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DOI:

[10.1016/j.jdmm.2023.100802](https://doi.org/10.1016/j.jdmm.2023.100802)

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Document Version

Publisher's PDF, also known as Version of record

Citation for published version (Harvard):

Cisneros-Martínez, JD, McCabe, S & Fernández-Morales, A 2023, 'Assessing the contribution of different markets in combatting destination seasonality: The case of Benidorm, Spain', *Journal of Destination Marketing and Management*, vol. 29, 100802. <https://doi.org/10.1016/j.jdmm.2023.100802>

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Assessing the contribution of different markets in combatting destination seasonality: The case of Benidorm, Spain

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ARTICLE INFO

Keywords:

Destination seasonality
Gini index
Social tourism
Imsero
Benidorm
Tourism segments

ABSTRACT

This study assesses the relative contributions that different demand segments make to a reduction in seasonality at tourism destinations. Specifically, we ask which types of markets are the most effective for counter-balancing seasonality in high seasonality-prone coastal destinations? This is particularly important where there is a significant presence of 'non-market' based segments, such as social tourists, as in Benidorm, Spain. The study integrates different statistical techniques to compare the relative effectiveness over time of four different groups (Imsero travellers, other domestic, the UK and other international) on the seasonality of demand in Benidorm. Using 10 years of accommodation data, we analyse trends in counter-seasonal effects of each segment through significant economic events (the Global Financial Crash and Brexit). The results confirm that both Imsero and UK travellers reduce seasonality in Benidorm. However, the analysis shows varying magnitudes and the specific effects that each segment exerts on seasonal variations, which has implications for destination managers when selecting strategies for market development to reduce seasonality over time.

1. Introduction

Coastal destinations, which are often reliant on sun and sand tourism, are generally affected by seasonality of tourist demand since they are strongly dependent on the weather. Seasonality is defined by Allcock (1994) as the concentration of tourist flows in specific periods of the year. It is one of the factors that most negatively influences tourism development (Martín Martín & Salinas Fernández, 2022) and a common and protracted issue for many tourism destinations, presenting a persistent obstacle to the industry's competitiveness. Seasonality hinders effective tourism destination planning, generates unemployment problems in resort economies (Ashworth & Thomas, 1999), jeopardizes the financial viability of businesses (Alvarez, Bahja, & Fyall, 2022), contributes to highly uneven concentrations of demand flows (Duro, 2016) and an unbalanced structure of income and costs (Butler, 2001). Spain received the second highest number of international tourists in the world: 83.5 million in 2019 (United Nations World Tourism Organization [UNWTO], 2020) and represents one of the most important coastal

sun and sand tourism destinations globally, with 138.4 million overnight stays in hotel establishments in Mediterranean coastal destinations and islands (Statistics National Institute 'Instituto Nacional de Estadística' [INE], 2020a). Spanish sun and sand destinations are therefore greatly affected by seasonality and both private enterprises and Spanish policymakers should design strategies and policies aimed at stimulating off-season demand and effectively balancing supply and demand (Gil-Alana, Gil-López, & San Román, 2021).

The identification and attraction of targeted demand segments may be an effective strategy that destination managers could implement to help reduce seasonality fluctuations and ameliorate their negative effects. For example, international tourists attracted by cultural tourism have been identified as the market that contributes the most to the reduction of seasonality (see Vergori & Arima, 2020). The impact of seasonality may vary between tourism regions, likely due to seasonal patterns of demand between domestic and international market segments (Perles-Ribes, Ramón-Rodríguez, Sevilla-Jiménez, & Moreno-Izquierdo, 2018). Recent studies have applied additive

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<https://doi.org/10.1016/j.jdmm.2023.100802>

Received 26 July 2022; Received in revised form 15 June 2023; Accepted 24 July 2023

Available online 4 August 2023

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decomposition of the Gini index to estimate the contribution of each market (by origin of tourist) to the global seasonality of destinations using aggregated data at country, region or province level such as Fernández-Morales, Cisneros-Martínez, and McCabe (2016), Fernández-Morales (2021) and Duro and Turrión-Prats (2022). This study aims to assess the contribution of different demand segments in counteracting seasonality. It combines different statistical techniques that can be applied with disaggregated data at the local municipal level to enrich the analysis of the effects these segments exert on seasonality.

These combined techniques, we argue, can help destination managers identify and target segments and develop strategies that could mitigate the negative effects of large variations in demand. An example is the 'retired' segment group, which has the means and motivation to travel in the low season, which represent a useful target for coastal destinations with high seasonality. Many countries, including Spain, have long-established stimulus programmes designed to improve the wellbeing and quality of life of senior citizens and to boost the visitor economies at destinations under the concept of social tourism. Social tourism programs can contribute to job creation and economic growth in destinations with high seasonality, example include: Imsero in Spain (Spanish Institute of Social Services and the Elderly 'Instituto de Mayores y Servicios Sociales' [Imsero], 2021), INATEL in Portugal (Eusébio, Carneiro, Kastenholz, & Alvelos, 2016), and the recent programme in Greece (Kakoudakis & McCabe, 2018). Social tourism in Spain provides discounted holiday packages during the low season to (largely) senior citizens.

Although there is some research supporting the claim that at a general level, the Imsero social tourism activity contributes to counter-seasonal effects, evidence at a granular or specific destination level is weak. Furthermore, we have little knowledge concerning the effectiveness of what is essentially a 'stimulus' market versus free-market segments in alleviating these negative effects. This is due to previously limited sources of disaggregated data and a paucity of methodologies to address these questions. Further empirical analysis is needed to understand the potential comparative and relative effects different segments have for improving seasonal imbalances in destination demand.

The empirical focus for our study is the municipality of Benidorm, located in the region Comunidad Valenciana on the southeast coast of Spain. Benidorm is one of the largest urbanised coastal tourism destinations in the world, and yet there are no studies that have focused on the seasonality of tourism demand of this resort. It is the most important destination for social tourists as it receives the greatest number of Imsero travellers. In 2019, 23.5% of all Imsero trips made to the 67 Spanish coastal and island resorts were in Benidorm (Hotel and Tourism Business Association of the Valencian Community 'Asociación Empresarial Hotelera y Turística de la Comunidad Valenciana', [HOSBEC], 2022; Imsero, 2020; Mundiplan, 2020), which makes it an ideal study locale to assess the relative contribution of 'non market based' strategies targeting specific demand segments compared to the free market.

2. Literature review

2.1. Destination seasonality and market strategies

Seasonality is one of the most serious problems for the sustainability of tourism in mass tourism destinations (Duro & Turrión-Prats, 2021). According to Gil-Alana et al. (2021) seasonality causes the underutilization of tourist infrastructures in the low season, generating losses of efficiency or difficulties for companies to adapt to changes in tourism demand. This is critical to a destination's performance since seasonality is characterised by periods of over- and under-use of resources, leading to inefficiencies in the organisation and management of tourism businesses and public services, which in turn leads to knock-on effects on employment, residents' quality of life and visitor satisfaction (Turrión-Prats & Duro, 2018). Seasonality can also have positive effects by providing rest periods for the regeneration of natural resources and the

restoration of sociocultural issues (Batista e Silva et al., 2018). However, its negative effects usually outweigh the benefits, a problem that extends to many economic activities (Vergori, 2017). Our purpose here is not to review all the effects, causes and determinants of seasonality, which have been widely documented in the literature reviews on tourism seasonality (see Allcock, 1994; Duro, 2016; Koenig-Lewis & Bischoff, 2005), but to combine different statistical techniques which have been used independently in the past to enhance our understanding of seasonality of demand at the destination level. Research on seasonality of tourist demand continues to develop and recent studies have focused on its causes (Zvaigzne, Litavniece, & Dembovska, 2022), on the determinants (Turrión-Prats and Duro (2019), on measurement issues (Ferrante, Lo Magno, & De Cantis, 2018), on the general effects (Ridderstaat & Croes, 2020), on strategies to combat it (Sainaghi, Mauri, Ivanov, & d'Angella, 2019), on its economic effects (Cuccia & Rizzo, 2011), on the seasonality of hotel prices (Lozano, Rey-Maqueira, & Sastre, 2021), on the relationship between seasonality and tourism demand forecasting (Vergori, 2017) on its impacts on the finances of hotels (Zhang, Xie, & Sikveland, 2020), or on the individual seasonality of hotels (Duro & Turrión-Prats, 2021), among others.

Tourism seasonality is an important issue that tourism managers must take into account when formulating marketing strategies (Koenig-Lewis & Bischoff, 2010). Reducing seasonal imbalances in demand is a priority for destination managers and requires effective marketing strategies and a clear understanding of the behaviour of different segments (Spencer & Holecek, 2007). Marketing strategies should seek to optimise resource efficiencies by balancing out supply and demand, identifying and targeting segments that are appropriate for counteracting seasonality, and considering regional seasonal concentrations. For example, Fernández-Morales et al. (2016) argued that diverse market segments often exhibit different seasonal patterns within a destination, and thus destination marketers can use marketing mix variables to yield better revenues and/or use resources more efficiently, depending on the ways different segments contribute to the destination strategy.

Source markets can show different seasonal patterns, so identifying less seasonal markets allows destination marketers to develop targeting efforts. Turrión-Prats and Duro, for example, suggest that market strategies designed to counteract destination seasonality might be classified into three types (2018). First, product diversification such as hosting existing events and festivals or creating new ones staged in the low season to attract new visitors. A second is defined as market segmentation. This approach recognises that some segments are not dependent on the weather in sun and sand destinations. These groups may require additional products or experiences and may have different values and expectations. A third strategy is based on differential pricing, specifically discounting in the low season. Discounting can have positive effects for some destinations and can be linked with government incentives.

When forming policies and strategies to reduce seasonality at a destination, it is necessary to understand demand in a segmented way to avoid resource inefficiencies and poorly focused marketing strategy (Koenig-Lewis & Bischoff, 2010). Yet, there is remarkably little research linking quantitative analysis of seasonal demand and destination marketing implications, including segmentation strategies. Pike and Page (2014) noted, for example, the lack of research on the performance of destination marketing organizations and their efforts in counteracting seasonality effects in destinations.

In recent years, new approaches have emerged, such as the tourism seasonality index developed by Lo Magno, Ferrante, and De Cantis (2017). Currently there are numerous indices available for measuring tourism seasonality (see Ferrante et al., 2018). However, there are few examples that provide destination managers with specific information on the seasonal behaviours of different demand segments. This is essential to establish specific strategies targeting less seasonal markets. Therefore, the effectiveness of counter-seasonal strategies depends to a

large extent on knowledge of the structure of demand at the destination level, often due to a lack of disaggregated data.

Recently, [Duro and Turrión-Prats \(2022\)](#) evaluated three approaches to decompose the seasonality of tourism demand by markets within a regional context: the method proposed by [Lerman and Yitzhaki \(1985\)](#), the one by [Shorrocks \(1980\)](#) and, for the first time in the field of tourism, the [Shapley value \(1953\)](#). They concluded that results obtained by the three methods were solid and similar although the Lerman and Yitzhaki was more effective, since it permits an estimation of the specific contribution of each demand segment relative to the global seasonality of the destination.

Our approach complements the study of Duro and Turrión Prats by comparing Lerman and Yitzhaki decomposition together with the Podder and Chatterjee approach (2002). This allows us to identify non-seasonal demand segments that could be attractive to target in low season, and can also be used to measure their effectiveness through an analysis of the variation in seasonality produced by different segments over time, including periods of crisis. This is especially useful in enabling an analysis of the contribution of stimulus programmes compared to free market segments.

2.2. The economic role of social tourism

Social tourism is aimed at people who are generally excluded from general tourism for economic reasons, health problems, disability, or other personal circumstances ([McCabe & Qiao, 2020](#)). Spain is a major player in social tourism and an international benchmark in terms of its role in supporting senior social tourism. The Imsero tourism programme subsidises holidays to coastal destinations largely for the elderly due to this group's potential to travel in low season at a lower cost and in the context of structural seasonality present in the Spanish coastal tourism industry. The scheme is credited as a 'win-win-win', since it provides important opportunities for holiday participation

among relatively disadvantaged groups, benefits to hoteliers and other tourism industry sectors from direct spending and economic activity, diluting fixed costs during the low season months, and local and national economies benefit from more sustainable employment, thereby supporting regional growth and saving welfare costs ([Kakoudakis & McCabe, 2018](#)). Additionally, the whole resort economy also benefits directly and indirectly from the presence of more tourists in the low season.

Imsero annual reports since 2001 have stated that Imsero trips contribute to reducing seasonality ([Imsero, 2021](#)). However, no analysis has been done to confirm this. [Cisneros-Martínez, Fernández-Morales and McCabe \(2018\)](#) carried out a quantitative analysis of seasonality in the regions hosting Imsero tourists which confirmed the effects on employment and economic performance; however, the effect size depended on the structure of global demand since a high volume of international tourism in a region significantly affects the potential to reduce seasonality. Among the main results of the analysis carried out by the aforementioned authors is that seasonality has not been resolved in all regions, including the Comunidad Valenciana, in which extremely high seasonality persists and is growing.

2.3. Contextualisation of Benidorm

Benidorm is a major coastal tourism destination located in the region of Comunidad Valenciana ([Fig. 1](#)). The resort has the most hotel beds on the Spanish coast, constituting 40% of total overnight stays in hotel establishments in the Comunidad Valenciana ([INE, 2020a](#)). Benidorm has an area of 38.5 km², with more than 5 km of beaches and is one of the earliest mass tourism destinations developed in Spain. With a population of 68,721 residents in 2019, it has a very high population density (1785 inhabitants per km²) compared to the average density of 94.3 inhabitants/km² in Spain ([de Alicante, 2020](#)).

While sun and sand tourism is the predominant product in Benidorm,

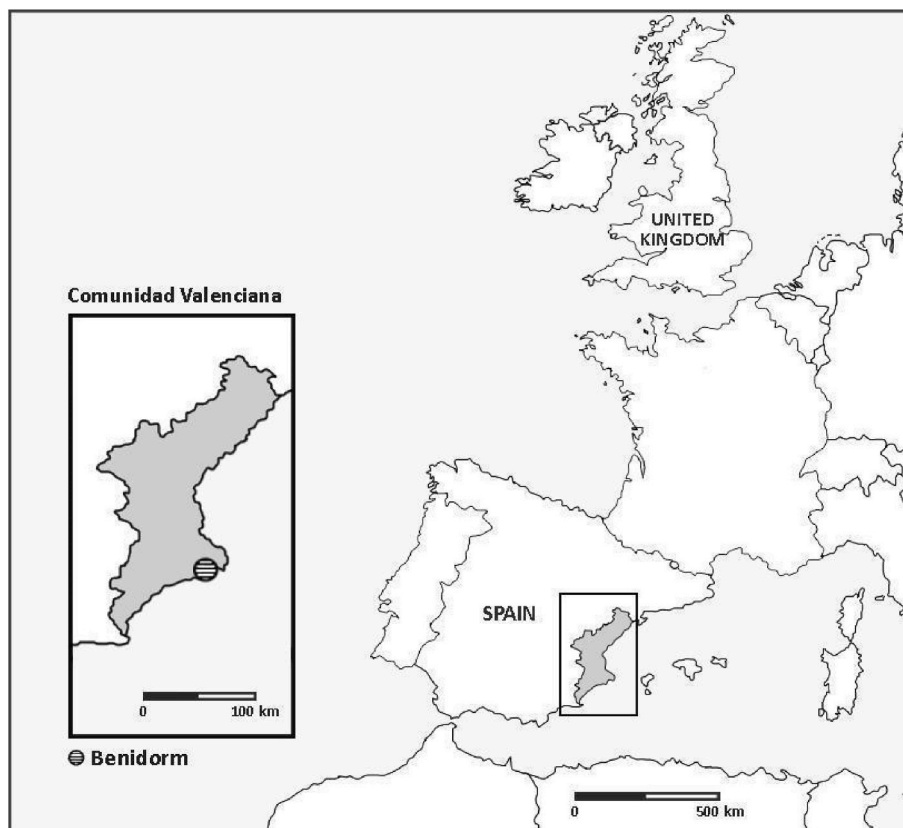


Fig. 1. Geographic location of Benidorm.

in recent years there has been a diversification with other products such as golf, health and beauty, festivals and concerts, nightlife, gastronomy, water sports, and MICE tourism being introduced (VisitBenidorm, 2020).

At present, the demand for Benidorm is practically dominated by Spanish domestic and United Kingdom tourists, with a high proportion of elderly people in both markets. In 2019, 2.15 million travellers stayed in hotels in the destination. Of these, 1.10 million were Spanish residents of which 15.41% were Inmerso tourists. The remaining 1.05 million were overseas tourists, of which 75.3% were UK residents (INE, 2020a; Inmerso, 2021). Ivars i Baidal, Rodríguez Sánchez, and Vera Rebollo (2013) evaluated the development of Benidorm as a tourist destination between 1988 and 2009. The last phase (2007–2009), a period in which the world economy began experiencing significant economic recession due to the Global Financial Crash (GFC), significantly affected tourism demand. This situation was aggravated by Benidorm’s dependence on the UK market, which saw the devaluation of the pound against the euro. The fall in international overnight stays was compensated by domestic demand.

3. Methods

3.1. Methods

A range of methods have been developed to calculate seasonality of tourism demand. These include the Gini index that provides the degree of annual seasonality and its decomposition, developed by Lerman and Yitzhaki (1985), which made it possible to identify the segments that contribute most to reducing destination seasonality by considering their proportion of total demand and has been widely applied in tourism contexts (Duro, 2016; Duro & Turrión-Prats, 2022; Fernández-Morales & Cisneros-Martínez, 2019; Fernández-Morales & Mayorga-Toledano, 2008; Halpern, 2011; Lau & Koo, 2017, 2022; Rosselló & Sansó, 2017; Vergori & Arima, 2022; Šegota and Mihalič, 2018). Although previous studies have identified segments with less seasonal demand, the data used are always aggregated to country, region, province or area level, which can mask the differences in seasonal demand structure at municipality scale. This is especially relevant in coastal destinations since they have their own peculiarities, resources, and sources of competitive advantage; therefore, using more disaggregated data can provide more sophisticated and bespoke results, of which Benidorm is no exception.

Additionally, the decomposition of the Gini index proposed by Podder and Chatterjee (2002) has been used to estimate the causal effects of the variations between different time points to analyse how seasonal behaviour evolved for each demand segment. At a national level, this decomposition was recently applied in tourism by Fernández-Morales (2017) to analyse the contribution of each segment to variations in annual seasonal concentration from a temporal viewpoint by classifying Spanish demand according to tourist origin and trip purpose.

For an analysis of the seasonality of hotel demand in each month of the year, the seasonal component was isolated by calculating the seasonal factors using the multiplicative decomposition that generates values for the geometric mean seasonality unit. The software used was EViews (version 12). The values of these seasonal factors are interpreted as the percentage differences that on average, across the years investigated, are observed in each month with respect to the trend-cycle of the series due to the seasonal effect.

Additionally, the Gini index was used as the only measure of annual concentration. The values of this index range between 0 and 1. Values closer to 1 indicate high seasonality, while values close to 0 determine low seasonality.

$$(1) G = \frac{2}{Y} cov(Y, F) \quad (2) G = \sum_{k=1}^K S_k R_k G_k \quad (3) RME_k = \frac{\partial G / \partial e^k}{G} = S_k \left(\frac{R_k G_k}{G} - 1 \right)$$

- (1) The Gini formula follows that proposed by Lerman and Yitzhaki (1985). This is based on covariance, where \bar{Y} is the arithmetic mean of Y , F is the distribution function of Y , and $cov(Y, F)$ represents the covariance between Y and F . This formula of the Gini index allows one to weight the months of the year, assigning appropriate numbers of days for February and so on.
- (2) The decomposition of the Gini index also developed by Lerman and Yitzhaki (1985) was used to estimate the effect on the total Gini index G of the components of the series. This decomposition provides a measure that indicates the contribution of each demand segment to the variation of the Gini index total. G_k is the annual Gini index of a demand segment k , S_k is the annual participation of k in the annual value of Y (S_k identifies the proportional share of each demand segment to the total demand). R_k is the Gini correlation between Y_k and Y , that is, the covariance (Y^k, F)/covariance (Y^k, F^k) where F and F^k are the distribution functions of Y and Y^k , respectively (R_k determines the degree of correlation of the Gini index for each demand segment with the Gini index of total demand; values closer to 1 indicate greater correlation in the same direction, whereas values closer to -1 indicate greater correlation in the opposite direction). In short, this decomposition allows us to obtain the contribution of each demand segment to the overall seasonal concentration. This contribution is expressed in relative terms such as $k: S_k R_k G_k / G$. The total Gini index may be lower than the Gini index of some segments because it is concentrated in different months compared with the concentration of the other segments. This generates a compensation effect that translates into a reduction in the total seasonality of the destination.
- (3) This decomposition of the Gini index allows us to calculate the Relative Marginal Effects (RME) in which a slight relative increase in a given segment k , equal to e^k distributed equally throughout the year, will increase or reduce the total Gini index, that is, the seasonal concentration. The sum of the RME_k is equal to 0. The RME allows us to identify the extent to which a change in any demand segments will contribute to an increase or decrease in the total seasonality according to its sign. Specifically, an RME is equal to the percentage change in G resulting from a percentage change in the number of overnight stays in a given segment (RME_k indicates the percentage change in the total Gini index when the number of overnight stays in a segment increases by 1%, thus keeping the monthly distribution of all segments constant). Additionally, this decomposition provides the share of inequality indicating the proportional participation of each segment in the total Gini index.

Additionally, we used the decomposition of the Gini index proposed by Podder and Chatterjee (2002) to obtain a thorough analysis of the evolution of the Gini indexes for each demand segment, social tourists and UK international visitors. The difference between a current Gini index ($t = T$) and a reference one ($t = 0$), $\Delta G = G_X(T) - G_X(0)$, is formulated as

$$(4) \Delta G \simeq \sum_{k=1}^K C_k \Delta S_k + \sum_{k=1}^K S_k \Delta C_k$$

- (4) This decomposition indicates the observed variation of the total Gini index obtained through the combination of a share effect ($\Delta S_k * C_k$) and a concentration effect $\Delta C_k * S_k$ between two given years, where C_k is a concentration ratio obtained through the product $G_k * R_k$. The share effect represents the change in the share of a segment $k: \Delta S_k = S_k(T) - S_k(0)$, while the concentration effect indicates the change in the concentration levels of a segment $k: \Delta C_k = C_k(T) - C_k(0)$. To calculate the weights of both effects

we used $C_k = (C_k(0) + C_k(T))/2$ y $S_k = (S_k(0) + S_k(T))/2$, respectively.

3.2. Data

The number of overnight stays in hotel establishments (hotel, aparthotel, motel, hostel, or pension) was used to quantify tourist demand. This is an effective variable since it considers the average stay of each traveller. Specifically, the variables included: the number of overnight stays in hotels in Benidorm provided by the [INE \(2020a\)](#), and the number of overnight stays made by the [Imserso trips in the region of Comunidad Valenciana provided by Imserso \(2020\)](#). It was not possible to obtain social tourist data disaggregated at a local level from Imserso, so we used the number of overnight stays at the regional level to approximate the real activity of Imserso in Benidorm. For this, we took into account the information provided by [HOSBEC \(2022\)](#) on the proportionate numbers of Imserso trips to the region. During the period studied, Benidorm accounted for approximately 80% of Imserso tourism undertaken within the Comunidad Valenciana. To understand the magnitude of this figure, it should be considered that Imserso trips, depending on the year, are mostly concentrated in four or five municipalities in Comunidad Valenciana. In 2019, 78.6% of the 53 hotels receiving trips from Imserso in the region were in Benidorm and 28% in Gandía, Peñíscola and Calpe ([Mundiplan, 2020](#)).

4. Results

4.1. Background to Benidorm's seasonality

To contextualize tourist demand in Benidorm and its evolution in recent years, the annual averages calculated from the monthly data provided by the Hotel Occupancy Survey [[INE, 2020a](#)] are presented in [Fig. 2](#). These variables have remained relatively stable and shows the stability of tourism supply and demand in Benidorm. Benidorm is a destination that has largely overcome seasonality, with an occupancy rate of over 70% throughout the period, an average of 91.3% maximum occupancy (August), and 59.1% at the lowest (January). The average

number of hotels was 121, the lowest being 2007 (117) and highest in 2019 (123). Although we could have used the number of rooms offered, it is more appropriate to use the number of beds since it represents the true occupancy potential. With an average of 37,800 beds, which remained stable until 2014 thereafter showing a slightly increasing trend reaching 40,800 in 2019. The average occupancy rate in the period was 76% and the lowest data was in the 2008–2010 period due to the effects of the global economic recession, which is also reflected in the numbers of employees, which remained below 5000 through 2009–2015 period after which increasing from 2016 reaching up to 5500 in 2019.

Overall, Benidorm accommodated 45.6% of overnight stays by foreign and 33.4% of overnight stays by domestic tourists within the Comunidad Valenciana. Between 2007 and 2019, tourism demand in Benidorm was dominated by domestic and UK tourists, a profile that remained stable throughout the period ([Fig. 3](#)). In 2019, overnight stays by international travellers from other countries (Other countries segment) only represented 12.9% of the total, while the UK segment accounted for 41.6%. In the composition of domestic tourists, the overnight stays made by Imserso trips (Imserso segment) represent 10.3% of the total demand, while other domestic tourists (Others from Spain segment) represent 35.2%.

As the composition of tourist demand has remained relatively stable, the volume of the total demand has also remained consistent, with a growing trend from 2009 to 2017. This occurred despite the negative economic impacts at the national and international level that were felt in the years after the beginning of the GFC ([UNWTO, 2010](#)), which confirms how resilient Benidorm is as a destination. In 2018 and 2019, there was a decrease in total demand. This was caused by uncertainty around Brexit that began in 2017 (8.9% drop in overnight stays by UK tourists). Also, at a national level, the economic cuts made by the Spanish government to the Imserso travel programme caused a drop of 26.4% in 2019 compared to 2015.

4.2. Social tourism in Benidorm

According to data from the Active Population Survey 'Encuesta de

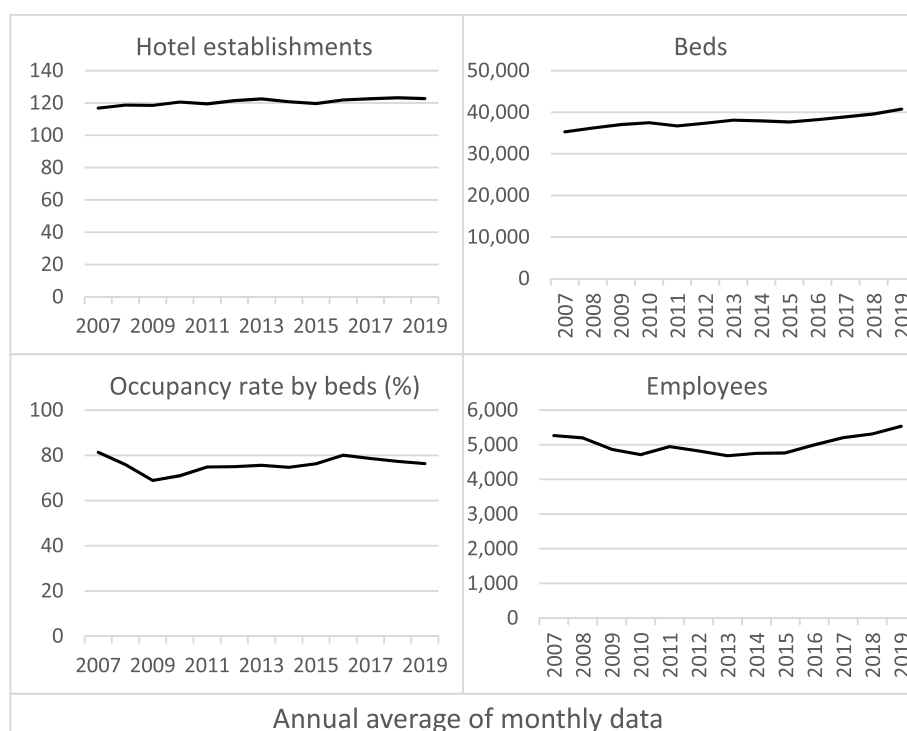


Fig. 2. Annual averages of relevant tourism variables of Benidorm: Hotel establishments; Occupancy rate by beds (%); Beds; and Employees.

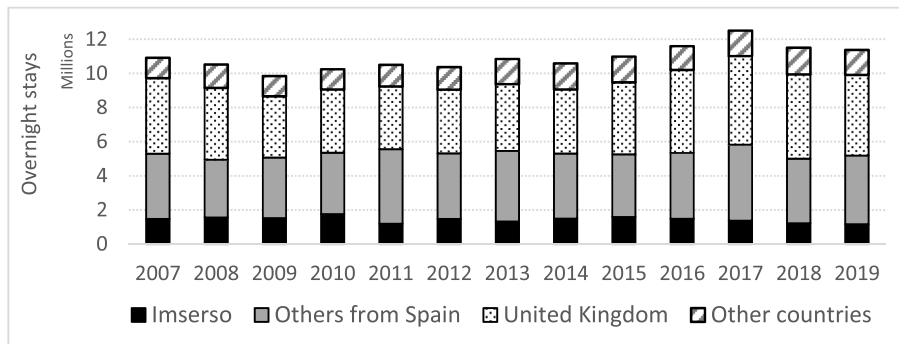


Fig. 3. Overnight stays in hotel establishments (millions).

Población Activa' undertaken by the INE, 72.8% of the 8.3 million active population in the Comunidad Valenciana are employed in the tourism industry (INE, 2020b). Considering that most hotels receiving Imserso trips in the region are in Benidorm, we merged months of the Imserso program (October–May) with both the employment data generated or maintained by the Imserso in hotels of Comunidad Valenciana provided by Imserso (2021) and with the total demand of hotels in Benidorm obtained from INE (2020a). The annual averages of the months of the employment generated in hotel establishments in Benidorm are presented in Fig. 4a. The employment generated by Imserso is highly relevant in Benidorm since it comprises average values close to 50% of total employment, although since the 2016–2017 season it decreased to around 42%. Imserso trips do not only generate employment in hotels (direct employment) but also indirect employment in other related industries. Fig. 4b represents the composition of the total employment generated by Imserso trips in Benidorm (direct and indirect). This composition was obtained by Imserso (2021) at the regional level and the specific data for Benidorm was also calculated considering the percentage of hotels in Benidorm receiving Imserso trips. The exponential effect of Imserso activity on job creation can be verified when looking at the indirect jobs that represent more than 80% across the period. Indirect employment has been affected more than direct employment since it has fallen by a greater extent in the later years, reflecting a greater susceptibility to decreases in Imserso trips in that period.

In 2019 (the last year analysed in this study not affected by the COVID-19 pandemic), 143 hotels offered 44,659 beds in the summer months, the monthly average being 123 and 40,753 beds, 6,538 people were employed in hotels in Benidorm in August and 4075 in January, with a monthly average of 5534 (INE, 2020a). These occupancy and employment data show that this municipality presents a low seasonality

degree compared to other Mediterranean sun-and-sand destinations in which high levels of seasonality generate negative impacts on local economies (Martín-Martín, De Dios-Jiménez, & Molina-Moreno, 2014).

The Imserso trips have a very important position in tourist activity in Benidorm accordingly. Numerous media affirm that thanks to the Imserso trips, Benidorm maintains a high level of hotel occupancy throughout the year (Alicanteplaza, 2020; Preferente, 2020). Although Benidorm has low levels of seasonality according to the data collected by the INE (2020a), no previous research has quantified the effect of Imserso trips to the reduction of seasonality in this destination.

4.3. Seasonal factors

Imserso trips take place in the low season, between October and May (Imserso, 2021). The effects of the Imserso activity are therefore greater than the direct economic benefits in terms of spending on hotel accommodation; by remaining open during the low season months, hotels can capture additional market share from other demand segments. This also contributes indirectly to the entire visitor economy since if hotels remain open and attract tourists, there is a greater propensity for other tourism related services to remain open and operate throughout the year.

Fig. 5 shows hypothetical scenarios if we removed Imserso and UK demand segments to illustrate the importance they hold for reducing total seasonality. The total demand in Benidorm has a moderate seasonality with seasonal factors that do not exceed the value of 1.5, which compares favourably to most Mediterranean countries' sun and sand destinations characterised by a very pronounced high season in the summer (Duro & Turrión-Prats, 2019). In the hypothetical case that there was not a large demand of UK travellers, seasonality would be

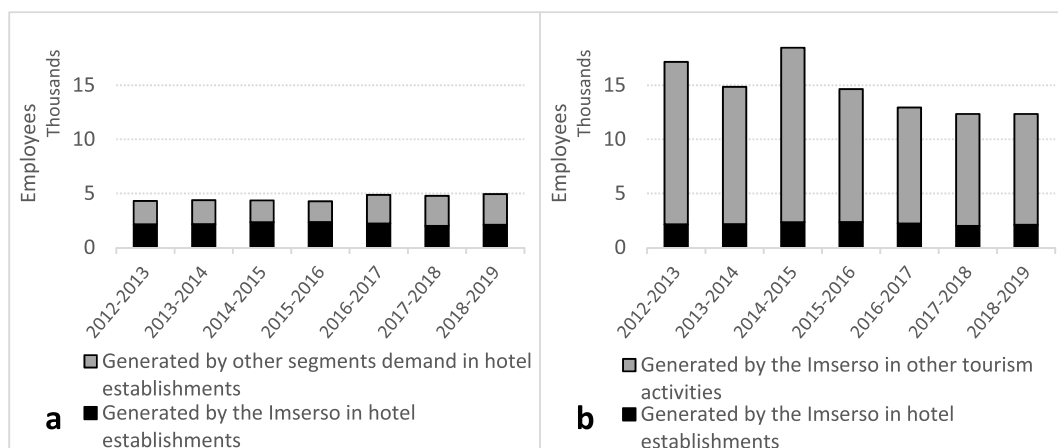


Fig. 4. Employment generated by the Imserso and other segments demand in hotel establishments (Fig. 4a), and employment generated by the Imserso in hotel establishments and in other tourism activities (Fig. 4b).

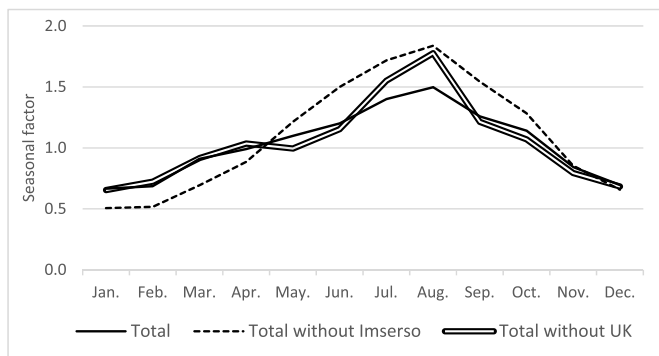


Fig. 5. Seasonal factors of total demand and other possible scenarios.

much greater in the peak summer months (June–August). For this reason, the UK segment is essential in allowing Benidorm to contain these higher seasonality pressures during the summer period. However, Fig. 5 also shows how seasonality would be higher and for much longer (May–November), without the ameliorating effects of the Imserso segment.

All domestic tourists representing the domestic Spanish segments

(Imserso and Others from Spain) cause a very marked peak in demand during the summer months, reaching a seasonal factor of 1.71 in August, which indicates that on average (every August between 2007 and 2019) demand was 71% higher than the trend-cycle (Fig. 6). In contrast, for January (0.66), where demand was 34% lower, a high degree of concentration is noted. Domestic Spanish tourists exhibit a very sharp high season between June and September. In the case of international tourists (All foreign), these segments are less seasonal and show a less pronounced peak between May and October, reaching a maximum in September (1.34). In conclusion, according to the seasonal factors, international tourists behave less seasonally than domestic tourists, as in the case with most Spanish Mediterranean coastal provinces (Duro, 2016).

A further analysis of the demand by the different segments was undertaken to assess their relative seasonal behaviours. The column chart represents the composition of the demand per month calculated through the average of the overnight stays (Fig. 7). This enables an appreciation of the great weight that the Imserso segment has in the low season months, which compensates for the lowest volume of domestic demand in those months. In Benidorm’s high season, between June and September, the Imserso tourists would not have a relevant deseasonalising effect, probably since the increase in the Others from Spain segment fills the proportion of the Imserso demand, which ceases in

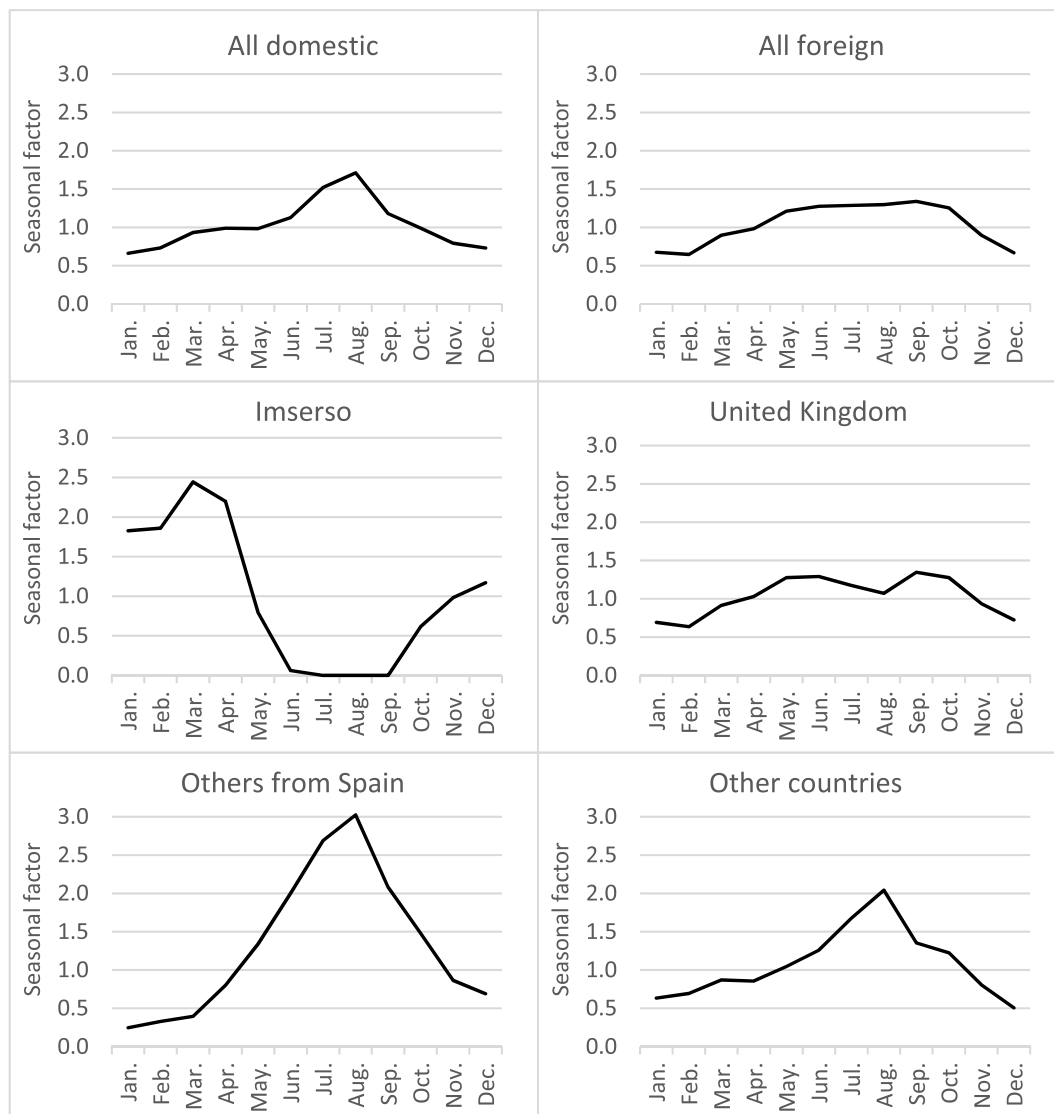


Fig. 6. Overnight stays (%) and seasonal factors of total demand disaggregated by segments.

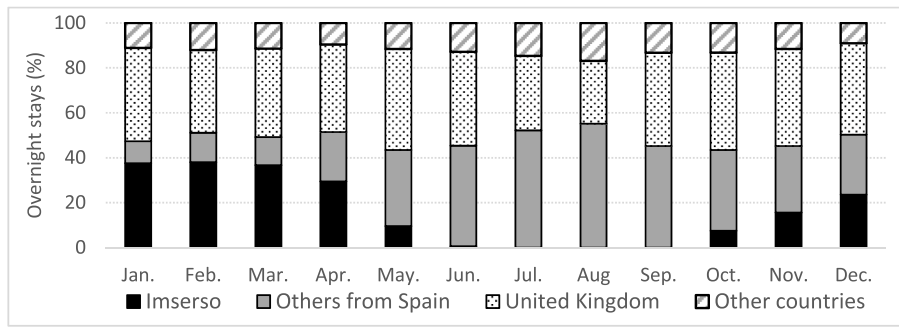


Fig. 7. Composition of the demand per month calculated through the average of the overnight stays for all the years analysed.

those months. This is due to the domestic demand in Spain that in general tends to concentrate in the summer months for institutional, labour, and cultural reasons.

The seasonal factors of the Others from Spain segment (All domestic excluding Imsero) allows us to see how seasonality would increase in the summer months without the existence of Imsero trips, with seasonal factors higher than 2 in the summer months (3 in August). The high seasonal contribution in winter months for the Imsero segment

basically represents the inverse pattern of the other demand segments. This is a manifestation this segment's effect in reducing seasonality in both the domestic and total demand. The UK segment is considerably less seasonal than the other countries segment, with seasonal factors not very high and stable in all months. This, together with the large volume of demand from this segment, means that it considerably reduces the overall seasonality produced by international travellers, as well as the seasonality among the total demand.

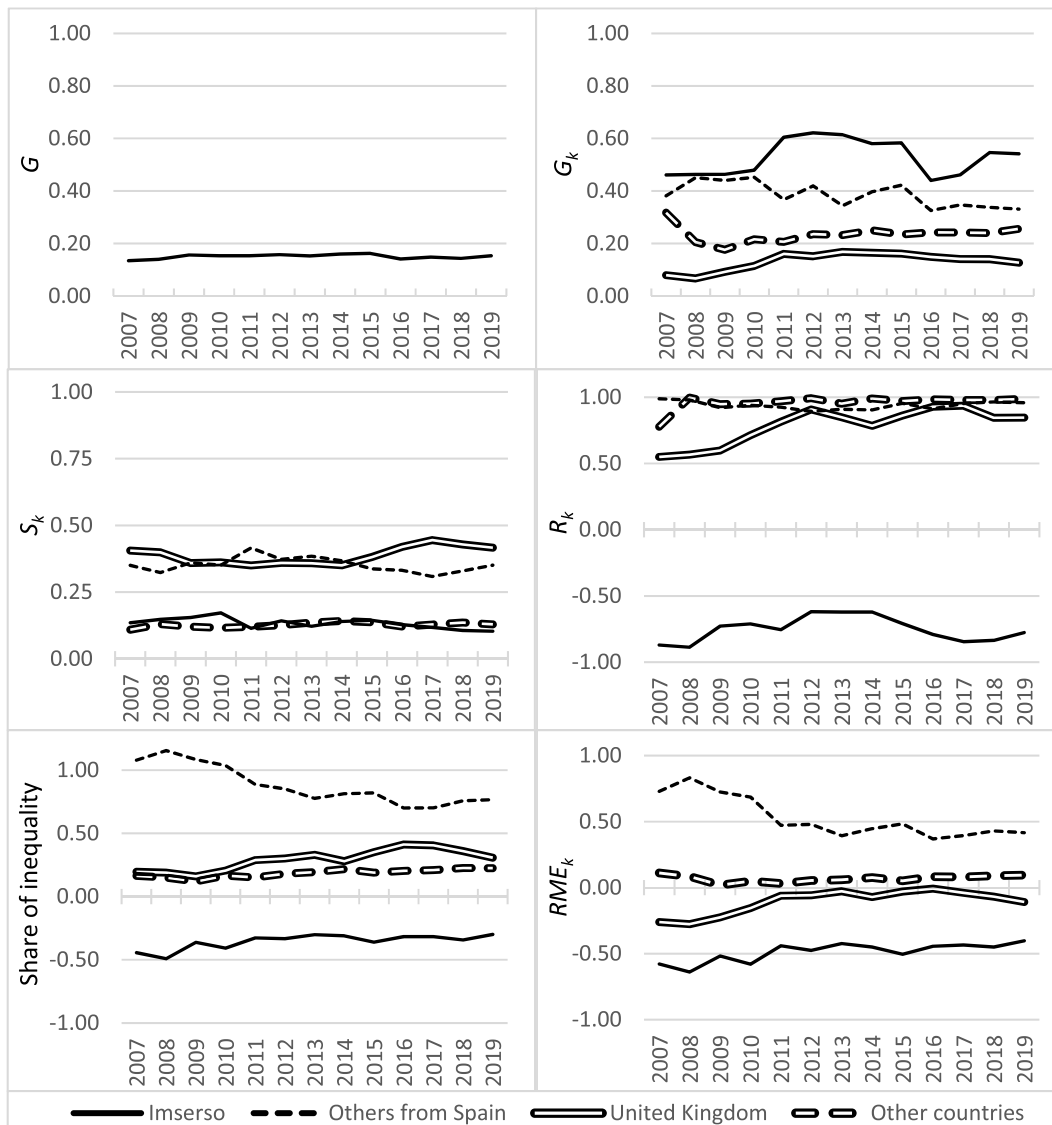


Fig. 8. Components of the Gini index decomposition (the definition of each component is described in the Methods subsection).

4.4. Lerman and Yitzhaki's Gini decomposition

The seasonal concentration measured with the Gini index (G) presents very low levels across the entire period, with values oscillating around 0.15 (Fig. 7). This indicates that seasonality in this destination is quite limited compared to most destinations on the Mediterranean coast, which is to be expected given Benidorm's longstanding reputation as a large-scale destination with a diverse and quality tourist offer. However, it is important to delve deeper and investigate which segments contribute the most to this low level of seasonality, enabling tourism destination managers to target segments more effectively to maintaining efficiency and further reduce seasonality.

By disaggregating the demand into different segments, we note that the Imsero tourists show the highest degree of seasonality, with annual Gini index values (G_k) closest to 1. However, this is in an opposite trend to the rest of the segments, highlighting that it compensates total seasonality in Benidorm. The degree of correlation of the Gini index for the Imsero segment with the Gini index of total demand (R_k) confirms that it is the only market with an opposite direction to the Gini index of total demand, and in a very intense way by showing values close to -1 in contrast to the other segments. This can also be seen through the negative share of inequality of the Imsero segment, which reflects a null share to the Gini index of total demand [Fig. 8 near here].

In addition, the Relative Marginal Effect (RME_k), in which a slight relative increase in a given segment k , equal to e^k distributed equally throughout the year, will increase or reduce the total Gini index also supports the evidence that the Imsero segment is the most favourable for reducing seasonality in Benidorm (throughout the period analysed) with negative values close to -0.5 . The Imsero segment is also shown to have a large deseasonalising effect in the Comunidad Valenciana, showing negative RME_k between the years 2007–2014 (see also Cisneros-Martínez, McCabe, & Fernández-Morales, 2018). However, since 2015 the Imsero segment shows a slight decrease in Benidorm, i.e., a reduction in its capacity to reduce seasonality and with a slight positive trend of RME_k values closer to 0. An RME_k of 0.4 in 2019 indicates that a 1% increase in Imsero overnight stays in the short term would reduce the Gini index of total demand by 0.4%. This may be attributed to reductions in Imsero trips due to cuts in state funding to this scheme; according to the data collected on Imsero (2021), around half the budget assigned was reduced between 2010 and 2011 and 2014/2015 seasons because of the GFC. This had an impact in the financial support offered for each Imsero trip, the subsidy was reduced from 30% to 22% between both seasons (Imsero, 2021).

Furthermore, we need to bear in mind the proportional share of each demand segment to the total demand (S_k) since higher negative RME_k values in a segment with a low participation in the total demand, as is the case of Imsero, multiplies the seasonally adjusted impact. This is because a 1% increase in overnight stays in a segment with a low volume of demand would be easier to attract than a segment with a high volume of demand. For example, the UK segment, a large segment showing negative RME_k would also be a useful segment to target to counteract seasonality effects, but to a lesser extent. In 2019, the UK segment had an RME_k of 0.1, so an increase of 1% of overnight stays in this segment would produce an increase of 0.1% in the total Gini index. Considering the volume of overnight stays in 2019 for the Imsero segment (1.1 million) and the UK segment (4.7 million), the 1% increase in the Imsero segment would be less in overnight stays than in the UK segment. Furthermore, the percentage decrease in the total Gini index would be three times greater for the Imsero segment.

With negative ERM_k throughout the period, the UK segment is also highly efficient for reducing seasonality in Benidorm. With the Gini indices closest to 0, this is the segment that presents the least propensity towards seasonality throughout the period. The highest values were between 2011 and 2014, a period of global economic recession, when demand from this segment reduced, producing lower S_k values, indicating that increases in the composition of total demand by the UK

segment are correlated with decreases to the Gini index. The loss of demand from the UK segment in this period was compensated by the increase in Others from Spain segment given that Spaniards, as many other markets, were more likely to opt for domestic tourism in times of economic crisis. From 2015, an era of global economic recovery, the UK segment began to regain its share of total demand in Benidorm, eclipsing the levels prior to the GFC. However, in 2018 and 2019 there was another decrease, attributable to the impact of Brexit. The Gini index correlation between the UK segment with that of the total demand occurs in the same direction with values of R_k close to 1. However, the UK segment is not the segment showing the most correlation since Others from Spain and Other countries segments show an extremely intense correlation with the Gini index of total demand in all the years analysed.

The Others from Spain segment (domestic Spanish tourists who are not Imsero travellers) shows the highest Gini index values and demonstrates a very high correlation with the values of total demand; therefore, this segment produces the most seasonal concentration in the destination. In addition, this group forms a large share of the total demand similar to the UK segment, except it has a reverse behaviour; in the years that the share of the UK segment increased in proportion of the total demand, the Others from Spain segment decreased and vice versa. Likewise, this segment differs greatly from the others and represents the greatest share of inequality, which is why its participation in the total Gini index is very high. The magnitude of positive RME_k confirms the capacity of this segment to increase seasonality, and although there is a slight downward trend in the RME_k , it still shows high values in the later years. For example, in 2019 the RME_k value is 0.42, which implies that, in the short term, a 1% increase in overnight stays by Others from Spain would mean an increase of 0.42% in the Gini index of total demand.

The Other countries segment also contributes to the increase of seasonality in Benidorm with intermediate Gini index values and positive RME_k . However, the proportion of the total demand is low, so the increases in this segment would not imply considerable increases to the Gini index of the total demand to those from the Others from Spain segment. In addition, the contribution of the Other countries segment to the Gini index of the total demand is the lowest following the Imsero segment.

4.5. Podder and Chatterjee's Gini index decomposition

This decomposition enables us to appreciate the evolution of the effects over time. We applied this technique in two distinct points in time in two separate periods (2007–2015 and 2015–2019) to ascertain the relative contribution each segment offers to Benidorm's resilience in periods of economic recession and growth. We analysed the changes produced in the seasonal concentration for 2015 with respect to 2007, a period of economic contraction following the GFC. Additionally, we compared 2015 with 2019, marked by sustained economic growth before the arrival of COVID-19 pandemic. We chose 2015 as an intermediate year because this is the point at which total tourist demand began to grow after the previous years of economic recession.

The evolution of the Gini indices throughout this period has been stable, with a minimum in 2017 (0.123) and maximum in 2015 (0.166). In the 2007–2015 period, the Gini index showed an increase in seasonal concentration by 0.043. However, with the Podder and Chatterjee decomposition, we can ascertain whether this increase was caused by an increase in the share effect, in the concentration effect, or if it was a combination of both effects (see Table 1). The joint sum of the share effects and the concentration effects is equal to the variation produced in the total Gini index. In this period, the total concentration effect was positive and the total share effect negative, yet we can also analyse how each demand segment contributes to those effects.

The UK segment presents the greatest concentration effect due to increases in the Gini index and a negative share effect produced by decreasing demand from that market. This indicates that the impact the UK market had on the increase in the total Gini index is produced by its

Table 1
Share effect and concentration effects of Gini index decomposition.

	2007–2015 ($\Delta G: 0.043$)		2015–2019 ($\Delta G: 0.020$)	
	Share effect $\Delta S_k C_k$	Concentration effect $\Delta C_k S_k$	Share effect $\Delta S_k C_k$	Concentration effect $\Delta C_k S_k$
Imsero	-0.004	-0.002	0.017	-0.001
Others from Spain	-0.005	0.009	0.005	-0.029
United Kingdom	-0.002	0.043	0.004	-0.018
Other countries	0.007	-0.002	-0.002	0.003
Σ	-0.005	0.048	0.025	-0.045

contribution to the seasonal concentration and not by its volume of demand. On the contrary, the fact that both effects are negative in the Imsero segment indicates that its contribution to the increase in the total Gini index has been in the opposite direction, i.e., seasonality has not increased to a greater extent. This is due to both the decrease in seasonality in this segment and its slight decrease in the total demand. With this decomposition, the Imsero segment’s ability to reduce the total seasonality of the destination is also confirmed, even in periods of recession.

The Others from Spain segment has contributed to increase the Gini index due to its concentration effect, unlike the Other countries segment, which has contributed through its participation effect. Considering that the volume of demand of the Others from Spain segment (one of the major segments in Benidorm), its negative share effect has an even greater impact in containing the increase in seasonality than other minority segments such as Imsero. However, the greater concentration effect of the Others from Spain segment, considered a highly seasonal segment, shows that its increase in the seasonal concentration has indeed contributed to a degree to the total seasonality through this sub period. The Other Countries segment, a minor segment in the total demand, has contributed to seasonality with its share effect, in other words, its concentration effect has contributed to reduce seasonality in the destination.

Analysing a second period between 2015 and 2019 enables us to understand the effects of economic recession and growth, especially since the former led to cutbacks in government support to the Imsero program that limited the numbers of tourists in this segment. In this period, the total Gini index decreased. The segments that contributed the most to this decrease with their concentration effects were Others from Spain and the UK, precisely the largest segments in the composition of Benidorm’s demand. Thus, they are considered the segments that have effectively contributed to reducing seasonality in this period even though the increase in their share effects was limited. The Imsero segment showed the greatest share effect in the opposite direction (a negative variation of the total Gini index). We observe that the Imsero segment contributed to the increase in seasonality with a positive and greater magnitude share effect caused by the segment’s lower proportion of the total demand for 2019 compared to 2015. However, the Imsero segment has maintained its ability to reduce the seasonality of the total demand through its concentration effect. Other countries segment showed a reversal to those of the previous period; its share effect reduced the total seasonality in this period instead of its concentration effect as seen in the previous period.

5. Conclusions, discussion and implications

5.1. Conclusions

This study aimed to examine the relative contributions of different market segments at counter-acting seasonality and to deploy different statistical methods to quantify the contribution effects of different

demand segments at a disaggregated level. We compared the relative effects of a state-funded stimulus programme specifically aimed at addressing low demand in the low season with the contribution of the ‘free market’ demand segments. Highly successful and well-developed destinations such as Benidorm, where seasonality is moderate, point to the success the destination has had in attracting and targeting diverse demand segments with a highly attractive product mix, which in turn has helped alleviate some of the most negative effects of seasonality. However, our study points to where opportunities lie in enhancing the effectiveness of marketing strategies targeting specific segment groups, which contribute disproportionately to current seasonal concentrations. The importance of the social tourism programme in underpinning a destination’s viability in the low season with the spill-over effect of increasing its attractiveness for other markets is an area for further investigation.

The combination of statistical techniques proposed comprises a new methodology that can be used by tourism destination managers or researchers to identify less seasonal demand segments that could help reduce seasonality of demand in destinations. Likewise, those local destinations receiving Imsero trips can use this methodology to quantify the actual counter-seasonalising effect of these travellers, as well as to identify which segments contribute most to the reduction of seasonality, which has not been previously understood due to a lack of available data/methods. At the same time, the Imsero institution could benefit from the use of this methodology incorporating it into its annual reports in which they state that Imsero contributes to reducing seasonality without applying any type of quantitative analysis.

5.2. Discussion

Our study confirms previous findings that found that Benidorm is a highly successful mass tourism destination and that it occupies a prominent position in terms of its attractiveness for both international and domestic tourists (Ivars i Baidal et al., 2013). Regions with high tourist intensity and high seasonality are more vulnerable to any crisis that may affect the tourism sector (Batista e Silva et al., 2018). The longitudinal analysis has shown that while demand was affected by the GFC following 2007, it was relatively small; this relatively stable composition of tourism demand across different segments shows the resilience of a highly developed destination as is the case of Benidorm. However, crises such as the GFC and COVID-19, or external events that create uncertainties in core markets, such as Brexit or the devaluation of Sterling, contribute to demand composition changes, which in turn influences the levels of seasonality since both the shares in the total demand and the capacities to reduce seasonality are affected. This highlights the importance of applying statistical approaches that can contribute to a finer grained analysis of the effects of external factors on seasonal demand patterns among different market segments, to understand which could facilitate effective market strategies that mitigate negative effects (Koenig-Lewis & Bischoff, 2010).

Our focus on Benidorm was due to the large presence of domestic Spanish tourists in the low season resulting from funding received through the Imsero social tourism programme. The programme is primarily aimed at improving the wellbeing of Spanish seniors, yet the economic stimulus the activity injects into coastal visitor economies over the low season has proven an important factor in the continuance of this policy (Eusébio et al., 2016). However, until recently, there has been very little accurate information on the counter-seasonal effects of the Imsero programme in Spain (Cisneros-Martínez et al., 2018; Eusébio et al., 2016). The results confirmed the effects that Imsero activity offers at a destination level where there is a high level of participation. We show how the Imsero segment out of all demand segments contributed the most to counter-balancing seasonal variation. The results endorse the positive economic effects of policies directed towards stimulating low-season demand in highly concentrated seasonal tourism destinations (Kakoudakis & McCabe, 2018).

Imserso activity is targeted directly at low season months of the year, whereas ‘free market’ segments have the propensity to be present throughout the year. The UK was highlighted as the most important international market segment for Benidorm. However, international demand segments, particularly the UK market tends to contribute most to seasonal imbalances, which has also been confirmed in previous studies related to Spain, including the Balearic Islands (e.g. [Rosselló Nadal, Riera Font, & Sansó Rosselló, 2004](#); [Turrión-Prats & Duro, 2018](#)). The huge proportion of UK tourists as a share of the total international demand for Benidorm could indicate a problem of over-dependence in terms of seasonality reduction. However, our findings show this is not the case as this segment contributes significantly to counter-balancing seasonal concentrations. What the analysis does not capture, but what can be readily inferred, is the interaction effects between the stimulus and international market demand segments. We know that social tourism helps to keep resorts open and vibrant during low season months, providing opportunities for retail, hospitality, events, and attractions ([McCabe & Qiao, 2020](#)). Therefore, a thriving and diverse offer throughout the low seasons could be one factor contributing to the relatively high level of demand from the UK international market and the availability of supply of local tourism businesses that is not dependent on sun and sand ([Perles-Ribes, Rodríguez-Sánchez, & Ramón-Rodríguez, 2017](#)). We can interpret it as being sustained by the presence of a large contingent of Imserso travellers.

However, this seems to have fewer positive effects on the other segments. Benidorm’s success might also be attributed partly to the relatively high level of ‘free market’ domestic tourists as Others from Spain segment (cf. [Gil-Alana et al., 2021](#)). Yet, this group had the highest contribution to seasonal concentrations in Benidorm. This analysis might offer some potential to the Destination Marketing Organisation in terms of creating market development strategies that could be applied, such as attracting higher value domestic tourist segments or product diversification, which have been shown to be useful in counter-balancing seasonality in other contexts ([Koenig-Lewis & Bischoff, 2010](#); [Turrión-Prats & Duro, 2018](#), p. 2019). As to the Other countries international segment, which has a less-pronounced seasonal effect, a further disaggregation could be carried out in order to identify some nationalities that could independently have an effect in the reduction of seasonality.

The Gini index is a measure of annual seasonal concentration, which can be decomposed and differentiated by markets or segments, making it especially suitable for the kind of detailed analysis of the role that each market or segment has in the annual seasonal distribution. Other available decompositions by sources of concentration indices, including the Theil index and the Coefficient of Variation decompositions could have been selected ([Duro, 2016](#)). The Gini index has a relative disadvantage to these other approaches since it is not additive, thus, to investigate the RME of different markets, the Gini decomposition offered by [Lerman and Yitzhaki \(1985\)](#) provides a solution. This decomposition is the most commonly used to analyse tourism seasonality, which facilitates comparisons with previous studies. The decompositions of the Gini index used in this study have previously been applied independently in the field of tourism at a regional level. As far as we know, it is the first time in the literature that the joint use of both decompositions has been performed in a tourism context and at municipality level and through periods of market turmoil and growth to assess the relative effects on different segments in terms of seasonality. Each region is made up of several local destinations with different demand segments and seasonal patterns. Using this methodology at a local level is especially useful to analyse the specific composition of the demand in a more disaggregated way that is relevant to the specificities of destination.

5.3. Theoretical implications

The study contributes to research on seasonality through the application of different approaches that enable a disaggregation of tourism

demand into four different segments and their trends over time, which is unique at the destination level since most previous studies on seasonal demand patterns and/or their explanatory factors have been carried out at the region or aggregate level (cf. [Duro, 2016](#)). We provided a more granular analysis of the relative effects of different market segments in assessing their potential to help smooth the distribution of demand. Our analysis also confirms the importance of understanding and accounting for the share of the total demand taken by different segments and the relative effects of each to counteracting seasonality. This extends recent research which has compared the effectiveness of different decomposition methods ([Duro & Turrión-Prats, 2022](#)) to show how combinations of approaches can be used to hypothesise the relative contributions of different segments to combatting seasonality.

By applying different decompositions of the Gini index, including the Podder and Chatterjee approach (2002), we were able to assess not only the components of demand over different periods of time but also to attempt to explain whether the seasonal variations were due to increases in the share or concentration level of each demand segment, responding to recent calls for finer grained analysis of the ways different segments influence seasonal concentrations of demand ([Fernández-Morales, 2017](#)). Our analysis of different hypothetical scenarios relating to decreases in the Imserso or the UK demand, using two different decompositions, enabled us to compare the capacity each segment offered for reducing concentration of the demand. This enables a better understanding of the effects of different external events on different segments of demand, such as cuts to the Imserso programme or the effects of the GFC. In turn this enables us establish the resilience that different segments provide through the course of such externalities and provides a useful approach for further studies.

5.4. Practical implications

Benidorm was one of the destinations worst affected by the pandemic. The amount invested by the Spanish Government in supporting the Imserso trips is fully recovered through taxes generated during low season and savings in unemployment benefits for workers whose jobs are maintained ([Cisneros-Martínez & Fernández-Morales, 2020](#)). Nevertheless, there are serious challenges emerging between the hotel sector in Benidorm and Imserso regarding the sufficiency of the economic value created. Present conditions of high inflation triggered by Russia’s war in Ukraine, hotel establishments receive only 22 euros per person per night on a full board basis, of which 20.7% of is the amount the Imserso contributes and the rest paid by the tourists. Hoteliers argue that Imserso tourists generate losses, and they are demanding an increase of between 27 and 30 euros simply to cover costs. This is likely to put severe strain on the system and jeopardise participation in the programme in future seasons (HOSBEC, 2022). The disappearance or reduction of Imserso trips to Benidorm would yield massive impacts for the destination due to the possible linkages between the year-round availability of services and amenities, as previously noted. This study provides a more detailed understanding of these linkages, which could help inform the current debates around Imserso policy and funding levels.

The findings support the general argument that Imserso activity contributes to reducing seasonality in Spain, which until now lacked detailed scrutiny. The availability of data at the local as well as regional level is essential in this respect. In Spain, the INE collects monthly data on overnight stays and on travellers staying in hotels for *puntos turísticos*, including Benidorm (municipalities where the concentration of tourism is significant) and *zonas turísticas* (set of municipalities where tourism industry activity is concentrated) for all Spanish regions and provinces ([INE, 2020a](#)). Currently, the Imserso reports only provide monthly data on travellers and overnight stays at the regional level ([Imserso, 2020](#)), but this does not provide details on the magnitude of Imserso trips at the local level. Therefore, we estimated the information with the data provided by hoteliers or hotel associations such as HOSBEC, who provided

an estimate of the proportion of overnight stays of Imsero travellers in Benidorm and was used to carry out this study (HOSBEC, 2022). However, this involved laborious and detailed data collection, which is not readily available and requires resources.

5.5. Limitations and future research

The lack of available data in other countries or with different types of stimulus programmes are a crucial limitation to replicate this research. The methodology used here can provide very detailed analysis to inform strategy at the destination level, yet few countries or regions collect data with which to perform further studies. To analyse other local destinations, the major demand segments should be identified in order to quantify the effects they have on the seasonal variations of the total demand. However, a critical limitation of the study is that it cannot fully explain the effects of a total cessation or dramatic reduction of the demand in one or more of the segments, as was the case during the COVID-19. We did not include the pandemic years of 2020 and 2021 because of the effects on international demand and the suspension of Imsero trips, which were not reactivated until the beginning of 2022 (Imsero, 2021).

Further research on any direct or indirect spill overs would help underscore the important role that social tourism plays in tourist destinations beyond maintaining employment and economic activity in low season and could help inform market strategy. All tourism and visitor economy stakeholders benefit from maintaining or increasing non-seasonal demand segments; however, we needed more detailed research on the implications of capacity of destinations to recover since the low season can offer a period of recovery and recuperation for the workforce and destination infrastructure.

Funding

This work was supported by the British Academy [SRG18R1\180504].

Author statement

José David Cisneros-Martínez: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Resources; Validation; Writing - original draft; Writing - review & editing. Scott McCabe: Conceptualization; Funding acquisition; Investigation; Project administration; Investigation; Supervision; Writing - original draft; Writing - review & editing. Antonio Fernández-Morales: Conceptualization; Formal analysis; Investigation; Methodology; Investigation; Supervision; Writing - original draft; Writing - review & editing.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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