

# Seasonal Deviations in Tourist Accommodation Establishments in Romania and Portugal - A Quantitative Analysis

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## Abstract

This article aims to characterize the hotel industry in Romania and Portugal. For this purpose, the authors use a set of statistical indicators, also applying the Buys Ballot model. The results show that, between 2015 and 2020, in Romania and Portugal, in the months of June, July, August, September and October the seasonal factor deflected the number of nights spent by domestic tourists over the trend line. Thus, the seasonal factors varied between 0.065 and 0.454 in Romania and between 0.02 and 0.388 in Portugal. It should be mentioned that, in the period 2015-2019, on average, the share of domestic tourists' overnight stays reached 29.2 percent in Portugal and 79.3 percent in Romania of the total overnight stays, the first country being mainly focused on non-residents tourists originated from EU Member States. Moreover, the GDP per capita at constant 2010 prices stood at EUR 17,628 in Portugal, 2.1 times higher than in Romania. In this context, in the case of hotels and similar accommodation, the turnover had an annual variation rate of 10.8 percent in Romania, compared to 11.6 percent in Portugal. Instead, in 2020, due to the COVID-19 pandemic, in Portugal and Romania, domestic tourists held 52.0 percent and 91.8 percent respectively of nights spent in hotels and similar accommodation. These results may allow better decision-making by hotel managers in Portugal and Romania, particularly in this post-pandemic period in which it is necessary to relaunch the strong dynamism that characterized the sector.

## Keywords

Tourism, Hospitality Industry, Tourist Accommodation, Financial Performance, Buys Ballot Model.

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## Introduction

Tourism is considered the most coveted activity in the world, considering the growing number of destinations around the world that have been investing in this activity over the past decades, making it the major driver of socioeconomic progress through the creation of jobs and companies, export revenues and infrastructure development, leading to a continuous expansion and diversification that reveals it as one of the fastest growing economic sectors in the world. In this context, it is worth noting the strategic role of the hotel industry (Mucharreira et al., 2019).

The macroeconomic context is an extremely important factor for the growth and development of companies, and tourism sector organizations are particularly exposed to economic cycles, namely hospitality companies. In addition to many other factors, seasonality influences tourist demand and consequently financial performance (Mucharreira et al., 2019). The expansion and growth of tourism can also have a strong influence on the business performance of the hotel industry. On the one hand, the

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expansion of industry or tourism activities directly increases the development of the hotel industry, increasing the occupancy rate and, consequently, sales revenue. On the other hand, the development of

tourism can significantly improve the business environment, which has an indirect effect on the business performance of hotel companies (Chen, 2010; Mucharreira et al., 2019). Seasonality is largely considered as a physiological characteristic of tourism, and it has been taken for granted as an inevitable feature of this economic sector of activities, being a factor with very wide-ranging causes and impacts (Cannas, 2012).

This research intends to carry out a brief characterization of seasonal deviations in tourist accommodation establishments in Romania and Portugal in recent years, prior to the pandemic crisis. For this purpose, the authors implemented a Buys Ballot Model to characterize the situation of these two countries in the period between 2015 and 2020. The COVID-19 pandemic crisis has severely affected the entire economy, but the tourism sector has been particularly affected. Any pandemic crisis has a social, political and economic impact which put any nation into a difficult state and brings huge challenges to the modern world (Lima Santos et al., 2021; Gambará, Basco and Mucharreira, 2021).

The paper is structured as follows. After the introduction, a section describes the evolution of hotels and similar accommodation demand in Romania and Portugal. Section 3 presents the employed methodology and the fourth data used and the model estimation. Fifth section discusses the results, and the paper ends with the conclusions.

### 1. Hotels and similar accommodation, in Romania and Portugal

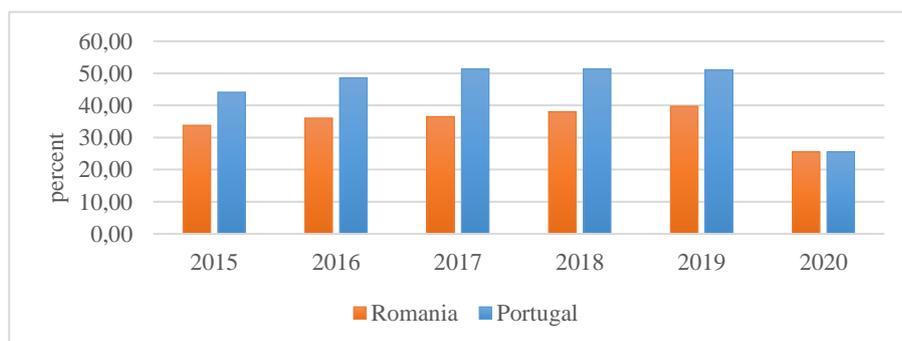
Table 1 presents some indicators that help to characterize the hospitality sector in Romania and Portugal.

**Table no. 1. Main economic indicators by CANE Rev.2 activity - 5510 Hotels and similar accommodation in Romania and Portugal, 2015-2019**

	Enterprises (number)		Persons employed (number)		Value added at factor cost in production value (percent)		Turnover (EUR mill.)		Investment rate (percent)	
	RO	PT	RO	PT	RO	PT	RO	PT	RO	PT
2015	2,339	4,180	37,078	51,380	40.5	47.5	931.7	2,876.90	51.6	53.3
2016	2,382	4,334	38,917	55,277	44.3	48.6	1,009.50	3,340.70	46.9	54.5
2017	2,403	4,405	39,136	59,506	47.1	50.6	1,079.20	4,013.10	37.5	51.5
2018	2,439	4,511	39,843	63,504	48.4	49.7	1,205.70	4,149.10	39.1	49.9
2019	2,466	4,686	40,596	66,410	50.0	48.9	1,407.00	4,463.50	65.4	54

Source: EUROSTAT

At level of CANE Rev.2 - 5510 Hotels and similar accommodation, in the period 2015-2019, the number of enterprises rose gradually from 2,239 to 2,466 in Romania and from 4,180 to 4,686 in Portugal. The turnover had an annual variation rate of 10.8 percent in Romania, compared to 11.6 percent in Portugal. It should be mention that the number of persons employed per enterprise ranged between 15.9 and 16.5 in Romania and between 12.3 and 14.2 in Portugal. Moreover, in Romania, the investment rate decreased from 51.6 percent in 2015 to 37.5 percent in 2017, followed by an ascending trend during the interval 2018-2019 up to 65.4 percent. On the other hand, in Portugal, the investment rate was 53.3 percent in 2015 and 54.5 percent in 2016, oscillating around the value of 50 percent during the next three years (Table 1).



**Figure no. 1. Net occupancy rate of bed-places in hotels and similar accommodation in Romania and Portugal, 2015-2020**

Source: EUROSTAT

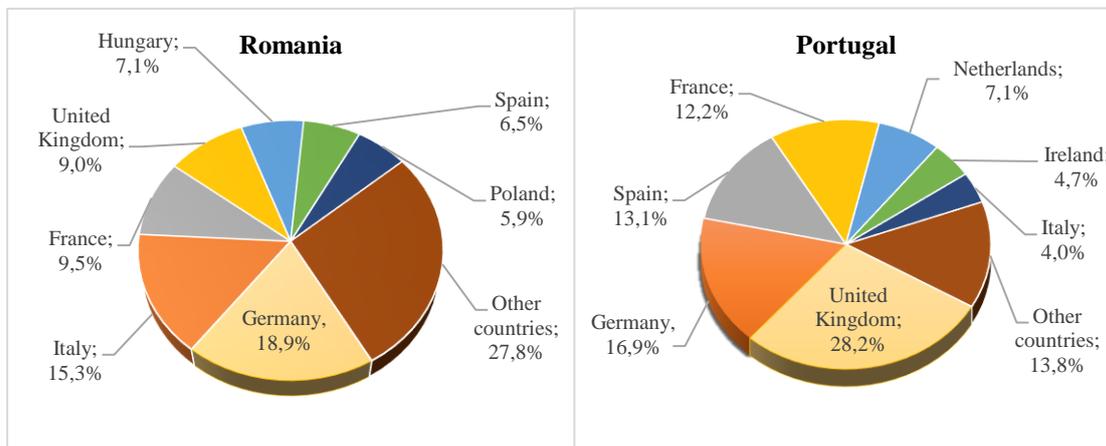
In Romania and Portugal, the net occupancy rate of bed-places in hotels and similar accommodation was less than 52.0 percent, between 2015 and 2020 (Figure 1).

**Table no. 2. Number of overnight stays in hotels and similar accommodation in Romania and Portugal, 2015-2020**

	Overnight stays, total		of which:			
			Foreign tourists		Domestic tourists	
	Romania	Portugal	Romania	Portugal	Romania	Portugal
2015	19,749,508	50,627,129	4,100,387	35,474,514	15,649,121	15,152,615
2016	21,232,963	55,258,227	4,399,597	39,326,453	16,833,366	15,931,774
2017	22,241,911	59,534,386	4,799,993	42,852,697	17,441,918	16,681,689
2018	23,335,367	58,700,513	4,854,167	41,517,325	18,481,200	17,183,188
2019	24,328,701	59,946,819	4,804,038	42,043,190	19,524,663	17,903,629
2020	11,320,667	21,496,853	931,467	10,324,556	10,389,200	11,172,297

Source: EUROSTAT

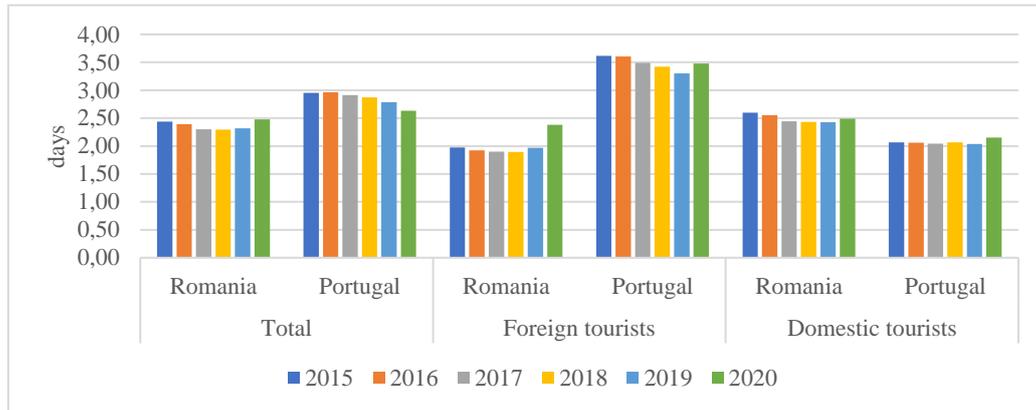
In 2020, in hotels and similar accommodation, due to the COVID-19 pandemic, the overnight stays totaled 11,320.7 thousand in Romania and 21,496.8 thousand in Portugal, down 49.9 percent and 62.2 percent respectively versus 2015-2019 average. Moreover, it is noteworthy that, in the 2 countries mentioned above, domestic tourists held 91.8 percent and 52.0 percent respectively of the total overnight stays (Table 2).



**Figure no. 2. The distribution of the overnight stays of foreign tourists from EU countries in hotels and similar accommodation in Romania and Portugal, average 2015-2019**

Source: EUROSTAT

Regarding the overnight stays of foreign tourists from EU countries in hotels and similar accommodation, between 2015 and 2019, on average, in Romania, the largest share was held by those coming from Germany (18.9 percent of the total of EU foreign tourists), followed by those from Italy (15.3 percent) and France (9.5 percent). Instead, in Portugal, the highest weights had visitors arrived from United Kingdom (28.2 percent of the total of EU foreign tourists) and Germany (16.9 percent) (Figure 2).



**Figure no. 3. The average time of stay in hotels and similar accommodation in Romania and Portugal, 2015-2020**

Source: EUROSTAT

In the case of hotels and similar accommodation, in Romania, in the period 2015-2019, the average length of stay was 2.3 days (1.9 days for foreign tourists), compared to 2.9 days (3.5 days for foreign tourists) in Portugal. In 2020, the average length of stay for domestic tourists equaled 2.5 days in Romania and 2.2 days in Portugal, amid tightening restrictions due to increasing COVID-19 cases (Figure 3). It should be noted that, as of December 30, the total number of confirmed cases of people infected by coronavirus reached 627,941 in Romania and 406,601 in Portugal.

## 2. Research methodology

In this paper, we will use the Buys Ballot model, that consists in the simultaneous investigation of the trend and the seasonality. According to Enache (2015), the model can be utilized if the time series satisfy 3 conditions:

- the evolution of trend is linear:  $Y_t = \Theta_1 t + \Theta_2$
- the seasonal variation is relatively constant over time:  $s_j = s_t = ct$

where:

$$t = j + k(i-1)$$

$j = \overline{1, k}$  the number of subperiods

$i = \overline{1, p}$  the number of periods

$s_j$  – the seasonality coefficients of subperiod  $j$

$s_t = s_{j,i}$  - the seasonality coefficients of subperiod  $j$  in periods  $i$

- the investigated phenomenon shows a random nature (type bruit blanc)  $e_t$ .

In these conditions, the additive decomposition method is appropriate for modeling time-series data.

$$y_t = \Theta_1 t + \Theta_2 + s_j + e_t \quad (1)$$

Or:

$$y_t = \Theta_1 t + \Theta_j + e_t \quad (2)$$

Where:  $\Theta_j = \Theta_2 + s_j$

Replacing in the model  $t = j + k(i-1)$ , by using the method of least squares, we estimate parameters  $\Theta_1$  and  $\Theta_j$  on the basis of which we will calculate the coefficients of seasonality,  $s_j$ , and the value of term  $\Theta$ , which can be determined in the following way:

$$\hat{\theta}_1 = \frac{1}{p(p^2 - 1)} \left( \sum_{i=1}^p \sum_{j=1}^k \frac{y_{ij}}{k} - \frac{p+1}{2k} \sum_{i=1}^p \sum_{j=1}^k y_{ij} \right) \quad (3)$$

$$\hat{\theta}_2 = \sum_{i=1}^p \sum_{j=1}^k \frac{y_{ij}}{pk} - \hat{\theta}_1 \frac{pk+1}{2} \quad (4)$$

$$\hat{s}_j = \sum_{i=1}^p \frac{y_{ij}}{p} - \sum_{i=1}^p \sum_{j=1}^k \frac{y_{ij}}{pk} - \hat{\theta}_1 \left( j - \frac{k+1}{2} \right) \quad (5)$$

The model (1) can be equal to a multiplicative model after performing the logarithmic transformation as the linear relationship does not affect the variables, only the parameters:

$$\ln(y_t) = \Theta_1 t + \Theta_2 + s_j + e_t \quad (6)$$

Where:

$$\Theta_1 = \ln(1 + \hat{\theta}_1); \Theta_2 = \ln(\hat{\theta}_2); s_j = \ln(\hat{s}_j); e_t = \ln(u_t).$$

As a result, the multiplicative model will be as follows:

$$y_t = \Theta_2' s_j' u_t (1 + \hat{\theta}_1')^t \quad (7)$$

A supplementary condition, related to the seasonal factors postulates the presence of offsetting seasonal movements per cycle:

$$\sum_{j=1}^k s_j = 0 \text{ – for additive model;}$$

$$\sum_{j=1}^k s_j = \sum_{j=1}^k \ln(s_j) = 0 \rightarrow \prod_{j=1}^k s_j = 1 \text{ – for multiplicative model.}$$

### 3. Data description, model estimation and results

The Buys Ballot model is used to study the variation in the nights spent by domestic tourists in hotels and similar accommodation in Romania and Portugal, in the period 2015M01-2020M12.

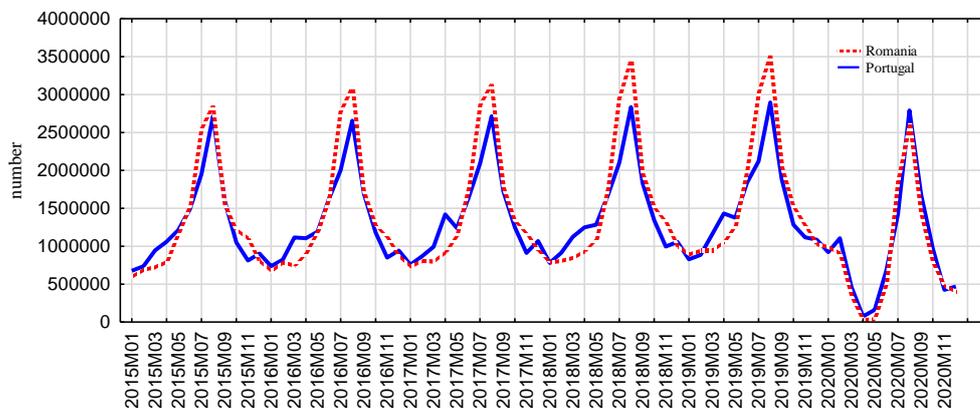
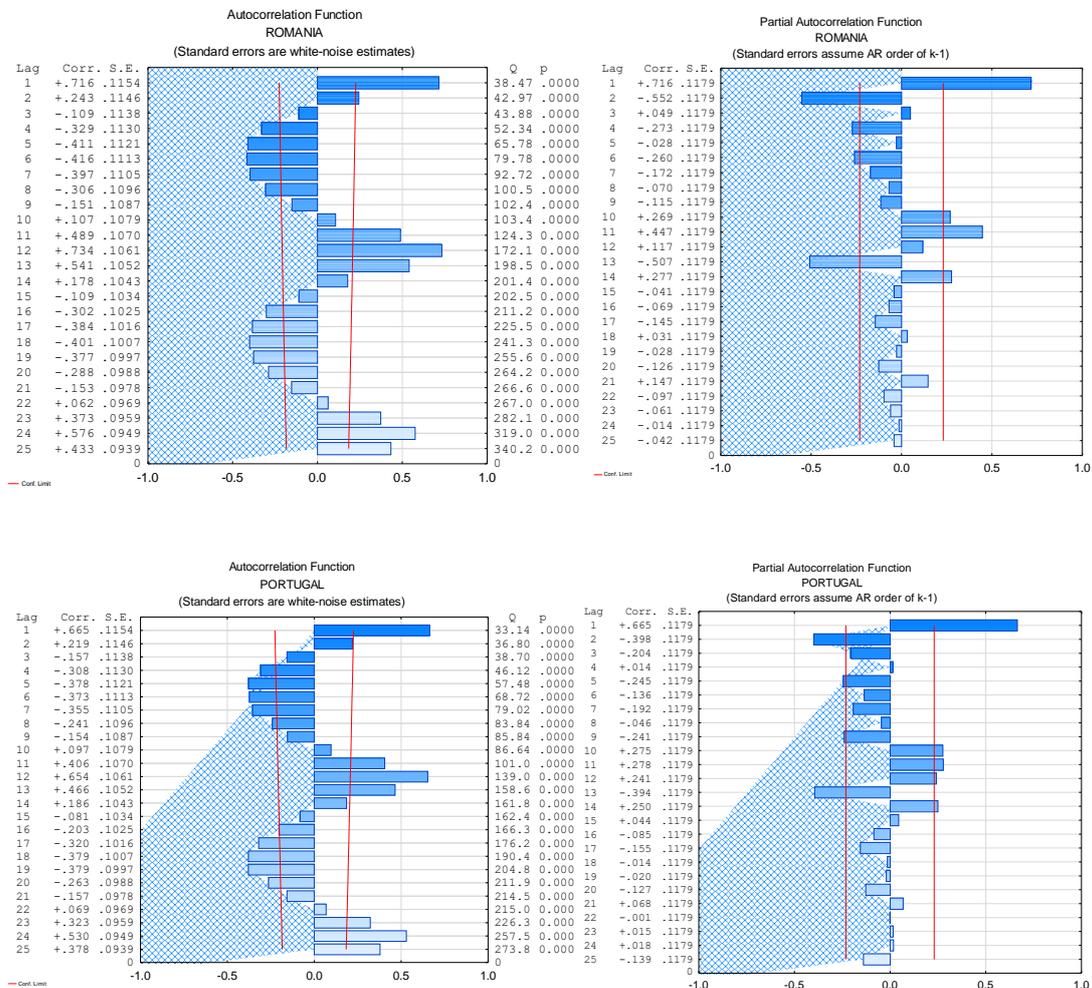


Figure no. 4. Nights spent by domestic tourists in hotels and similar accommodation in Romania and Portugal, 2015 M01-2020M12

Source: EUROSTAT

In the period 2015-2020, the monthly average number of nights spent by domestic tourists at tourist accommodation establishments (which includes hotels and similar accommodation) equaled 1,365,531.5 in Romania and 1,305,905.4 in Portugal. In addition, the coefficients of variation stood at 59.9 percent for Romania, compared to 47.7 percent for Portugal, indicating that the two series investigated are not homogeneous. The kurtosis values were found to be 0.48 in the case of Romania and 0.6 in the case of Portugal. In addition, the skewness values reached 1.08 for Romania and 0.86 for Portugal, illustrating that the 2 distributions are highly and moderately skewed respectively. The autocorrelation and partial autocorrelation coefficients show that the both investigated data series are not stationary and they have been affected by seasonality (Figure 5).



**Figure no. 5. Autocorrelation and Partial Autocorrelation Functions**

Source: Own calculations based on Eurostat data, using Statistica 13.0

The estimation of the 2 components of the investigated time series (trend and seasonality) based on the Buys Ballot model in the multiplicative variant, is done with the help of the relations:

- for Romania:

$$\ln[\hat{y}_{j+m(i-1)}] = 6.1813 - 0.038[j + k(i - 1)] + \hat{\delta}_j$$

- for Portugal:

$$\ln[\hat{y}_{j+m(i-1)}] = 6.1539 - 0.026[j + k(i - 1)] + \hat{\delta}_j$$

Where:

$\hat{\delta}_j$	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12
RO	-0.178	-0.144	-0.213	-0.334	-0.212	0.104	0.381	0.454	0.204	0.065	-0.013	-0.114
PT	-0.18	-0.124	-0.101	-0.173	-0.111	0.093	0.229	0.388	0.188	0.02	-0.134	-0.095

The results show that in Romania and Portugal in the months of June, July, August, September and October the seasonal deviations were positive. In August, the seasonal factor deflected, on average, the number of nights spent by domestic tourists at tourist accommodation establishments (which includes hotels and similar accommodation) with 0.458 nights in Romania and 0.388 nights in Portugal over the trend line (peaks of activity). At the same time, in all the months between November and May the seasonal deviations were negative (below the trend line).

The 2 models are statistically valid, as long as the calculated values of the F-test are 241.22 (Significance F: 0.000) in the case of Romania and 316.29 (Significance F: 0.000) in the case of Portugal, explaining 77.5 percent and 81.9 percent respectively of the variation in the nights spent by domestic tourists in hotels and similar accommodation. The coefficients of the 2 models proved to be statistically significant after the Student's t-test was applied.

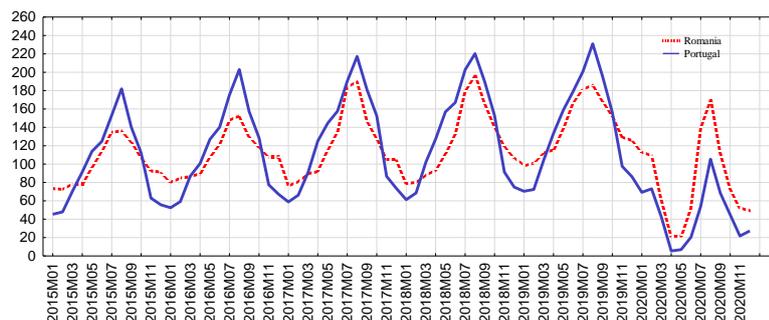
#### 4. Discussions

The tourism and hotel sectors are the sectors that suffer the most fluctuations throughout the year, and it can be divided into three seasons - high, medium, and low. Seasonality is the phenomenon that implies the variation in the number of tourists in a region, consequently threatening regional development. With a greater or lesser impact, seasonality extends across all tourist companies, regardless of industry, location, target audience or quality of service provided (Nunes et al., 2021).

In Romania and Portugal, in the period 2015-2020, the seasonal factor deflected the number of nights spent by domestic tourists in hotels and similar accommodation over the trend line during June to October. At the same time, in all the months between November and May the seasonal deviations were negative (below the trend line).

These results were achieved in the condition that, on average, during the period 2015-2019, the share of domestic tourists' overnight stays reached 29.2 percent in Portugal and 79.3 percent in Romania of the total overnight stays, the first country being mainly focused on foreign tourists from EU countries. An analysis of the annual variation rate for the number of nights spent by domestic tourists reveals that some of the highest growth rates were recorded in the Região Autónoma dos Açores (12.8 percent, reaching 872.0 thousand nights), the Nord Vest region (7 percent, reaching 2,419.3 thousand nights), Alentejo (6.9 percent, reaching 1,356.3 thousand nights) and the Sud-Est region (6.4 percent, reaching 5,373.3 thousand nights). Another point worth noting is that, from 1 to 3 nights accommodation, on average, the Romanian tourists paid, EUR 22.31 per night, while the Portuguese tourists spent EUR 34.14 per night. Moreover, the GDP per capita at constant 2010 prices stood at EUR 8,212 in Romania, compared to EUR 17,628 in Portugal.

Instead, in 2020, due to the COVID-19 pandemic, in Romania and Portugal, domestic tourists held 91.8 percent and 52.0 percent, respectively, of nights spent in hotels and similar accommodation. In the two countries mentioned above, the most popular destinations were the Sud Est region and the Região Autónoma dos Açores. However, the bed occupancy net rate equalled 22.9 percent in Romania and 25.5 percent in Portugal. It should be noted that the number of confirmed cases on December 30, 2020 exceeded the threshold of 620,000 in Romania and 400,000 in Portugal. In fact, in Romania, 35.8 percent of hotels and similar accommodation were registered in towns and suburbs (down 0.3 percentage points against the average for 2015-2019), 35.4 percent in cities (down 0.3 percentage points) and 28.8 percent in rural areas (up 0.6 percentage points). Simultaneous, in Portugal, 38.7 percent of hotels and similar accommodation were reported in towns and suburbs (down 0.2 percentage points) and 24.8 percent in rural areas (down 1 percentage point). The revenue per available room was EUR 11.62 in Romania and EUR 22.6 in Portugal.



**Figure no. 6. Index of turnover for accommodation in Romania and Portugal, 2015 M01-2020M12 (2015=100)**

Source: EUROSTAT

Against this background, the monthly turnover index for a subset of tourism industries (accommodation) indicates a relatively stronger growth in Portugal in the period 2015-2019 than in Romania. In 2020, compared to Portugal, Romania's tourist accommodation activities were much more seasonal (Figure 6).

According to Nunes et al. (2021), seasonality must be studied and understood, so that the adaptation process to this factor is easier, thus allowing it to be possible to mitigate its negative effects and, also allowing to take advantage of the positive seasonality that exists throughout the year to create loyalty in the hospitality at various times of the year.

## Conclusions

In the present study it was obvious the significant growth of the Romanian and Portuguese hospitality sector. Such growth is evidenced in the period 2015-2019, among other indicators, by the increase in the number of hotels and similar accommodation companies, the overnight stays recording a positive annual average dynamic. In fact, the overall picture of the total overnight stays spent by domestic tourists in hotels and similar accommodation is pretty comparable in the 2 investigated countries. Thus, in Romania, 40.5 percent of overnight stays were registered in cities, 38.9 percent in towns and suburbs and 20.6 percent in rural areas. At the same time, in Portugal, 42.0 percent of overnight stays were recorded in towns and suburbs and 38.6 percent in cities. Despite its geographical location, in Portugal only 20.3 percent of all nights spent by domestic tourists were recorded in coastal areas, compared to 19.3 percent in Romania. In 2020, due to the COVID-19 pandemic, in Romania and Portugal, domestic tourists held 91.8 percent and 52.0 percent, respectively, of nights spent in hotels and similar accommodation.

The use of the Buys Ballot model pointed that in August, on average, the seasonal factor deflected the number of nights spent by domestic tourists in hotels and similar accommodation with 0.458 nights in Romania and 0.388 nights in Portugal over the trend line (peaks of activity), for the period between 2015 and 2020.

The results may allow better decision-making by hotel managers in Portugal and Romania, particularly in this post-pandemic period in which it is necessary to relaunch the strong dynamism that characterized the sector.

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