of 1%.

4.2.3 Concluding remarks and implications

Seasonality is an imbalance in the tourism sector that is crucially important in the case of consolidated destinations. Failure to correct this threatens the very growth of the sector and the destination brand itself. Understanding seasonal patterns is, therefore, fundamental for tourism enterprises and destinations due to its impact in tourism consumption and production (Cuccia and Rizzo, 2011). It is essential that destinations use strategic management and marketing policies as tools for evening out the peaks and troughs and minimizing the impact of seasonality. When designing strategies for tackling seasonality, it is thus necessary to measure, evaluate and understand the factors behind this phenomenon, recognizing the seasonal patterns of their markets and attracting appropriate target market segments in each one of the seasons.

Taking the markets as reference units, methodologies for measuring and analysing seasonality are proposed in the current study. Firstly, following the definition by Butler (1994), measurement is carried out by means of summary indicators and the coefficient of variation is specifically recommended. The use of this measure contrasts with the more general practice in the literature of using the Gini coefficient (Fernández-Morales, 2003; Fernández-Morales et al., 2016; Fernández-Morales and Mayorga-Toledano, 2008; Lundtorp, 2001; Martín Martín, Jiménez Aguilera, and Molina Moreno, 2014; Wanhill, 1980). Measurements should be specific to source markets and this motivates the additional implementation of an additive decomposition technique that quantitatively clarify the final role of these markets in explaining overall tourism seasonality. Secondly, to explore the main explanatory factors in greater depth, a dynamic panel data model is estimated using data per market and year. Using a method that is relatively new in this context, we take the standard economic tourist demand functions as a reference. The proposed methodologies, which have been typically underutilized until now in this field, allow further information about the seasonal patterns to be gathered, thus improving our knowledge from a marketing perspective. An additional main objective of the study is to provide empirical results as a reasonable way of guiding national policies. The analysis includes an empirical implementation of these methodological proposals for the 2000–2014 period in Spain, one of the biggest international tourist destinations in the world.

Some implications of these results for marketing strategies and tourism policy are suggested:

First, the monthly concentration of tourism demand in Spain, despite the drop experienced up to 2008, clearly grew subsequently and this coincided with a phase of high growth in international demand. Consequently, recent years show an unbalanced growth and we highlight the need to evaluate this phenomenon and correct it by means of appropriate policies.

Second, the evidence suggests that almost two-thirds of this concentration can be attributed to three markets; the United Kingdom with 28% of the total; France with almost 19%, and Germany with 15%. There is a need pursue a significant reduction in their monthly tourist demand concentration in Spain.

Third, for these markets, there was a notable reduction in the contribution of the French market, which essentially corresponds to the drop in its individual concentration. Given this progress, this market should continue being the focus of attention in tourism policies, and this is facilitated by its proximity. In evident contrast, the change in the role of the British market is particularly negative, insofar as its relative contribution has slightly increased, driven by its growing concentration. The combination of decreasing overall demand and growing concentration shows that tourists who used to visit in non-summer months are no longer coming. The priority in this market should be to apply a comprehensive strategy to reduce concentration (and possibly increase demand) and, consequently, to increase the differential in the demand for quieter months. This might be achieved through promotional strategies during the year and attractive packages that market actions outside the high season.

Fourth, the econometric models used reveal that the past has a significant impact on current seasonality. Although inertia is an important factor, there is scope for promoting significant short-term changes in seasonality levels.

Fifth, price variations are a significant factor, and income is particularly important. Economic growth is associated with a reduction in concentration, while times of crisis increase it. Economic crises do not just reduce the level of annual demand, but also increase seasonal concentration. In policy terms, this indicates that for markets in recession or with low growth, it is necessary to put anticipatory policies in place to increase demand outside summer months. Additionally, and given the possible divergences in economic cycles, it seems reasonable to act to diversify markets. A contribution of this study is that such diversification is not only positive in terms of stabilizing demand, but also in terms of its monthly distribution.

Finally, the exchange rate plays a significant role in the variations in seasonality by market. The results indicate that a rise in the value of foreign currency increases seasonality. Currency fluctuations may primarily encourage demand associated with low- to medium- spending visitors who typically want to travel in the summer months. This, combined with the problems of reducing seasonality, would reasonably encourage policies focused on higher-income profiles in the British market.

4.3 A case study for Catalonia

Catalonia is one of the 17 self-governing regions of Spain. It is located in the northeast of the Iberian Peninsula and covers some 32,000 km^2. Tourism in this region is one of the main economic driving forces, representing approximately 12% of its GDP. Since 2002, Catalonia has become the main international tourism destination of the country, as it receives over 25% of the total number of tourists who visit Spain, i.e. almost 17 million tourists during the last year.[18]

In general terms, those international tourists who visit Catalonia are attracted by leisure (over 80%), they choose to organise their trips in an independent manner (over 80%), mainly use air transport (66%)—although the use of cars is noteworthy (26%)—and mainly seek accommodation in hotels (60%).

Catalonia possesses diverse tourist attractions. The main forms of tourism include sun and sand, business, cultural, rural, snow and nature tourism. Partly linked to this, the region is divided into nine regional tourist brands (areas): Val d'Aran, Pirineus, Costa Brava, Terres de Lleida, Paisatges Barcelona or Catalunya Central, Costa de Barcelona, Barcelona, Terres de l'Ebre and Costa Daurada (Figure 5). Excepting the typical errors associated with generalisations, it may be said that sun and sand products are concentrated on the Mediterranean coastal regions (Costa de Barcelona, Costa Brava, Costa Daurada and Terres de l'Ebre), business tourism is focused on the regional capital (Barcelona), while cultural tourism involves all brands and rural, snow and mountain tourism are confined to the northern and inland areas of the region (Pirineus, Terres de Lleida and Val d'Aran). In all events, it must be noted that Barcelona and the Costa Brava between them are responsible for the concentration of around 70% of international tourism registered in Catalonia.

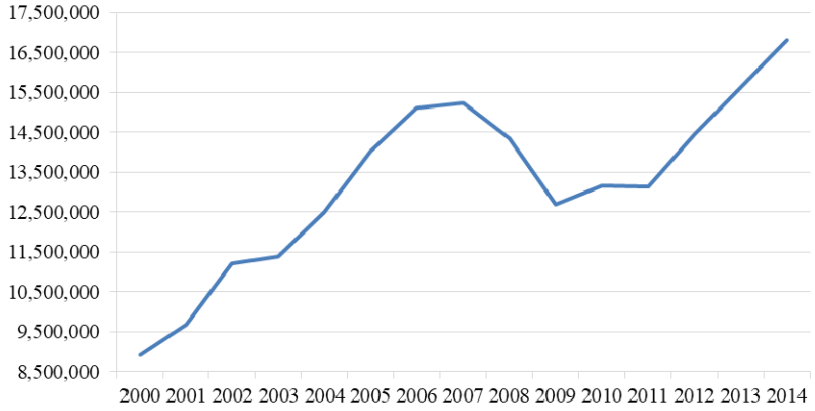
[18] The number of international tourists during the 2000–2014 period, which will be used as a demand indicator, is the highest number available to date. We consider that this is a reasonable indicator, as it connects with the idea of measuring seasonality as a dimension of tourist impact in the region. This data is from the Frontur (Institute of Tourism Studies).

In recent years, Catalonia has seen a growth in tourist flows. Figure 6 shows the significant increase in terms of international tourists since the year 2000, which was spurred by the rise of low-cost airlines and which was interrupted solely by the 2007–2009 crisis period (e.g. in 2008 demand decreased by 5.8% and by 11.4% in 2009). So, although the overall tourism crisis took place mainly in 2009, in previous years Catalonia was already showing a clear slowing of growth during first half of the decade. After 2009, Catalonia reinitiated its growth phase, based, inter alia, on the rise of Barcelona as a world destination. The region has, in simple terms gained some 4 million tourists since 2011, mainly in the more concentrated brands, such as Barcelona.

Figure 5. Territorial tourist brands in Catalonia.

If we examine the composition of the markets (Table 4), the important influence of the large European (and therefore neighbouring) source markets can be seen. France is the main market, accounting for 27% of the total (due to the effect of proximity and greater familiarity)—this differentiates Catalonia from Spain, where the main source market is that of Britain. Other important markets for Catalonia are the British, the German and the Italian, which together accounted for 55% of tourists during 2014.

Figure 6. International tourist arrivals to Catalonia.



Source: Own elaboration through data from Instituto de Estudios Turísticos (IET).

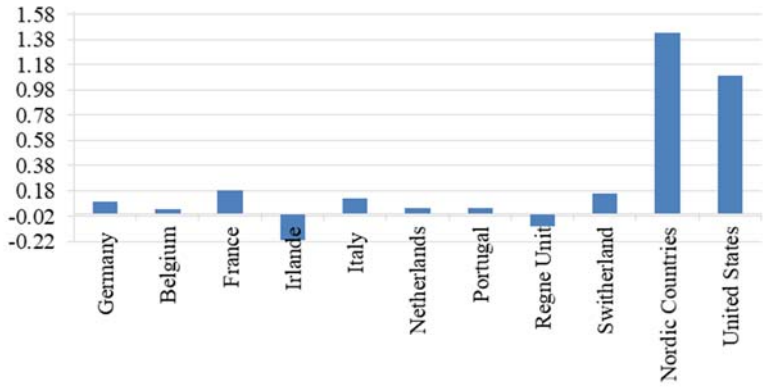
Table 4. International tourist arrivals to Catalonia by country of origin, 2014.

Country	Arrivals	%
France	4,604,068	27.38%
UK	1,782,398	10.60%
Germany	1,429,852	8.50%
Italy	1,345,510	8.00%
Russia	833,48	4.96%
Netherlands	814,696	4.85%
Nordic countries	758,194	4.51%
Belgium	592,598	3.52%
USA	512,603	3.05%
Switzerland	411,578	2.45%
Portugal	179,323	1.07%
Ireland	178,657	1.06%
Others	3,371,241	20.05%
Total	16,814,199	100.00%

Source: Own elaboration through data from Frontur Survey (Institute of Tourism Studies).

In dynamic terms, between 2000 and 2014, the number of foreign tourists increased in most markets (Figure 7). The main increase was seen in the Russian market, followed at a distance by the Scandinavian countries and the USA. In all events, the marked growth of the French market must be noted (18%) in addition to the increase of the Italian (12.4%) and German (9.5%) markets. The British and especially the Irish markets however registered a fall of 10% in the overall period.

Figure 7. Growth rates international tourist arrivals by markets.

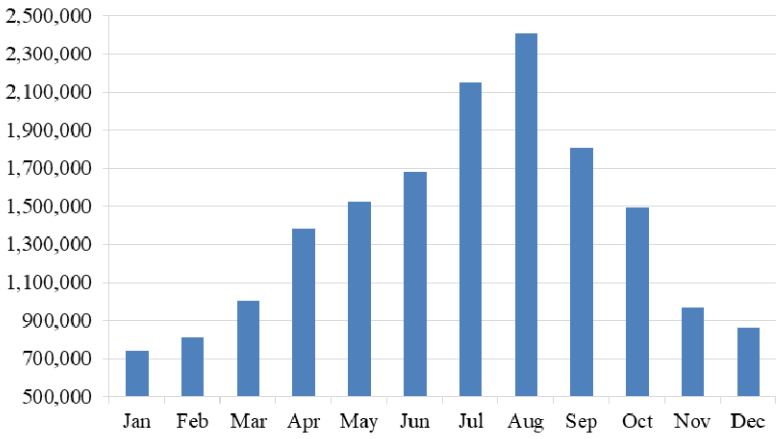


Source: Own elaboration through data from Instituto de Estudios Turísticos (IET).

4.3.1 Tourism and seasonality in Catalonia

We are therefore analysing a territory having a clear expansion of demand, so an investigation of the situation and development of seasonality is of particular interest. As an initial analysis, Figure 8 shows monthly demand, with a clear one-peak distribution characteristic of those destinations with a marked climatic feature.

Figure. 8. Monthly distribution international tourist arrivals in Catalonia, 2014.



Source: Own elaboration through data from Instituto de Estudios Turísticos (IET).

Beyond the mere observation of seasonal demand distribution, it is important to rigorously quantify the level of seasonal concentration, which will allow us to clarify its development over time and its comparability with other regions. In this respect the Gini

Coefficient,[19] a measurement normally applied in this type of analysis, has been used and it has been calculated for the six regions with highest levels of international tourism demand in the country (Table 5). The results obtained for 2014 reveal the especially high level of differential seasonality in the Balearic Islands, followed by similar and significant figures from Valencia, Andalusia and Catalonia (0.21). Seasonality in Catalonia is linked to especially high figures in coastal areas.[20] The high level of annual demands would make it especially convenient to reduce the aforementioned values as much as possible in order to guarantee their sustainability. Andalusia, with half the annual demand of Catalonia has a similar Gini rating. However, Madrid and the Canary Islands are on the opposite side, both with Gini ratings under 0.1, a fact explained by different reasons; business tourism and the capital effect for the former and above all climatic features in the latter (agreeable year-round temperature and reduced monthly dispersion).

Table 5. Tourism seasonality in the six most tourist regions in Spain according Gini coefficient.

	Regions	Gini	D
1	Balearic Islands	0.469	11,365,479
2	Valencia	0.233	6,232,677
3	Andalucía	0.229	8,502,379
4	Catalonia	0.210	16,814,203
5	Madrid	0.091	4,546,694
6	Canary Islands	0.061	11,475,001
	Spain	0.208	64,990,209

Note: Gini coefficient has been computed according to data for 2014; D is the overall demand in 2014.
Source: Own elaboration through data from Instituto de Estudios Turísticos (IET).

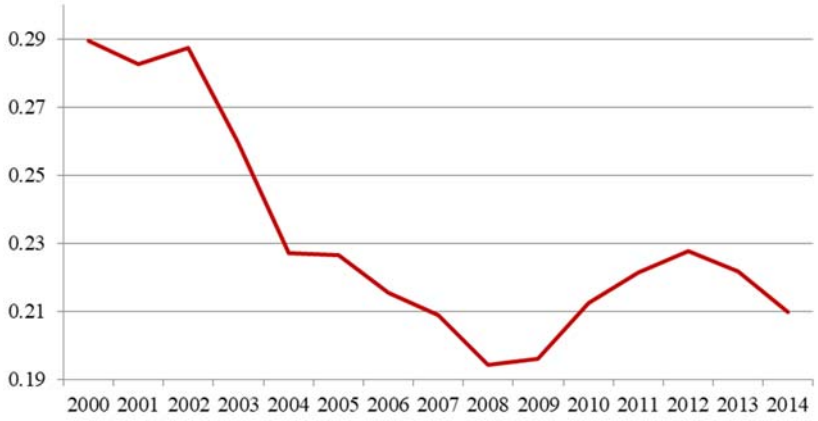
Figure 9 provides the seasonal perspective with respect to monthly concentration using the Gini index as a basis. In fact, it can be seen that seasonality had fortunately dropped

[19] The Gini index has been widely used in the analysis of tourism seasonality. The value of this index varies between 0 and 1. To the extent that this value is closer to one, it indicates a situation in which the variable presents a high concentration, while when the values are closer to zero it shows that the variable selected is distributed more evenly over time. Authors such as Wanhill (1980), Lundtorp (2001), Fernández-Morales (2003), Rosselló et al. (2004), Fernández-Morales and Mayorga-Toledano (2008), and Martín et al. (2014) have used and encouraged this means of measurement to examine seasonality for different areas and years. In all events the calculation of other measurements, such as the coefficient for variation do not provide excessively different results in our case. The calculations are available on request, from the authors.

[20] Duro (2016), on analysing the seasonality of the hotel demand at a provincial level (and not a regional one) finds that in the provinces of Girona and Tarragona are among those with the highest level of seasonality, together with the Balearic Islands, which are double the national average.

in the period of analysis, the Gini index in Catalonia dropping from the significant figure of 0.29 in the year 2000 to the aforementioned figure of 0.21 in 2014. This is an interesting reduction, which leads us to consider the explanatory factors. In all events, this development has not been monotone during the cited period. The main part of this drop occurred up to 2008, with concentration figures reaching 0.19 in 2008. However, since 2009 Catalonia seems to have had greater problems in reducing this imbalance, which also coincides with a period of intense growth in terms of annual demand, as described earlier. Therefore it seems that the beneficial correlation for the earlier years of this period (overall expansion leading to a reduction of seasonality), which was probably aided by the increase in the number of low-cost airlines and secondary airports in Catalonia (in Reus to the south and Girona to the north) has not extended to recent times. The significant additions of new foreign tourists has met with an increased seasonal imbalance, an event that has fortunately waned somewhat in the last two years. Furthermore, one should also note the development of seasonality, which has increased in the most critical years of the global economic crisis, i.e. between 2009 and 2012. Tentatively, it appears that the economic crisis correlates with greater seasonality at an overall level. The final section of this work will help us to contrast this idea more closely.

Figure 9. Evolution of Gini coefficient in Catalonia.

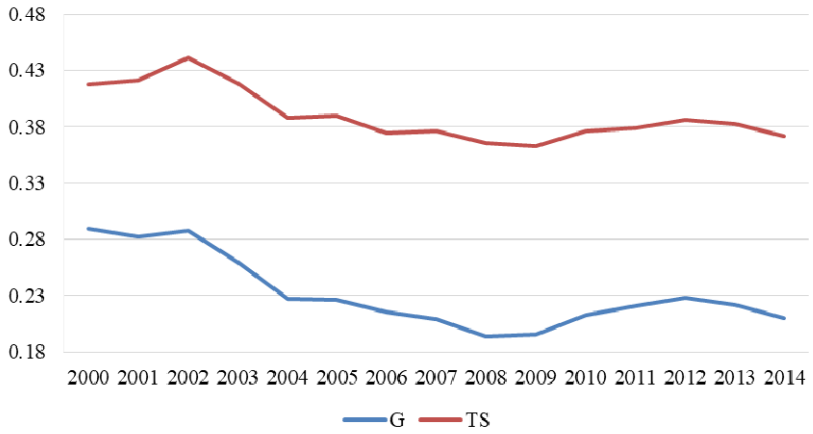


Note: The value of this index varies between 0 and 1. To the extent that this value is closer to one, it indicates a situation in which the variable presents a high concentration, while when the values are closer to zero it shows that the variable selected is distributed more evenly over time.

Source: Own elaboration through data from Instituto de Estudios Turísticos (IET).

The detailed analysis of this seasonality by source markets requires however the use of an indicator distinct to that of the Gini index; one of a partial nature. When the analysis seeks to detail the data available at a market level, information is not provided for periods of several months in some cases; a situation that hinders the application of measures of overall imbalance, such as the Gini index. In this case, an indicator of partial concentration has been used, such as that of the proportion of international visitors by country of origin from June to August within the annual total by country of origin. This measurement has been selected for three reasons—the high correlation (close to 0.93) with the Gini index for those countries where data is available, the high typical demand concentrated in those months in Catalonia and the structural similarity between the June and the months of maximum demand of July and August.[21] Note in Figure 10 that both measurements, the chosen partial method (TS) and the Gini (G), show a highly similar development over time and for the region in overall terms.[22]

Figure 10. Evolution of partial monthly concentration and Gini coefficient for Catalonia.



Source: Own elaboration through data from Instituto de Estudios Turísticos (IET).

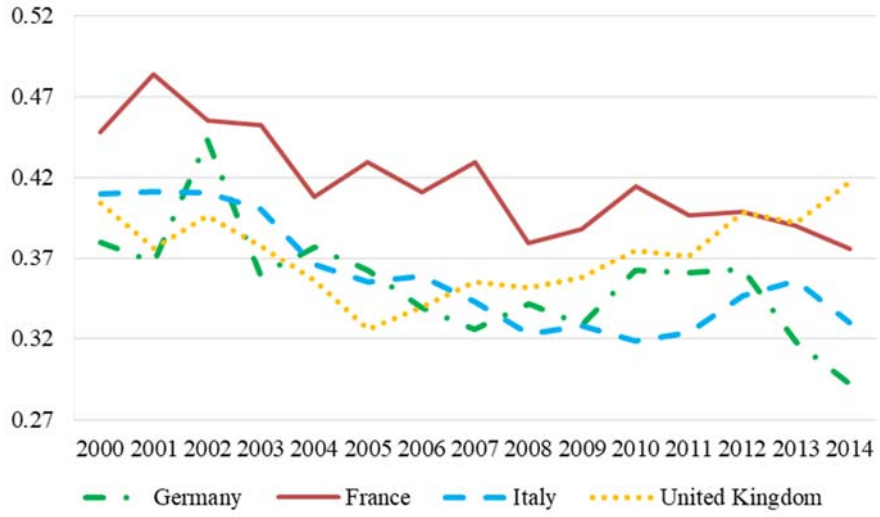
The difficulty in obtaining statistical data for Belgium and Portugal has prevented their inclusion in this analysis. The results in the Figure 11 reveal that between the four main source countries, France presents greater values of partial concentration with respect to

[21] Correlation in all the samples, i.e. in both the pooled figures for markets and years, as in the annual average of the cross-section of markets or the average throughout the markets in annual development, between the proportion measurement from June to August with that corresponding to July-August is very high. Calculations are available from the authors on request.

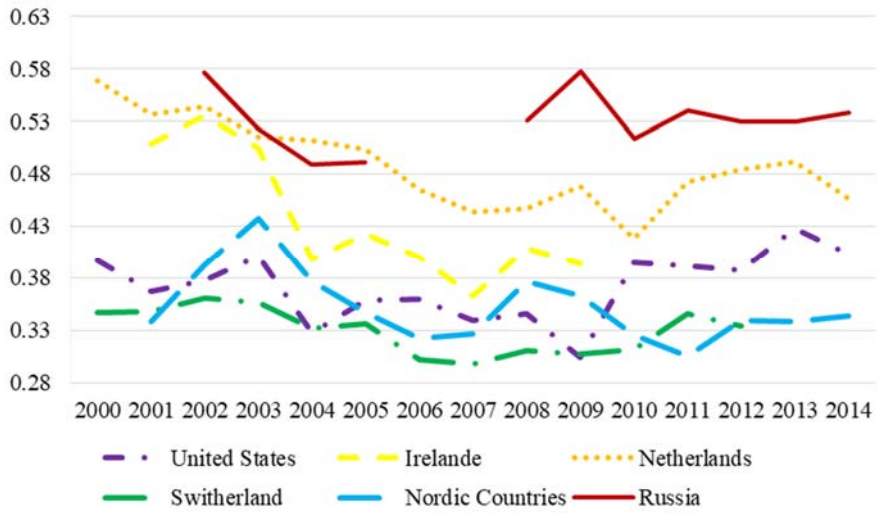
[22] It was confirmed that the correlations between the two measures were elevated, taking into account both aggregate level such as disaggregate level by segments.

our measurement (an average of 0.42), after which come the United Kingdom (0.37), Italy (0.36) and Germany (0.35). With respect to its development, only the United Kingdom reveals an overall (although reduced) growth. The remaining countries show significant drops. On the other hand, the difference in seasonality in large countries over the crisis period must be noted. Therefore, while the concentration for France and Italy worsened, it improved for Germany and the UK. On the other hand, with respect to source markets of a smaller size, the high concentration of the Russian market, for example, is noteworthy. In addition, it is the largest of all markets, without a perceptible improvement in recent years. The Netherlands and Ireland also reveal high partial concentrations, with respective values of 0.49 and 0.44 on average, and which are even higher than those of the French market, but with a significant drop in both cases (until 2009–2010). The Scandinavian countries however reveal lower concentrations with an average pattern of decreased growth, but with an increasing trend since 2011.

Figure 11. a-b) Evolution of partial monthly concentration by country of origin.



(a)



(b)

Source: Own elaboration through data from data from Instituto de Estudios Turísticos (IET).

4.3.2 Measurement

The fundamental aim of this section consists in clarifying some of the main empirical points regarding seasonal tourist concentration figures in Catalonia during the period analysed through a dynamic data panel, where the basic units of analysis are the source markets. The dynamic structure of the panel and therefore, the inclusion of the lagged dependent variable allows, among other aspects, to tackle the probable relevance of habit formation as a factor that explains the levels and the growth of this imbalance in tourism. In all events, and as will be seen below, the models include, as a fundamental aspect, those variables normally used in tourism demand models, i.e. income levels and price variables.

In order to undertake the analysis, the eight individual source markets have been included, with the data available from the dependent and explanatory variables. In all events, these markets (France, the United Kingdom, Germany, Italy, the Netherlands, the United States, Switzerland and Ireland) represent two thirds of the total number of international arrivals made during the period being investigated and include the four main markets. Thus, it seems to us that this analysis is appropriate, taking into consideration the proper precautions.[23]

[23] It must be taken into account, in this respect that the maximum coverage has not exceeded 75%, as some of the source markets are not individualised due to a lack of sufficient observations (i.e. the Other Countries

The dependent variable chosen in the analysis, as noted in the section above, is a partial measurement of monthly concentration, i.e. the proportion of international visitors by country of origin from June to August within the annual total by country of origin.

As a theoretical reference model, the classic model of microeconomic demand has been used in which, as is well known, the basic determinants used coincide with income and prices (Crouch, 1994a, b). The model includes the following as determinants:[24] the lagged measurement of concentration; relative price (that coincides with a relative measurement that relates the Consumer Price Index in the country of destination to the Consumer Price Index in the country of origin); income (Real Gross Domestic Product per capita from the source country will be used, expressed in purchasing power parity); the exchange rate (destination currency divided by the currency of the source country); finally, the price of oil as a proxy for transport costs. We decided to use this proxy following other researchers such as Garín-Muñoz, 2006 or Ledesma-Rodríguez et al., 2001 because the choice of the indicator to be included is often complicated and it is not often possible to have complete information. Given the complex structure of the transportation system, which determines a high variability in transportation prices (e.g. low-cost flights) due to its effect on demand could or not be important. Therefore, this is a variable, whose use has always been somewhat controversial (Crouch, 1994a, b).[25]

Note that in the last three cases, the price type variables are different and their separate inclusion seeks to capture the different sensibilities of consumers with respect to them and their variations. We provide more detail on consistency and on the usefulness of each one of the variables below.

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and Scandinavian Countries group). In this case, the sample used would involve using almost 90% of the maximum individualised demand possible.

[24] For the case of Catalonia, we use the same variables using in the previous study of Spain.

[25] The model used in the end does not include fictitious variables in order to gather the influence of atypical observations, as the result of events or extraordinary occurrences. Although in preliminary versions, the relevance of dummies, among other factors, was tested 2001 and 2008, in order to monitor the effects of the terrorist attacks and the global crisis, which did not produce any statistically significant results. Data are available on request from the authors.

The empirical base model used in the final analysis was the following:

$$Ln\ ts_{i,t} = \beta_0 + \beta_1 ln\ ts_{i,t-1} + \beta_2 ln\ rp_{i,t} + \beta_3 ln\ gdp_{i,t} + \beta_4 ln\ ex_{i,t} + \beta_5 ln\ tc_{i,t} + v_{i,t} \quad (4)$$

As an extension of the above, it is of interest to consider the possible relevance of the differential effects of the variables with respect to the markets (at least the main ones), and taking into account those limitations imposed by the size of the sample and the mechanism used for calculation. In this respect, interaction variables have been tested among the regressors and the four main markets (France, Germany, the UK and Italy). The complementary model finally used, based on the significance of the interaction variables by country was the following:

$$ln\ ts_{i,t} = \beta_0 + \beta_1 ln\ ts_{i,t-1} + \beta_2 ln\ rp_{i,t} + \beta_3 ln\ rp\_it_{i,t} + \beta_4 ln\ gdp_{i,t} + \beta_5 ln\ gdp\_ger_{i,t} + \beta_6 ln\ ex_{i,t} + \beta_7 ln\ ex\_uk_{i,t} + \beta_8 ln\ tc_{i,t} + v_{i,t} \quad (5)$$

Where $TS_{i,t}$ is the measure of seasonality in the country of origin *(i)* and year *(t)* and $v_{i,t} = \lambda_t + \eta_i + \varepsilon_{it}$ is the fixed effects decomposition of the error term in which λ_i is the time effects and η_i the country of origin-specific effects, and the error component ε_{it} which is assumed to be serially uncorrelated with zero mean and independently distributed across regions, but varies across regions and time. Both models adopts the double-logarithmic form for economic variables.

The data panel for 2000–2014 period is not balanced, as some countries do not possess observations for every year. The data used with respect to the determinant variables are from the Organisation for Economic Co-operation and Development (OECD), of the Instituto de Estudios Turísticos (IET) and the Instituto Nacional de Estadística of Spain (INE).

Table 6 provides a brief description of the variables used in this investigation.

Table 6. Variables description.

Variable	Description	Obs.	Mean	Std. Dev.	Min.	Max.
ts	Partial Monthly Concentration Measures for international tourists	114	0.39	0.061	0.292	0.568
rp	Relative Consumer Price Index (destination/origin)	120	0.971	0.048	0.819	1.090
rp_it	Differential Relative Consumer Price Index (destination/origin) effect for Italian market	120	0.122	0.325	0	1.101
gdp	GPD per capita country of origin	117	35,673.11	4,912.12	26,666	45,665
gdp_ger	Differential GPD per capita effect for German market	120	4,201.67	11,180.01	0	36,163
ex	Nominal Exchange Rate	120	0.987	0.197	0.609	1.642
ex_uk	Differential Nominal Exchange Rate effect for UK market.	120	0.171	0.458	0	1.642
tc	Import Average Oil Price by country of origin	104	60,841	30,885	22,070	115,640

The empirical results have been obtained by using panel data, as mentioned, which both allows us to reduce multicollinearity and helps us in dealing with the problem of omitted variables (Hsiao, 2014). Given the dynamic structure of the specifications, however, the use of a fixed-effects panel and/or random effects panel would cause random and inconsistent estimates, unless the time dimension is very high, which is not the case here (Baltagi, 1995). Given these circumstances, we decided to use the GMM–DIFF method (Arellano and Bond, 1991). The use of this procedure with respect to differences also helped us to eliminate the problem of non-stationarity and allowed us to obtain short and long-term elasticities. This method may be used in a one-step because it is preferable for inference on coefficients, especially in small samples like ours (Arellano and Bond, 1991). In addition, the number of instruments has been restricted (Alonso-Borrego and Arellano, 1999).[26]

[26] Regarding the instruments, we used the delays of the dependent variable with a maximum of two periods for reducing biases due to the existence of many instruments with respect to sample size (Alonso-Borrego and Arellano, 1999).

4.3.3 Main results

This section presents the main empirical results obtained from the estimates made using the GMM–DIFF model with the dynamic data panel for international tourists in Catalonia. The estimates have been obtained from STATA v.13 econometric software. Table 7 shows that the model functions satisfactorily, as indicates the Wald Test for the joint significance of the independent variables, that of serial correlation and that of Sargan on the over-identification of restrictions.[27] The corresponding results are also shown for short and long term elasticities.[28] In any case, the number of observations is not high and therefore the results should be interpreted with caution; it will be interesting to complete them later when more information is available.[29] In the light of these results, the following points of interest may be noted:

Firstly, the lagged coefficient in the measurement of concentration shows that increases of 1% in concentration from the previous year would give rise to increases of close to 0.2% in current seasonality. Note that this result indicates the existence of a certain level of automaticity or rigidity in the variation of partial monthly concentration. This figure however is not especially high, and therefore it suggests that there is some margin for implementing correction measures or for correcting this imbalance in the seasonal area.

Secondly, the overall results obtained for price elasticity in the short term suggest that the relative price does in fact influence concentration, namely in a negative manner, i.e. increases of 1% with respect to annual relative prices reduce tourist concentration to around 1.3% at an overall market level, such that, with increases in relative prices in Catalonia, international tourists opt to make more journeys outside the June to August period, probably to take advantage of its lower pricing characteristics. In the long term, the price elasticity of the concentration results in a high value of -1.5%. This sensitivity, which is the largest of the variables, therefore reveals the importance of pricing strategies

[27] The serial correlation test ascertains as to whether perturbations are independent and identically distributed. The final part involves a test on the identification of restrictions, which evaluates the validity of the instruments, so that contrasts may be made with the non-correlation and the error term. Therefore, both cases are tests that evaluate the validity of the model specification.
[28] The long-term elasticities were calculated on the assumption of long-term equilibrium, therefore obtained by dividing each one of the coefficients by $(1 - \beta_1)$.
[29] Nevertheless, other papers like Garin-Muñoz (2006, 2009) have used a similar sample with a similar methodology but in that case implemented for explaining global yearly tourist demand.

as a key policy element. The strategy of high prices may seem advisable in this context, although obviously it would be conditional upon its effects on overall demand, which typically are negative.

Thirdly, the results show that income in the country of origin is also an important variable for explaining those changes in monthly concentration for activity in Catalonia. The findings suggest that in the short term, an increase of 1% in the income of countries of origin would reduce concentration in Catalonia by 0.9%; a reduction that would amount to 1.1% in the long term. Consequently, an increase in income in the more important economies would not only be positive in terms of annual demand but also in terms of its seasonal distribution. However, similarly, any crises would worsen everything. In terms of policy, this result would suggest that in recessive markets or economies, or those with macroeconomic weaknesses, it is necessary to step up the introduction of anticipatory policies to increase demand in months with less activity. Furthermore, given that markets can experience different cycles, it would be interesting to diversify not only in terms of the overall annual demand (Garín-Muñoz, 2006) but also in terms of its monthly distribution, given our evidence.

Fourthly, the exchange rate has a positive and important effect on the partial concentration of tourist demand. As such, when the exchange rate is beneficial for the country of origin (i.e. own currency appreciation) a larger concentration of demand arises from June to August. An increase of 1% in the nominal exchange rate increases concentration by almost 0.4%. Rosselló et al. (2004) obtained a qualitatively similar result, in their analysis of the Balearic Islands. Authors such as Crouch, (1994a, b) and Lim (1999), which focused on modelling annual overall tourist demand, have shown that although the exchange rate has a positive impact on demand, the type of tourist attracted by variations in the exchange rate is characterized by reduced spending capacity. In our case, this would lead to an interpretation that currency appreciation would also, to a large extent, mean that people who had previously not thought about visiting Catalonia during the months of higher demand, probably due to their profile as medium to low spenders and/or their high sensitivity to price, would now do so, due to the ‘artificial’ increase in terms of their spending power.

Finally, the estimated value for transport costs suggests that its impact on concentration is both positive and important, although reduced, with coefficients in the long and short term of 0.08% and 0.1%, respectively. The results therefore indicate that increases in oil prices lead to a higher concentration of demand during the summer. This may be due to the fact that with increased travelling expenses (usually for road use) visitors decide to make fewer trips during the year but do, however, still travel during the summer. International tourist arrivals to Catalonia by road are greater than to the other autonomous communities of Spain due to the proximity of this territory to Europe borders, representing on average 41% of arrivals between 2004 and 2012.

Table 7. Dynamic Model Results, 2000-2014.

Variable	Arellano-Bond (1991)
ln $ts_{i,t-1}$	0.160***
	(0.0556)
ln rp	-1.282***
	(0.430)
ln gdp	-0.927***
	(0.293)
ln ex	0.423***
	(0.106)
ln tc	0.0810*
	(0.0453)
constant	8.550***
	(3.032)
Autocorrelation	
m_1	-2.043
m_2	1.149
Sargan Test	20,709 (20)
Wald Test	73,210 (5)
Observations	84
Long term parameters	
ln rp	-1.526
ln gdp	-1.104
ln ex	0.503
ln tc	0.096

Dependent variable: Logarithm of partial concentration *denotes a significance level of 10%, ** of 5% and *** of 1%.

In all events, one must be careful with this idea, as the low value of this parameter derives from difficulties involved in determining the effect of transport costs in a more effective manner.

Taking the basic results above as a starting point, it would be interesting, from a practical standpoint, and above all with respect to policy guidance, to explore the relevance of interaction variables by markets and therefore explore if important differential effects arise in sign or in scale or not and in which markets. Empirical studies, such as those of Croes and Vanegas (2005) and Mello, Pack and Sinclair (2002) have in fact observed these differences in tourist demand patterns with respect to the source country in question.

The most relevant results obtained are summarized in Table 8. The table details four estimates, in which one contains the variables of the base model, the only difference being the inclusion of those distinct variables of interaction that have proven of significant. Model 1 incorporates the variable for relative price interaction with the Italian market, Model 2 includes the differential income effect found for Germany, Model 3 exchange rate for the United Kingdom and finally, Model 4 includes all the interaction variables together. The results obtained may be summarised in the following basic points:

Firstly, it should be mentioned that the estimates obtained in this case confirm that the coefficients of the base model are maintained at an approximate level. This means that there are no significant changes in the values of the main determinants when introducing the interaction variables.

Secondly, Model 1 reveals that the price variable, when further separated for the Italian market, shows a high and differentially negative value. It therefore appears that Italian tourists are especially sensitive with respect to prices, and when confronted with increases, differentially divert their consumption to non-peak months. As such, this market would be especially sensitive to intra-annual mobilization with respect to prices (and which represents 8% of the total demand). This market would therefore appear to be a good candidate for intensifying campaigns based on prices in order to redistribute it differently on a monthly basis.

Thirdly, Model 2 shows that the coefficient for variable income in the German market is differentially high, but positive, countering the generally negative effect that was found. Income elasticities indicate therefore, that for Germany, favourable economic conditions clearly increase concentration. This result therefore suggests that the German market,

when faced with economic crises decrease to a smaller (larger) extent its relative consumption in non-summer (summer) periods. In this regard, these results could indicate that in periods of lower economic growth in Germany, more demand is removed proportionally from the peak months. This may be because during these months, the bulk of travel arises from tourists with a medium to low income, when compared with the typical profile which travels in the non-middle months. Therefore, during German expansion phases, one would have to design specific policies in the off-season for all the profiles, especially those of a medium to low output.

Fourthly, Model 3 shows that the British rate of exchange affects concentration in Catalonia less than the rest of the markets. This means that in this country there is a larger mass of tourists with respect to other relevant markets (i.e. with their own currency) who, with respect to the appreciation of currency, direct their demand more towards the non-summer period than in the Swiss or North American market, for example. This result may be attributed to a greater prevalence in the British market of medium to low spending tourist profiles.

Finally, it must be noted that Model 4, where all interaction variables are integrated together, does not reflect substantial changes in the coefficients in values and/or signs. However, we must consider that this model has a larger number of instruments and therefore must be taken into consideration with precaution due to the level of demand required for the available sample.

Nevertheless, we present a last comment on the virtues of the specification. As mentioned earlier, the type of modelling and econometric technique used and the tests supplied would seem to indicate an absence of serious problems with respect to specification. In all events, several collateral tests were made in order to detect possible biases through the omission of relevant variables or multicollinearity, without any outstanding errors being detected.[30]

[30] In this respect, the model with pooled data was tested without finding any evidence of this possibility (using the Ramsey, RESET application test), nor was multicollinearity encountered at a general level (VIF calculation). More data is available, on request from the authors.

Table 8. Estimation results for the dynamic model according to market (2000-2014).

Variable	Model 1	Model 2	Model 3	Model 4
ln $ts_{i,t-1}$	0.124**	0.169***	0.138**	0.112*
	0.05	0.06	0.062	0.059
ln rp	-1.208***	-1.270***	-1.437***	-1.331***
	0.414	0.449	0.443	0.439
ln_rp_it	**-3.390****			**-3.309****
	1,352			**1,674**
ln gdp	-1.069***	-0.976***	-0.831**	-1.033***
	0.256	0.262	0.329	0.267
ln gdp_ger		**1.249*****		**1.032***
		0.536		**0.542**
ln ex	0.409***	0.399**	0.491***	0.443***
	0.095	0.1	0.150	0.108
ln ex_uk			**-0.342***	**-0.273****
			0.207	**0.111**
ln tc	0.102**	0.069	0.078*	0.090*
	0.047	0.045	0.047	0.051
constant	9.905***	7.421***	7.550**	8.172***
	2,668	3,031	3,428	2,954
Autocorrelation				
m_1	-2.008	-2.008	-2.056	-1.992
m_2	0.922	1.011	1.115	0.768
Sargan Test	28,865 (20)	27,688 (20)	29,673 (20)	27,136 (20)
Wald Test	69.22 (6)	640.95 (6)	268.25 (6)	1746.27 (7)
Observations	84	84	84	84
Long-term parameters				
ln rp	-1.379	-1.529	-1.667	-1.5
ln rp_it	**-3.87**			**-3.728**
ln gdp	-1.22	-1.175	-0.964	-1.163
ln gdp_ger		**1.503**		**1.163**
ln ex	0.467	0.48	0.57	0.499
ln ex_uk			**-0.397**	**-0.308**
ln tc	0.117	0.083	0.091	0.102

Note: Dependent variable: Logarithm of CV for monthly tourism. Standard errors in parentheses. The asterisks denote that the coefficient is significant at *10%, ** 5% and *** 1%.Two-step estimation results are presented; m1 and m2 refer to first and second order autocorrelation tests. The Hansen Test is used to test for the overall effectiveness of all the instrumental variables.

4.3.4 Concluding remarks

Seasonality is one of the most important imbalances threatening the sustainability of growth in tourist destinations, especially those that are well-established and subject to overcrowding. Seasonality is a serious threat to economic efficiency, as assets remain unused for part of the year, while they are over-congested the rest of the time. It is also a

serious threat from a labour-orientated standpoint, as it affects both the quality of human capital and its productivity. It is also a serious environmental problem due to the negative externalities that result from it overuse. Finally, it is a serious threat in terms of social stability, as it causes problems in terms of safety, health, social climate and duality with respect to residents. As such, it is logical that the academic community has been concerned with the analysis of this issue, especially since the well-known manual written by Bar-On in 1975. Among the aspects of concern to academics are measurement, analysis and the exploration of key factors (Koenig-Lewis and Bischoff, 2005). Measurement and analysis are fundamental, as they allow us to discover where we are and how we have reached this point. The clarification of these key factors allows us to investigate the explanatory factors in a rigorous manner in order to (and from this position) offer guides with respect to the design of policies concerned with correction and mitigation. This study deals with both aims.

Firstly, it measures and analyses seasonality or the seasonal concentration of tourist demand in the main region of Spain with respect to the number of international tourists received (Catalonia) throughout the 2000–2014 period. Here, it offers an interesting case study for analysing and adding to existing international evidence. Secondly, and in a more innovative methodological manner, it empirically examines the region's main factors through the use of a dynamic panel data model (DPDM) for markets, covering the 2000–2014 period, which, in addition to checking for various econometric biases, allows us to clarify the inertial part of the concentration. We are unaware of a similar analysis in works that have examined seasonality. The technique is commonly applied to analyse overall demand, but not its monthly or intra-annual distribution. The theoretical model used as a reference to explore the factors is the standard demand model that focuses on income and price effects. Although some literature also concerns itself with factors of another type for seasonality, such as institutional determinants, we consider that for an analysis of a single destination, different markets, seasonal variations and a relatively short space of time, these factors would not explain much, as they are reasonably homogeneous throughout the sample. In all events, the models used do not appear to have problems with respect to the omission of relevant variables.

Before offering a summary of the main empirical results obtained, we reiterate some of our previous points. One, the demand variable used as an indicator for analysis is the

amount of international tourists. This variable is regularly used in analyses and, furthermore, it seems especially reasonable if one wishes to analyse seasonality in terms of pressure on territorial resources. In all events, it possesses the advantage of including all demand in terms of accommodation, regardless of whether this is regulated or not. Secondly, and although it would have been better to have used a complete concentration measurement, such as the Gini coefficient or the coefficient of variation, this was not possible due to a lack of monthly data for certain source markets and years. In this case, we opted to use a measurement of partial concentration, such as that of demand weight in the summer months, from the total figures. We consider that this proxy is reasonable as it analyses a single destination that has a marked summer tourism component. The correlation analyses between the Gini index and the partial measurement for Catalonia and the source markets for which the analyses are available display markedly high values.

The main conclusions of this work may be summarized as:

Firstly, Catalonia is a regional destination with an important tourist concentration, one which is problematic, when compared with the annual number of tourists it receives. Its main market is France, which is the market that provides the highest average seasonal concentration from among the larger countries. Fortunately, the global monthly concentration was reduced between the year 2000 and 2008, a fact probably caused by the rise of low-cost airlines, secondary airports and Barcelona becoming a global destination. However since then, no improvements have occurred, despite the addition of 4 million tourists. Indeed, the time patterns of the overall Gini index for Catalonia appears to suggest a relationship between the global economic cycle and its dynamics traced, i.e. the phases of overall economic growth favour the reduction of concentration, but the emergence of the crisis would end up making it worse. This is useful as information for policy-making, as when crises occur, not only should we be concerned about the total amount of attraction, but also its seasonal distribution, which may naturally tend to worsen.

Secondly, the estimates of the econometric model suggest the existence of a significant inertial component in terms of concentration. Therefore, word of mouth or greater knowledge not only acts by repeating flows at the destination, but also by repeating them in a similar period. As such, the results suggest that some of the variations in

concentration are rigid, and depend strictly on what has happened in the past. In all events, and given the size of the coefficient of the lagged variable, the results suggest that also there is room to act on that area of seasonality that is not so automatic.

Thirdly, the estimates allow us to conclude that the prices have an important effect on concentration, and especially that higher pricing would reduce demand during the summer months, this effect being much greater in the case of the Italian market. It is relevant in terms of prices strategy, but also, we need to take into account the possible effects on yearly global demand.

Fourthly, results suggest that the income effect is also relevant. Thus, the economic growth of the source markets are associated, overall, with reductions in seasonal concentration (June to August) in Catalonia. This has some policy implication. However, this global finding would not be the case for the German market, which can be associated with the special relevance of low-income profiles, or specific problems for attracting them in low seasons.

Fifthly, the estimates allow us to conclude that the appreciation in the currency of the source country gives way to increases in seasonal concentration of demand in Catalonia. That could also be associated with the typical emergence in these situations of low-income profile tourists. In the case of British tourists, this effect would clearly be smaller.

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CHAPTER 5

DIFFERENCES IN BEHAVIOUR PATTERNS BETWEEN MARKETS*

Overview. Previous researchers have found differences in tourism demand patterns and the aim of this chapter is to analyse certain aspects of this phenomenon. Specifically, we identify the differences in monthly concentration patterns between countries with regard to variations in seasonality determinants. A dynamic model was used for a Spanish provincial panel data set during the 2006–2015 period. The model combines natural and non-natural explanatory variables. The results show that the inertial factor, economic variables (income levels and relative prices), and climatic variables (temperatures differences between the destination and the place of origin) are significant determinants, together with several differences among the main markets. It is hoped that the findings of this research will assist public and private organizations in developing their predictions and especially with respect to designing anticipatory correction policies.

Keywords: seasonality; markets; dynamic panel data model; GMM estimators; Spain.

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5.1 An approach for Spain

Researchers such as Croes and Vanegas (2005), Crouch (1995), Daniel and Ramos (2002) and Mello, Pack, and Sinclair (2002) found that different patterns of tourism demand exist among markets. Therefore, the purpose of this chapter is to identify if the countries of origin show different behaviours faced with variations in the determinants of the seasonality. To do that, Spain has been selected as a country of destination.[32] On the other hand, as countries of origin, we have decided to choose the United Kingdom, Germany, and France. These markets have been selected as they are key source countries of tourists who visit Spain, considering that the latter represented almost 50% of overall international demand for the 2006–2015 period. Furthermore, recent research, such as that carried out by Turrión-Prats and Duro (2016), has shown that these markets contribute to explaining two-thirds of monthly international tourism concentration demand in Spain, which has increased in recent years. In this regard, it seems reasonable to focus on the efforts in these countries, in order to significantly mitigate the monthly concentration of foreign demand in Spain.

A dynamic estimator, particularly the Generalized Method of Moments, Xtabond2, has been used, this combines natural factors (climate in the destination and origin markets) and non-natural factors (basically economic variables) as explanatory variables. This type of model allows us to incorporate the lags of the dependent variable as explanatory factors. It is especially useful in this type of study due to the relevance of the inertia factor and tradition to explain seasonal behaviour. The model uses a panel data set that consists of the monthly concentration of the British, German, and French markets in Spanish provinces during the 2006-2015 period. Seasonality has been analysed by means of a monthly synthetic concentration measure, such as the coefficient of variation (Duro, 2016). The main contributions of this study to current literature on the topic are described in the following paragraphs.

Firstly, the current study includes under-utilized methodologies in this context, which may constitute a toolbox for other analyses and cases. Thus, in the analysis of the

[32] As we have already mentioned, we have selected Spain because is one of the most important destinations worldwide. Moreover, it is one of the most seasonal countries in the European Union (second only to Italy) and even having an increasing pattern in recent years.

determinants involved in this imbalance, we applied Generalized Method of Moments (GMM) estimators, and specifically the Xtabond2 estimator proposed by Roodman (2006). This estimator, as far as we know, has not been used in this type of analysis (seasonality analysis). Moreover, we propose the use of the coefficient of variation as a measure with which to summarize monthly concentrations. Despite its advantages, such as the uniform treatment it gives to months, this instrument is rarely used.

Secondly, we used models separated by markets, which include natural (such as destination climate and home climate) and non-natural (economic) factors as determinants of seasonality. In summary, researchers have attempted to identify and classify determinants that help to explain seasonal patterns, but detailed quantitative research into their nature is limited. Weather conditions are unanimously agreed to be one of the most important factors to take into consideration. Very few researchers have analysed the combined impact of home, destination, and relative, climate as potential travel motivators. Furthermore, the conceptual framework has shown us that school and labour holidays, and special events have been some of the most widespread causes of seasonality levels. However, when a focus is placed on analysing short (and medium) term patterns, for example, in terms of variations of seasonality, the use of economic factors, such as the main determinants may be more appropriate. Economic Theory and demand models offer an excellent conceptual reference for their inclusion. The identification of which economic determinants (and others) have an impact on seasonality would help the public and private sectors to have better forecasts with respect to future trends in the distribution of intra-year arrivals and improving the management of tourism inputs and activity (Rosselló, Riera, and Sansó, 2004). As such, economic factors with the demand model have been included in this study together with tourist income and relative prices (Crouch, 1994a, b; Garín-Muñoz, 2006; Garín-Muñoz and Montero-Martín, 2007; Serra, Correia, and Rodrigues, 2014; Witt and Martin, 1987).

The rest of the chapter is organized as follows. The second section describes the data and the applied methodology. The third section gives a descriptive analysis and the empirical results. Finally, a section has been devoted to the major policy implications and conclusions obtained.

5.2 Research method and data sources

The aim of this chapter is, then, to propose and estimate a model that explains tourism seasonality in the main Spanish markets. For various reasons, this study focuses on those tourists who choose hotel accommodation. First, this type of accommodation represents a high number of the tourist arrivals from Germany (69%), the United Kingdom (63%), and France (50%) according to the 2012 Annual Report created by the Institute of Tourist Statistics - Instituto de Estudios Turísticos. Secondly, the average daily expenditure of tourists who choose this type of accommodation is higher than that of tourists who choose another type; and thirdly, this is the only demand variable that is available for this study at the required level of regional detail (i.e. provinces).

The study used panel data to estimate the models. This methodology allowed us to improve both the possible econometric specifications and the parametric estimations. The structure of panel data consists of several observations made over time, which provide more informative data and greater variability. Panel data also limits the problem of omitted variables and reduces multicollinearity bias (Hsiao, 2014). This methodology has the advantage of controlling unobserved heterogeneity and removing the risk of obtaining biased results if no controls are established for this heterogeneous behaviour. Lastly, this method makes it possible to analyse variables for which there is no information available in all the periods.

It is also important to underline that panel data is applied to a dynamic model. This type of models permits us to tackle the probable relevance of inertia or habit formation as a factor for modelling the levels and the growth of this imbalance in tourism. As explained in Chapter 4, there are two methodologies available for carrying out estimates with endogenous variables: Instrumental Variables (IV) approach and Generalised Method of Moments (GMM). When wishing to use the lagged dependent variable, as an independent variable, the favoured option would be GMM. We use the Xtabond2 estimator proposed by Roodman (2006) which allows us to carry out the regression with endogenous variables, using both their differences and levels as instruments, thus reducing the loss of information in the short time series available to us. This estimator also offers more alternatives in the treatment of variables. For instance, it could also be possible to exclude the lag of the dependent variable as a regressor, or treat the variables differently (as

strictly exogenous, endogenous or predetermined). This method is used in a two-step mode in order to improve the efficiency of the estimations.

Moreover, in order to support and confirm the robustness of the results, each model has been approximated by means of another estimator, and both procedures appear to yield very similar outcomes. Although other estimators such as Balestra and Nerlove (1966) or Arellano and Bover (1995) could have been used, the alternative estimator chosen was Diff-GMM, as proposed by Arellano and Bond (1991), and which is one of the most commonly applied to analysing global demand. Diff-GMM uses instrumental variables based on lags for the endogenous and predetermined variables and differences for strictly exogenous variables. The values of the dependent variable that are lagged for two or more periods are valid instruments for the lagged dependent variable, creating consistent and efficient estimates. The use of this procedure, with respect to differences, also helps to eliminate the problem of non-stationarity.

Xtabond2 handles relevant modelling concerns such as fixed effects and endogenous variables. However, the problem of instrument proliferation often arises in the application of this estimator, especially when the number of groups in the sample is small. It weakens the Hansen test, which verifies the overall effectiveness of all the instrumental variables. In our case, in order to solve the problem, and to reduce bias in estimation due to the existence of many instruments with respect to sample size, the number of instruments has been restricted.

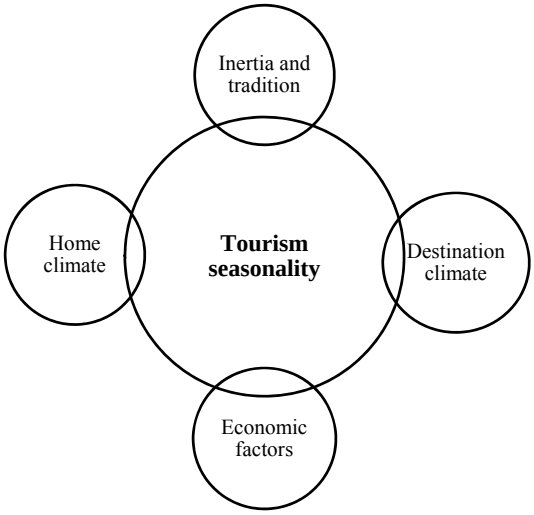
The study employs the coefficient of variation of monthly demand as a dependent variable. The demand indicator used to create this variable is the number of international tourists lodged in hotel establishments and who arrive from the United Kingdom, Germany, and France, broken down by by month, year and province. Data between 2006 and 2015 is taken from the Hotel Occupation Survey (EOH) carried out by the Spanish National Statistics Institute (INE).

The reference framework used to select the determinants of tourism seasonality to be introduced in the model is based on the combination of different factors proposed in the research literature (Figure 1). Both natural and economic determinants have been used in the analysis. With respect to natural factors, considering previous studies and data

availability, the current analysis includes destination climate, domestic climate, and relative climate variables. The economic determinants used in this analysis are income levels and relative prices (Crouch, 1994a, b; Garín-Muñoz, 2006; Garín-Muñoz and Montero-Martín, 2007; Serra, Correia, and Rodrigues, 2014; Witt and Martin, 1987).

Although the approach would allow other factors, such as territorial comparisons for each market and short-term analysis, to be added, the ones actually used should constitute a reasonable basis for empirical analysis. Note that, for example, institutional factors such as holiday periods would seem to have little relevance in this study given that, in any specific year or market, these parameters could be expected to affect all Spanish destinations in a similar way. Nor does the analysis add product variables, since it seems reasonable to think that this kind of variable should not have a significant effect because the model is specified in terms of initial differences. In all events, the tests applied on the models indicate that the omission of relevant variables is not a problem for the results' robustness.

Figure 1. Conceptual framework of causal factors of seasonality in the tourist sector.



Source: Own creation.

Going into detail, the model includes the following variables as determinants:

Firstly, the lagged dependent has been selected in order to identify an inertial behaviour or habit formation in seasonality (Butler, 1994). The use of a lagging dependent variable is becoming a common practice in global demand modelling (see, for example, Witt and

Martin, 1987). Therefore, it is logical to extend this practice to an analysis of tourism seasonality. The introduction of this variable would indicate the presence of a certain level of automaticity in the imbalance and therefore difficulties in varying a part of the monthly concentration (Commons and Page, 2001).

Secondly, as a proxy for income, we used data from median equivalent net income of source markets (income_o), expressed in purchasing power parity. Researchers have used several measures in order to include income in the demand models. For instance, Lim (1997) suggests applying the income remaining after taking into account that spent on necessities in a tourist's home country. Nevertheless, in some cases due to the difficulties that arise in obtaining direct income data, the most common practice has been to use Gross Domestic Product.[33] According to economic theory, changes in consumer income may cause variations in terms of product demand. For instance, an increased income provides consumers with a greater spending power; depending on whether a tourist destination is considered normal or low cost, demand for it will increase or decrease. A priori, the predicted effect of changes in income on monthly concentration is less well-known. For instance, the sign depends on factors such as tourist profile or their sensitiveness with respect to off-season travel.

Thirdly, selecting an overall price variable for a product such as tourism is a complicated task due to the large number of different kinds of costs that may affect the travel costs. The price variable we have used coincides with a relative measurement that relates the Consumer Price Index in the country of destination (CPI^d) with the Consumer Price Index in the country of origin (CPI^o) and the exchange rate ($EX^{d/o}$), calculated according to: : $rp\_tc_{i,t} = \frac{CPI_t^d}{CPI_t^o} * \frac{1}{EX_{d/o}}$. This is possibly the most-frequently applied price measurement in the academic literature consulted (Daniel and Ramos, 2002; Garín-Muñoz and Montero-Martín, 2007). In the case of seasonality, there are no clear hypotheses about the expected effect of the relative prices. An empirical analysis could therefore help us to arrive at some conclusions regarding their relationship (Rosselló et al., 2004).

[33] As we had already mentioned in previous section, the use of this variable in its distinct versions, constant or current prices or in per capita terms, is common in the analysis of tourism demand models (Ledesma-Rodríguez, Navarro-Ibáñez, and Pérez-Rodríguez, 2001; Garín-Muñoz and Montero-Martín, 2007; Song and Witt, 2000).

Fourthly, specification also includes destination, home, and relative climate variables. The most commonly-used summary line consists of incorporating temperature variables such as minimum, maximum, or average as proxies to observe the effects of climate on tourist flows (Hamilton and Tol, 2007; Taylor and Ortiz, 2009; Kulendran and Dwyer, 2010; Hadwen et al., 2011; Becken, 2013; Riddestraat, Oduber, Croes, Nijkamp, and Martens, 2014). Other types of variables, such as aesthetic factors (e.g., cloud cover, high visibility, solar radiation, or sunshine) and physical factors (precipitation and wind speed), also have been proposed in the literature (Freitas, 2003). However, this study only uses temperature variables due to their significance and the availability of meteorological data. The temperature variables used have been measured in terms of annual average (see Bigano et al., 2006) and by seasons (Nunes, Cai, Ferrise, Moriondo, and Marco, 2013). The temperature during high season is calculated as the average temperature from May to September and the temperature in the low season as the average of the remaining months (providing a consistent intra-annual shape of distributions). Nevertheless, we also used temperatures from the high-season period of June to September with similar results.

The specific climatic variables included in the model are as follows: annual average temperature at destination and origin (tm_d and tm_o); the relative temperature (relative_tm_o) calculated according to annual average temperature at destination and divided by origin; annual average temperature at low and high season in destination (tm_low_season_d, and tm_high_season_d) and origin (tm_low_season_o and tm_high_season_o); the relative annual average temperature at low season expressed as annual average temperature at low season at destination divided by the origin (relative_tm_low_season_o); and the relative annual temperature in high season calculated according to annual average temperature at high season in destinations divided by origin (relative_tm_high_season_o).

Finally, the dummy variable, d_2008, was included to capture the special influence of the financial and economic crisis on seasonality in the three main markets.

The models used in the analysis are as follows:

$$ln\ ts\_o_{i,t} = \beta_0 + \beta_1 ln\ ts\_o_{i,t-1} + \beta_2 ln\ income\_o_t + \beta_3 ln\ rp\_tc\_o_t + \beta_4 tm\_d_{i,t} + \beta_5 tm\_o_t + \beta_6 d2008 + v_{i,t} \quad (1)$$

$$ln\ ts\_o_{i,t} = \beta_0 + \beta_1 ln\ ts\_o_{i,t-1} + \beta_2 ln\ income\_o_t + \beta_3 ln\ rp\_tc\_o_t + \beta_4 relative\_tm\_o_{i,t} + \beta_5 d2008 + v_{i,t} \quad (2)$$

$$ln\ ts\_o_{i,t} = \beta_0 + \beta_1 ln\ ts\_o_{i,t-1} + \beta_2 ln\ income\_o_t + \beta_3 ln\ rp\_tc\_o_t + \beta_4 tm\_low\_season\_d_{i,t} + \beta_5 tm\_high\_season\_d_{i,t} + \beta_6 tm\_low\_season\_o_{i,t} + \beta_7 tm\_high\_season\_o_{i,t} + \beta_8 d2008 + v_{i,t} \quad (3)$$

$$ln\ ts\_o_{i,t} = \beta_0 + \beta_1 ln\ ts\_o_{i,t-1} + \beta_2 ln\ income\_o_t + \beta_3 ln\ rp\_tc\_o_t + \beta_4 relative\_tm\_low\_season\_o_{i,t} + \beta_5 relative\_tm\_high\_season\_o_{i,t} + \beta_6 d2008 + v_{i,t} \quad (4)$$

where ts_o i,t is the measure of seasonality in provinces (i) and year (t); d is the destination country (Spain) and *o* is the market of origin (United Kingdom, Germany, or France). This model adopts the double-logarithmic form for economic variables and vi,t denotes the fixed effects decomposition of the error term (time and country-specific effects) and the error component which varies across regions and time.

The data for economic explanatory variables comes from the Organization for Economic Cooperation and Development Statistics (OECD) and EUROSTAT. The climatological data were collected from Spanish National Institute for Statistics (INE) for Spanish provinces, the British Meteorological Office (Met Office) and the World Bank for Germany and France.

Table 1 provides descriptive statistics for the variables used in this study.

Table 1. Descriptive statistics for the variables.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
ts_uk	487	0.525	0.202	0.082	1.388
ts_ger	490	0.566	0.204	0.062	1.212
ts_fr	498	0.569	0.168	0.106	1.144
income_uk	500	17,124	974	15,776	18,778
income_ger	500	18,269	1,373	15,167	20,365
income_fr	500	17,848	1,573	14,981	19,885
rp_tc_uk	500	0.998	0.030	0.952	1.040
rp_tc_ger	500	1.000	0.011	0.981	1.015
rp_tc_fr	500	1.003	0.013	0.976	1.021
tm_d	478	15.690	2.825	10.050	22.367
tm_uk	500	11.733	0.608	10.588	12.625
tme_ger	500	9.833	0.665	8.322	10.795
tm_fr	500	12.614	0.523	11.611	13.391
relative_tm_uk	478	1.340	0.245	0.886	2.113
relative_tm_ger	478	1.603	0.303	1.018	2.688
relative_tm_fr	478	1.245	0.227	0.824	1.926
tm_low_season_ d	482	11.521	3.227	5.600	21.029
tm_high_season_ d	481	21.510	2.778	15.760	26.900
tm_low_season_uk	500	8.171	0.983	6.286	9.457
tm_high_season_uk	500	16.720	0.601	16.150	18.220
tm_low_season_ger	500	5.158	1.051	3.036	6.874
tm_high_season_ger	500	16.378	0.376	15.723	17.306
tm_low_season_fr	500	9.213	0.867	7.977	10.580
tm_high_season_fr	500	17.376	0.456	16.651	18.008
relative_tm_low_season_uk	482	1.426	0.427	0.721	3.345
relative_tm_high_season_uk	481	1.288	0.171	0.943	1.637
relative_tm_low_season_ger	482	2.330	0.843	1.029	6.926
relative_tm_high_season_ger	481	1.314	0.170	0.976	1.693
relative_tm_low_season_fr	482	1.259	0.368	0.629	2.625
relative_tm_high_season_fr	481	1.238	0.158	0.919	1.599

5.3 Results

5.3.1 Tourism Seasonality in Spain

In this first section, a descriptive analysis of the monthly concentration of British, German, and French markets in Spanish provinces was presented. In Spain, there are 50 provinces and 2 cities, but we have chosen only hose that possess monthly data for most

of the years during the entire period (2006–2015). This implies the exclusion of the two cities (Ceuta and Melilla). Nevertheless, the regions selected include the vast majority of national demand, which represents over 99% of the total international hotel demand in Spain according to the Spanish National Institute of Statistics (INE, 2015). This study focused on tourist arrivals in hotels establishments, based on data from the Hotel Occupation Survey (EOH), as compiled by the Spanish National Institute of Statistics (INE). Tourism is an important sector for the Spanish economy, where according to the EOH the number of visitors during 2015 was 93 million, 51% of these being Spanish tourists and 49 percent of whom were foreigners. The main source markets of international tourists are European countries. British tourists accounted for 20% of all international tourist arrivals, German 16%, and French 12% (INE, 2015).

Arrivals in Spanish hotel establishments (this being the main type of tourist accommodation) are not distributed uniformly throughout the year and are typically concentrated in the summer months. As an initial overview of seasonal changes in tourist flows, the monthly distribution of hotel arrivals is shown in Figure 2. The plot confirms a clear high-demand season from May to September containing about 60% of the yearly flows received. Furthermore, the figure shows that the seasonal patterns for British and German tourists are similar. Both seem to have a high season that encompasses the spring and summer months. Nevertheless, the French market shows two clear peaks in annual distribution, having a second demand peak during April, which coincides with the Easter holidays.

Table 2 shows the results for the summarized measure of the monthly concentration during selected years from the period studied. As can be seen, the markets analysed show a monthly concentration higher than the international average for each of the selected years. Note also that the three markets have increased their monthly concentration significantly between 2006 and 2015. Demand also increased during this period, especially in the French case (which increased 57%). Also relevant is that the financial and economic crisis of 2008 affected this expansion demand (except for France). Thus, from 2006 to 2009, demand decreased 19.5% (but seasonality increased 6.4 per cent) in the British market. The German market however, reveals a decrease in both variables (with a drop in demand of 14.3 percent and a reduction of the monthly concentration of only 1.3 percent). By way of contrast, the French market shows an increase in both

variables in this sub-period (possibly because Spain is a proximity destination for French). Nonetheless, in the recent 2012–2015 sub-period, hotel demand has recovered in these three countries and it would seem that there is even an improvement in monthly concentration, except in the French case. This country displays the highest growth in two variables (with a 12% rise in seasonality and 24.6% in tourist demand).

Table 2. Monthly concentration in terms of main markets.

		2006	2009	2012	2015	Variation Rate (%)		
						2006-2009	2012-2015	2006-2015
UK	CV	0.387	0.412	0.487	0.451	6.4	-7.4	16.6
	D	7,979,996	6,423,724	7,809,363	8,992,936	-19.5	15.2	12.7
GER	CV	0.413	0.408	0.447	0.440	-1.3	-1.6	6.4
	D	7,106,811	6,089,489	7,019,583	7,261,342	-14.3	3.4	2.2
FR	CV	0.419	0.462	0.447	0.501	10.1	12.0	19.4
	D	3,387,317	3,494,386	4,259,793	5,309,417	3.2	24.6	56.7
INT	CV	0.318	0.297	0.335	0.320	-6.7	-4.4	0.6
	D	15,937,638	15,994,636	20,847,989	24,129,675	0.4	15.7	51.4

Note: CV is the coefficient of Variation; D is the total demand; INT: does not include the United Kingdom, Germany, or France.

Source: Author's own, from the Hotel Occupation Survey (INE).

Nevertheless, with respect to monthly concentration, relevant differences exist among destination provinces. Table 3 shows tourism seasonality for the ten tourist locations with the greatest average demand during the 2006–2015 period for each of the main markets (in order to save space). The provinces more affected in a negative sense are the Balearic Islands, Girona, and Tarragona (the latter in the case of British and French tourism). Note that these provinces are typical sun-sand-and-sea destinations. The Balearic Islands is facing a highly worrying situation due to high demand and monthly concentration levels that have increased, even with respect to 2006. Girona is also one of the regions most affected by this imbalance, despite its efforts to implement a strategy of diversification towards a more culturally-orientated tourism. At the other extreme are regions such as Santa Cruz de Tenerife, Las Palmas, and Madrid. Despite high demand, these locations are in a privileged situation in terms of monthly concentration. The lower values in the Canary Islands (Santa Cruz de Tenerife and Las Palmas) are likely due to their low variation in annual temperatures, considering that the annual average temperature coincides with the optimum level for their main type of tourism. Demand in Madrid is

also uniformly distributed throughout the year. This can mainly be attributed to the multipurpose motivation of international visitors, that is, the higher number of tourists received in summer months by vacation tourism may well be offset by the lower values of business and conference tourism during the summer period. Although, in relation to changes in monthly concentration, Madrid shows a positive growth rate in all cases, while Las Palmas is only positive for the British market and in Santa Cruz de Tenerife for the German market, but not for the British.

Table 3. a. Monthly concentration of the ten provinces with the greatest demand, on average, in the 2006–2015 period based on British tourism.

		CV	Var. CV	D
1	Balearic Islands	0.931	+	2,103,838
2	Tarragona	0.893	+	300,396
3	Girona	0.667	+	189,063
4	Málaga	0.365	+	805,565
5	Barcelona	0.316	+	779,712
6	Seville	0.304	+	105,760
7	Alicante	0.240	+	744,845
8	Madrid	0.203	+	334,197
9	Las Palmas	0.121	+	786,639
10	S. Cruz de Tenerife	0.102	-	805,433

Table 3. b. Monthly concentration of the ten provinces with the greatest demand, on average, in the 2006–2015 period based on German tourism.

		CV	Var. CV	D
1	Girona	0.880	+	179,056
2	Balearic Islands	0.724	+	2,849,454
3	Cádiz	0.594	+	250,326
4	Granada	0.508	+	90,548
5	Seville	0.507	-	85,441
6	Málaga	0.417	+	268,732
7	Barcelona	0.368	-	539,326
8	Madrid	0.257	+	236,854
9	S. Cruz de Tenerife	0.170	+	500,356
10	Las Palmas	0.095	-	1,184,568

Table 3. c. Monthly concentration of the ten provinces with the greatest demand, on average, in the 2006–2015 period based on French tourism.

		CV	Var. CV	D
1	Balearic Islands	0.875	+	239,914
2	Tarragona	0.802	+	270,563
3	Málaga	0.586	+	213,348
4	Girona	0.564	+	677,820
5	Granada	0.564	+	118,554
6	Seville	0.421	-	167,978
7	Barcelona	0.358	+	724,876
8	Guipúzcoa	0.315	+	98,145
9	Las Palmas	0.288	-	111,308
10	Madrid	0.163	+	310,402

Note: CV is the coefficient of average variation during the 2006–2015 period; Var. CV is the variation of CV with respect to 2006; D is the total average demand during the 2006–2015 period.
Source: Author's derivation from the Hotel Occupation Survey (INE).

5.3.2 Main Estimates

The estimation of the model has been carried out using the Stata v.14.0 econometric program. A dynamic estimator such as Xtabond2 is used to estimate the models described in the previous section. Table 4 and Table 5 present the main empirical results from the estimates.

Some preliminary comments on the validity of the results are appropriate. The validity of the specifications has been analysed using the Wald test for the joint significance of independent variables, the first- and second-order serial correlation tests ascertain as to whether perturbations are independent and identically distributed, and the Hansen test is used to verify the overall effectiveness of all the instrumental variables. This latter test allows us to corroborate the consistency of the results, as they depend on whether the lagged values of the endogenous and exogenous variables are valid instruments. Furthermore, most of our estimates accomplish the condition suggested by Roodman (2009), which states that in the Hansen test it would be optimal where prob> χ^2 is between 0.1 and 0.25. The model has been also estimated with the 'collapse' option, which has been used to reduce the instruments. This tool allows us to create an instrument for each variable and lag, instead of one for each period, variable, and lag. All of this allows us to reduce the risk of more instruments than necessary appearing, satisfying the condition

that the number of instruments is less or equal to the number of groups. There therefore appears to be no evidence of over-identification in the estimates. On the other hand, several tourism variables, such as tourist arrivals or overnights in a destination, may be conditioned by the values of their neighbouring tourism destinations. This dependency may cause spatial autocorrelation and, consequently, biased results. In this sense, it would seem reasonable to test the presence of spatial autocorrelation in our samples. Concretely, Moran I (Anselin, 2005) was computed and the results obtained reveal that no problems exist with respect to spatial autocorrelation.

Following on from this and our results, we now note several points of interest for the most important market, that is, the British (in terms of overall demand and contribution to overall international seasonality in Spain):

Firstly, the result for the lagged dependent variable shows that increases of 1% in monthly concentration for the previous year would increase current seasonality by an average of almost 0.3%. This outcome indicates the existence of a certain level of rigidity in the monthly concentration of British tourism. Nevertheless, in this market there would be room for action, given that this coefficient is not very high (for example when compared with that obtained in Turrión-Prats and Duro (2016), where 0.5% of the international monthly concentration in Spain is attributed to habit-persistence effects).

Secondly, the estimates suggest that British incomes are also an important variable for explaining changes in monthly concentration. In particular, an increase of 1% in British income leads to a decrease in the monthly concentration of tourist flows in Spain by more than 1 percent. Consequently, an increase in British income would, not only be positive in terms of annual demand in Spain, but also in terms of monthly distribution. Related to this result, one issue of special concern is the effects of Brexit. According to the results, Brexit could aggravate monthly concentration (and, of course, overall demand) due to an expected drop in GDP (according to data from National Institute of Economic and Social Research). In terms of policy, this evidence would suggest that with respect to recessive economic cycles in the U.K., it would be necessary to ramp up the introduction of anticipatory policies to increase demand in months with less activity.

Thirdly, the overall results obtained for price elasticity suggest that relative prices have a negative influence on monthly concentration. In general, a relative increase of 1% on prices would contribute to decreasing seasonality by about 0.3%. As such, the differential price rise in Spain would proportionally withdraw more tourists from the months of greater demand. The differential pricing strategy may be relevant for attracting British tourists in the low season. Brexit would have consequences, not only through the income-channel, but also through the price-channel, as several studies have predicted that travel could be more expensive due to a possible devaluation of the pound in medium-long term. Consequently, the perceived increase of the prices may temporarily redistribute flows, which per se is positive. However, one must also take into account that the estimates suggest the impact of relative prices being less than the impact of income, which predicts the opposite effect, a worsening of monthly concentration.

Fourthly, in terms of destination climate, the results indicate that the coefficient of the annual average temperature is statistically significant and has a negative effect on monthly concentration. That is, for every unit that increases the average temperature in Spain, the monthly concentration in this market decreases by an average of almost 5%. We see in Model 3, that this is true when this increase occurs in the off-season, as this variable is statistically significant and negative (-0.059). By contrast, high temperatures during the peak season do not seem to have any affect. Studies such as Coshall (2009) shows that the British market was not influenced by the extremely hot month of August 2003. Ibarra (2011) indicated that more people spend their holiday in August in Benidorm, as this is the hottest month and the beaches were mainly used during the hottest hours of the day. Relating our results with the effects of climate change, suggests that changes such as growths in temperatures during the low season (all other things being equal) could improve monthly distribution, favouring the arrival of tourists during the spring and autumn season (see Maddison, 2001). Another possible consequence addressed in the literature is that an alteration in climatological conditions may modify the geographical distribution of the tourists in summer. Researchers such as Priego, Rosselló, and Santana-Gallego, (2015) found that rises in temperature would increase the frequency of trips to the colder provinces in the north of Spain and reduce the tourist attraction of the warmer provinces in the south (see also Moreno and Amelung, 2009).

Fifthly, in terms of domestic climatic factors, annual average temperature, in both cases, when measured in annual terms and by seasons, has a significant and positive impact on tourism seasonality (with coefficients above 4%). On the one hand, when average temperature rises in the low season, the British are more likely to stay at home. On the other hand, an improvement of temperatures in the high season would seem to incite them to travel to Spain during this period. This may be due to the fact that an increase in temperature during the high season would be not sufficient to promote domestic tourism or that it causes discomfort among the public at home. In fact, when evaluating weather suitability in terms of tourism one should take tourist motivation into account. Thus, terms such as 'comfortable climate' could be relative because it depends on the desired tourist activity. Regions with uncomfortable climates are less likely to exchange international and domestic tourism than regions with better climatic conditions (Eugenio-Martín and Campos-Soria, 2014). Based on our estimates, and in the context of climate change, an increase in the temperatures at home during the low season could involve a growth of domestic tourism and reduce tourist flows to Spain.

Sixthly, Model 2 and Model 4 are estimates used to determine the impact of climate in relative terms (home-destination). The values of the coefficients show that monthly concentration is highly dependent on the weather differences between home and destination. This result is in the line with other authors, who consider that a motivation to travel may be the existence of differences between the climate in the place of origin and destination (Gómez Martín, 2005; Petrick, 2002). This evidence suggests that greater differences between the destination and home temperatures, in annual (with a coefficient of -0.630) or seasonal terms (a coefficient of -0.249 in the low season and -0.363 in the high season), would improve the monthly distribution of British tourists in Spain.

Finally, the results for dummy variables (d2008) confirm the special sensitivity of English tourists to the economic crisis, which would promote the monthly concentration.

Table 4. Estimation results for the British market (2006-2015).

Variables	Model 1	Model 2	Model 3	Model 4
L.ln_ts_o	0.322***	0.291***	0.259**	0.286***
	(0.106)	(0.109)	(0.107)	(0.109)
ln_income_o	-1.083***	-1.201***	-1.207***	-1.231***
	(0.220)	(0.245)	(0.223)	(0.246)
ln_rp_tc	-0.289**	-0.306**	-0.491***	-0.317**
	(0.124)	(0.124)	(0.143)	(0.160)
tm_d	-0.0546***			
	(0.0170)			
tm_o	0.0472***			
	(0.0117)			
relative_tm		-0.630***		
		(0.192)		
tm_low_season_d			-0.0560**	
			(0.0222)	
tm_high_season_d			-0.00251	
			(0.0154)	
tm_low_season_o			0.0312***	
			(0.00864)	
tm_high_season_o			0.0774***	
			(0.0242)	
relative_tm_low_season				-0.249***
				(0.0938)
relative_tm_high_season				-0.363**
				(0.171)
d_2008	0.080***	0.095***	0.104***	0.0946***
	(0.0296)	(0.0299)	(0.0271)	(0.0289)
Constant	10.290***	11.950***	10.26***	12.21***
	-2,130	-2,441	-2,089	-2,464
Wald Test	76.40 (6) ***	62.92 (5) ***	92.85 (8) ***	67.99 (6) ***
Autocorrelation				
m1	-4.22***	-4.34***	-4.24***	-4.52***
m2	1.00	0.67	0.74	0.44
Hansen Test	2.30 (1)	1.79 (1)	0.91 (1)	1.62 (1)
Num. Instruments	8	7	10	8
Collapse	Yes	Yes	Yes	Yes
Observations	414	414	416	416
Num. Groups	50	50	50	50

Note: Dependent variable: Logarithm of CV for monthly tourism. Standard errors in parentheses. The asterisks denote that the coefficient is significant at *10%, ** 5% and *** 1%. Two-step estimation results are presented: m1 and m2 refer to first and second order autocorrelation tests. The Hansen test is used to test for the overall effectiveness of all the instrumental variables.

In addition, Table 5 shows the main results obtained for German and French markets. Given the results, some points may be highlighted:

Firstly, the estimated coefficients for income elasticity suggest that French monthly concentrations are also strongly affected by changes in income, but this effect is different to that of British tourists. In France, higher incomes growth would in fact increase monthly concentration (elasticity near to 1). Therefore, during phases of economic growth in France the strategy implemented would need to anticipate the pattern and intensify actions for increasing flows in the off-seasons (e.g. marketing campaigns). Note that for the German market, the effect of this variable is not conclusive, since it is only positive and statistically significant in one of the models. Taking into account these results, and assuming that the United Kingdom and France have more or less homogeneous economies, it would be interesting to diversify markets, not only in terms of the overall annual demand but also in terms of global monthly distribution.

Secondly, the coefficients for relative prices elasticities suggest that both markets (German and French) are greatly influenced by changes in prices. For the case of the French market, the connection is similar (in the same direction) to the British market but higher in scope (nevertheless, for some models the coefficient is not significant). However, this is not true for the German market, where its effect is high but positive. Consequently, for this market, we find that the distribution of arrivals throughout the year tends to be smoother (more concentrated) when relative prices decrease (increase) which confirms Rosselló et al. (2004). So, it would seem that the Germans have a differential preference for the high season in terms of the price-channel.

Thirdly, and regarding the effect of home and destination climate on tourism seasonality, the estimates indicate that, as in the case of the British, the average temperature in the low season is statistically significant and positive for both markets.

Finally, according to the estimated d2008 value, contrary to the British case, for the Germans and French in some of the models, the economic crisis decreases its relative consumption differentially in high season periods, so reducing concentration.

Table 5. Estimation results for the German and French markets (2006-2015).

	German market				French market			
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
L.ln_ts	0.138	0.224*	0.117	0.236*	0.221*	0.233*	0.0919	0.122
	(0.114)	(0.127)	(0.105)	(0.124)	(0.134)	(0.135)	(0.113)	(0.0969)
ln_income_o	0.296*	-0.0175	0.290	0.0585	0.838***	0.903***	1.017***	1.017***
	(0.180)	(0.194)	(0.191)	(0.214)	(0.176)	(0.171)	(0.323)	(0.198)
ln_rp_tc	1.587**	2.741***	1.751**	1.991**	-1,442	-2.077*	-2,283	-2.798**
	(0.667)	(0.724)	(0.891)	(0.834)	-1,183	-1,199	-2,034	-1,353
tm_d	-0.0571***				-0.0376***			
	(0.0209)				(0.0104)			
tm_o	0.0239				0.0289**			
	(0.0188)				(0.0129)			
relative_tm		-0.350***				-0.438***		
		(0.132)				(0.122)		
tm_low_season_d			-0.0814***				-0.0335**	
			(0.0233)				(0.0149)	
tm_high_season_d			0.0165				-0.00848	
			(0.0176)				(0.0173)	
tm_low_season_o			0.0426**				0.0267**	
			(0.0167)				(0.0127)	
tm_high_season_o			-0.0740				-0.00337	
			(0.0572)				(0.0248)	
relative_tm_low_season				-0.0320				-0.239***
				(0.0299)				(0.0916)
relative_tm_high_season				-0.420***				-0.237
				(0.153)				(0.243)
d_2008	-0.0546*	-0.0521	-0.0411	-0.0543*	-0.0448	-0.0392	-0.0646*	-0.0525**
	(0.0318)	(0.0340)	(0.0251)	(0.0322)	(0.0316)	(0.0323)	(0.0330)	(0.0265)
Constant	-2,760	0.289	-1,853	-0.379	-8.441***	-8.743***	-10.08***	-9.857***
	-1,765	-2,029	-1,895	-2,160	-1,780	-1,615	-2,931	-1,994

	German market				French market			
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Wald Test	40.580(6)***	40.420(5) ***	37.02 (8)***	43.2(6)***	82.410(6) ***	77.500(5) ***	70.59(8)***	68.34(6)***
Autocorrelation								
m1	-2.500**	-2.510**	-2.83**	-2.47**	-3.860***	-2.310***	-3.440***	-3.880***
m2	-0.89	-0.61	-1.02	-0.53	-0.9	-0.95	-1.27	-1.23
Hansen Test	9.080(7)	11.490(7)	2.33(1)	11.03 (7)	0.480(1)	0.550(1)	3.580(2)	2.680(2)
Num. Instruments	14	13	10	14	8	7	11	9
Collapse	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	419	421	421	428	428	430	430
Num. Groups	50	50	50	50	50	50	50	50

Note: Dependent variable: Logarithm of CV for monthly tourism. Standard errors in parentheses. The asterisks denote that the coefficient is significant at *10%, ** 5% and *** 1%. Two-step estimation results are presented: m1 and m2 refer to first and second order autocorrelation tests. The Hansen test is used to test for the overall effectiveness of all the instrumental variable

5.3.3 Additional Estimates

Taking the basic results above as a starting point, the earlier models have been re-estimated using two interesting subsets: coastal destinations (provinces in which there is a high correlation between being on the coast and offering the sun and the beach as a main product, although there may be other products available, depending on the province) versus the rest of the destinations. In general terms, each of these groups offers different types of tourist products. It is interesting, from a practical standpoint, and above all with respect to policy guidance, to explore if there are differential effects between both types of destinations, a rise in sign or in scale or not. This structure is similar to the one used in Chapter 3, where to create the variable for type of product offered, the tourist locations were grouped into four types: coastal and inland capitals and coastal and inland areas (see Martín Martín, Jiménez Aguilera, and Molina Moreno, 2014). In order to simplify matters, only the results for one of the models (Model 2) are included in Table 6.

The results may be summarised in the following basic point:

Firstly, the estimates reveal that the past has a very important impact on current seasonality for the provinces of the coast, contrary to what happens in other provinces. Therefore, word of mouth or greater knowledge, not only repeats flows in such of provinces but also repeats them over a similar period (this being particularly important for UK and German markets). The rootedness of this imbalance and its dynamics would indicate more difficulty in varying a part of the concentration in the coastal areas, which already show greater signs of concentration. Consequently, planners in the tourist industry face a major challenge with regard to these areas.

Secondly, income has a negative impact and is of similar magnitude for both types of provinces and for the British market. While for French tourists, income has, contrarily a positive and significant effect, which is higher for interior destinations (with a coefficient of more than 1). One possible reason for this result is that urban tourism or inland tourism may be more expensive, especially in the high season, and this would explain why this type of tourism could be more sensitive to changes in income.

Finally, the price-elasticity results from Germany are similar in both types of provinces (positive and large). Nevertheless, for the French market, elasticities are negative and clearly higher in the case of inland provinces. It would therefore seem that, for such provinces, differential pricing might be an effective policy.

Table 6. Estimation results for the main markets (2006–2015).

	Coastal destinations			Rest of destinations		
Variables	**UK**	**GER**	**FR**	**UK**	**GER**	**FR**
L.ln_ts_o	0.647***	0.796***	0.310*	0.236	0.213**	-0.0185
	(0.114)	(0.108)	(0.165)	(0.192)	(0.105)	(0.133)
ln_income_o	-0.805*	-0.0500	0.728***	-0.896*	-0.0976	1.246***
	(0.459)	(0.248)	(0.245)	(0.466)	(0.203)	(0.335)
ln_rp_tc	-0.147	2.104***	-1,378	-0.300	2.092**	-3.829*
	(0.194)	(0.803)	-1,991	(0.253)	(0.954)	-2,144
relative_tm	-0.365***	-0.171*	-0.469***	-0.406**	-0.0989	-0.690***
	(0.113)	(0.102)	(0.175)	(0.187)	(0.112)	(0.207)
d_2008	0.0785	0.0183	-0.0132	0.0684	-0.0263	-0.0804*
	(0.0608)	(0.0487)	(0.0279)	(0.0575)	(0.0371)	(0.0483)
Constant	8.093*	0.662	-6.902***	8.635*	0.734	-11.96***
	-4,437	-2,548	-2,276	-4,506	-2,020	-3,115
Wald Test	313.9(5) ***	315.310(5)***	59.630(5)***	14.23(5)***	12.220(5)**	20.570(5)***
Autocorrelation						
m1	-2.880***	-2.750***	-1.940**	-2.688***	-2.380**	-2.420**
m2	-0.450	-0.280	-0.370	1.44	-0.180	-1,290
Hansen Test	6.630(5)	10.490(6)	5.130(3)	21.96(15)	6.350(6)	6.200(3)
Num. Instruments	11	12	9	21	12	9
Collapse	Yes	Yes	Yes	Yes	Yes	Yes
Observations	189	192	192	225	227	236
Num. Groups	22	22	22	28	28	28

Note: Dependent variable: Logarithm of CV for monthly tourism. Standard errors in parentheses. The asterisks denote that the coefficient is significant at *10%, ** 5% and *** 1%. Two-step estimation results are presented; m1 and m2 refer to first and second order autocorrelation tests. The Hansen Test is used to test for the overall effectiveness of all the instrumental variables.

5.4 Concluding remarks

This research attempts to identify and measure the impact of the seasonal determinants for British, German, and French tourism; the main international tourism markets in Spain. The available literature finds differences in tourism demand patterns between countries, and our work models this for each market. Extensive academic research has theoretically investigated the natural and non-natural determinants of monthly concentrations with respect to tourism demand, although much less research has empirically investigated its relations. Thus, the present study proposes and uses methodologies for empirically measuring and analysing seasonality, taking Spanish provinces as reference units. Essentially, the main features, and contributions, of this research are as follows:

Firstly, following Butler's definition (1994), measurement is carried out by means of summary indicators, especially the coefficient of variation. This is a reasonable measure, which allows the changes that take place in different months to be treated homogenously. As a robustness exercise, our models have also been re-estimated using the Gini index, and in overall terms, this yields qualitatively similar results.

Secondly, in order to explore the main explanatory factors in greater depth, a dynamic panel data model has been estimated, with data for the 2006–2015 period. The use of panel data allows us to improve our econometric specifications and parameters due, for example, to greater variability in all the variables, higher levels of freedom, little multicollinearity and control of unobserved heterogeneity. The estimator used is Xtabond2, as proposed by Roodman (2006), which, among other advantages, reduces information loss in a relatively small sample such as the one available to us. This is a state-of-the-art estimation technique, and as far as we know, it has not previously been used in this area.

Thirdly, the proposed methodologies allow us to test the theoretical framework of the determinants proposed in the literature. For instance, even though the importance of climate in tourism seasonality has been recognized in many research studies, to date there have been few researchers that have also quantitatively examined the relationship between climate (especially in the country of origin) and tourism seasonality. Furthermore, this research includes economic variables linked to typical demand modelling in the conceptual framework.

Fourthly, these methodologies have been applied to the case of Spain, which is one of the largest international tourist destinations in the world (currently ranked third, and only surpassed by France and the United States) and its monthly (and recently-increasing) concentration level is one of the highest among the high tourism demand European Union countries. The empirical analysis concentrated on the British, German, and French markets for several reasons: because these countries are the major source markets for tourists to Spain, and because in previous studies it has been found that these three markets contribute to explaining two-thirds of the monthly concentration of international tourism demand in this country (Turrión-Prats and Duro, 2016). So, it is reasonable to focus the analysis on these markets when seeking to mitigate Spanish seasonality in a significant way. The main empirical conclusion may be summarized as:

First, the estimates of the econometric model typically predict the existence of an inertial component in terms of concentration, particularly in the case of the coastal destinations. Consequently, destination marketers and planners whose work relates to these provinces might face a greater challenge in order to improve seasonal distribution, while taking into account the fact that these areas already have higher seasonality values. In the literature, the most common tactics suggested to counteract this imbalance have been product diversification, market segmentation, and differential pricing (Butler and Mao, 1997).

Second, the results suggest that the British and French markets are heavily dependent on their economic situation. The evidence shows that tourists from the United Kingdom tend to become less concentrated when their income increases. In contrast, in France, favourable economic situations would worsen monthly distribution, especially in inland destinations. Thus, these results may be used for designing specific anticipatory policies, given the GDP estimates for these countries. In fact, given that business cycles in the European Union may be similar, these results reinforce the utility of diversifying markets, in terms of the seasonality outcomes.

Third, the estimates of the models show that the German and French markets are very sensitive to variations in prices, especially this latter market in interior provinces. For French tourists, the differential increase in destination prices would involve travelling more in the off-season, given the evidence regarding the relevance of differential pricing strategies as a tool to manage French seasonality. In the case of the German market, the relationship is inverse, which may suggest a clear preference for travelling in peak seasons. For the UK, as for France, relative prices have a negative effect, but less so. Consequently, the possible effects of Brexit, such as an increase in the price of air tickets, could lead to an improvement in monthly concentration. Nevertheless, it must be noted that the magnitude of the effect of relative price changes is lower than the income, which would lead to a worsening in the distribution of tourist flows.

Fourth, the estimates for destination climate indicate that in all the markets, an increase in the Spanish average temperature for the low season would improve the monthly distribution of tourist arrivals. With respect to home climate variables, increases in the low season temperature in the country of origin, would seem to indicate that tourists travel to Spain less in off-peak periods. However, only British tourists would prefer to concentrate their trips to Spain during the high season when its temperature increases.

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CHAPTER 6
TOURISM SEASONALITY WORLDWIDE *

Overview. As mentioned in previous chapters, tourism seasonality is generally seen as a problem for most of the main destinations in the world, particularly from the point of view of sustainability. However, in spite of its importance, so far there is no a reasonably homogeneous international measurement of seasonality available, which allowed us to carry out global comparative analyses beyond the existing national work. This chapter offers a measurement of tourism seasonality, for the period 2008–2013, using a reasonable synthetic index for a large sample of countries with relevant international tourist demand worldwide. The data have made it possible to ascertain the comparative position of countries and significant regional groups as these changed over time. It was also possible to carry out an empirical investigation into the main global determinants, taking advantage of the econometric advantages associated with the availability of a data panel.

The main results obtained could be summed up as follows. Firstly, there would be no substantial change in world seasonality during a phase of major growth in tourist demand. Secondly, the highest (and increasing) seasonality is concentrated on the Mediterranean countries, in contrast to other regions. Lastly, in terms of empirical determinants, the income of major markets of origin, prices, and geographical location are globally significant variables. We believe that these results, beyond their academic value, can be useful for policy-makers.

Keywords: Seasonality; concentration; measurement; determinants; panel data; worldwide.

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6.1 Introduction

The first study on tourism seasonality appears in Bar-On (1975). From this pioneering work, academic research has clarified what are the areas of concern (economic inefficiency, the impact on the workforce and the environmental, and social impacts), especially for consolidated destinations. In a well-known survey, Koenig-Lewis and Bischoff (2005) established the priority areas for research. The proposed, for example, the measurement of imbalance and research into its causes. Thus, without a measurement of the disequilibrium of flows, how it changes and a comparative analysis, it is not possible to make good diagnoses on which to base policy decisions. Although we have some assessments at a specific country level, until now there have been no global assessments at a worldwide level, based on a wide range of countries. Thus, while there is no great problem in finding a comparative assessment for an activity such as annual demand and, thanks to the work of the World Tourism Organization, some other characteristics across a wide sample of countries, we cannot say the same about the analysis of seasonality by country. This paper is primarily dedicated to this aspect.

Specifically, this chapter starts by presenting a synthetic assessment of comparative tourism monthly concentration for a reasonable sample of countries with significant demand for tourism at a global level, covering the period 2008–2013. In past research, most of the analysis has focused only on measuring and analysing tourism seasonality as part of a case study for a specific region or country, but little research has been carried out at a global level in order to try to extract a general overview. In particular, reviewing the literature, most studies have focused on Europe or North America and little research exists for other regions such as Asia, Africa, South America, and the Middle East. However, recently some studies explore Asian tourism seasonality (Chen, Li, Wu, and Shen, 2017; Li, Goh, Hung, and Chen, 2017; Li, Song, Li, 2017). Given the growing importance of some of these regions, for instance China, in terms of international tourist arrivals, it is interesting to gain a greater knowledge about seasonality in these areas and to make a global comparison.

In this study, the countries included in the calculations generate nearly 73% of worldwide demand in the top 50 countries (almost 75% of the top 20), which increases to 81% (86% of the top 20) if we exclude France from the calculations for which, surprisingly, no

homogeneous monthly data was found. A synthetic measure, such as the coefficient of variation (Duro, 2016), is used to measure tourism seasonality and to analyse the evolution of global seasonality by regional groups and countries. We have opted to use the coefficient of variation due to it giving the same weight to changes in observations (i.e. months) regardless of their location on the monthly ranking (Duro, 2016), unlike Gini index (which gives more weight to observations located around the average). As a robustness test, it was confirmed that the results obtained by both were highly correlated (0.998).

An interesting topic is how seasonality changes across the global economic cycle, which manifests itself in the variation in annual global demand. Thus, in the period analysed, we find a severe economic crisis, which spilled over into tourist activity followed by a subsequent recovery. It is interesting, on an analytical level, to clarify what happened in terms of seasonality to improve our understanding of how global activity itself evolved, and the consequences of that.

Secondly, the chapter takes advantage of the nature of the data i.e. countries and years, in order to conduct an empirical investigation into the aggregate relevance of different potentially relevant factors based on a data panel model. Given the relatively short period analysed, the data availability, and the probable high level of spatial, as opposed to temporal, heterogeneity in seasonality, some geographical variables related to country location have been included.

The rest of the chapter is structured as follows: First, it addresses some methodological aspects and data. Second, it considers the evolution of tourism seasonality for some of the most important destinations worldwide. Finally, the paper concludes with a summary of the main results and conclusions.

6.2 Methods and Data

The purpose of this paper is to analyse seasonality in the main tourist destinations of the world for the period 2008–2013. Seasonality is measured based on international tourist arrival data, which is a standard indicator in the literature, where months are taken into account as a basic seasonal unit (Duro, 2016; Lundtorp, 2001; Rosselló, Riera, and Sansó,

2004; Tsitouras, 2004; Turrión-Prats and Duro, 2017; Wanhill, 1980). The data for disequilibrium in demand over the course of the year are taken from the official sources for each country (see Annex A). Regarding the sample, the analysis includes 36 countries located among the top 50 tourist destinations (see Annex B). Specifically, the sample represents about 73% of the total international tourist arrivals among the 50 main tourist destinations (UNWTO) and nearly 75% of all top 20 tourist countries.[35] An effort has been made to homogenize the sample as much as possible, so all the data refer to the same indicator and typically to the same population. In some countries, excursionists are introduced because there is no breakdown between tourists and hikers, but in most countries where this happens, the latter make a relatively small contribution.

The model used in this chapter is based on a combination of several determinants proposed in the previous literature. In addition, it is restricted by data availability and the empirical context analysed. Natural and economic factors have been introduced into the analysis for different reasons. Firstly, natural factors, such as destination climate, have been selected because weather conditions are identified as one of the most important determinants. Nevertheless, very few researchers have analysed the impact of climate on tourism seasonality. Secondly, given that the aim of our chapter is focused on a short- and medium-term period (2008–2013), the use of economic variables as the main determinants of seasonality in tourism may be advisable. As we will verify, the estimated models seem quite satisfactory.

In more detail, the model includes the following variables as determinants:

Firstly, as proxy for income, we used data from Real Gross Domestic Product per capita in the countries of origin, expressed in Purchasing Power Parity (Ledesma-Rodríguez, Navarro-Ibáñez, and Pérez-Rodríguez, 2001; Song and Witt, 2000).

Secondly, the price variable is expressed in relative terms i.e. the ratio of the Consumer Price Index in the country of destination to the Consumer Price Index in the country of origin. This variable is one of the most commonly used in this type of analysis (Rosselló et al., 2004; Croes and Vanegas, 2005). As noted in previous chapters, a priori, the

[35] Given the importance of France, by removing this country the representativeness of our sample would rise to 81% in terms of the top 50 and 86% in terms of the top 20).

predicted impact of income and prices on monthly concentration is unknown. Aspects such as the profile of the average visitor or the differential preferences for low-season demand may influence the relationship. Hence, empirical analysis may help us to arrive at some conclusions.[36]

Thirdly, the proximity of destination countries to the equator in terms of degrees of latitude has been used as a proxy for climate for two main reasons. First, because latitude affects the weather of a region, determining greater or lesser solar radiation, dictating the duration of the day and the height of the sun on the horizon according to the inclination of the terrestrial axis throughout the year. Therefore, latitude is one the fundamental controllers of a location's climate. Regions in high latitudes (around 60 degrees from the equator) are usually characterized by having cool summers and cold winters. At the other extreme, countries in low latitudes receive greater solar energy and therefore have climates with warm temperatures throughout the whole year. Finally, the amount of solar energy received by areas in middle latitudes (from around 30 to 60 degrees) varies with the season. This all indicates that seasonality should affect high latitude regions more. It is expected that the length of the summer season is shorter in countries at higher latitudes. In contrast, in countries at lower latitudes, the duration of the summer season is longer allowing the tourist season to be prolonged beyond the traditional months. Second, the choice of this variable is also due to the difficulty of selecting an adequate weather variable aggregated by country, given that weather can be very different across a single country.

Finally, the study includes two named dummy variables, which allow us to capture the differential effect of the financial and economic crisis in the monthly seasonal concentration of tourism. These are divided between advanced economies and those not considered as being so advanced (the global variable have not been significant).

[36] This could be true given the difficulty in determining an adequate price and income variable, because the destinations benefit from the arrival of tourists from different countries. Variables have been weighted according to the weight of each emitting country on the total demand of the destination. To this end, the countries selected are those that emit the tourists who make up about 70% of the total demand. For the remaining 30%, since there are many countries with low relative weight, we use the global data of the variable. Tourist arrivals data for 2013 have been used in order to calculate the weighting, although we observed that there are no significant changes when using a different year.

Data on income and consumer price indexes for the countries of origin were collected from the World Bank, and the source for latitude is the Central Intelligence Agency (CIA).

Based on the above descriptions, the model to be estimated is:

$$ln\_ts_{i,t}=\beta_0+\beta_1 ln\_income\_o_{i,t}+\beta_2 ln\_cpi\_o_{i,t}+\beta_3 latitude_i+\beta_4 crisis08\_advacedeco+\beta_5 crisis08\_noadvacedeco+ a_i+ \varepsilon_{i,t} \quad (1)$$

$$ln\_ts_{i,t}=\beta_0+\beta_1 ln\_income\_o_{t,t}+\beta_2 ln\_cpi\_o_{i,t}+\beta_3 latitude_i+\beta_4 crisis08\_advacedeco+\beta_5 crisis08\_noadvacedeco+ \beta_6 dnorthamerica+\beta_7 dnortheastasia+\beta_8 dsoutheastasia+\beta_9 dnortherneurope+\beta_{10} dwesterneurope+\beta_{11} dcentraleasterneurope+\beta_{12} dsouthernmedieurope+ a_i+ \varepsilon_{i,t} \quad (2)$$

Where $ts_{i,t}$ is the measure of seasonality in the destination country *(i)* and the year *(t)* and *o* is the market of origin. Here the subset of regressors that are potentially correlated with a_i, are given as endogenous variables.

This model has adopted the double-logarithmic form for economic variables, so coefficients in these cases have to be interpreted in terms of elasticities. Note that this logarithmic transformation, which is convenient in terms of econometric consistency, implies that international seasonality could be explained in terms of differences. In this analysis, as in previous chapters, we use panel data due to their advantages.[37] In particular, the method used is an estimator of the instrumental variables proposed by Hausman and Taylor (1981).[38] This allows us calculate the coefficient for those variables that do not have inter-temporal variation, as in our case the latitude variable. Nevertheless, it does so

[37] First, its structure consists of several observations over time, which provides data that are more informative and contain more variability. Second, it limits the problem of omitted variables and reduces multicollinearity bias (Hsiao, 2014). Third, this methodology monitors the unobserved heterogeneity, removing the risk of obtaining biased results if we do not check for this heterogeneous behaviour. All of this makes it possible to improve both the possible econometric specifications and the parameter estimates. In addition, panel data allow us to analyse variables for which there is no information available for all of the periods.

[38] This method was also applied in the third chapter.

by assuming that some specified regressors (exogenous variables) are uncorrelated with the fixed effect (Cameron and Trivedi, 2010).

6.3 Main results

This section gives the results of tourism seasonality worldwide as well by regions and countries. They are approximated by the sample data, which appear to be sufficiently representative. Our idea, therefore, is to complement the global analysis with regional analysis, thereby testing possible dissimilar patterns in the position and evolution of the phenomenon by territory. The regions are at different levels of tourism development, are in different climate areas, and have different market profiles that may affect the results. In this respect, an interesting subject for general analysis is to compare the effects of the global crisis on destinations from both, economic and tourism perspective and the pattern of their subsequent recovery. In addition to the descriptive work, quantitative models will be estimated, as mentioned, through panel data techniques with the aim of clarifying general determinants.

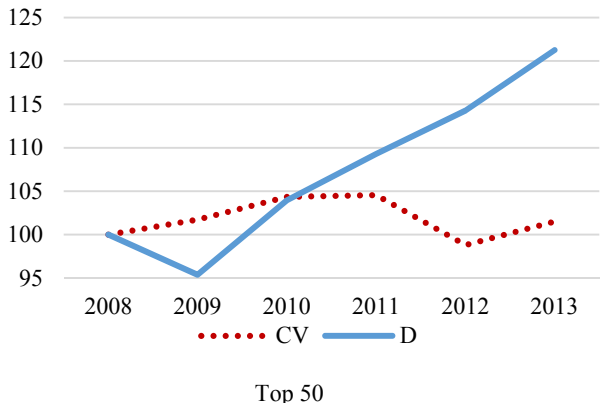
6.3.1 Descriptive results

Initially, for an overview of the situation, it is worth examining the evolution of world tourism demand and seasonal distribution, measured by the Coefficient of Variation.[39] Figure 1 shows the evolution of both dimensions, according to our sample. The data indicates that world tourism seasonality did not change much if we compare 2008 with 2013, taking a concentration index value of around 0.24. In any case, if we take a close look at the seasonal pattern, seasonality seems to have slightly increased up to 2011 and subsequently reduced, coinciding with the major recovery in world demand (an increase of 21.3% since 2008). Since 2010, the great growth in demand as coincided with a slight reduction in seasonality, a rather positive outcome. If the enormous growth in activity had been accompanied by an increase in seasonality, the negative impacts would have been greater at a global level. Given the diversity between countries and regions, the analysis necessitates a territorial examination. As a first segmentation, we thought it interesting to provide the results based on the level of the country's development. Thus, we have

[39] For more information about this indicator see Chapter 2 (Section 3).

differentiated between advanced and non-advanced economies, following the World Bank structuring.

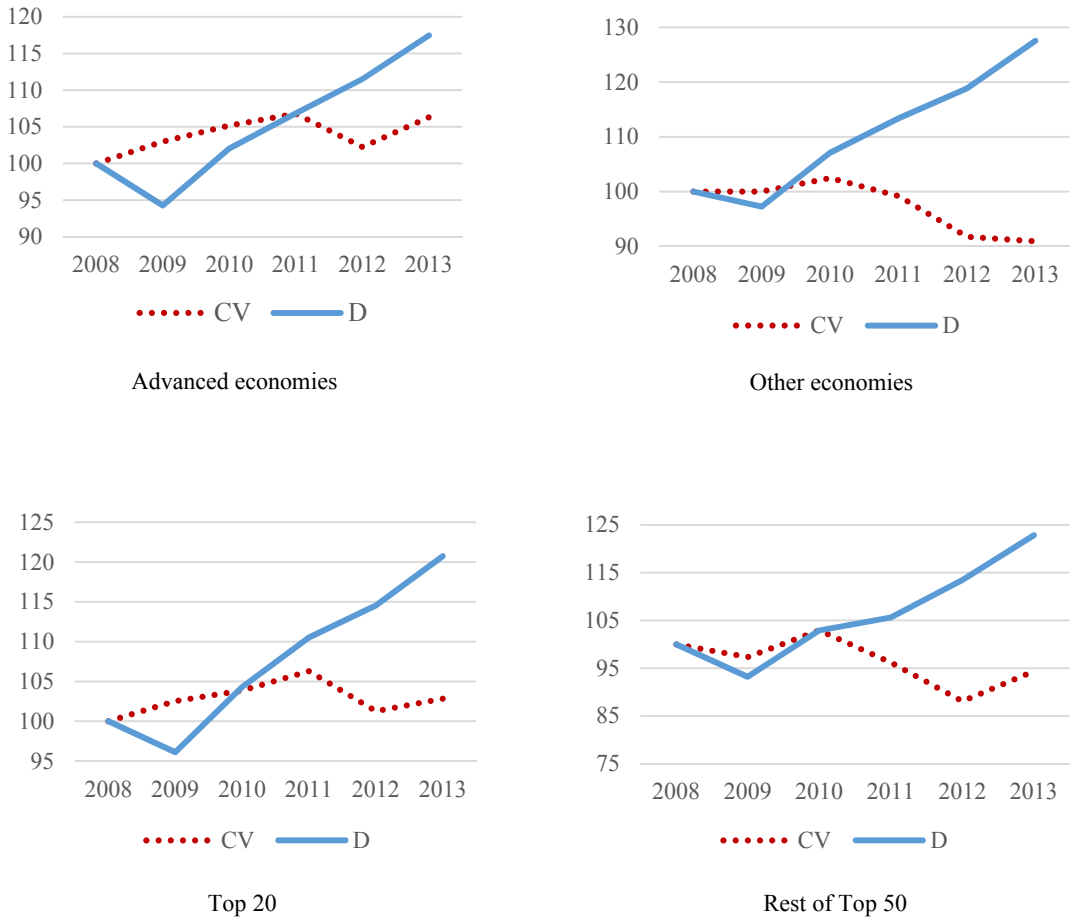
Figure 1. Seasonality and global demand, 2008–2013.



Note: CV is the Coefficient of Variation; D is the total demand.
Series are indexed according to the initial value (2008=100).
Source: Author's own synthesis from the official sources of each country.

Figure 2 details the results. Thus, all economies, advanced and others, have seen a growth in tourist flows of late, only interrupted by the crisis period. In contrast, the impact of this growth on monthly concentration has been slightly different depending on the area. Specifically, in the case of advanced economies, in which most of the world's demand is concentrated, seasonality typically increased in line with growth (except in 2012) whereas, however, for the remainder of the economies, the monthly imbalance in demand clearly decreased from 2010 (with a drop of 10% in the synthetic index between 2010 and 2013). Therefore, seasonality seems to get worse in more consolidated countries, worsening the impact that this has on them, while in less developed or emerging countries the opposite pattern is true. Here then, we find a first qualitative difference.

Figure 2. Seasonality and global demand for advanced and non-advanced economies, 2008–2013.



Note: Series are indexed according to the initial value (2008=100). According to data from the International Monetary Fund (IMF) the following are considered as advanced economies: Austria, Belgium, Canada, Czech Republic, Finland, Germany, Greece, Italy, Japan, Netherlands, Portugal, Singapore, Spain, Switzerland, United Kingdom and United States.

Source: Author's own synthesis from the official sources of each country.

It is therefore worth pursuing the analysis of these patterns in detail. One immediate analysis consists of assessing the patterns followed by each of the different regions, using the division proposed by the World Tourism Organization (Annex B). Table 1 brings together the main results. Note that, although our sample contains countries that belong to the Caribbean, South America, South Asia, and Sub-Saharan Africa, these regions have not been included, because we only used those regions with higher demand. In particular, Table 1 shows that on the one hand, during the reporting period, European regions as a whole were those with the highest levels of demand and monthly concentration. In

Europe, the number of international tourist arrivals reached 286 million in 2008 and rose to 335 million in 2013. Most of these were tourists coming from within Europe, which is a consequence of the intra-regional nature of this demand. In the same way, their monthly concentration also noticeably increased from 0.36 in 2008 to 0.39 in 2013 (a growth of 8.2% in the index). In particular, the worse pattern was experienced by the Southern and Mediterranean area, which shows a growing trend in the number of tourist arrivals over the period analysed but also a strong and growing seasonality (from 0.48 to 0.53, the highest world value, and a very significant growth of 9.8%). On the other hand, the Asia Pacific region, a region of increasing demand, particularly in the South-East, presents the lowest values of seasonality (between 0.06 and 0.07). The Asia Pacific region, despite having similar numbers of international tourist arrivals as North America, for example, displays just half of the monthly concentration. In addition, this region, in contrast with the European values, experienced a reduction in seasonality during the last period, just as in North America (since 2008).

Table 1. Tourism seasonality by UNWTO regions.

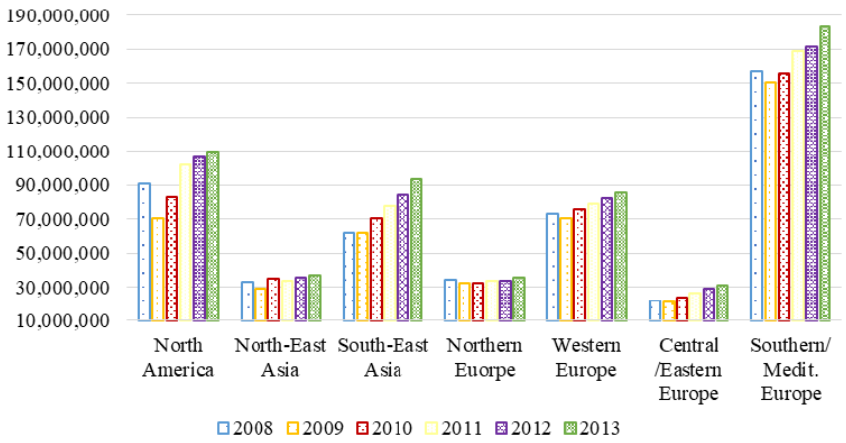
							Rate of Variation (%)			
	2008		2009		2013		2008–2013		2008–2009	
	CV	D	CV	D	CV	D	CV	D	CV	D
America	**0.19**	**90,574,737**	**0.14**	**70,090,123**	**0.17**	**109,978,311**	**-9.82**	**21.42**	**-28.18**	**-22.62**
North America	0.19	90,574,737	0.14	70,090,123	0.17	109,978,311	-9.82	21.42	-28.18	-22.62
Asia Pacific	**0.06**	**94,671,251**	**0.07**	**90,876,267**	**0.06**	**125,078,206**	**-8.13**	**32.12**	**11.2**	**-4.01**
North-East Asia	0.10	32,676,035	0.11	28,727,058	0.1	36,654,304	-2.86	12.17	5.31	-12.09
South-East Asia	0.06	61,995,216	0.06	62,149,209	0.07	88,423,902	15.99	42.63	1.75	0.25
Europe	**0.36**	**285,778,003**	**0.37**	**273,935,677**	**0.39**	**335,415,136**	**8.16**	**17.37**	**4.13**	**-4.14**
Northern Eur.	0.17	34,379,832	0.17	32,106,267	0.18	35,487,684	4.99	3.22	-2.19	-6.61
Western Eur.	0.21	72,726,214	0.22	70,574,988	0.23	85,643,582	6.38	17.76	2.29	-2.96
Cent./East. Eur.	0.35	21,763,882	0.37	20,867,175	0.3	31,166,847	-15.1	43.2	3.95	-4.12
South/Medit. Eur.	0.48	156,908,075	0.5	150,387,247	0.53	183,117,023	9.84	16.7	4.25	-4.16
of which EU	0.34	250,845,931	0.36	238,576,825	0.38	291,549,023	10.16	16.23	4.43	-4.89

Note: The table shows only those regions with the highest demand, therefore excluding regions such as South America, South Asia, the Middle East or South and North Africa. CV is the Coefficient of Variation; D is the total demand. In the case of China, foreign visitor arrivals from Macao, Hong Kong and Taiwan are excluded due to the lack of monthly information.

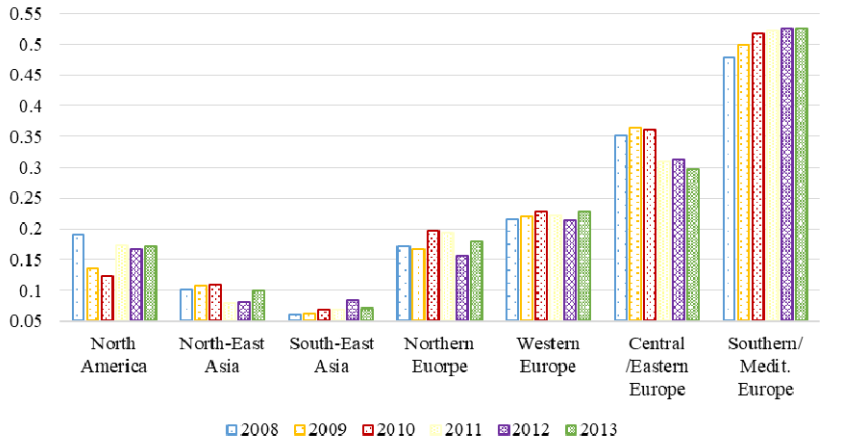
Source: Compiled by the authors based on the official sources of the countries.

Figure 3. Global demand and seasonality by regions, 2008–2013.

a) Tourism Demand



b) Monthly Concentration



Source: Author with data from the official sources of the countries.

Tourism demand can be significantly affected by changes in the economic cycle, for instance, economic and financial crises. However, its effect on tourism seasonality is not so clear. At this point, it may be interesting to consider what effect the global crisis of 2008 had on tourism demand and especially on the monthly distribution. In order to consider the impacts of the economic crisis, Table 1 also includes data for 2009. In this table, we see that during the critical initial phase of the crisis, 2008–2009, levels of demand decreased in all regions except South-East Asia where growth rates were positive but very limited. The regions most affected by the economic recession were the northern regions, specifically North America (22.6%), North-East Asia (with a fall of 12.1%), and Northern Europe (6.6%). Conversely, monthly concentration over this year increased in

all regions with the notable exception of North America (-28.2%) and Northern Europe (-2.2%). Thus, tentatively, it appears that, overall, the economic crisis was, on average, negative when correlated with tourism seasonality.[40]

With regard to results at country level, and taking into account the difficulties of adding patterns, and of the limited space available, Table 2 shows that in 2013, among the ten tourist countries with least seasonality, eight of them belong to the Asia Pacific region (Singapore, Thailand, Vietnam, Indonesia, the Philippines, Japan, Malaysia, and China). Some of these countries such as Thailand, Vietnam, Indonesia, the Philippines, and Japan managed to reduce their concentration rates as compared with 2008. Otherwise, the highest values belong to countries from the Mediterranean coastline and Southern Europe (Croatia, Greece, Italy, Turkey, Spain, Morocco, and Portugal), Bulgaria, Canada and Austria. These values may reflect the importance of climate as a determinant of seasonal imbalance and represent the typical pattern of the main markets. In addition, some of these countries demonstrate a rising trend in their monthly concentration figures compared to 2008, such as, for example, Greece, Bulgaria, Italy, Canada, Portugal, and Spain that therefore increases in the problem of tourist sustainability.

Table 2. The ten tourist countries with the most / least seasonality in 2013.

	CV	Var. CV	D			CV	Var. CV	D
Croatia	1.16	decrease	10,948,366	1	Peru	0.07	decrease	3,163,639
Greece	0.88	Increase	17,919,582	2	Singapore	0.07	increase	15,567,923
Bulgaria	0.68	Increase	9,191,782	3	Thailand	0.09	decrease	26,546,725
Italy	0.51	Increase	50,263,236	4	South Africa	0.09	decrease	9,536,568
Canada	0.5	decrease	16,059,342	5	Vietnam	0.09	decrease	7,581,500
Turkey	0.49	decrease	34,910,098	6	Indonesia	0.10	decrease	8,802,129
Portugal	0.45	Increase	8,400,252	7	Philippines	0.10	decrease	4,681,307
Spain	0.39	Increase	60,675,489	8	Japan	0.10	decrease	10,363,904
Tunisia	0.37	decrease	6,268,700	9	Malaysia	0.11	increase	25,715,460
Morocco	0.36	decrease	10,046,264	10	China	0.11	increase	26,290,400

Note: CV Coefficient of Variation for 2013; Var. CV is the variation of CV with respect to 2008; D is the total demand for 2013. In the case of China foreign visitor arrivals from Macao, Hong Kong, and Taiwan are excluded due to the lack of monthly information.

Source: Compiled by the authors based on the official sources of the countries.

[40] In fact, if we were to do a simple analysis of the correlation between regions, excluding North America and Northern Europe, which are the only ones to show diminished seasonality during the global crisis, the result would be a marked negative value between growth in global demand and seasonality. Calculation available on request from the authors.

As a complementary analysis, Table 3 shows a ranking of monthly concentration for 15 of the countries that make up the top 20 destinations, with most demand for tourism according to data from 2013.[41] Note that the distribution of the countries in the ranking does not change significantly from year to year. In addition, as can be seen in detail in the table, more than half of the main tourist destinations of the world show an increase in monthly concentration, which is a cause for concern. Note that, for example, Italy and Spain are facing an even more negative situation due to their high demand.

Table 3. Country classification based on measures of monthly concentration in 2013. Top 20 destinations.

		CV	Variation	D
1	Greece	0.879	increase	17,919,582
2	Italy	0.513	increase	50,263,236
3	Canada	0.499	decrease	16,059,342
4	Turkey	0.488	decrease	34,910,098
5	Spain	0.385	increase	60,675,489
6	Austria	0.342	decrease	24,813,128
7	Netherlands	0.274	increase	12,782,892
8	Germany	0.263	increase	31,448,050
9	United Kingdom	0.178	increase	32,689,000
10	United States	0.155	decrease	69,768,455
11	Poland	0.123	decrease	14,123,200
12	Mexico	0.122	decrease	24,150,514
13	China	0.11	increase	26,290,400
14	Malaysia	0.109	increase	25,715,460
15	Thailand	0.086	decrease	26,546,725

Note: CV Coefficient of Variation for 2013; D is the total demand for 2013. In the case of China foreign visitor arrivals from Macao, Hong Kong and Taiwan are excluded due to the lack of monthly information.
Source: Compiled by the authors based on the official sources of the countries.

[41] For some of the countries (France, Russia, Ukraine, and South Korea) that make up the Top 20 we have not been able to get tourist arrival data. For example, for France we only have data on tourists staying in establishments such as hotels, holiday homes and other short-stay accommodation; campsites, recreational vehicle parks and trailer parks. Taking this data, provided by Eurostat, France's average monthly concentration between 2011 and 2014 was 0.523. For South Korea we have data on visitor arrivals provided by the Korea Tourism Organization (KTO) without differentiating between same-day visitors and tourists. Selecting this data as a reference, between 2008 and 2014 the average monthly concentration in this country was 0.081.

In fact, an interesting analysis is to explore the increase in the demand-growth binomial of seasonality according to the four possible combinations. Table 4 has been included to achieve this. In particular, and if the growth in demand and tourism seasonality forms part of the vector of strategic objectives of any destination, the countries situated in the first row and first column should be the most dissatisfied ones. Actually, this quadrant features the countries with a downturn or limited growth in global demand since 2010 and an increase in seasonality. We therefore have the cases of countries such as Spain, Italy, Greece, and others. Another of the problematic quadrants is that in which significant growth in demand coincides with an increase in seasonality, which amplifies the negative impact of growth, obviously dependent on the levels achieved by global demand in respect of resources and population (Martín Martín, Jiménez Aguilera, and Molina Moreno, 2014). This is the case, for example for countries such as Vietnam, Indonesia, and Portugal where, given the weight of demand, the last emerges as the most problematic. Appearing in a more favourable quadrant, where growth in demand coincides with a reduction in seasonality, are Asian countries together with some in South America, and Turkey. Annex C provides the detailed data of these variables for each country.

Table 4. Relationship between the growth of tourist demand and monthly concentration, 2010–2013.

	Decrease or low demand growth	*High demand growth*
Increase in Concentration	Malaysia, South Africa, Greece, Spain, India, Netherlands, Italy, Austria, United States, Switzerland	Vietnam, Indonesia, Portugal
Reduction in Concentration	Finland, China, Mexico, Germany, Morocco, Brazil, United Kingdom, Croatia, Belgium, Bulgaria, Dominican Republic, Canada, Japan, Tunisia	Thailand, Peru, Poland, Philippines, Chile, Turkey, Czech Republic, Singapore, Cambodia

Note: In order to determine whether demand growth has been high or low, we are using as a base the country averages from 2013 (20.71%). Source: Compiled by the authors based on the official sources of the countries.

Source: Compiled by the authors based on the official sources of the countries.

6.3.2 Modelling global empirical determinants

Estimation of the model was carried out using the Stata v.14.0 econometric program. The work by Hausman and Taylor (1981) is used to estimate the models described in the previous section. Table 5 shows the main empirical results. From the estimations, the following points of interest can be noted:

First and foremost, the model behaves in a reasonable way. Thus, the joint significance test of the model, the rho, is very high, as is the Wald test, which verifies the global significance of the variables included. Three models are attached: one, the basic model, with just the central variables, which are income, prices and latitude; a second, in which regional dummies have been incorporated, with the aim of capturing the homogeneous territorial differences that are unexplained by the previous variables; and a third, in which only significant regional dummies are included. The Ramsey (1969) and Link (Pregibon, 1979) tests give us an idea of the validity of the specifications. Out of the three models, the one that passes the two specification tests is Model 3. Model 2 passes the Link but not the Ramsey test and Model 1 passes neither, which indicates that the basic model needs dummies. Be that as it may, and going beyond the values produced by the synthetic specification tests, the results for the parameters are similar in all cases.

Second, regarding income, the results show that its effect is negative. Following this result, an increase of 1% in the income of the main markets of origin would suggest a decrease of 0.6% for the monthly concentration of the destination country. Therefore, it seems that an increase in the incomes of international tourists would, not only be positive in terms of global annual demand, but also in terms of its monthly distribution. Note then that within the sample, on average, the economic growth of markets and thus their economies, reduces seasonality in the target destinations. This result is, in fact, positive on a global level, given that it makes the growth in global demand more sustainable. In any case, a parameter value of 0.6% is not especially high. In fact, and being very cautious in the light of comparability issues, Turrión-Prats and Duro (2016, 2017) find an elasticity higher or closer to 1 in Spain and the Catalonia region, although using different data and methodologies (in this case, among other differences, using a dynamic panel). Conversely, the crisis not only depressed global demand in numeric terms (Crouch, 1994a, b), but also concentrated it into the peak months (that is, smaller decreases during those months). Note that this information can be used to anticipate results, based on to

observed economic growth in markets and which allow anticipatory mitigating measures such as promotion.

Third, with respect to relative prices, the positive value of the coefficient suggests that an increase in relative prices would contribute, all other things being equal, to increasing monthly concentration. Therefore, high prices not only reduce global demand (Crouch, 1994a, b) but also concentrate it seasonally or, what amounts to the same thing, reduce low season demand even further. Note that this result could be interpreted in terms of peak season travel having a basic consumer profile. In any case, it should be pointed out that the value for price elasticity is low, less than 0.2.

Fourth, the geographical location variable, based on latitude, has a significant impact on monthly concentration. Thus, higher latitudes are generally associated with increments in seasonal concentration and these regions are particularly susceptible to seasonality. A non-linear relationship was tested, but was not found to be significant. Note, therefore, that on a global level, this effect adds a certain level of inertia to seasonality. It would be interesting to test the effect of climate change on this variable, an issue which, in order to approach it rigorously, would need much longer time series than those available. Not only the effects of change on demand would have to be assessed, but also the impact on the seasonal distribution of demand. In temperate highly seasonal areas of Europe, for example, climate change could lead to a reduction in inter-annual climatic disparities and, hence, seasonality. Note that this variable, indirectly, would partly include the tourist product.[42]

Fifth, the variable *crisis08* behaves different according to each level of development of a country's economy. The results suggest that, for advanced economies, contrary to the others, the crisis demonstrated a differential decrease in relative consumption in peak seasons, reducing concentration. In non-advanced countries, however, the pattern is the

[42] The authors undertook a tentative supplementary analysis by carrying out the previous specifications adapted to the different cross-sections, with the aim of testing, among other aspects, changes in the estimated parameter relative to geographical position. In summary, no significant patterns were found (results available on direct request to the authors).

opposite. If a global crisis variable had been included, the results would not have been significant.

Finally, in the second model we introduced regional dummies. In this case, we find that the only significant dummy variables are for Asian regions and the zones of Southern and Mediterranean Europe. In particular, the Asian regions seem generally to exhibit lower concentration and the Mediterranean countries, conversely, clearly higher values.

Table 5. Empirical determinants of international seasonality. Panel 2008–2013.

	Model 1	Model 2	Model 3
Variables			
ln_income	-0.570**	-0.616**	-0.593**
	-0.283	-0.313	-0.293
ln_cpi	0.185*	0.184*	0.186*
	-0.107	-0.108	-0.107
latitude	0.018***	0.016**	0.012**
	-0.005	-0.007	-0.005
crisis08_advancedeco	-0.067***	-0.068***	-0.068***
	-0.021	-0.022	-0.021
crisis08_noadvancedeco	0.110**	0.110**	0.111**
	-0.047	-0.048	-0.048
dnorthamerica		-0.15	
		-0.312	
dnortheastasia		-1.038***	-0.857***
		-0.187	-0.142
dsoutheastasia		-0.701***	-0.634***
		-0.194	-0.201
dnortherneurope		-0.479	
		-0.354	
dwesterneurope		-0.210	
		-0.270	
dcentraleasterneurope		-0.295	
		-0.453	
dsouthernmedieurope		0.650***	0.844***
		-0.252	-0.186
Constant	3.82	4.498	4.229
	-2.865	-3.151	-2.97
Observations	214	214	214
Number of destinations	36	36	36
Rho	0.95	0.89	0.894
Wald Test	210.62(5)***	1805.53(8)***	1805.53(8)***
Ramsey Test	22.25(3, 205)***	5.39(3, 198)***	1.31(3, 202)
Link Test	1.152***	0.097	0.060

Note: Dependent variable: Logarithm of CV for monthly tourism. Standard errors in parentheses. The asterisks denote that the coefficient is significant at *10%, ** 5% and *** 1%.

6.4 Conclusions

This study measures and analyses the temporal concentration of tourist demand on a worldwide level for the period 2008–2013. In particular, the analysis includes 36 countries that are within the top 50 tourist destinations by numbers of international tourists, accounting for more than a 72% of the total international tourist arrivals in the main tourist countries (81% if we exclude France). To the best of our knowledge, this is the first study that analyses tourism seasonality on a worldwide scale. In this paper, the number of international tourists is used as an indicator of demand, which seems a reasonable variable in terms of pressure on territorial resources and which, in fact, is commonly used in these types of studies. In addition, this research uses a monthly concentration measure, that is, the coefficient of variation. The empirical period used, given the availability of data, is 2008–2013. At a second stage, we modelled the empirical determinants of international seasonality using demand variables (income and prices), the geographical location, and time and regional controls with a panel data specification. Our main empirical results may be summarized as follows:

First, the change in worldwide seasonality (approximate) for the period would not have been particularly substantial if we had compared 2008 with 2013. Thus, the major increase in international tourist demand, particularly observable since 2009 following the crisis in that year, would not have increased this imbalance in a relevant way. In fact, if each of the years is examined, the seasonal pattern of seasonality grew slightly until 2011 before then falling off. In any case, this global result conceals a certain level of variability at the country grouping level. Effectively, for the most advanced countries, which typically lead the rankings for world tourist demand, seasonality followed an upward pattern, even over the later years. In contrast, for the remainder of the countries, this pattern was a declining one.

Second, if we were to perform the analysis by regional group, the divergent role of Europe, especially Southern and Mediterranean Europe, is clear. In this area, not only is the level of seasonality double that of the rest of the world, but it also grew significantly from 2008. The problem of global seasonality is largely generated from this area, where the growth in international demand was 17% from 2008, coinciding with an increase in

monthly concentration of 10%, causing a great many concerns about the resulting socio-economic impacts.

Third, if we perform the analysis by country, it confirms the high level of seasonality in Greece, Italy, Canada, Turkey, and Spain, with the Greek, Italian and Spanish cases standing out due to their high levels of global demand. Countries with lesser imbalances include those in the Asian continent, where most of them even reduced seasonality over the period analysed.

Fourth, the modelling of explanatory factors, using panel data methodology, illustrates that the specifications work quite well. The evidence suggests that income in emitting markets has a positive and significant effect on reducing seasonality. Elasticity is not particularly high, but it indicates that economic expansions, not only increase global demand (due to the income factor) but also, fortunately, reduce seasonal concentration. This relationship, on a global level, thus reduces the potentially destabilizing effects of growing demand. Moreover, conversely, the crisis flags problems that can then be used as leading indicators and as pointers for advance action.

Fifth, apart from income, prices have shown themselves to be relevant in the explanation of the differences in levels of seasonality and their evolution. High comparative prices increase seasonality and therefore differentially take more demand away from the low seasons. This has to be approached with some caution, as the elasticity is relatively limited.

Sixth, a country's location affects its seasonality and seasonal variation—the higher the latitude, the greater the seasonality and the greater its growth. Note that these results show a certain resistance to change in a country's imbalance.

One of the main limitations of this work was the lack of available data. Therefore, we consider that an extra effort will need to be made to obtain homogeneous international data on monthly tourism demand that are comparable and cover the majority of the top 50 countries. These efforts could be undertaken by the UNWTO, which has already been working on annual demand and its characteristics. In addition, having homogenous global statistics between countries would make it easier for researchers to include explanatory

variables that may be relevant to their models, such as the prices of competing destinations. Further research may improve with the availability of longer time series, because it would be interesting to compare the variations in the relevance of previous parameters especially that of climate change.

Annex

A. The data used with respect to the measure of monthly concentration are from the following sources:

Countries	Source
Austria	Statistics Austria
Belgium	Eurostat
Brazil	Ministerio de Turismo
Bulgaria	National Statistical Institute
Cambodia	Ministry of tourism
Canada	Government of Canada Statistics
Chile	Servicio Nacional de Turismo
China	Planning Division Tourism Bureau - Ministry of Transportation and Communication
Croatia	Croatian Bureau of Statistics
Czech Republic	Eurostat
Dominican Republic	Banco Central de la República Dominicana
Finland	Eurostat
Germany	Eurostat
Greece	Border Survey of the Bank of Greece
India	Ministry of Tourism
Indonesia	Ministry of Culture and Tourism. Statistics Indonesia
Italy	Eurostat
Japan	Japan National Tourist Organization (JNTO)
Malaysia	Tourism Malaysia Corporate website
Mexico	Secretaría de Turismo de México (SECTUR)
Morocco	Observatory du Tourism Morocco
Netherlands	Central Bureau of Statistics Netherlands
Peru	Ministerio de Comercio Exterior y Turismo
Philippines	Department of Tourism
Poland	Central Statistical Office of Poland
Portugal	Eurostat
Singapore	Singapore Government-Singapore Tourism Board
South Africa	Statistics South Africa
Spain	Instituto de Estudios Turísticos (IET)
Switzerland	Eurostat
Thailand	Ministry of Tourism and Sports
Tunisia	National Institute of Statistics- Tunisia
Turkey	Ministry of Culture and Tourism
United Kingdom	Office For National Statistics
United States	The National Travel and Tourism Office (NTTO)
Vietnam	General Statistics Office of Vietnam

B. The countries included in the analysis have been grouped by regions based on the classification of the World Tourism Organization.

Countries included in the analysis grouped by regions based on the UNWTO			
Africa	**Americas**	**Asian and the Pacific**	**Europe**
North Africa	*North America*	*North-East Asia*	*Northern Europe*
Morocco	Canada	China	Finland
Tunisia	Mexico	Japan	United Kingdom
	United States		
Subsaharan Africa		*South-East Asia*	*Western Europe*
South Africa	*Caribbean*	Cambodia	Austria
	Dominican Republic	Indonesia	Belgium
		Malaysia	Germany
	South America	Philippines	Netherlands
	Brazil	Singapore	Switzerland
	Chile	Thailand	
	Peru	Vietnam	
		South Asia	*Central /Eastern Europe*
		India	Bulgaria
			Czech Republic
			Poland
			Southern/ Medit. Europe
			Croatia
			Greece
			Italy
			Portugal
			Spain
			Turkey

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CHAPTER 7
GENERAL CONCLUSIONS

7.1 Empirical findings and their implications

The main aim of this thesis is to analyse seasonality in tourism, a current topic of particular concern for destination marketers and planners and the academic literature. Since this phenomenon has negative effects on most of the popular tourist destinations, it constitutes one of the most significant threats to the tourist industry's growth and sustainability. The Strategic Tourism Plans of the most popular destinations prominently include measures to track seasonality. Therefore, the seasonal nature of tourism has become a relevant issue for both tourism managers and policy makers. These agents spend time, money and efforts trying to mitigate its effects. Nevertheless, seasonality is still, paradoxically, one of the least understood aspects of this field (Jang 2004). Since the problem of seasonality is complex and its consequences are multiple, it seems necessary to attempt to come to a better understanding of the phenomenon. We have posed various related-research questions and have made a modest effort to answer them throughout the seven chapters of this thesis. The empirical results obtained in each chapter allow us to draw some specific conclusions that seem interesting from a global academic point of view, and also have some general, illustrative marketing and public policies implications.

First, this thesis applies several somewhat underutilized methodologies in the area of tourism seasonality (or monthly concentration), which may constitute a toolbox for future empirical analysis. With respect to measurement of seasonality, we follow the recommendations of Butler (1994) who suggests using summary indicators. We generally decided to apply the coefficient of variation (in Chapter 4, for the case of Spain), Chapter 5, and Chapter 6). This measure has some advantages that allow us to make a reasonable analysis of seasonality. In Chapter 3 and 4 (the municipalities analysis and the case study of Catalonia) seasonality is not measured using a full summary measure, but rather with a partial concentration indicator due to the unavailability of information covering every month. The application of this measure allows us to solve the problem related to the absence of statistical data for some months. However, as a robustness exercise, we

confirmed that all the results obtained through a partial measure or coefficient of variation were highly correlated with the Gini index (which is one of the most used by researchers).

The summary measures can be decomposed taking into account groups, additive sources, and multiplicative factors (Duro, 2008). In this work, by applying the Shorrocks-decomposition (1982), we disaggregated international seasonality by market of origin for Spain as a whole. The results suggest important differences between these markets (Chapter 4). The use of this technique in detecting those markets that are less seasonal, aids in targeting marketing efforts. It is essential that destination marketers identify seasonal patterns in their markets to attract compatible segments (Buhalis, 2000), so that they can make more efficient use of their assets and maximize their revenues.

In order to explore the main determinants of seasonality, the models were estimated using panel data set techniques. This allowed us to improve our econometric specifications and parameters because it offered greater variability in all the variables, higher levels of freedom, little multicollinearity, and the control of unobserved heterogeneity. In particular, the estimators used were as follows:

In Chapter 3 and 6, we applied the Hausman and Taylor (1981) estimator, which allows estimation of variables that do not vary over time (in our case, tourist product or latitude).

In Chapter 4, we used the GMM difference method (Arellano and Bond, 1991), a dynamic model whose application tourism seasonality is, as far as we know, original. Most researchers have used it only to study annual demand, in spite of the relevance of inertia and tradition as determinates for explaining seasonal behaviour. This was a particularly useful method, because it allowed us incorporate lagged explanatory variables (that is the inertia or tradition) without causing biased and inconsistent coefficients as in Within Groups and Random Effects estimators (except when the number of periods is large, see Baltagi (1995)). In addition, this estimator eliminated the problem of non-stationarity by differencing data.

In Chapter 5, we applied Xtabond2 (Roodman, 2006) which, as far as we know, has not been used for analyses in this area. Among the advantages of this dynamic model, we highlight that it permitted us to incorporate explanatory endogenous variables, using both

their differences and levels as instruments. This reduces the loss of information, in small samples (as in our case). It also offers more alternatives for the treatment of variables, for example, we can identify the variables as strictly exogenous, endogenous or predetermined.

These econometrical approaches, allow us to improve our understanding of causes of seasonality, which is extremely helpful. For instance, tourism enterprises can improve their predictions about seasonal patterns and consequently, they can do a more efficient use of their resources.

Second, this thesis checks empirically the theoretical framework of the determinants proposed in the literature. This contributes to academic research in the field given that few researchers have examined the relationship between economic variables or climate (especially in the country of origin) and seasonality. Specifically, the results suggested that these factors explain a significant part of seasonality. In addition, the evidence shows that tourists from different markets have different sensitivities to changes in the determinants of seasonality (Chapter 4 and 5). These findings suggest the suitability of specific management and marketing strategies for markets, given the general inhomogeneity. In fact, in general terms, we could use the information provided by the previous aggregate models and their results, together with the situation and predictions of parameters such as national income, prices and climate (home and destination), in order to anticipate the reactions of markets. This allow designing rapid and appropriate mitigation and correction policies for annual seasonality.

Third, and in terms of the particular empirical results obtained and their implications, the evidence suggests that destinations such as Spain and Catalonia should take into account the cyclical economic situation in order to design specific policies and marketing mix strategies (for example, seasonal price variation or market diversification), and should also address the specific problems associated with various markets. Therefore, given that economic cycles in the European Union may be similar, these results strengthen the possibility that market diversification may be positive both in terms of stabilizing demand and mitigating seasonality.

In addition, in terms of marketing strategies, the possible existence of inertial behaviour in seasonality, related to habit formation in international tourism, is an important issue for tourist destinations. This behaviour might be attributed to the reduction of uncertainty, especially that of weather (considering that this factor is particularly significant in the case of the coastal destinations (Chapter 5)). The presence of inertia would indicate difficulties in changing some of the concentration and would hinder the implementation of correction measures by destinations marketers. Nevertheless, in the case of Catalonia and Spain, it seems that there is still room for appropriate action.

Fourth, the results show that a great deal needs to be done in terms of combating seasonality in countries such as Spain. Many problems exist, including the recent increase in seasonality, the unresolved issues in markets such as the British one, and the partial evidence of the low profile of the demand and its effect on concentration. All of these underline the need to seriously consider correction strategies, not only to correct the negative externalities that concentrated growth generates, but also to safeguard sustainable growth in an economy such as Spain's, where the tourism sector as a whole makes a significant contribution to GDP.

Finally, in Chapter 6, we propose, to the best of our knowledge, for the first time, a homogenous international measurement of tourism seasonality on a worldwide scale. In summary, we find that the world is not uniform in terms of seasonality, the problem being found to be heavily centred on the European Mediterranean area. Therefore, in this region combating seasonality would appear to be a particularly important element of tourism strategy.

7.2 Future research

This thesis has brought to light some lines of investigation, which we believe may be interesting to develop in future research.

Firstly, an important issue is related to the use of micro data. This thesis has been based on analysing seasonality using aggregate data, that is, we assume that a whole group behaves in the same way. We believe that it is also of interest to model the seasonal behaviour of tourists and are currently working on this for the Costa Daurada brand (and

territory) based on the individual data available from the Parc Científic i Tecnològic Turisme i Oci (PCT) for the period 2014–2016. In particular, the purposes of this study are: first, to analyse seasonality at the territorial level; second, to test if the seasonality of each establishment coincides with the territorial average. If this is not the case, we intend to analyse the determinants of seasonality using characteristics of the supply (see Capó, Riera, and Rosselló, 2007), such as location, category, or size. We believe that the results of this work may be useful for planners in the development of their strategies focused on hotel restructuring.

Secondly, in the literature, we do find some studies that examine the impact of strategies to counteract seasonality. Nevertheless, there seems little research focused on quantifying the impact of the actions. In this sense, we believe that it would be interesting to examine the degree of effectiveness of existing policies to combat seasonality using policy evaluation techniques. This typically would imply comparing the real position with a prototypical one in the absence of politics. For instance, authors such as Brännäs and Nordström (2002) have examined the impact of staging events and festivals (one of the most common strategy, see Andersson and Getz, 2009; Getz 1991, 1997, 2008). In particular, these researchers present an approach for evaluating the positive and negative effects of festivals on tourist accommodation. They use econometric models, specifically an autoregressive approach, which incorporate the main factors used in the planning and evaluation of an event (e.g. spare capacities, displacement effects and the costs to the visitors). For two large Swedish festivals, it was found that they had a positive net effect, as, on-average, visitors stay longer during festival periods. On the other hand, Batchelor (2000) analyses the effects of staggering holidays over a longer period in the United Kingdom and making similar changes in other European regions. The results suggest that spreading of domestic holidays into off and medium-season is most apparent in European countries with a staggering of the school holidays or a more flexible system (Fitzpatrick Associates, 1993).

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