Quantifying seasonality in tourism: a case study of Montenegro

Miloš Bigović
University of Montenegro
Faculty of Economics, Podgorica, Montenegro
milos.bigovic@mail.me

Abstract

The purpose of this paper is to quantify seasonal variations in tourism and to benefit from an understanding of seasonality. The investigation was based on data regarding the number of tourist arrivals in Montenegro and the approach is based on five measures – seasonal range, coefficient of seasonal variation, seasonality ratio, seasonality indicator and the Gini coefficient. The results of quantifying show a pronounced seasonality that is constant with only negligible variations over time. There are no vital discrepancies among the results obtained using different measures. These findings suggest the following: to understand the nature of seasonality it is enough to use only one measure and there is no need for a holistic way of measuring.

Key words: seasonality, tourist arrivals, measures, Montenegro

1 Introduction

Seasonality is an essential issue of a tourism destination planning system. It has been very well documented that the overall aim is to reduce or even eliminate seasonal pressure and to smooth fluctuations in a tourism demand. In fact, one of the challenges is to achieve a balance which is as good as possible throughout the year among economic, socio-cultural and environmental objectives. Therefore, it is always significant to recognize and "control" the degree of seasonality in tourism activity.

There are many ways to express seasonality in the tourism demand. Usually, the main unit is the number of tourist arrivals per month. Sometimes other physical and financial units are used (number of tourist overnight stays, length of stay, number of departures, tourist expenditure) as well as another time units (day, week, quarter).

Using monthly data, this paper endeavours to quantify the phenomenon of seasonality in Montenegrin tourism and to show that in order to understand the nature of seasonality it is quite enough to use only one measure. For reasons of comparison, several methods and destinations are used.

Montenegro is a more or less typical summer destination and because of that very interesting for our research. The results were expected to provide important quantitative information about seasonality which could be useful for both an academic audience and above all, for those concerned with development at a strategic level.

This paper is divided into seven sections. At the outset, we state a brief introduction in order to outline some general thoughts. The next section covers the conceptual background and includes the theoretical implications of seasonality as well as some basic aspects of the seasonal pattern in Montenegrin tourism. This section also contains an overview of the formulated hypotheses. Section 3 refers to the research methodology. It encompasses a framework of the theoretical concepts used in measuring – quantifying. Five measures are presented there. This is followed by the subsequent part which examines records about tourist arrivals in Montenegro. It is very important because many of the impacts of seasonality can be understood simply by looking at the raw data. Next, the results are presented and a discussion is built up. At the end, a number of concluding comments are made.

2 Background and formulation of hypotheses

2.1 Definition of seasonality in tourism

Seasonality is identified as one of the most visible characteristics of modern tourism, and most destinations experience some kind of seasonal pattern. In general, seasonality means special annual dependence, or, more precisely "seasonality is the systematic, although not necessarily regular, intra-year movement caused by the changes of the weather, the calendar, and timing of decisions, directly or indirectly through the production and consumption decisions made by the agents of the economy. These decisions are influenced by endowments, the expectations and preferences of the agents, and the production techniques available in the economy" (Hylleberg, 1992, 4).

Among many factors affecting tourism demand (see Reece, 2010), seasonality is one of the most important. Although there is no generally accepted definition of seasonality in tourism (Koenig-Lewis & Bischoff, 2005), it could be said that there have been numerous attempts to define the seasonal concept in the tourism industry. For instance, Biedermann (2008, 41) stated that seasonality is "a prevalent characteristic in travel and tourism marked by sharp variations in demand depending on the time of the year". Then, Wall and Mathieson (2006, 57) argued that most destination areas "experience an annual cycle of activity with a peak season and an off-season which are separated by two shoulder seasons". Also, Butler (2001, 5) described seasonality in tourism "as a temporal imbalance in the phenomenon of tourism, which may be expressed in terms of dimensions of such elements as numbers of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment and

admissions to attractions". Bender, Schumacher and Stein (2005, 303) stressed that seasonality "refers to the existence of unevenness or fluctuation during the course of the year, which occurs in relation to a specific season". Furthermore, "seasonality is a global tourism phenomenon caused by temporary movement of people" (Chung, 2009, 84). In addition, Cooper, Wanhill, Fletcher, Gilbert and Fyall (2008, 114) stated that "we know that within most patterns of demand in tourism, there are regular fluctuations due solely to the time of year. This phenomenon is called seasonality", which they defined as "the temporal fluctuations of tourism on a daily, weekly, monthly or annual basis" (Cooper, Wanhill, Fletcher, Gilbert & Fyall, 2008, 686). All these definitions are similar and accent oscillations in tourism. Are these oscillations strong or not? Are the oscillations constant or not? The answers to these questions give us another definition of seasonality: *seasonality in tourism is a temporal imbalance, expressed in different ways, which can be 1) strong (i.e., pronounced) and constant, 2) strong and non-constant, 3) weak and constant or 4) weak and non-constant*. It is obvious that stated definition stresses two issues: strength and dynamics of seasonality.

2.2 Causes of seasonality in tourism

There are two basic causes of tourism seasonality, the first is "natural" and the second is "institutionalized" (BarOn, 1975). Natural seasonality is a result of nature and its forces, predominantly related to the elements of weather and climate such as temperature, snow, sunlight, rainfall etc. As Koenig-Lewis and Bischoff (2005) wrote, all these natural factors "are predictable as they are relatively stable in a particular destination, and recur with only small changes".

On the other side, institutionalized seasonality is associated with legislation, religion, custom, historic conventions… and remains in the domain of people. For instance, it is very well known that school and public holidays produce institutional seasonality. The same can be said with the main religious holidays.

Beside these two basic causes, there are some additional, also important, sources of seasonality in tourism. They include social pressure, fashion, imitation, inertia, tradition etc., (see Koenig-Lewis & Bischoff, 2005) however, these are not prominent as the basic causes are.

2.3 Negative and positive effects of seasonality in tourism

According to most authors (e.g., Bender, Schumacher, & Stein, 2007, 183; Butler, 2001, 5; Holloway, Humphreys, & Davidson, 2009, 561–562; Pearce, 1989, 188; Sharpley, 2002, 17) seasonality is usually highlighted as a negative phenomenon in tourism and is treated as a weakness or a problem, not only in an economic sense, but also in a socio-cultural and ecological sense as well. The phenomenon may cause "overuse as well as under-utilization of resources and facilities" (Bender, Schumacher, & Stein, 2005, 304), and because of that, destinations are making every effort to reduce seasonality and avoid the negative effects. The potential *problems* of tourism caused by seasonality are listed below.

Some of the major *economic problems* are related to the loss of profit due to the inefficient use of resources, low returns on capital, difficulties with employment (small chances of recruiting and retaining full-time employees), a shortage of quality rooms during the main season etc. (see Koenig-Lewis & Bischoff, 2005; Chung, 2009, for discussion). Further, *socio-cultural problems* include congestion, overcrowding, significant increases in the cost of community services, noise, increased crime due to a higher number of people, the need for extra police, sanitary and medical personnel, increased risk of accidents, the possibility of negative influences on the traditional way of life etc. (see Koenig-Lewis & Bischoff, 2005; Chung, 2009, for discussion). Finally, *ecological problems* contain pollution problems and an exhaustion of the natural resources (Bender et al., 2005). Hence, it is clear why destinations seriously attempt to reduce seasonality. "They do this by reducing prices, attempting to attract visitors, such as senior citizens who have more flexible schedules, and by developing special events. Most of the effort so far has been placed on manipulating the supply side in an attempt to make destinations more attractive in off-peak periods" (Wall & Mathieson, 2006, 58).

It is worth noting that "very little research has been done to explore any of the positive aspects of seasonality" (Butler, 2001, 6). In spite of that, there are positive effects. First of all, each year's rest period may be beneficial for the majority of natural resources, where the off-peak season provides a chance for recovery. In addition, local communities can preserve their own identity through time. These are crucial positive effects of seasonality in tourism.

2.4 Montenegrin tourism and seasonality

Montenegrin tourism development strategy to 2020 was adopted in the year 2001 and its revised version in 2008.[1] All this time, one of the key challenges of this strategy has focused on reducing pronounced seasonality in Montenegrin tourism. In fact, according to the revised version of the tourism development strategy, seasonality has shrunk considerably during the period indicated above (see Montenegro tourism development strategy to 2020, 2008, for discussion). That was expected and should be considered as a normal consequence of the strategy implementation process. However, expectations are not always realized for one reason or another. Therefore, we want to check whether the degree of seasonality in Montenegrin tourism has changed and become less prominent. Hence, our supposition is that the degree of seasonality has not shrunk and, above all, has been constant with negligible variations, which is quite opposite to the previous statement.

2.5 Formulation of hypotheses

Based on the previous discussion, especially on offered definition of seasonality in tourism, we are prepared to formulate our hypotheses. In our opinion, two moments in quantifying seasonality phenomenon are important.

The first moment refers to the fact whether the seasonality is pronounced or not. Thus, the first *hypothesis* we formulated read:

H1: *Seasonality in Montenegrin tourism is pronounced*

We could not find any theoretical 'critical limit' suggesting a clear difference between pronounced and not pronounced seasonality in tourism. Thus, we formulated sub-hypotheses in order to determine whether the seasonality in Montenegrin tourism is pronounced or not. The stated sub-hypotheses read:

H1.1: *All calculated values of the seasonal ranges are over 350*

H1.2: *All calculated values of the coefficients of seasonal variation are over 120*

H1.3: *All calculated values of the seasonality ratios are over 3*

H1.4: *All calculated values of the seasonality indicators are under 0.35*

H1.5: *All calculated values of the Gini coefficients are over 0.5*

If the majority of sub-hypotheses (i.e., minimum three out of five) are correct, we accept hypothesis **H1** and claim that seasonality in Montenegrin tourism is pronounced. It is worth underlining that if any of the sub-hypotheses is rejected it does not mean that there is no strong seasonal pattern – it only means that our specific criterion is not achieved.

On the other side and according to the offered definition of seasonality in tourism, the second moment is whether the seasonality is constant or non-constant during the given period. Thus, the second *hypothesis* we formulated read:

H2: *Seasonality in Montenegrin tourism is constant with negligible variations*

Again, we could not find any theoretical method suggesting a procedure for testing whether the seasonality is constant or non-constant. Therefore, only a visual comparison can help. If all values graphically approximate a constant level with just negligible variations, we accept hypothesis **H2** as correct.

Therefore, according to the formulated hypotheses **H1** and **H2**, we suppose that Montenegrin tourism is faced with pronounced as well as constant seasonality.

In our opinion, in order to understand the nature of seasonality in a destination (i.e., strength and dynamics) it is enough to use only one measure. All other measures will show the same key properties. Consequently, there is no need for a holistic way of measuring. A combination of different measures brings

1 Montenegro tourism development strategy to 2020 is available at GOV.

no additional value to the understanding of the core characteristics of seasonality in a tourist destination. Thus, the third *hypothesis* we formulated read:

H3: *To understand the nature of seasonality it is enough to use only one measure*

If all measures show the same – pronounced as well as constant seasonality – we accept hypothesis **H3** as correct.

3 Methodology

Reliable and appropriate measuring methods are needed in order to quantify seasonality phenomenon in Montenegrin tourism. "It is highlighted that the decision about which measure is to be used depends on the research question and the degree of detail required" (Koenig-Lewis & Bischoff, 2005). According to the previous discussion and stated hypotheses, we strive to quantify and then to explore the nature of seasonality in Montenegrin tourism. In order to fulfil that goal we found that the most proper measures are seasonal range, coefficient of seasonal variation, seasonality ratio, seasonality indicator and the Gini coefficient. At the same time, "it is necessary to decide for a category of figures" (Weidner, 2009, 5). As we stated at the beginning of this paper, the main and most often used category – unit is a number of tourist arrivals per month, which is also used in this paper. This allows us to compare the results with those obtained by other authors. For instance, figure v_{it} is a monthly number of tourist arrivals in Montenegro at time *it*, where *i* refers to the month (i.e., $1 \le i \le 12$) and *t* relates to the specific year. In many cases, the time series plot of v_{it} can be useful to get a first impression of seasonality (see Nadal, Font & Rosselló, 2004). Now we can take a closer look at the selected methods.

Seasonal range (SR)

The seasonal range (*SR*) is the difference between the highest and the lowest value of monthly indices (Koenig-Lewis & Bischoff, 2005), where index = 100 is the average number of tourist arrivals per month. In our case study, if $I_{\max}$ is the highest monthly index in year *t*, $I_{\min}$ the lowest monthly index in year *t* and $average = 100$ indicates that the monthly average number of tourist arrivals is a base index, then the seasonal range *SR* related to Montenegrin tourism in the year *t* can be calculated as follows $SR_t = I_{\max(average\ =\ 100)} - I_{\min(average\ =\ 100)}$. This measure can take theoretical values between 0 and 1200 (i.e., $0 \le SR_t \le 1200$). With the same number of tourist arrivals every month the seasonal range is zero and if all visitors come in Montenegro in month *i* then the seasonal range is 1200.

Coefficient of seasonal variation (s)

The coefficient of seasonal variation (*s*) is equal to the standard deviation of the seasonal indices, where index = 100 is the average number of tourist arrivals per month (Lundtorp, 2001, 29). Concretely, if *Ii* is a seasonal index, where *i* refers to the related month (i.e., $1 \le i \le 12$), and $\bar{I}$ is the mean of seasonal indices (i.e., 100), then the coefficient of seasonal variation *s* related to Montenegrin tourism in the year *t* can be calculated as follows $s_t = \sqrt{\frac{\sum_{i=1}^{12}(I_i - \bar{I})^2}{12-1}}$ (see Mann, 2009, 98–102). The quantity $(I_i - \bar{I})$ in the previous formula is called the deviation of *Ii* from the mean $\bar{I}$. The smaller value of coefficient *s* means the smaller seasonality in Montenegrin tourism and vice versa, the greater value of *s* means the greater seasonality in the destination.

Seasonality ratio (R)

The seasonality ratio (*R*) is a relation between the highest number of monthly tourist arrivals and the average number of tourist arrivals per month. In our case study, where v_{sum} is the total number of tourist arrivals in Montenegro during the whole year (i.e., $v_{sum} = \sum_{i=1}^{12} v_i$), $\bar{v}$ is the average number of tourist arrivals (i.e., $\bar{v} = \frac{v_{sum}}{12}$) and the highest monthly number of tourist arrivals is v_h , the seasonality ratio *R* related to Montenegrin tourism in the year *t* is calculated as follows $R_t = \frac{v_h}{\bar{v}}$. With the same number of tourist

arrivals every month the ratio is one and if all visitors arrive in Montenegro in month *i* then the seasonality ratio is exactly twelve (i.e., $1 \le R \le 12$). With increasing seasonal variation, the seasonality ratio increases (Lundtorp, 2001, 29).

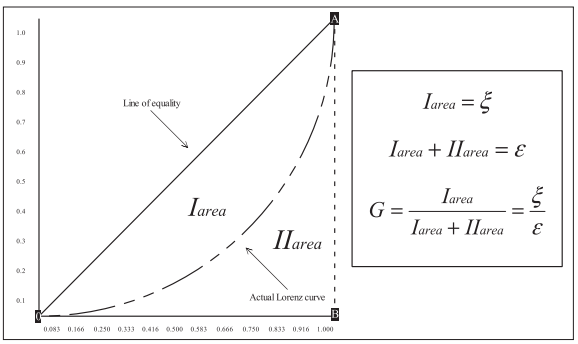
Seasonality indicator (ω)

The seasonality indicator (ω) is a ratio between the average number of tourist arrivals per month and the highest monthly number of tourist arrivals (i.e., the inverse value of the ratio used in calculating seasonality ratio *R*) and this definition was chosen because of the interpretation (Lundtorp, 2001, 29–30). Again, v_{sum} is the total number of tourist arrivals in Montenegro during the whole year (i.e., $v_{sum} = \sum_{i=1}^{12} v_i$), $\overline{v}$ is the average number of tourist arrivals (i.e., $\overline{v} = \frac{v_{sum}}{12}$) and the highest monthly number of tourist arrivals is v_h, then the seasonality indicator ω related to Montenegrin tourism in the year *t* is calculated as follows $\tilde{\omega}_t = \frac{\overline{v}}{v_h}$. This measure can take theoretical values between 0.08333 and one (i.e., $1/12 \le \tilde{\omega} \le 1$). With the same number of tourist arrivals every month the seasonality indicator is one and if all visitors come in Montenegro in month *i* then the seasonality indicator is 0.08333.

The Gini coefficient (G)

The Gini coefficient (*G*) is "a statistical measure of inequality" (Black, 2002, 197) and "is derived from the Lorenz curve" (Lundtorp, 2001, 30). In fact, the famous Lorenz curve is a graphical representation of inequality while the Gini coefficient is a measure for this inequality. For complete equality (the same number of tourist arrivals every month), which is an extreme situation, the Lorenz curve would be a straight line (i.e., represents 45° equality line) and it becomes more curved as inequality rises (Black, 2002, 279). On the other hand, the Gini coefficient is a number between 0 and 1 (i.e., $0 \le G \le 1$). The larger the Gini coefficient, the greater the inequality /seasonality in Montenegrin tourism/ and the smaller the Gini coefficient, the lower the inequality /seasonality in Montenegrin tourism/ (see Arnold, 2008, 578). More specifically, in tourism industry the Lorenz curve shows "the cumulated frequencies in rank with the lowest frequency (winter month) to the left and the month with the highest number of visitors to the right. With the same number of visitors every month, the Lorenz curve would be a straight line, the line of equality. The more unequal the seasonal distribution of visitors, the larger will be the area between the Lorenz curve and the line of equality (i.e., straight line). The Gini coefficient is calculated as the area between the curve and the 45° equality line divided by the entire area below the 45° line" (Lundtorp, 2001, 30). This idea is theoretically represented in Figure 1.

Figure 1: *The Gini coefficient.*



Source: Author.

Accordingly, the Gini coefficient in Montenegrin tourism is equal to the area between the line of equality (0A) and the actual Lorenz curve $\rightarrow I_{area} = \xi$, divided by the entire triangular area (0AB) $\rightarrow I_{area} + II_{area} = \varepsilon$ under the line of equality. As depicted in Figure 1, area ξ is divided by the triangular area ε. Then, the Gini coefficient *G* related to Montenegrin tourism in the year *t* can be calculated as follows $G_t = \frac{\xi}{\varepsilon}$. The closer value of the Gini coefficient to zero means the smaller seasonality in Montenegrin tourism and the closer value of the Gini coefficient to one means the stronger seasonality in the destination.

All of the measures are calculated separately using quantifying methods discussed above. At the same time, appropriate graphical representation of quanti-

fied values and actual number of tourist arrivals in Montenegro is depicted on the same graph. In our opinion, it is the best way for understanding seasonality phenomenon in tourism and one which offers a better possibility of highlighting key properties, especially the evolution of indicators and a comparison over time. Above all, to gain the best insight into the research questions it is inevitable to make parallels with other coastal destinations. For that purpose we chose to explore the seasonality issues in Turkish and Croatian tourism. Therefore, the results of quantifying seasonality in Montenegrin tourism are numerically and visually compared with the ones related to these two tourist destinations.

4 Data

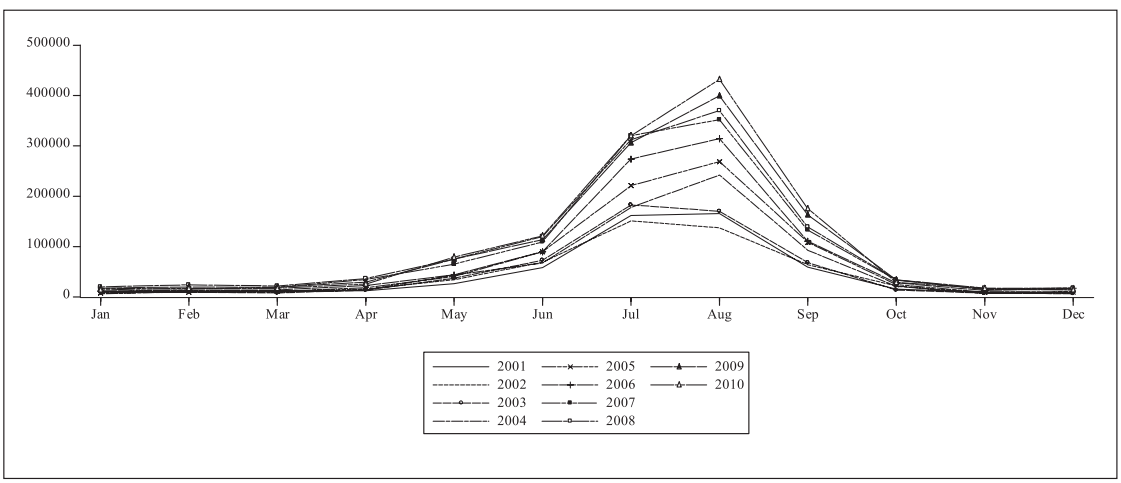
In order to quantify and understand seasonality pattern in Montenegrin tourism historical data is required. Fortunately, such a data set is obtainable from Statistical Office of Montenegro. We acquired the data regarding the monthly number of tourist arrivals in Montenegro, which covers the period of ten years, from January 2001 to December 2010, in which we have 120 observations – ten annual observations for each of the twelve months. In order to get a first impression of seasonality, yearly number of tourist arrivals in Montenegro is graphically represented in Figure 2 below.

First of all, graphical representation reveals that seasonality has a peak in July and August. As a result, we can say that these two months are the main season. Furthermore, it is visible that one shoulder season is during May and June, while September is another shoulder season. Finally, rest of the year (i.e., January, February, March, April, October, November and December) refers to the off-peak season in Montenegrin tourism. Unfortunately, the graph cannot fully explain the extent of seasonality because the effects of depiction of seasonal fluctuations are limited, thus calling for an additional discussion.

Prior to further discussion, we should also look at the descriptive statistics of the data related to the monthly number of tourist arrivals in Montenegro. Table 1 presents calculated values of the designated statistics – mean, median, maximum and minimum values, standard deviation, skewness and kurtosis.

At this point we are ready to report the results and try to contrast them with those obtained from similar tourist destinations (i.e., Croatia and Turkey – destinations relying on coastal tourism). Finally, it can help us in formulating correct concluding remarks regarding seasonality phenomenon in Montenegrin tourism.

Figure 2: *Yearly number of tourist arrivals in Montenegro: 2001–2010.*



Source: Statistical Office of Montenegro.

Table 1: *Descriptive statistics – monthly number of tourist arrivals in Montenegro.*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mean	46253	45142	49953	58624	68371	79494	94453	99010	100641	105249
Median	14256	18753	13758	17720	21536	25261	34019	35358	31714	27315
Maximum	165750	151284	182814	241916	268669	314279	351903	370293	399753	432268
Minimum	9642	6826	6377	6578	7999	11988	15617	17044	14054	14092
Std. Dev.	57736	50943	63555	76934	89393	105526	119457	120925	128252	138539
Skewness	1.46	1.24	1.34	1.49	1.39	1.50	1.44	1.44	1.45	1.45
Kurtosis	3.50	3.07	3.27	3.88	3.46	3.66	3.50	3.58	3.70	3.77

Source: Author's calculations.

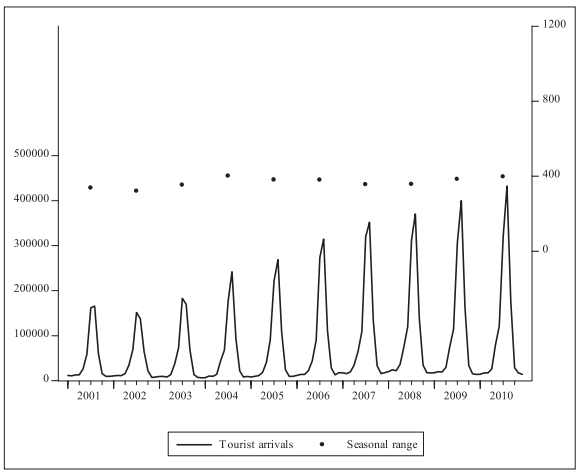
5 Results

Seasonal range

The second row of Table 2 shows the evolution of the seasonal ranges in Montenegrin tourism from 2001 to 2010. It is evident that all of the calculated values show a pronounced seasonality, thus supporting hypothesis H1. The highest value is about 401, while the lowest is about 320. Consequently, sub-hypothesis H1.1, that all calculated values of the seasonal ranges are over 350, cannot be accepted because not all of the calculated SR values support this supposition. In spite of the fact that stated sub-hypothesis is rejected, it is clear that the degree of seasonality in Montenegrin tourism is substantial.

Figure 3 shows a comparison of the calculated values of the seasonal ranges and the actual number of tourist arrivals in Montenegro. It is visible that over ten years time, from 2001 to 2010, the number of tourist arrivals were constantly growing. On the other side, the calculated values of seasonal ranges are quite steady, which implies that seasonality has not changed much over time. All of that reinforces our supposition stated in hypothesis H2, that seasonality in Montenegrin tourism is constant with only negligible variations.

Figure 3: *Comparison of calculated SR values and actual number of tourist arrivals in Montenegro: 2001–2010.*



Source: Author's calculations.

In hypothesis H3, we stated that in order to understand the nature of the phenomenon of seasonality in a tourist destination (i.e., degree and dynamics of seasonality) it is enough to use only one measure. Hence, it is very important for the ultimate success of this paper to check whether the other measures of seasonal variations also show a pronounced and constant seasonality in Montenegrin tourism.

Table 2: *Evolution of the Seasonal range: Montenegro, Croatia and Turkey (2001–2010).*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Montenegro	337.51	320.01	353.21	401.44	381.26	380.27	356.04	356.78	383.24	397.32
Croatia	309.27	320.60	327.21	315.22	304.04	288.14	290.01	296.75	316.00	311.09
Turkey	146.40	144.25	163.46	140.95	141.11	150.34	149.59	150.45	159.15	148.71

Source: Author's calculations.

With the aim of getting better results, it is significant to make a comparison with previously selected destinations. Subsequently, is the extent and dynamics of seasonality in Turkish and Croatian tourism similar to Montenegrin? Do these destinations also face with such a strong and constant seasonality? Table 2 above presents SR values for all destinations together.

According to the results, it is evident that seasonality in Montenegrin tourism is the strongest among the selected destinations – the highest SR value is about 401. Croatian tourism faces pronounced as well as constant seasonal variations too. However, the extent of seasonality is obviously smaller than in Montenegrin tourism – the highest SR value is about 327. The lowest but still constant extent of seasonality is recorded in Turkish tourism – the highest SR value is only about 163. There is a huge difference between the degree of seasonality in Montenegrin and Turkish tourism. Figure 4 displays the results graphically.

Coefficient of seasonal variation

The evolution of the coefficients of seasonal variation in Montenegrin tourism from 2001 to 2010 is presented in the second row of Table 3. The calculated values go from about 113, which is the lowest obtained value, to about 133, belonging to the highest one. According to that, the formulated sub-hypothesis H1.2, that all values of the coefficients of seasonal variation are over 120, is rejected – there is one calculated value under 120 while all others are over that number. Regardless of that, all calculated values of the coefficients of seasonal variation are quite large showing distinct seasonality in the number of tourist arrivals in Montenegro, and thus supporting the hypothesis stated in H1.

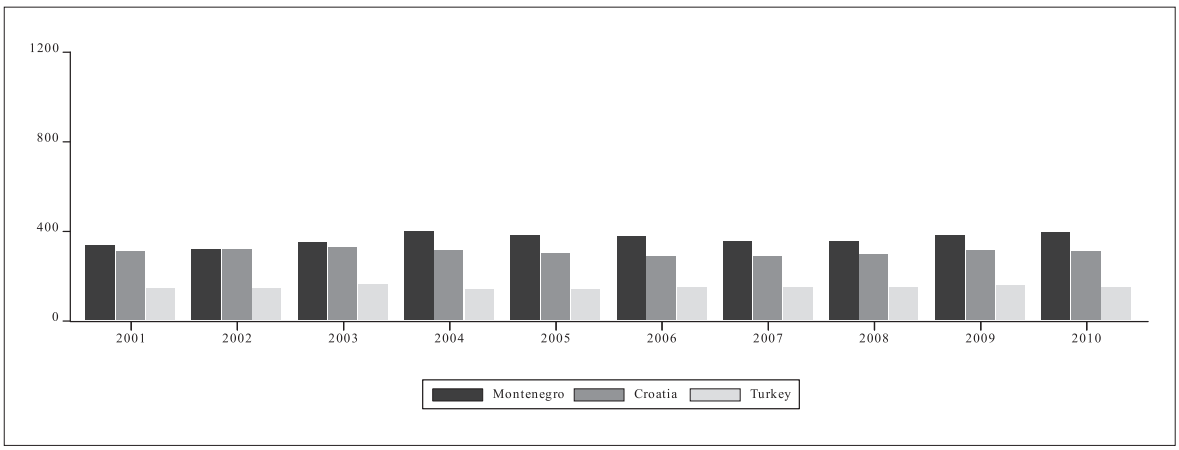
The comparison of the calculated s values and the actual number of tourist arrivals in Montenegro is depicted in Figure 5 below. All calculated values of the coefficients of seasonal variation are relatively stable throughout the years which again implies that seasonality has not changed much over time. On the

Table 3: *Evolution of the Coefficient of seasonal variation: Montenegro, Croatia and Turkey (2001–2010).*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Montenegro	124.82	112.85	127.23	131.23	130.75	132.75	126.47	122.14	127.44	131.63
Croatia	110.9	110.4	110.2	109.1	109.3	105.2	103.5	104.3	108.5	111.2
Turkey	53.3	53.3	59.1	51.1	50.7	52.3	52.9	53.4	53.4	52.2

Source: Author's calculations.

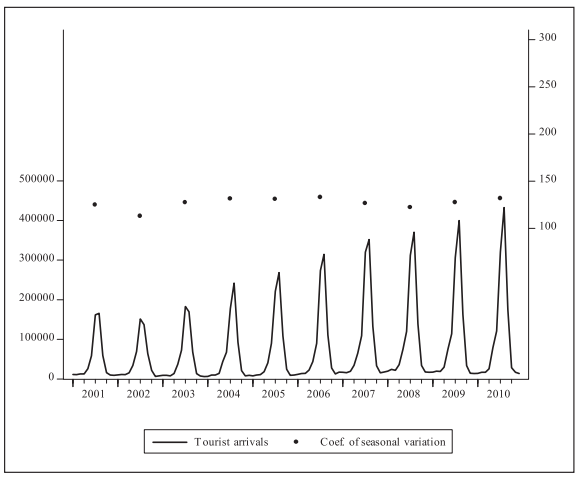
Figure 4: *Comparison of calculated SR values: Montenegro, Croatia and Turkey (2001–2010).*



Source: Author's calculations.

other side, the number of tourist arrivals has an upward trend. All of that strengthens our supposition stated in hypothesis H2, which is that seasonality in Montenegrin tourism is constant with negligible variations and the overall picture of seasonality, in terms of coefficient of seasonal variation, shows stability in the long run pattern. The same as the previous measure showed.

Figure 5: *Comparison of calculated s values and actual number of tourist arrivals in Montenegro: 2001–2010.*



Source: Author's calculations.

With respect to hypothesis H3, this measure also shows a pronounced and constant seasonality pattern in Montenegrin tourism, thus confirming that it is enough to use only one measure with the purpose of understanding the nature (strength and dynamics) of seasonality phenomenon in a destination.

Further, Table 3 above and Figure 6 present calculated values of the coefficients of seasonal variation for all destinations together.

Again, it is obvious that seasonality in Montenegrin tourism is the strongest among the selected destinations – the highest value of s is about 133. Seasonality in Turkish tourism is more than two times weaker – the highest value of s is only about 59. An enormous difference between the degree of seasonality in Montenegrin and Turkish tourism is evident. Expectedly, calculated values of s show that Croatian tourism also faces with pronounced as well as constant seasonal variations. Nevertheless, the extent of seasonality is smaller than in Montenegrin tourism – the highest s value is about 111.

Seasonality ratio

The second row of Table 4 displays all calculated values of the seasonality ratios in Montenegrin tourism, from 2001 to 2010. It is obvious that all computed figures indicate prominent seasonality in the number of tourist arrivals, which supports hypothesis H1. The lowest obtained value of the seasonality ratio is about 3.35 and the highest calculated value is about 4.13. Thus, the formulated sub-hypothesis H1.3, that all values of the seasonality ratios are over 3, is accepted – all of the calculated values reinforce this supposition.

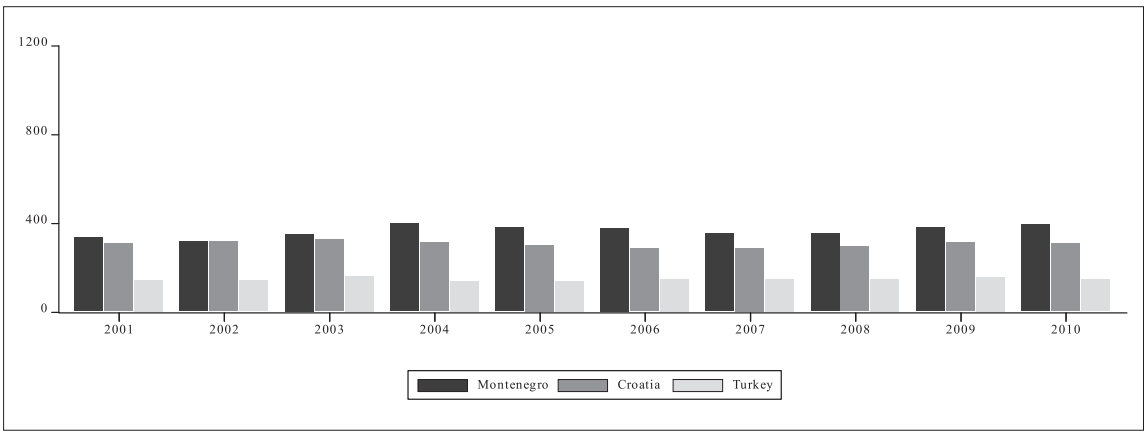
Figure 7 presents comparison of the calculated values of the seasonality ratios and the actual number of tourist arrivals in Montenegro. The figure demonstrates that seasonality pattern (values of the seasonality ratios) is very steady over time. On the other side, constant upgrowth has been recorded in the number of tourist arrivals in Montenegro. Indisputably, all of that supports our supposition stated in hypothesis H2, that seasonality in Montenegrin tourism is constant with only negligible variations.

Table 4: *Evolution of the Seasonality ratio: Montenegro, Croatia and Turkey (2001–2010).*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Montenegro	3.58	3.35	3.66	4.13	3.93	3.95	3.73	3.74	3.97	4.11
Croatia	3.23	3.34	3.39	3.27	3.16	3.01	3.03	3.11	3.31	3.23
Turkey	1.84	1.72	1.95	1.78	1.81	1.88	1.86	1.86	1.92	1.83

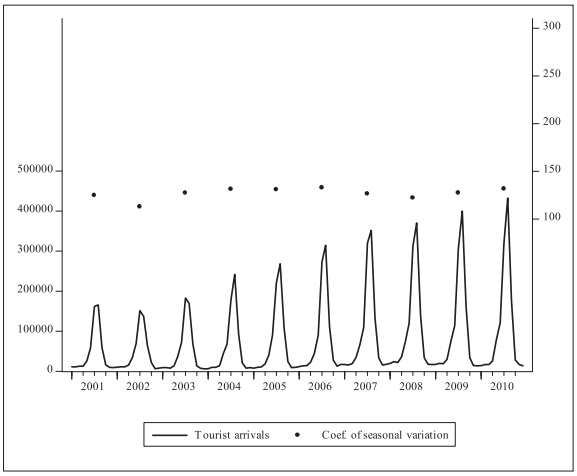
Source: Author's calculations.

Figure 6: *Comparison of calculated s values: Montenegro, Croatia and Turkey (2001–2010).*



Source: Author's calculations.

Figure 7: *Comparison of calculated R values and actual number of tourist arrivals in Montenegro: 2001–2010.*



Source: Author's calculations.

This measure also shows a pronounced and constant seasonality in Montenegrin tourism, thus supporting hypothesis H3, that it is enough to use only one measure in order to understand the nature of seasonality.

Table 4 above and Figure 8 show comparison of the calculated values of the seasonality ratios for all destinations together.

In terms of seasonality ratios, the seasonal variations in Montenegrin tourism are the strongest among the selected destinations – the highest R value is about 4.13. Croatian tourism also faces with a pronounced and constant seasonality but the degree is smaller than in Montenegrin tourism – the highest R value is about 3.39. Apparently, the extent of seasonality in Turkish tourism is relatively small – the highest R value is only about 1.95.

Seasonality indicator

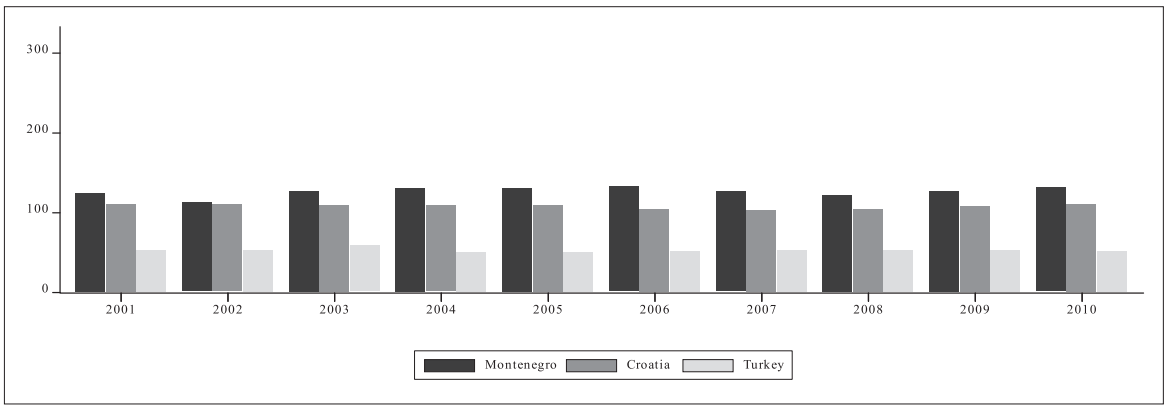
The second row of Table 5 lists all calculated values of the seasonality indicators in Montenegrin tourism. All figures are very small, which is a clear sign of a noticeable seasonal pattern in the number of tourist

Table 5: *Evolution of the Seasonality indicator: Montenegro, Croatia and Turkey (2001–2010).*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Montenegro	0.28	0.30	0.27	0.24	0.25	0.25	0.27	0.27	0.25	0.24
Croatia	0.31	0.30	0.29	0.31	0.32	0.33	0.33	0.32	0.30	0.31
Turkey	0.54	0.58	0.51	0.56	0.55	0.53	0.54	0.54	0.52	0.55

Source: Author's calculations.

Figure 8: *Comparison of calculated R values: Montenegro, Croatia and Turkey (2001–2010).*

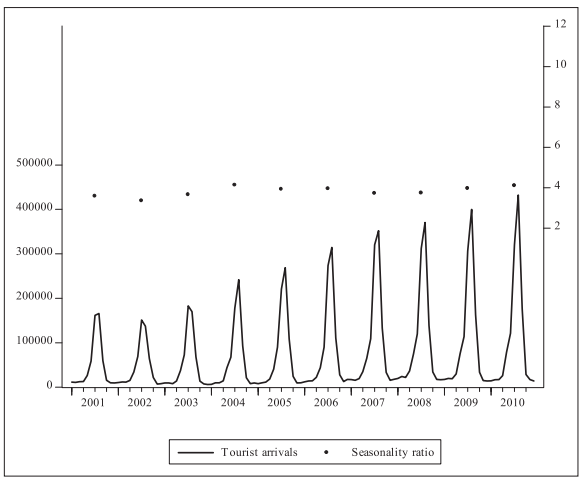


Source: Author's calculations.

arrivals in Montenegro. Furthermore, it reinforces hypothesis H1, that seasonality in Montenegrin tourism is pronounced. The highest obtained value is about 0.30 while the lowest one is about 0.24. According to that, the formulated sub-hypothesis H1.4, that all values of the seasonality indicators are under 0.35, is accepted – there is none calculated value over that number.

A time comparison of the calculated values of the seasonality indicators and the actual number of tourist arrivals in Montenegro is shown in Figure 9 below.

Figure 9: *Comparison of calculated ω values and actual number of tourist arrivals in Montenegro: 2001–2010.*



Source: Author's calculations.

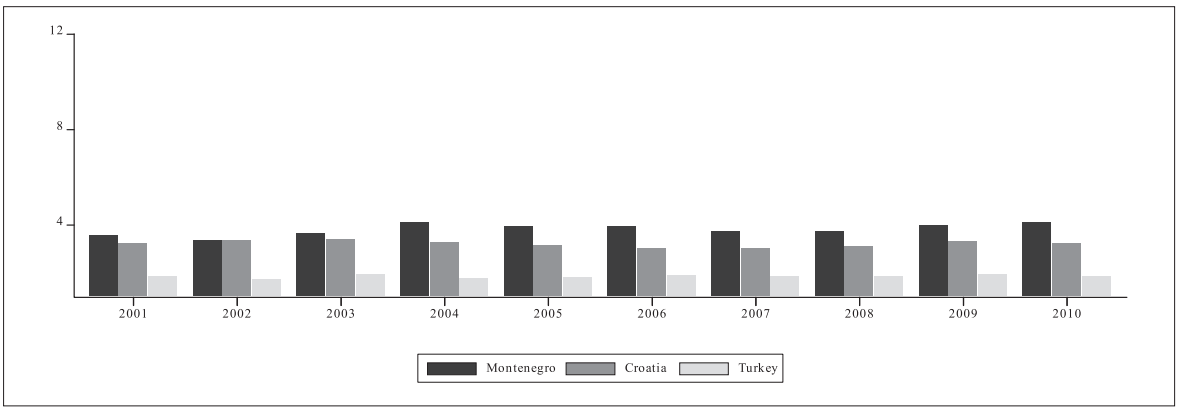
All calculated values of the seasonality indicators are relatively steady over the course of the ten years, which again implies that seasonality in Montenegrin tourism has not changed much over time. On the other side, the number of tourist arrivals has an increasing trend. All of that makes our supposition stated in hypothesis H2, that seasonality in Montenegrin tourism is constant with only negligible variations, stronger. This is exactly the same conclusion as the ones reached by all previous measures.

With respect to hypothesis H3, this measure also shows a pronounced and constant seasonality in Montenegrin tourism, thus implying that it is enough to use only one measure in order to understand the nature of seasonality.

With the intention of comparing the seasonality phenomenon among selected destinations, Table 5 above and Figure 10 present all calculated values of the seasonality indicators.

Once more, it is evident that seasonality in Montenegrin tourism is the strongest among the selected destinations – the smallest ω value is about 0.24. Croatian tourism faces with pronounced as well as constant seasonal variations too. In spite of that, the extent of seasonality is smaller than in Montenegrin tourism – the smallest ω value is about 0.29. Results also reveal that the lowest, but constant extent of seasonality refers to Turkish tourism – the smallest

Figure 10: *Comparison of calculated ω values: Montenegro, Croatia and Turkey (2001–2010).*



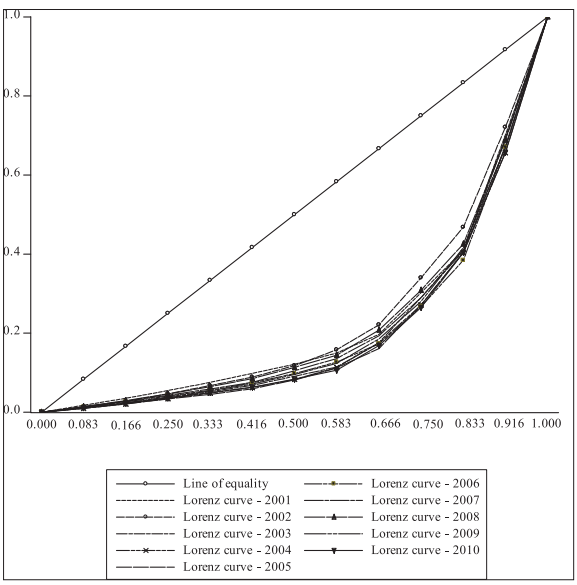
Source: Author's calculations.

ω value is even about 0.58. A huge difference between the degree of seasonality in Montenegrin and Turkish tourism is obvious.

The Gini coefficient

The Lorenz curves, each representing one year, along with the line of equality are outlined in Figure 11. Their resemblance is apparent, which suggests that Gini coefficients are quite similar in value. In addition, the first impression brings to mind a probable degree of seasonality in Montenegrin tourism. In fact, all Lorenz curves are far away from the line of equality, which implies that large values of the Gini coefficients in Montenegrin tourism can be expected.

Figure 11: *Lorenz curves – tourist arrivals in Montenegro: 2001–2010.*



Source: Author's calculations.

The second row of Table 6 reveals all calculated values of the Gini coefficients in Montenegrin tourism. All figures point out prominent seasonality in the number of tourist arrivals, which strongly supports hypothesis H1, that seasonality in Montenegrin tourism is pronounced. The highest obtained value of the Gini coefficient is about 0.61 and the lowest one is about 0.54. Therefore, the formulated sub-hypothesis H1.5, that all values of the Gini coefficients are over 0.5, is accepted – all of the calculated values back up this supposition.

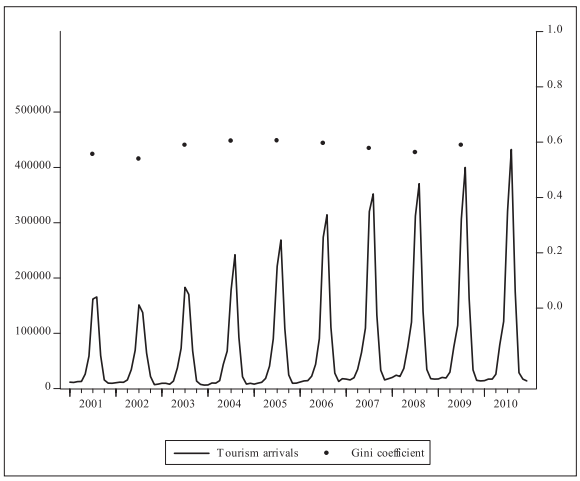
Figure 12 shows comparison of the calculated values of the Gini coefficients and the actual number of tourist arrivals in Montenegro. Over a ten year period of time from 2001 to 2010, the number of tourist arrivals were constantly expanding. On the other side, the calculated values of the Gini coefficients are very stable, which implies that seasonality is constant. All of that strongly strengthens our supposition stated in hypothesis H2, that seasonality in Montenegrin tourism is constant with only negligible variations.

Table 6: *Evolution of the Gini coefficient: Montenegro, Croatia and Turkey (2001–2010).*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Montenegro	0.56	0.54	0.59	0.60	0.61	0.60	0.58	0.56	0.59	0.61
Croatia	0.54	0.54	0.54	0.54	0.54	0.52	0.52	0.52	0.53	0.54
Turkey	0.29	0.29	0.32	0.28	0.27	0.28	0.29	0.29	0.29	0.28

Source: Author's calculations.

Figure 12: *Comparison of calculated G values and actual number of tourist arrivals in Montenegro: 2001–2010.*



Source: Author's calculations.

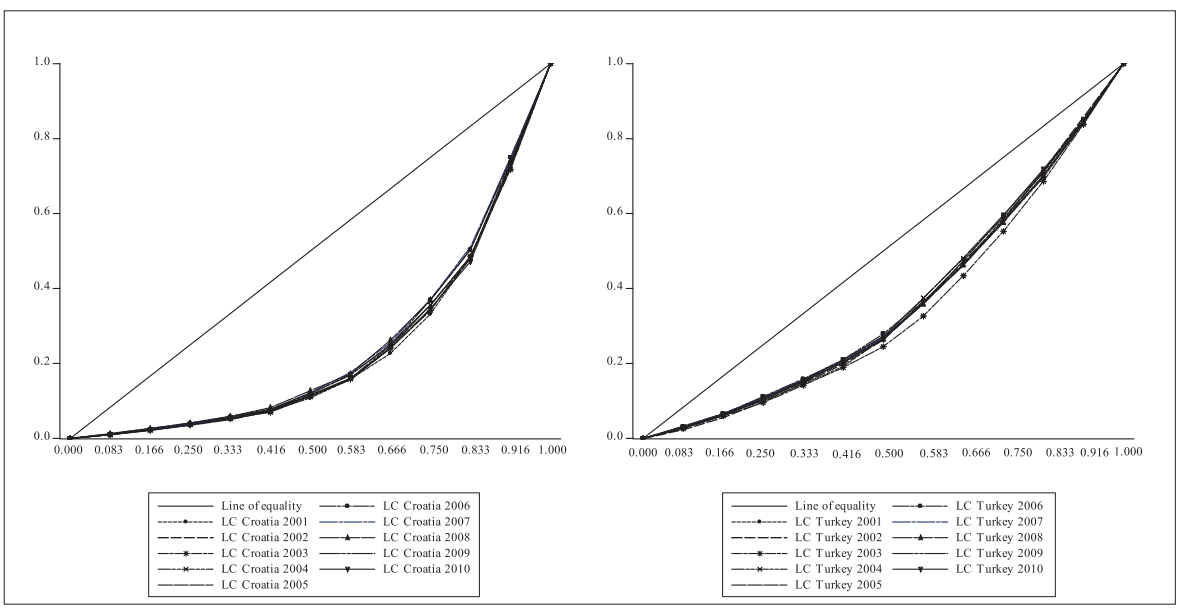
Like in any of the previous measures, the result of this one is the same, that seasonality in Montenegrin tourism is pronounced and constant, thus supporting hypothesis H3 – that it is enough to use only one measure.

Prior to comparing the Gini coefficients among the selected destinations, let us have a look at Figure 13 which presents two Lorenz curves related to Croatian and Turkish tourism.

Table 6 above and Figure 14 below show a comparison of the calculated values of the Gini coefficients for all destinations together.

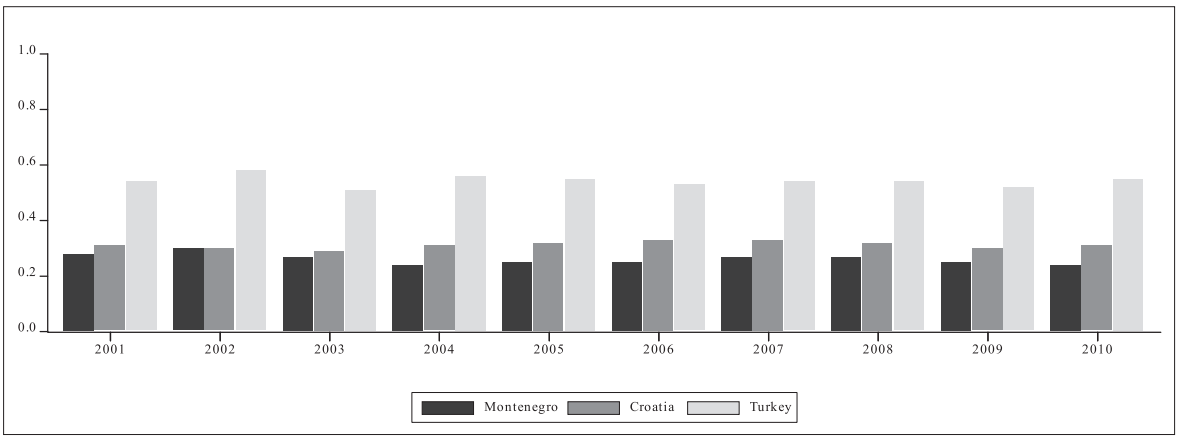
Once again, it is clear that seasonality in Montenegrin tourism is the strongest among the selected destinations – the highest value of the Gini coefficient is about 0.61. Seasonality in Turkish tourism is constant, but

Figure 13: *Lorenz curves – Croatia and Turkey (2001–2010).*



Source: Author's calculations.

Figure 14: *Comparison of calculated G values: Montenegro, Croatia and Turkey (2001–2010).*



Source: Author's calculations.

weaker – the highest G value is only about 0.32.[2] It is a vast difference. Croatian tourism also faces with pronounced and constant seasonality but the extent of seasonal variations is smaller than in Montenegrin tourism – the highest G value is about 0.54.

According to all results, three sub-hypotheses are accepted as correct, which enables us to also accept hypothesis H1 as correct. Furthermore, all quantified values approximate a constant level, with only negligible variations. Thus, we accept hypothesis H2 as correct as well. Additionally, in section 2.5, we stated that if all measures show the same result – pronounced as well as constant seasonality – we accept hypothesis H3 as correct. Indeed, all five measures confirm the correctness of the formulated hypothesis suggesting that in order to understand the nature of seasonality phenomenon in a tourist destination it is enough to use only one measure. As a result, we accept hypothesis H3, thus claiming that a combination of different measures brings no additional value to the understanding of the core characteristics of seasonality in a tourist destination.

2 For further reading about Gini coefficient in Turkish tourism see Karamustafa & Ulama (2010).

6 Discussion

This paper shows that seasonality in tourism has two characteristics: strength and dynamics. The first refers to the level or degree of seasonality while the second signifies variations over time.

To be able to understand these features it is necessary to quantify seasonal variations in a certain tourist destination. The first question: what is the most adequate quantifying method and are there any related theoretical implications that this paper presents? This question relates to hypothesis H3.

On the other side, when the results of measuring are obtained, it is essential to draw conclusions about seasonality in a specific tourist destination. The second question: what are practical implications that can be derived from quantifying the phenomenon of seasonality in Montenegrin tourism? This question relates to hypotheses H1 and H2.

6.1 Theoretical implication

In hypothesis H3 we stated: *to understand the nature of seasonality it is enough to use only one measure*. The acceptance of this hypothesis has an interesting theoretical implication: *there is no need for a holistic way of measuring*. Therefore, a combination of different measures brings no additional value to the

understanding of the nature of seasonality in a tourist destination. Accordingly, if the aim of quantifying is to comprehend the nature of seasonality, it is adequate and sufficient to use only one measure. All others will show the same key properties regarding to the nature of seasonality.

Bearing in mind characteristics of seasonal variations (strength and dynamics) as well as their potential combinations (strong and constant, strong and non-constant, weak and constant or weak and non-constant), it is evident that our study supported the correctness of the stated hypothesis. Using data related to three tourist destinations (Montenegro, Croatia and Turkey) and employing five measures (seasonal range, coefficient of seasonal variation, seasonality ratio, seasonality indicator and the Gini coefficient) we strongly enhanced our deduction. In all selected destinations, all other measures have confirmed the results of the first one.

6.2 Practical implications

In hypotheses H1 and H2 we stated: *seasonality in Montenegrin tourism is pronounced and constant with negligible variations*. The acceptance of these hypotheses has several practical implications related to Montenegrin tourism. Some of the most important are presented below.

Montenegro is an ecological country trying to establish sustainable tourist product throughout the whole year. Sustainable product in tourism industry requires a balance in terms of carrying capacity, available natural resources and number of visitors. Unfortunately, because of the pronounced seasonality, there is no balance in Montenegrin tourism, which is easily seen just by looking at the quantified values of seasonality. Namely, during the main season there is overuse of resources (i.e., number of tourists highly exceeds the carrying capacity limit) and during the two shoulder seasons there is under-utilization of resources (i.e., carrying capacity limit exceeds the number of tourists). An additional problem is a constant level of a strong seasonal pattern. According to all of that, the product sustainability is under threat during the peak season. The solution to this problem lays in reducing the seasonality phenomenon in Montenegrin tourism. The degree of seasonality should be approximately adequate to the carrying capacity limit.

A huge problem in Montenegrin tourism is the black market, which is a direct and negative consequence of pronounced and constant seasonality. Due to a large number of tourists and many economic activities during the main season, it is impossible to control all direct and indirect participants in the market. A pronounced seasonality "prevents" the authorities from taking proper and planned activities in order to reduce the black market. The main season is too short to enable adequate and coordinated actions. Consequently, a long run quality of tourist product is questionable. However, the solution to this problem is not in reducing the black market itself, because it is impossible. The solution is in reducing seasonality in Montenegrin tourism, which will gradually reduce, because of the better business environment, many illegal economic activities in the destination.

Montenegrin tourism also faces some problems related to tourism employment, which are yet another direct consequence of pronounced and constant seasonality. In fact, there is a paradoxical situation. The majority of employees are foreigners while residents are not eager to work, although the unemployment rate is very high. The cause of that situation is the very short working period due to a strong seasonality. On the other side, employers are not ready to recruit and retain full-time employees, again due to a pronounced seasonal variation. Accordingly, the solution to this problem requires the longer season that will motivate both, employers and employees to find common interests.

As a consequence of pronounced and constant seasonality, Montenegro is considered as coastal and mass, rather than selective and exclusive tourist destination. Actually, the current situation is far away from a desired destination image and, above all, from real potentials – based on diversity and quality of natural and artificial resources. Without reducing the extent of seasonality, it will be very hard to create and maintain a competitive and sustainable tourist product in Montenegro.

7 Conclusion

The results of this paper have academic as well as practical implications. Firstly, the outcomes of quantifying seasonality in tourism show that seasonal variations have two characteristics – strength and dynamics, and that in order to understand the nature of these attributes, in any tourist destination, it enough to use only one quantifying method (i.e., there is no need for a holistic way of measuring). Secondly, ten years is a long period of time and can provide reliable deductions about aspects of seasonality in a tourist destination. According to that, the case study of Montenegro provides us with a few important conclusions. Precisely, all measures show a pronounced seasonality in Montenegrin tourism. The results confirm the correctness of hypothesis H1, which is accepted. Furthermore, three sub-hypotheses are also accepted as correct, while two are rejected as incorrect. Sub-hypothesis H1.1 is rejected as incorrect, because not all values of the seasonal ranges satisfy the condition, although the great majority do. Sub-hypothesis H1.2 is also rejected as incorrect, because not all of the calculated values of the coefficients of seasonal variation satisfy the criterion. Sub-hypothesis H1.3 is accepted as correct. Namely, all values of the seasonality ratios satisfy the condition. It is the same with sub-hypotheses H1.4 and H1.5, where all seasonality indicators and the Gini coefficients satisfy the conditions. Additionally, all measures show that seasonality in Montenegrin tourism is constant with only negligible variations. Thus, the results confirm the correctness of hypothesis H2, which is also accepted. Therefore, we can draw certain conclusions about characteristics of seasonality in Montenegrin tourism. According to hypotheses H1 and H2, Montenegrin tourism faces pronounced as well as constant seasonality. Further, all measures show the correctness of hypothesis H3 suggesting that in order to understand the nature of seasonality phenomenon in a tourist destination it is enough to use only one measure. As a result, we accept hypothesis H3, thus claiming that a combination of different measures brings no additional value to the understanding of the nature of seasonality in a tourist destination.

Now that we know how to describe the unfavourable characteristics of seasonality in Montenegrin tourism, the right question is – what could be done in order to reduce such strong and constant seasonality? In our opinion, several critical issues need to be addressed (structure of accommodation establishments, destination pricing policy, tourist product diversification and better flight connections). However, it is very hard to provide a simple answer. Accordingly, this paper is a good starting point for more discussion, thus providing a basis for further research.

Kvantitativni kazalniki sezonskosti v turizmu: študija na primeru Črne gore

Povzetek

Namen članka je kvantificirati sezonsko variiranje v turizmu in uporabiti spoznanja o sezonski naravi turizma sebi v prid. Na podlagi podatkov o številu novih gostov v Črni gori smo izračunali pet kazalnikov: sezonski razpon v številu gostov, koeficient sezonskega variiranja, sezonski kvocient, sezonski indikator in Ginijev koeficient. Na podlagi rezultatov kvantificiranja lahko zaključimo, da je turizem v Črni gori izrazito sezonske narave. Gre za stalen pojav, ki tudi na daljši časovni rok beleži le zanemarljivo variiranje. Med rezultati, pridobljenimi z uporabo različnih kazalnikov, ne obstajajo bistvene razlike. Na podlagi teh ugotovitev bi lahko zaključili, da je za razumevanje sezonske narave turizma dovolj, če se uporabi le en kazalnik, in da ni treba uporabiti celostnega meritvenega pristopa.

Ključne besede: sezonskost, število novih gostov, kazalniki, Črna gora

References

Arnold, R. A. (2008). *Economics*. Mason, Ohio: Cengage Learning.

BarOn, R. V. (1975). *Seasonality in tourism: A guide to the analysis of seasonality and trends for policy making*. London: The Economist Intelligence Unit Limited.

Bender, O., Schumacher, K. P., & Stein, D. (2007). Landscape, seasonality, and tourism: a survey with examples from Central Europe. In H. Palang, H. Sooväli, & A. Printsmann (Eds.), *Seasonal landscapes* (pp. 181–214). Dordrecht: Springer.

Bender, O., Schumacher, K. P., & Stein, D. (2005). Measuring seasonality in Central Europe's tourism – how and for what? Talk: CORP 2005 – GeoMultimedia 05. In: M. Schrenk (Ed.), *10th International conference on information & communication technologies (ICT) in urban planning and spatial development and impacts of ICT on physical space* (pp. 303–309). Wien: Technische Universität.

Biederman, P. S. (2008). *Travel and tourism: An industry primer*. Upper Saddle River: Pearson Education.

Black, J. (2002). *A dictionary of economics*. NewYork, NY: Oxford University Press.

Butler, R. W. (2001). Seasonality in tourism: issues and implications. In T. Baum & S. Lundtorp (Eds.), *Seasonality in tourism* (pp. 5–22). Oxford: Elsevier Science.

Chung, J. Y. (2009). Seasonality in tourism: A review. *e-Review of Tourism Research, 7*(5), 82–96.

Cooper, C., Wanhill, S., Fletcher, J., Gilbert, D., & Fyall, A. (2008). *Tourism: Principles and practice*. Harlow: Pearson Education.

GOV. (2011). Retrieved July 18, 2011, from http://www.gov.me

Holloway, J. C., Humphreys, C., & Davidson, R. (2009). *The business of tourism*. Harlow: Pearson Education.

Hylleberg, S. (1992). General introduction. In S. Hylleberg (Ed.), *Modelling seasonality* (pp. 3–14). Oxford: Oxford University Press.

Karamustafa, K., & Ulama, S. (2010). Measuring the seasonality in tourism with the comparison of different methods. *EuroMed Journal of Business, 5,* 191–214. doi: 10.1108/14502191011065509.

Koenig-Lewis, N., & Bischoff, E. (2005). Seasonality Research: The State of the Art. *International Journal of Tourism Research, 7*(4–5), 201–219.

Lundtorp, S. (2001). Measuring tourism seasonality. In T. Baum & S. Lundtorp (Eds.), *Seasonality in tourism* (pp. 23–50). Oxford: Elsevier Science.

Mann, P. S. (2009). *Uvod u statistiku*. Belgrad: Centar za izdavačku delatnost Ekonomskog fakulteta u Beogradu.

Ministry of tourism and environment. (2008). *Montenegro tourism development strategy to 2020*. Podgorica: Author.

Nadal, J. R., Font, A. R., & Rosselló, A. S. (2004). The economic determinants of seasonal pattern. *Annals of Tourism Research, 31,* 697–711. doi:10.1016/j.annals.2004.02.001.

Pearce, D. (1989). *Tourist development*. Harlow: Longman.

Reece, W. S. (2010). *The economics of tourism*. Upper Saddle River: Pearson Education.

Sharpley, R. (2002). Tourism: A vehicle for development? In R. Sharply, & D. J. Telfer (Eds.), *Tourism and development: Concepts and issues* (pp. 11–34). Clevedon: Channel View Publications.

Wall, G., & Mathieson, A. (2006). *Tourism: Change, impacts and opportunities*. Harlow: Pearson Education.

Weidner, S. (2009). *Seasonality in tourism: A review of seasonality of hotel accommodation in New Zealand*. Munich: GRIN Verlag.