

Seasonal Concentration of Hotel Demand in Morocco: A Breakdown by Nationalities.

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Conflict of interest: The author reports no conflict of interest.

To quote this article: LOUTFI .S & BAKHAT .M (2026) « Seasonal Concentration of Hotel Demand in Morocco: A Breakdown by Nationalities»,

IJAME : Volume 02, N° 20 | Pp: 111 – 130.



DOI : 10.5281/zenodo.20289707
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Abstract

Morocco has emerged as a leading tourist destination in Africa, due to the diversity of its landscapes, its rich cultural heritage, and its appeal to tourists, particularly for its large cities and seaside resorts but despite its strategic position, the country's tourism sector remains characterized by a high concentration of demand during certain periods of the year. This study aims to examine the seasonal concentration of hotel demand in Morocco, using monthly data on tourist arrivals and overnight stays from 2000 to 2019, by applying a decomposition of the Gini index by source market to identify each market's contribution and its marginal effect on overall seasonal concentration. The study's results reveal a strong seasonal concentration in the domestic market, particularly during the summer months, while for the international market, certain segments accentuate seasonality, whereas others help mitigate it. These findings allow for the formulation of tailored recommendations for each segment to ensure a well-balanced tourism policy. This article stands out for its dual spatial and segmented approach, which distinguishes between domestic and international demand patterns and provides a detailed analysis of seasonal imbalances, while adopting a tourism management approach focused on leveraging the off-season and diversifying markets.

Keywords: Seasonality, Gini index, Morocco, Seasonal concentration, Tourism

1. INTRODUCTION

Tourism represents a fundamental economic sector on a global scale, playing a crucial role in job creation and wealth generation, as it can mobilize a wide range of economic activities, including commerce, catering, accommodation, transportation, and other services. As an engine of growth and economic prosperity, the sector also acts as an attractive lever for territorial investment.

On a macroeconomic level, tourism makes a significant contribution to the gross national product (GDP) of many countries, especially those with limited industrial or natural resources. On a social level, the sector represents a major source of job creation, generating diverse opportunities for both skilled and unskilled workers. It also constitutes a key lever in tackling unemployment, particularly in rural or remote areas, which distinguishes it as one of the few viable sectors in these regions.

Nevertheless, the economic importance of tourism requires a thorough understanding of the various factors that govern the sector, including seasonality, which profoundly affects the functioning of several tourist destinations, including Morocco.

According to Chang et al. (2019) Seasonality is a widespread phenomenon in different sectors. Whether in agriculture industry or the service sector, seasonality can be the result of several factors such as production characteristics, consumer behavior natural factors and policies.

In the tourism industry, the seasonal concentration is linked to the concentration of tourist flows at specific times of the year, leading to fluctuations in the levels of activity and use of resources. These fluctuations in demand create several challenges for tourism market operators. During the high season, service providers and hotels must manage the massive influx of visitors, which can put excessive pressure on human resources and infrastructure, leading to seasonal recruitment. Conversely, during the low season, these players are faced with a decline in activity, which has a negative impact on profitability due to low occupancy rates and partial mobilization of staff, causing an imbalance in the overall economic situation. This phenomenon can vary from region to region, as some areas may experience high levels of seasonality while others may experience lower levels.

Building on BarOn's (1975) research, Butler (1994) established a definition of seasonality as « a 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 tourism sector represents a major pillar in Morocco's growth strategy, moreover, it contributes approximately 7% to Morocco's GDP and stands out as a high potential sector, generating foreign exchange and contributing to job creation. This major development is the result of a combination of strong performance, well-targeted investment, and government strategies aimed at revitalizing the sector to compete with major tourist destinations.

As reported by the Moroccan Ministry of Tourism, the country saw a record-breaking 14.5 million tourists in 2023, representing a 34% increase from the previous year 2022 and +12% compared to 2019, which underscores the country's enduring appeal as a leading tourist destination in Africa. However, like many tourist destinations, Morocco faces a marked phenomenon of seasonal concentration characterized by high and low seasons related to climate and events. Professionals have recognized that these periods represent opportunities to vary the activities offered to their clients, which makes seasonal concentration a recurrent theme of research in management science guided by the preoccupations of managers in the tourist industry.

The seasonality of tourism demand can be measured using parameters such as the Gini coefficient, which assesses the distribution and concentration of tourist arrivals over different periods. A comprehensive understanding of tourism seasonality is crucial for formulating effective strategies to manage fluctuations in demand, improve resource allocation and promote the overall progress of tourism. In addition, tourism seasonality plays a vital role in influencing employment within the industry, particularly in destinations where tourism activities are relatively seasonal.

Although seasonality has been the subject of several studies in other destinations, this situation underscores the increased need for in-depth analysis to better understand this phenomenon on a national scale, the empirical literature on the subject is rather limited. A few recent studies have begun to address this issue from different angles: Taouil et al. (2025) analyzed the development of tourism in Morocco in relation to seasonality and regional inequalities, while Elaanzouli et al. (2024) examined the spatial implications of seasonal tourism on the southern coast of Tetouan, El Azyzy (2025) focused on the current dynamics of the Moroccan hotel sector in the face of challenges and issues, as did the study by Kouraich and Sair (2023), which focused on the management of seasonality in Agadir. However, these studies remain specific to certain geographic areas and do not provide a deeper analysis of the subject. These studies are descriptive in nature and do not rely on empirical tools or methods that allow for disaggregation by nationality, which should be prioritized during the high or low season

This confirms the relevance of this research, which aims to shed light on the subject. The objective of this study is to analyze the seasonal concentration of tourism demand in Morocco, more precisely hotel demand, and decompose it by nationalities by using Gini index decomposition method of (Lerman & Yitzhaki, 1985) to better understand the factors driving fluctuations in tourism demand over time. This approach allows us to identify each market's contribution to the overall demand to develop well-tailored strategies that can mitigate seasonality. The structure of this article is as follows: A literature review that highlights the causes of seasonality and its negative effects on the tourism sector, thus establishing an essential framework for understanding the challenges associated with this problem. The next section details the methodology used and the data exploited to elaborate an analysis, whose results are discussed in the results and discussion section. And finally, the article concludes with recommendations for mitigating tourism seasonality in Morocco.

2. Literature review

Seasonality in tourism represents the fluctuations in tourist arrivals throughout the year. As mentioned by Rosselló and Sansó (2017), it refers to the predictable fluctuations in tourist activity that impact different destinations. During peak periods, such as the summer, resorts become fully booked, with very high occupancy rates due to the large number of visitor arrivals. In contrast, these indicators fall during off-peak periods, particularly in winter. In simpler terms, destinations are busier at some time(s) of the year than others. While most destinations have one peak season and one off-season (Butler and Kingdom, 2010)

2.1.Causes of seasonality

To better understand the phenomenon of seasonality, one must first understand its underlying causes. Based on Moore (1989) research, Duro and Turrión-Prats (2022) established that « Seasonality is understood as movements in a time series during a particular time of year that recur similarly each year. » In many works, such as Cannas (2012), Duro and Turrión-Prats (2022), Ferrante et al. (2018) and Fernández-Morales et al. (2016) the leading causes of seasonality are divided into two categories: natural factors that are linked to regular temporal fluctuations in the natural environment, associated with meteorological and climatic conditions throughout the seasons during the annual cycle, and institutional factors that are associated with policies or human activities, that can lead to seasonal fluctuations, which generally include festivals, school calendars, work schedules, and public holidays. These factors are believed to lead to the formation of seasonal characteristics specific to each destination.

2.2.The negative effect of seasonality

The effects of seasonality can be categorized as, social, economic, cultural, and ecological, highlighting the significant impact it has on the various components of the tourism industry. Seasonality can also generate other negative effects, such as possible environmental damage and saturation problems during the high season, which can lead to difficulties in supplying essential goods. Add to these adverse effects on unemployment, short-term temporary migration seasonality can also have negative consequences on the quality of services.

Pechlaner and Smeral (2014) added that the concentration of tourism demand during the seasons can also lead to high tourist pressure combined with congestion and erosion problems which can have a significant impact on the local environment. This seasonal dynamic represents a critical issue for the tourism sector, which is often pointed at for the difficulties it creates or exacerbates. Seasonality can also have a negative impact on costs as revenues generated in the high season need to cover or offset fixed costs. Overall, seasonality contributes to economic instability and social problems, so destinations must double their efforts to minimise this negative impact to maintain a sustainable industry.

Seasonality has significant implications for employment and capital investment, both the private and public sectors have made considerable efforts to reduce it in destination regions (Nadal et al., 2004) In parallel, Baum and Lundtorp (2001) highlight « that both the public and private sector in tourism invest significantly in seeking to overcome the perceived problems which seasonality in tourism presents. »

To cope with seasonality and limit its adverse effects, a series of measures can be implemented, as proposed by R.W. Butler (2001), Karamustafa and Ulama (2010), these include diversifying attractions and target markets and introducing temporary tariff and tax incentives. The promotion of domestic tourism during low-season periods also provides additional leverage.

To effectively highlight these measures, knowing how seasonality is calculated is essential. A panoply of statistical methods analyses data on visitor numbers over a given period. In general Seasonality is evaluated in terms of visitor numbers. However, other indicators can also be used, such as the number of arrivals or departures, the number of overnight stays, the length of stays or tourist expenditure. These data will then be measured on a daily, weekly, monthly, or quarterly basis.

3. Material and methods

Hotel demand is measured by the number of nights spent in hotels. These data come mainly from monthly series obtained by the Moroccan Tourism Observatory, which collects statistical data on the number of hotel tourists and overnight stays. The data obtained are divided between national and international tourists from various countries from 2000-2020. The year 2020 was excluded from the study due to the impact of the COVID-19 pandemic, which caused a drastic drop in the global tourism sector. Introducing this into our analysis could bias the results obtained.

For statistical reasons, we have based our analysis uniquely on hotel demand, as at present, there are currently no statistical sources for studying the seasonality of tourist demand for types of accommodation other than hotels, tourist apartments and campsites, such as second homes for tourism purposes or residences for friends or relatives.

We can notice that there are different methods to calculate and measure seasonality, « the most common approach for measuring seasonality in tourism consists of estimating seasonal factors in time series, using proportional deviates to moving averages, or through dummy variables in multiple linear regression» (Fernández-Morales, 2003).

As mentioned by Cowell (1995) the most used indicator of seasonality, measured in terms of the concentration of activity over time, is the Gini index. The value of this index lies between 0 and 1. High inequality corresponds to a value close to 1, while the absence of inequality corresponds to a value close to 0.

There are various formulas for calculating the Gini index; In this study, we will use the method of (Lerman & Yitzhaki, 1985) The Gini index for a variable Y is calculated as follows:

$$G = \frac{2}{\bar{Y}} cov(Y, F) \quad (1)$$

G is the Gini index, which measures inequality or concentration in the distribution of the variable Y. $\bar{Y}$ represents the mean of the variable Y and $cov(Y, F)$ designates the covariance between Y and the distribution function F of the variable Y. This covariance illustrates the relationship between the real values of variable Y and their distribution, giving a level of concentration or inequality in the data set.

We must have a mathematical decomposition of this index to measure the impact on the Gini index of series variable. There are various ways of proceeding, but in this study, we will use the method proposed by (Lerman and Yitzhaki, 1985), we can measure the contribution of each

variable to total concentration and estimate the marginal effect of market share. The time series is decomposed into k source components $Y = Y^1 + Y^2 + Y^3 \dots Y^k$ (for example, $k=2$; $Y^1 = \text{national demand}$ and $Y^2 = \text{international demand}$).

Decomposition is valuable for determining which markets contribute most to total seasonal concentration. The decomposition method used in this paper was elaborated by (Lerman & Yitzhaki, 1985) and is characterized by the following formula:

$$G = \sum_{k=1}^K S_k * R_k * G_k \quad (2)$$

Where G_k represents the global annual Gini index, S_k represents the global market share, k refers to the variable attributed to this component; and finally, R_k which represents the Gini correlation. These variables are essential for evaluating demand by nationality, and they allow us to understand how the distribution of demand for a specific nationality is related to the global distribution of demand on the market. The equation mentioned above shows how the contribution to overall concentration, named C_k , can be calculated using these three factors

G_k, S_k, R_k .

$$C_k = S_k * R_k * G_k \quad (3)$$

If S_k has a larger share of the total, which means that its contribution to the G ratio will also be more significant, in other words, the components with a high S_k have a significant impact on the overall concentration.

The same applies to G_k , and R_k for each component plays an imperative role in understanding the distribution and concentration of the variables under consideration. Although measuring the Gini index of each nationality is not sufficient to assess the overall seasonal concentration of the destination, it is possible that the peak demand of a market with a high concentration does not coincide with the peak months of other markets, which means that the relative share influences the impact of the seasonality of a market on seasonal concentration in hotel demand of the destination.

Each component k contributes to the global concentration ratio, G , according to the following equation: $k: S_k R_k G_k / G$. This formula shows the proportion of inequality attributed to the component k in relation to the overall concentration ratio G . This decomposition method allows us to divide the total concentration ratio G into the contributions of the individual components, thus generating information about the relative impact of the components on concentration. This

decomposition technique is used to estimate marginal effects. A small proportional increase e^k spread equally over the year, in the k component will lead to an equivalent variation in the total value G , calculated as follows:

$$RME_k = \frac{\frac{\partial G}{\partial e^k}}{G} = S_k \left(\frac{R_k G_k}{G} - 1 \right) \quad (4)$$

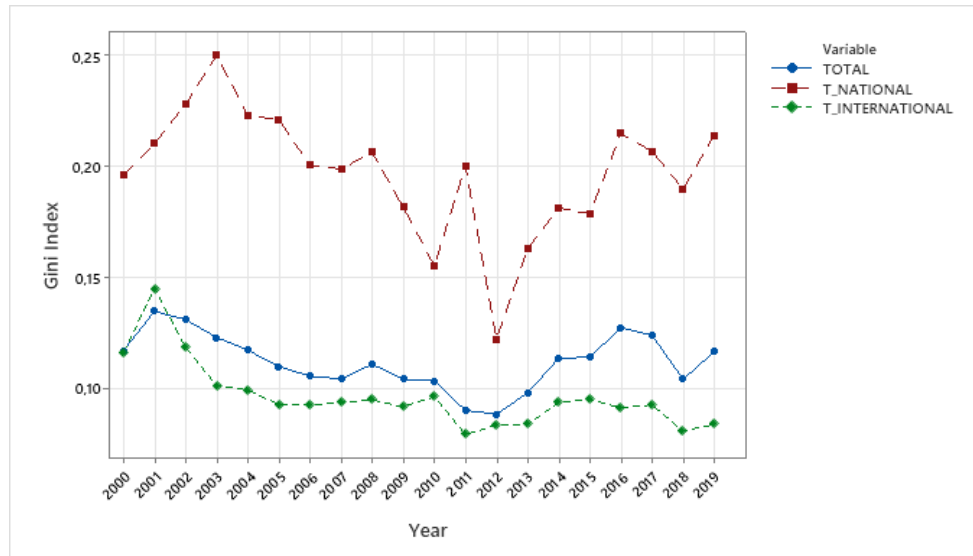
Estimating how proportional changes in component k affect marginal outcomes is essential for planning and marketing within counter-seasonal policy development. As discussed earlier, the annual contribution of a market segment depends on three key factors: G_k , S_k , and R_k . Among these, S_k is the easiest to adjust, as G_k and R_k are more structurally entrenched, whereas S_k can be influenced by targeted marketing campaigns.

4. Results and discussion

The evolution of the yearly Gini indexes of hotel demand and its breakdown between national and international demand from 2000 to 2019¹ is presented in Figure 1. The total level of seasonal concentration represented by the blue curve fluctuates between 0.11-0.14 throughout the period under study, indicating moderate and relatively stable seasonality in overall tourism accommodations in Morocco. Between 2000 and 2004, the index was above 0.11. Then, between 2005 and 2013, it fell slightly below this figure between 2005 and 2013, reaching a minimum of 0.08, before rising again between 2014 and 2019. The national Gini index shows significant peaks and troughs. The peak in 2003, followed by a sharp decline till 2012, could indicate temporary policies or economic conditions that initially exacerbated inequality but later addressed or mitigated these disparities. Consequently, although seasonality is a significant concern among academics, the public, and private entities, there has been minimal success in mitigating its effects.

¹ There is a slight drop in 2018

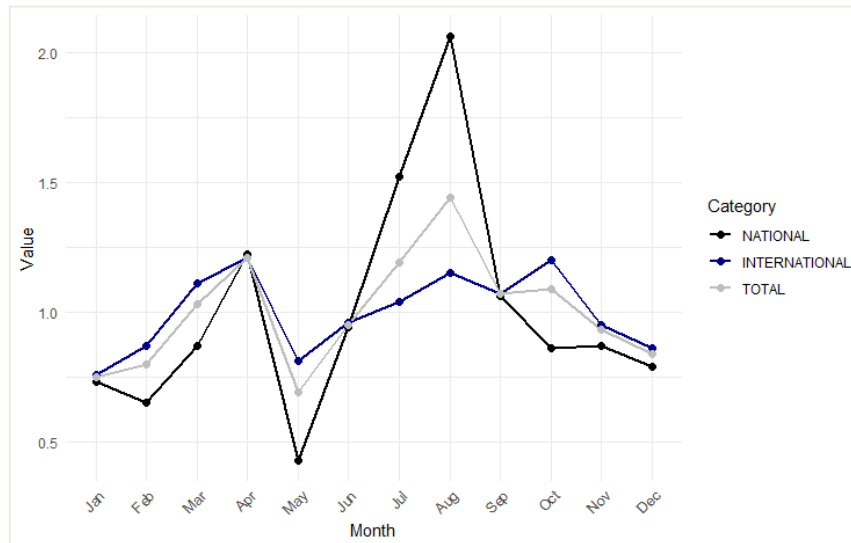
Fig.1. Yearly Gini indexes of hotel nights by nationality in Morocco (2000-2019)



Source: Derived by present authors

As explained in the previous section, the decomposition of the Gini index can be an effective method for understanding how different markets contribute to seasonal concentration and for developing targeted counter-seasonal policies. This decomposition can be performed on various levels of the variable. Our study focuses on the nationality of tourists who spend a minimum of one night in a hotel, classifying them into two categories: national and international. This categorization was chosen because: domestic and international markets are distinctly different and present different seasonality patterns, plus, no monthly data are available to enable a more detailed breakdown into specific markets., such as cultural and historical tourism or MICE, which are emerging segments in Morocco that may help us to get more insights and therefore reduce seasonality.

Fig,2, Seasonal factors of hotel nights by nationality in Morocco



Source: Derived by present authors

Figure 2 shows a significant peak in the high season from July to August, driven by the summer season, and another peak from March to April, linked to school holidays. This is followed by a decline starting in November, explained by the winter season, and continuing through February. International tourists are the main visitors to Morocco. They represent 60% of total tourist arrivals. Most of them stay in tourist accommodation establishments (24% in 2019). They also typically account for approximately 70 % of hotel nights² (69% in 2019) due to their longer average stay of 4.22 nights compared to national tourists. Travel receipts from international tourism increased to 8.2 billion dollars in 2019, 5.3% higher than in 2018. Fig.2 illustrates the seasonal distribution of overnight hotel stays by international tourists, which presents the estimated seasonal factors. The high season, characterized by factors above 1, runs from March to October, with the peak occurring in the summer months (July to September).

On the other hand, the domestic market represents 30% of hotel night. According to the OECD, in 2019, there were 3.5 million domestic overnight visitors (tourists) in classified accommodation establishments, with an estimated expenditure of 5 billion dollars. We can observe that the seasonal distribution for the domestic market is more concentrated in summer than the one of the international markets, which explains the 4% increase in the volume of overnight stays in classified tourist accommodation establishments for domestic tourists in 2019, contributing to an overall increase in overnight stays of 9.49% compared with 2018.

² The average of the last 10 years

The recent trends in the seasonal concentration of hotel nights in Morocco from 2000 to 2019, along with their breakdown by national and international markets, are detailed in Table 1. Before 2016, the international market largely drove the seasonal concentration in hotel demand, with its contribution (C_i) exceeding 55%. The national market's contribution (C_n) rose from 2010 to 2016, reaching 54%, but experienced a slight decline between 2017 and 2018, arriving at 53% in 2019. Furthermore, it is crucial to better understand the decomposition because the share of inequality stems from the combination of three components. Throughout the period under review, seasonal concentration was much more pronounced on the domestic market, with Gini indexes (G_n) higher than those of the international market (G_i). Thus, the international market contributes mainly to inequality through another component: the share of hotel demand (S_i), which is showing a clear negative trend. Indeed, in 2019, 69% of all overnight stays by international tourists were recorded in Morocco, a figure that has always been higher than 66% over the entire period observed. The third component of the Gini index, R , has a negligible effect on the decomposition due to its convergence to similar values during the last 10 years. Our prior analysis indicates that the international market contributes most to the seasonal concentration of hotel demand in Morocco. This situation is mainly explained by the higher total share/size of the international market, and not by its seasonal profile, which is less concentrated than that of the domestic market. Despite differing trends in seasonal concentration—within seasonal concentration - with the local market showing a slight stabilization of its concentration indicators, while the global market presents a more homogeneous picture (see figure 1) - the domestic segment continues to demonstrate a higher seasonal concentration than the international segment.

Table1. Decomposition of the seasonal concentration of overnight stay in Morocco (2000-2019)

	Gini Index			Market Share		Gini Correlation		Contribution to Total		Relative Marginal Effect	
Year	Gini index global	Gn	Gi	Sn	Si	Rn	Ri	Cn	Ci	RME _n (%)	RME _i (%)
2000	0,117	0,196	0,116	0,158	0,842	0,566	0,958	0,158	0,842	-0,8%	-4,3%
2001	0,134	0,210	0,145	0,143	0,857	0,028	0,958	0,007	0,993	-13,6%	2,7%
2002	0,131	0,228	0,118	0,209	0,791	0,734	0,965	0,279	0,721	5,8%	-10,1%
2003	0,123	0,250	0,101	0,229	0,771	0,629	0,951	0,327	0,673	6,5%	-16,8%
2004	0,117	0,223	0,099	0,210	0,790	0,699	0,986	0,298	0,702	7,0%	-13,1%
2005	0,110	0,221	0,092	0,188	0,812	0,706	0,986	0,283	0,717	8,0%	-13,7%
2006	0,105	0,200	0,092	0,179	0,821	0,734	0,958	0,267	0,733	7,1%	-13,2%
2007	0,104	0,199	0,093	0,186	0,814	0,643	0,972	0,244	0,756	4,3%	-10,5%
2008	0,111	0,206	0,095	0,205	0,795	0,706	0,937	0,297	0,703	6,5%	-15,9%
2009	0,104	0,181	0,091	0,228	0,772	0,867	0,923	0,356	0,644	11,7%	-14,5%
2010	0,103	0,155	0,096	0,225	0,775	0,818	0,923	0,294	0,706	5,2%	-10,9%
2011	0,090	0,200	0,079	0,262	0,738	0,455	0,825	0,332	0,668	0,4%	-20,3%
2012	0,088	0,122	0,083	0,281	0,719	0,825	0,965	0,329	0,671	4,0%	-6,4%
2013	0,098	0,163	0,083	0,269	0,731	0,811	0,888	0,396	0,604	9,4%	-17,6%
2014	0,113	0,181	0,093	0,269	0,731	0,825	0,979	0,376	0,624	8,6%	-14,1%
2015	0,114	0,178	0,095	0,320	0,680	0,853	0,958	0,441	0,559	10,8%	-13,7%
2016	0,127	0,215	0,091	0,340	0,660	0,916	0,958	0,538	0,462	18,7%	-20,8%
2017	0,124	0,207	0,092	0,319	0,681	0,944	0,958	0,508	0,492	18,4%	-19,4%
2018	0,104	0,190	0,081	0,298	0,702	0,839	0,853	0,496	0,504	15,9%	-23,7%
2019	0,116	0,214	0,083	0,310	0,690	0,895	0,909	0,532	0,468	20,1%	-24,0%

Source: Authors' calculations

From an overall market perspective, it can be distinctly categorized by nationality. France (19,2%in 2019), the UK (8,8%in 2019), Germany (6,9% in 2019), and Spain (3,5% in 2019), are the main countries driving demand in Morocco (Table 2). Other notable markets include the USA, the Middle East, Belgium, The Netherlands, Italy, and China, all accounting for over 2%

of hotel nights. Among the top countries for hotel demand, France had a Gini index of 0.09 in 2019. The seasonal pattern of French demand is marked by seasonal factors between 0.80 and 1.34, peaking in August. The high season, lasting from May to October, accounts for just 53% of the year's hotel nights. The winter season extends from November to February, with March and April showing seasonal factors near 1. The UK, the second largest market, had the lowest annual Gini index at 0.07 in 2019. The seasonal pattern of British demand is characterized by factors between 0.75 and 1.21, peaking in August. The high season, spanning May to October, represents just 55% of the year's hotel nights. The winter season, from November to February, has March and April with factors near 1. In contrast, Germany, the third largest market, recorded a Gini index of 0.13 in 2019 with a peak in March. The winter season, November to February, accounts for 32% of the year's hotel nights, whereas the high season, from May to October, makes up 45%, peaking in October and dipping in August. The Spanish market exhibits a similar pattern to Germany, with a Gini index of 0.12 in 2019 and a peak in April. The winter season accounts for 28% of the year's hotel nights, compared to 52% for the high season, with peaks in September and the lowest factors in January and February. Because of their substantial shares in Morocco, Table 2 shows that the French and British markets, which have substantial shares in Morocco, contribute 13.69% and 4.88% respectively to the Gini index. However, both markets have negative relative marginal effects on the Gini index, with a French RME of -5.53%.

Table2. A decomposition of seasonal concentration of overnight stays by nationality (2019)

Country	Gini Index Gk	Market Share Sk	Gini Correlation Rk	Contribution to total Concentration Ck%	Relative Marginal Effect, RMEk %
France	0,094	0,192	0,881	13,69	-5,53
Spain	0,120	0,035	0,699	2,50	-0,97
Germany	0,134	0,069	0,224	1,78	-5,13
UK	0,074	0,088	0,867	4,88	-3,93
Italy	0,135	0,017	0,182	0,35	-1,31
Belgium	0,140	0,022	0,923	2,46	0,24
Holland	0,117	0,017	0,888	1,54	-0,19
Portugal	0,374	0,013	0,846	3,61	2,28
Scandinavia	0,263	0,008	-0,259	-0,49	-1,33
Austria	0,210	0,002	-0,021	-0,01	-0,25
Switzerland	0,149	0,007	0,252	0,23	-0,49
CIS	0,356	0,000	-0,413	-0,01	-0,01
Hungary	0,176	0,001	-0,007	0,00	-0,09
Russia	0,234	0,004	0,510	0,44	0,01
Poland	0,287	0,013	0,441	1,36	0,11
USA	0,156	0,027	0,168	0,60	-2,06
Canada	0,145	0,007	0,427	0,37	-0,33
Maghreb	0,147	0,013	0,874	1,47	0,14
Middle_East	0,162	0,024	0,909	3,10	0,66
Japan	0,187	0,006	-0,175	-0,16	-0,72
China	0,122	0,015	-0,077	-0,12	-1,57
Africa	0,100	0,008	0,825	0,54	-0,22
MRE	0,507	0,002	0,818	0,75	0,54
Others	0,096	0,099	0,699	5,70	-4,18

Source: Authors' calculations

The results reveals that there are other countries with interesting characteristics. even if they are not major markets, the Italian, American and Chinese markets can be very attractive, given

their negative marginal effect and low Gini index. Italy's Gini index is 0.135 and its negative relative marginal effect is -1.31%. This shows that the market is stable throughout the year, making Italy an interesting market to exploit for sustainable growth. Belgium has a low market share of 2.22%, and its Gini correlation is 0.923, which explains why most trips are aligned with the seasonal peaks. As with Belgium, the Middle East presents a low Gini index of 0.162 but a Gini correlation of 0.909, which means that tourists tend to visit the country during seasonal peaks, thus increasing seasonal concentration; the Middle East's contribution to total concentration is 3.1%, which explains its considerable impact during the high season. China has a Gini index of 0.122, indicating low seasonality, and a contribution to total concentration of -0.12, showing its counterbalancing effect to seasonality, and a marginal effect, also negative, of -1.569%, indicating the potential of the Chinese market to have a stabilizing effect on tourist demand, but with a very modest market share of 0.015. The United States exhibits low seasonality, with an index of 0.156, indicating a well-distributed flow of American tourists compared to other markets. The United States contributes to the total concentration of 0.6, which shows a very minimal effect on the seasonality; the relative marginal effect of the country is negative at -2.06%, which means that the American market has the potential to reduce the seasonal concentration.

5. Conclusion

As tourism has become a key industry for Morocco, seasonality has always been perceived as a major issue for many emblematic destinations. However, it appears that tourism seasonality is a little-explored topic in the Moroccan context, despite its importance and usefulness for better management of tourism flows. The results of this study may pave the way for more in-depth analyses in a country where tourism is a major pillar of economic growth. This research analyses the seasonality of tourism demand based on monthly tourist arrivals and overnight stays over the period 2000-2019. The Gini index decomposition method was used to identify the contribution of different markets to this seasonality and the destinations capable of mitigating its effects, thus enabling the development of well-targeted counter-seasonal strategies.

The seasonal concentration of a market k is compounded by three elements: (1) the relative size of the market, which is the market share Sk ; (2) the level of seasonal concentration intrinsic to the market, which is quantified by the Gini index Gk ; and (3) the degree of alignment of the seasonal pattern with the overall seasonality of the market, which is measured by the Gini correlation Rk . The combination of these three elements provides the measure of seasonal concentration, which is analysed in detail in section 3. Of these, the market share factor Sk is the one that is easiest to influence, while the other two are more structural. Consequently, tourism planners looking to reduce seasonality in a destination should prioritise expanding the market share of segments characterised by minimal seasonal concentration (i.e., low G_k) or those with moderate to high seasonality but an inverse correlation with the general seasonal trend (i.e., low or negative R_k). The potential impact of such adjustments on the overall concentration index can be quantified using the relative marginal effect (RME_k).

The decomposition of seasonal concentration in hotel demand for Moroccan hotels has provided valuable insights. First, the overall level of seasonal concentration in hotel demand has remained relatively stable over the past 20 years, with only minor fluctuations. These variations have primarily been driven by changes in the international share of demand. Notably, International demand is characterized by a less pronounced degree of seasonal concentration and a negative relative marginal effect (RME). Consequently, the recent decline of the international share observed during the study period has significantly contributed to the higher levels of seasonal concentration recorded in this destination.

Furthermore, these findings indicate that implementing an untargeted strategy to increase the influx of international tourists is not a viable approach for addressing seasonality. As

demonstrated in the methodology section, there are substantial differences across international markets regarding their RME on the Gini index. A more targeted approach would involve broad promotional campaigns in source markets with negative RME—such as France, UK, Germany, Spain, USA, Holland, and Italy—and tailored campaigns focused on the low season in markets with positive RME, including Middle East countries, Maghreb countries, Portugal, Poland, and Russia. Additionally, the results underscore the pressing need to address the high levels of seasonal concentration within the domestic market, which remains a critical area for improvement.

These findings provide insight into why planning initiatives over the past two decades have struggled to mitigate seasonality in key Moroccan destinations, such as Marrakech, Agadir, Tangier-Tetouan region and the coastal region of Souss-Massa. Morocco, like many countries with a significant tourism sector, demonstrates a notable level of government intervention. The legislative framework grants considerable authority to regional councils and agencies to develop and implement tourism strategies. This has generated roadmaps and legislative measures, notably the Vision 2020 strategy, which aims to position Morocco as a leading global destination through advertising campaigns targeting domestic and international tourists, as well as regional development plans. Despite these efforts, those responsible for planning must thoroughly analyse the causes of seasonality. For example, while plans like the Azur Plan recognized seasonality as a weakness in the sector, they lacked targeted policies to counter it. Furthermore, objectives such as "strengthening domestic tourism" in recent national campaigns risk unintentionally intensifying seasonality, as domestic travel tends to peak during holidays and the summer months. This underscores the need for a more comprehensive approach to managing seasonality in Moroccan tourism planning. Policymakers must implement a multidimensional strategy that will ensure the diversification and enrichment of the tourist experience. The results show that recommendations must be tailored to the seasonal patterns of each segment, by promoting initiatives that enhance tourist flows during the mid- and low seasons. The markets with a negative marginal effect, such as the United Kingdom, France, Spain, Germany, and the United States, Italy, and the Netherlands constitute priority segments for a consolidation strategy aimed at spreading demand throughout the year through loyalty initiatives and offers tailored to the low or off-peak season, promoting sporting or cultural events, strengthening air connectivity outside peak periods, promote products such as city getaways and urban tours and developing MICE tourism. Whereas for markets with a relatively positive marginal effect, such as Portugal, the Middle East, Poland, the Maghreb, require a

precisely calibrated and more selective strategy for off-peak periods, such as family vacations and heritage tours, shopping getaways, luxury wellness, and attractive pricing strategies, accompanied by package deals and marketing campaigns focused on the fall, spring, and winter seasons so that a part of the demand is shifted away from peak periods. Finally, the domestic market should be considered due to its high concentration, which accentuates overall seasonality. It would be pertinent to adopt certain measures to stimulate demand outside the summer peak season, such as offering discounted weekend packages, strengthening social tourism programs especially during the off-season and promoting destinations that are less focused on beach resorts. Ultimately, these strategies will transform challenges of seasonality into opportunities and build a more resilient tourism sector.

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