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Measuring Pattern, Amplitude and Timing Differences between Monetary and Non-Monetary Seasonal Factors of Tourism – The Case of Aruba

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Measuring Pattern, Amplitude and Timing Differences between Monetary and Non-Monetary Seasonal Factors of Tourism - The Case of Aruba

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Abstract
Seasonality is a frequent and important occurrence in the tourism industry, with simultaneous effects on both the volume and financial flows of tourism. The seasonal characteristics of these monetary and non-monetary tourism indicators can show diverging paths. Lack of synchronization between the seasonal patterns of these two types of indicators of tourism development can produce suboptimal situations, with less than best choices when formulating and implementing anti-seasonal policies. The purpose of this study is to measure pattern, amplitude and timing differences between the seasonal factors of monetary and non-monetary indicators of tourism development in Aruba. The study contributes to the gap in the literature on the dynamics in the co-movement of these two types of seasonal factors, while concurrently incorporating three measurement dimensions of this relation. Moreover, the study introduces novel calculation techniques in two of the three measurement dimensions. The methodology involves decomposing time series on both monetary and non-monetary variables using Census X12-ARIMA, with subsequent calculation of Pearson’s correlation coefficients, median relative differences, and median timing differentials. The results show important quarterly differences in pattern, amplitude and timing of the seasonal factors, in terms of the applied timeframe, periodicity, variables and markets involved. The findings implicate the need for synchronizing strategies and a differentiated anti-seasonal policy.

Keywords: seasonality, Aruba, seasonal patterns, amplitude, timing, monetary and non-monetary tourism indicators

JEL classification: O11; C13; O29; Y10; Z18

¹The views expressed in this paper do not necessarily reflect those of the Central Bank of Aruba.
1. Introduction

Seasonality is a concept frequently encountered in the tourism industry. It is one of the most problematic issues facing tourism, yet it is one of the least understood aspects of this business (Jang, 2004). Its importance crosses over from the academic literature to the domains of policy making and practical tourism management (Koenig-Lewis & Bischoff, 2005; De Cantis et al., 2011). Butler (2001) defines seasonality 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 in highways and other forms of transportation, employment and admissions to attractions.” (p. 5).

According to Hylleberg (1992), the causes of seasonality can be convened into three groups, i.e., weather (e.g., variations in temperature, rainfall, snowfall, sunlight, daylight, etc.), calendar effects (e.g., timing of religious events such as Christmas, Easter, etc.), and timing decisions (e.g., school vacation). From the perspective of tourism, Butler (2001) distinguishes between institutional seasonality (resulting from religious, cultural, ethnic and social behavior of humans) and natural seasonality (which has to do with regular temporal and recurring variations in natural phenomena, for example, the climate). The typologies of both authors have common linkages with each other (e.g., weather seasonality with natural seasonality), which boils down to the seasonal phenomenon being a combination of both man-made and natural events.

There are numerous effects ascribed to seasonality, and understanding these impacts is critical for the tourism industry because seasonal variations can affect destination image, destination choice, and tourists’ decisions on spending (Goh, 2012). Periodical swings in the flow of tourists, for example, produce situations of over-capacity, non-utilization of infrastructure, decrease in the work force and absence of investments during low seasons (Pegg et al., 2012), causing reduced profitability and productivity (Karamustafa & Ulama, 2010). On the other hand, peak seasons of tourist flows can be characterized by over-use of public utilities (e.g., water supply, waste management, and road use), causing dissatisfaction with residents and tourists alike, while the environment can irreversibly suffer from damages because of tourism pressures (Cuccia & Rizzo, 2011). These effects may explain why there has been considerable efforts from both the public and private sectors to attempt to reduce seasonality in destination areas (Cannas, 2012). But, the literature shows as well that seasonality not always has a negative influence. For example, the environment needs a period of time to recover from heavy usage
during peak seasons (Pegg et al., 2012), while maintenance work on buildings and attractions can be better done during off-peak periods (Cannas, 2012). It is, however, generally recognized that seasonality has more negative effects, particularly from a socio-economic perspective (Karamustafa & Ulama, 2010). In any case, identifying the seasonal model affecting a destination’s tourism is necessary to better understand and cope with the recurring developments in tourism.

Three important weaknesses have been identified in the literature on tourism seasonality. Firstly, the literature has mostly compared seasonality between non-monetary indicators of tourism development (e.g., comparing seasonality of visitors from different countries of origin), with much less emphasis on seasonal relations between monetary and non-monetary indicators. Seasonality is not an isolated event, but occurs in both physical and financial facets of tourism development. Each type of indicator has its own prominence for the tourism industry. For example, monetary indicators could be important for profitability of businesses and the generation of foreign exchange for destinations. Non-monetary indicators, such as number of visitors, on the other hand, may be important for job stability (e.g., the more visitors there are during each time of the year, the more people are continuously needed to adequately serve them). The comparison between monetary and non-monetary tourism seasonal factors could be important for when considering anti-seasonal policies. The literature on this type of policy (see for example Yacoumis, 1980; Koenig-Lewis & Bischoff, 2010; Cannas, 2012) has been particularly geared towards finding solutions for the physical side of tourism seasonality (e.g., attracting more visitors or lowering them during certain periods) with much less consideration for the role of financial traits in seasonality. The latter could, for example, present undesirable consequences for the revenue management goals of businesses. Secondly, differences in seasonality between monetary and non-monetary tourism indicators can occur because of dissimilarities in patterns, levels of seasonal intensities as well as timing inconsistencies (e.g., seasonal peaks occurring earlier in one variable compared to the other). The literature has considered combinations of two of these measurement approaches (e.g., Dracatos, 1987; Koenig-Lewis & Bischoff, 2005; Croce & Wöber, 2010), but as far as is known, no study has considered all three lines of measurement together. Thirdly, when analyzing tourism seasonality using time series, the recurring periodic variations are best recognized and evaluated when eliminating other factors, such as trend and incidental elements. A number of authors have emphasized the
available tools to quantify seasonality (e.g., Bender et al., 2005; Koenig-Lewis & Bischoff, 2005; De De Cantis & Ferrante, 2011; Cantis et al., 2011), where popular methods such as the Gini coefficient, the coefficient of variation, and the seasonal index have been analyzed. However, the literature has spent little attention on the diagnostics of the calculated seasonal factors and whether these are immediately suitable for comparison in analyses, with possible biased conclusions in tourism seasonality studies.

The purpose of this paper is to compare the discrepancies in the seasonal factors of monetary and non-monetary indicators of tourism development in Aruba, in terms of patterns, amplitude and timing differences. The methodology involves decomposing time series on both monetary and non-monetary variables using Census X12-ARIMA, with subsequent calculation of Pearson’s correlation coefficients, median relative differences, median variances, and median timing differentials. Understanding differences in seasonality between both monetary and non-monetary tourism indicators could provide policy makers and practitioners of tourism (revenue) management with crucial information on how to design the appropriate mix of measures to simultaneously cope with the seasonal phenomenon in both these types of indicators of tourism development.

This study allows for a triad of contributions to the literature. Firstly, the study compares seasonality of both monetary and non-monetary factors, which has received little attention in the literature. The proposed research contributes to this literature gap by improving the understanding on the dynamics of the co-movement of seasonal factors of monetary and non-monetary indicators of tourism. Secondly, the study simultaneously explores three dimensions of seasonality, which is most likely a novel approach. Also, the study proposes original methods for measuring both amplitude and timing differences between seasonal factors of monetary and non-monetary tourism indicators. Thirdly, the study contributes as well to the literature on seasonality in small open island economies such as the case of Aruba.

The rest of this paper is organized as follows. Section two presents an overview of the literature covering the empirical relation between seasonal factors in tourism. Section three discusses tourism development in Aruba over the past decades. Section four reviews the data and the applied methodology, while section five presents the empirical results. Section six concludes and offers policy implications and lines for future research.
2. Literature Review

The tourism literature has considered the seasonality phenomenon from several angles of approach. For example, Ashworth & Thomas (1999), Dritsakis (2008) and Karamustafa & Ulama (2010) have looked at how seasonality varied during the year, using one of more methods to measure this phenomenon. A second group of studies (Goh & Law, 2002; Kulendran & Wong, 2005; Lim et al., 2009; Vergori, 2012) departed from a forecasting perspective, whereby they looked at several models for forecasting tourism demand, with a relevant role laid out for seasonality. Another cluster in the tourism literature has looked at seasonality as an impacted or impacting factor (e.g., Lim & McAllee, 2000; Yu et al., 2009, 2010; Hadwen et al., 2011; Boffa & Succurro, 2012; Goh, 2012; Pegg et al., 2012). For example, Yu et al. (2010) found that the seasonal factor of weather conditions impacted those of demand for two parks in the United States. Alternatively, authors such as Yacoumis (1980), Baum & Hagen (1999), Sharpley (2003), Jang (2004), Koenig-Lewis & Bischoff (2005) and Cannas (2012) looked at the formulation and implementation of anti-seasonal policies to contain seasonal effects. An extended faction in the seasonality literature has considered seasonality by comparing seasonal differences of particularly tourism demand data (Drakatos, 1987; Donatos & Zairis, 1991; Fernández-Morales, 2003; Bender et al., 2005; Koenig-Lewis & Bischoff, 2002; Ahas et al., 2007; Koc & Altinay, 2007; Croce & Wöber, 2010; De Cantis & Ferrante, 2011; De Cantis et al., 2011). For example, Drakatos (1987) compared the monthly seasonal patterns of arrivals to Greece from several destinations (including Austria, Italy, France, United Kingdom, Yugoslavia and US) for the period 1980-1985, and found considerable differences between the seasonal patterns of the nationalities arriving in Greece. Lim & McAleer, (2000) compared the seasonal patterns of tourism arrivals from Hong Kong, Malaysia and Singapore to Australia, and noted considerable differences between the seasonal patterns of these three tourism-generating countries.

There is no general agreement as to which data should be used to measure and analyze seasonality (Koenig-Lewis & Bischoff, 2005). Tourism demand in the studies comparing seasonality has been represented by variables such as tourist arrivals (Drakatos, 1987; Lim & McAleer, 2000; Bender et al., 2005), average spending per person (Koc & Altinay, 2007), hotel nights (Fernández-Morales, 2003), bednights (Croce & Wöber, 2010) and hotel bed occupancy rates (De Cantis & Ferrante, 2011; De Cantis et al., 2011). These variables are often linked to international demand for the destination studied, although in some instances (e.g., De Cantis &
domestic demand has also been included in the analysis. With the exception of Koc & Altinay (2007), these studies have almost exclusively been based on comparing the seasonality of non-monetary indicators. The latter authors perhaps come closest in terms of analyzing the differences in seasonal patterns of both monetary and non-monetary indicators of tourism development by investigating seasonal variations in monthly per person tourist spending in Turkey. For this purpose, they collected monthly data (January 1992-December 2004) on tourist arrivals and tourism receipts, which they subsequently used to calculate the average spending per tourist. Their findings suggest that the seasonal pattern in per person tourist spending was considerably different from the seasonal pattern of tourist arrivals and tourism receipts. On itself, this is an interesting conclusion that adds credence to the idea of comparing seasonal factors of both monetary and non-monetary indicators.

Analyzing seasonality requires the ability to adequately quantify this phenomenon. Yet, there are no general guidelines how to measure seasonality (Koenig-Lewis & Bischoff, 2005). The methodologies applied in calculating and analyzing the seasonal patterns vary from study to study. For example, Bender et al. (2005) applied several measures of seasonality, including seasonality ratio and Gini coefficient, combined with bi-variate Pearson’s correlation to gauge and evaluate seasonality. Koenig-Lewis & Bischoff (2002) used a multiplicative model of seasonal decomposition (whereby the seasonal factor was determined as the difference between the actual and the average value), and different measurement techniques, including concentration indices, Gini coefficients, amplitude ratios and indices of similarity to analyze the seasonality.

Croce & Wöber (2010) calculated the average bednights of 20 European city destinations as a proxy for the seasonal patterns, and subsequently applied Gini coefficients and Pearson’s bi-variate correlation coefficients to make seasonal comparisons. The methodological differences were also determinant for whether variations in seasonality were fixed for the whole period of analysis (e.g., Drakatos, 1987; Bender et al., 2005), or varied over the course of time (e.g., Koenig-Lewis & Bischoff, 2002; Koc & Altinay, 2007; De Cantis & Ferrante, 2011; De Cantis et al., 2011).

Most of the studies were geared towards analyzing differences in seasonal patterns, and in some instances (Koenig-Lewis & Bischoff, 2005; Croce & Wöber, 2010), both patterns and amplitude differences were analyzed. None of the studies have considered examining differences in timing between the seasonal factors, which is considered an omission in these studies.
While all studies found important differences in seasonality, there are three key methodological drawbacks found in the analyzed literature. Firstly, except for some exceptions like the rigorous work by Koc & Altinay (2007), Dritsakis (2008) and Vergori (2012), little attention has been given to the issue of whether the seasonal factors were deterministic or stochastic in nature. This distinction is important because stochastic seasonal series have long memory, whereby shocks will last forever and may actually permanently change the seasonal pattern (Hylleberg et al., 1990). According to Beaulieu & Miron (1993), the investigation of seasonal unit roots logically precedes the examination of other kinds of seasonality, because the latter can produce spurious results if seasonal unit roots are present but unaccounted for. Secondly, many of the studies did not provide any diagnostics on either the presence of seasonality, or the calculated seasonal patterns themselves. One can, for example, not determine the quality of the calculated seasonal data in these investigations. Lack of qualitatively adequate seasonal factors can produce biased results in the analysis of seasonality. Thirdly, the reviewed literature is particularly silent on comparing seasonal patterns in the same unit of analysis. Analyzing data with the same unit features is a precondition to avoid biased comparisons. The unit problem can be circumvented by standardizing the seasonal factors before starting with the comparison process. Considering these methodological downsides can improve the reliability of the results in the end, and will be considered in the further course of this study.

3. Tourism and Seasonality in Aruba

Aruba is a small island located about 32 km from the Northern coast of Venezuela. It has an area of 180 km² (or about 1½ times the surface area of Walt Disney World in Orlando, Florida), and a population of about 100,000 people. Tourism has been a source of income for more than fifty years. The industry started to get grip in 1959, when the island built its first 100-room hotel, modeled after similar ones in Florida and Puerto Rico (Cole & Razak, 2009). However, for a long time, the tourism industry played only a small role in the overall economic development of Aruba, given the dominant position of an oil refinery, the Lago Oil & Transport Company, Ltd. (Vanegas & Croes, 2000). The situation changed in 1985, when the oil refinery closed its doors, causing a shock to the Aruban economy. At that time, the refinery contributed to about 25% of Aruba’s gross domestic product (GDP), and directly and indirectly employed between 30%-40%
of Aruba’s population (Ridderstaat, 2007). Moreover, it provided about 50% of the foreign exchange earnings of the island and contributed to about 40% of all tax earnings.

The detrimental situation made finding a new source of economic activity a top priority. The most obvious way to increase income and foreign exchange receipts was to expand the tourism industry (Ridderstaat, 2007). Soon, new hotels, shopping malls and other commercial buildings were rising from the ground. The number of hotel rooms more than tripled, from 2,524 in 1986 to 7,975 in 2011. The efforts paid off: the number of stay-over visitors grew from 181,211 in 1986 to 871,316 in 2011. Tourism receipts grew from US$ 157.2 million in 1986 to US$ 1,340.8 million in 2011.

Today, tourism is the mainstay of the Aruban economy. According to the World Travel and Tourism Council (2012), tourism accounted for about 2/3 of the total GDP and employment in 2011. The United States is by far the largest market for Aruba, accounting on average for 65.4% of all stay-over visitors between 1996 and 2011. The Venezuelan market is the second largest market for Aruba (average 12.2% between 1996 and 2011). Together, these two countries accounted on average for about 77.6% of all stay-over visitors to Aruba between 1996 and 2011. Other smaller markets include, among others, Colombia, the Netherlands, Canada, Argentina and Brazil.

Seasonality in Aruba’s tourism is likely to be based predominantly on fundamentals external to the island. Weather conditions in Aruba are less volatile than in, for example, countries with four weather seasons, like the United States. The island is located in an area called the Southern Caribbean Dry Zone, with a discernible dry and rainy season, and sustained moderate to fresh easterlies (Meteorological Department of Aruba, 2013). Aruba has clear skies and bright sunshine almost every day of the year, with an average air temperature around 27.8 degrees (Aruba Tourism Authority, 2013). This makes local weather perhaps less influential on the seasonal tourism demand from various markets. According to Croes (2007), seasonality in tourism demand from the U.S. is probably influenced by institutional factors (e.g., school holidays, Christmas) and the weather in that country (particularly the winters season). In the case of demand from the Latin American market, this may generally be affected by weather conditions in the country of origin itself (both winter and summer periods). In the specific case of Venezuela, which has mostly similar climate conditions as in Aruba, other seasonal influences, such as school vacations, the Holy Week, and Christmas may be the most
determining factors in the seasonality of demand from this market. Hotels in Aruba may also influence the seasonal demand from those tourists with less hefty budgets, i.e., by pricing their room according to the season, whereby high season prices can outbalance the low season ones by up to 40% (Croes, 2007). In this way, domestic seasonal factors can steer to some extent the seasonality of demand from this specific group of tourists.

4. Data and Methods
This study is conceptually defined according to the framework presented in Figure 1, where the seasonal factors of the monetary indicators of tourism are compared with those of the non-monetary indicators. The monetary indicators are proxied by the variables tourism expenditures and average daily expenditures. The study employs these two types of revenue indicators to test for the robustness of the findings. Both variables are included in aggregate form (respectively, TOUREXP_TOT and ADE_TOT) and are further segmented into the US, Venezuelan and other tourism markets (respectively TOUREXP_USA, TOUREXP_VEN, TOUREXP_OTH, ADE_USA, ADE_VEN, and ADE_OTH). The US and Venezuelan markets are included separately, given their relatively importance in Aruba’s stay-over tourism (the latter is defined here as tourists remaining for 1 night or longer on the island). The other markets segment includes all other tourism markets (Colombia, the Netherlands, Canada, Argentina, Brazil, etc.). The data on the monetary indicators are derived from the periodical survey of the Central Bureau of Statistics of Aruba, and cover the period of the first quarter 1996 up to and including the fourth quarter of 2011.
The non-monetary statistics (number of stay-over visitors, and visitors’ nights) are also segmented into a total, US; Venezuela and others components (respectively \text{STAYVIS\_TOT}, \text{STAYVIS\_USA}, \text{STAYVIS\_VEN}, \text{STAYVIS\_OTH}, \text{NIGHTS\_TOT}, \text{NIGHTS\_USA}, \text{NIGHTS\_VEN}, \text{NIGHTS\_OTH}). Again, two types of non-monetary indicators are included in this study to test for the robustness of the outcomes. The data here are derived from the Central Bank of Aruba. In order to further test for the stability of the results, we have also included the period 2007-2011 in the analysis. So, basically, robustness in this study is assessed by applying different variables to represent both monetary and non-monetary indicators, and by applying different periods of analysis. Table 1 presents an overview of the variables involved in the study, where we transformed the variables into log function to stabilize their variance (Farooque, 2003). The table includes as well a number of descriptive statistics of the variables, i.e., the mean, median, maximum and minimum values as well as the coefficient of variation. The mean and
median values of all variables are fairly close to each other, and, in some instances even identical. This implicates the absence of outliers, as can be seen by the small differences between the minimum and the maximum values, and the relatively low coefficients of variation.

<table>
<thead>
<tr>
<th>Table 1: Variables used in the analysis</th>
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<td>Variable</td>
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Note: the coefficient of variation is equal to the ratio between the standard deviation and the mean.

To get a first impression of the seasonal differences between the monetary and non-monetary tourism indicators, we calculated first the quarterly ratios of each indicator in their annual total. Subsequently, we calculated the median values of these ratios per quarter, and subtracted then 25% from the results. The 25% is a proxy for the case when there is no seasonal factor influencing the quarterly results, where under normal conditions the ratio would be 25% for each quarter. The remaining values after subtraction provide a preliminary indication of the seasonal factors. Combinations of both monetary and non-monetary seasonal factors are presented in Charts 1-4, for both the periods 1996-2011 and 2007-2011. All charts show variations between the corrected ratios of both monetary and non-monetary seasonal factors, for all quarters. These differences are noticeable not only between the periods of analysis (1996-2011 versus 2007-2011), but also between quarters. This means that the further analysis of the differences should also consider a quarterly approach.
Economic time series often exhibit substantial seasonality, bringing with it the possibility that there may be unit roots at other frequencies than the zero frequency in the spectrum (Hylleberg et al., 1990). Therefore, the time series properties of the data need to be determined in order to make an accurate inference about the seasonal movements in the data (Koc & Altinay, 2007). The imposition of one kind of seasonality when another one is present can lead to serious biases or loss of information, making it therefore important to establish the kind of seasonality that is present in the series (Beaulieu & Miron, 1993). Seasonal unit root tests are much more complicated than the simple unit root tests, because they tend to have different unit roots, for example, quarterly, semi-annual and annual basis (Song et al., 2009). Hylleberg et al. (1990) developed a test to determine whether time series contain unit roots at other frequencies than the conventional long-term position. Following Dritsakis (2008), we apply the following HEGY test:

\[ Y_{4t} = \pi_1 Y_{t-1} + \pi_2 Y_{2t-1} + \pi_3 Y_{3t-1} + \pi_4 Y_{4t-1} + u_t \]  

(1)

Where

\[ Y_{4t} = (1 - L^4)Y_t = Y_t - Y_{t-4} \]  

(2)

\[ Y_{1t-1} = (1 + L + L^2 + L^3)Y_{t-1} = Y_{t-1} + Y_{t-2} + Y_{t-3} + Y_{t-4} \]  

(3)

\[ Y_{2t-1} = -(1 - L + L^2 - L^3)Y_{t-1} = -(1 - L)(1 + L^2)Y_{t-1} = -Y_{t-1} + Y_{t-2} - Y_{t-3} + Y_{t-4} \]  

(4)

\[ Y_{3t-1} = -(1 - L^2)Y_{t-2} = -(1 - L)(1 + L)Y_{t-2} = -Y_{t-2} + Y_{t-4} \]  

(5)

\[ Y_{4t-1} = -(1 - L^2)Y_{t-1} = -Y_{t-1} + Y_{t-3} \]  

(6)

\[ u \] normally and independently distributed error term with zero mean and constant variance.

\[ L \] = Backward shift operator

The above equation can be estimated by the ordinary least squares method involving an intercept, a time trend and three seasonal dummies. There are three hypotheses that will be tested here:

1. \( H_0: \pi_1 = 0, H_1: \pi_1 < 0 \rightarrow t\text{-test} \)
2. \( H_0: \pi_2 = 0, H_1: \pi_2 < 0 \rightarrow t\text{-test} \)
3. \( H_0: \pi_3 = 0, H_1: \pi_3 \neq 0 \text{ and } \pi_4 \neq 0 \rightarrow F\text{-test} \)
If the first hypothesis is not rejected ($\pi_1 = 0$), then there is a unit root at the zero frequency (or a non-seasonal unit root in the time series). If the second hypothesis is not rejected, then there is a seasonal unit root at the semi-annual frequency. If the third hypothesis is not rejected, there is a unit root at the annual frequency.

Time series usually consist of four components (Trend, Cycle, Seasonal factor and Irregular factor), and can be either multiplicative or additive (Bails & Peppers, 1993). The multiplicative model is a multiplication of these four components:

$$S = T \times C \times S \times I$$  \hspace{1cm} (7)

where:

- $S$ = Series;
- $T$ = Trend;
- $C$ = Cycle;
- $S$ = Seasonal factor;
- $I$ = Irregular factor.

In the additive model, the relation between these components is as follows:

$$S = T + C + S + I$$  \hspace{1cm} (8)

The Census X12-ARIMA decomposition method is applied here to each of the series. In economic applications, it is one of the most widely used procedures to decompose a time series (De Cantis & Ferrante, 2011). This produces a trend-cycle (TC), a seasonal factor (S), and an irregular component (I). Prior to applying the Census X12-ARIMA technique, the data were analyzed for the type of model (additive or multiplicative) they belong to. We apply here the following regression, borrowed from den Butter & Fase (1988), to assess the model type:

$$|Y - Y_T| = \alpha + \beta Y_T + \epsilon_t$$  \hspace{1cm} (9)

where:

- $Y$ = the original value of the time series;
\( Y_T \) = the centralized moving average of \( Y \) over a period of a year;
\( \alpha, \beta \) = coefficients;
\( \varepsilon \) = error term.

If \( Y \) and \( Y_T \) are uncorrelated, meaning that the coefficient \( \beta \) is not significantly different from zero, the model type is additive. If \( \beta \) is significantly different from zero, the model is multiplicative.

Simultaneously, when applying the Census X12-ARIMA methodology, we test the variables for the presence of seasonality using the following tests included in this decomposition approach: (1) a test for the presence of seasonality assuming stability (an F-test assessing the presence of seasonality at the 0.1% level); (2) a nonparametric test for the presence of seasonality assuming stability (a Kruskal-Wallis test assessing seasonality at the 1% level); (3) a moving seasonality test (an F-test assessing moving seasonality at the 5% level); (4) the ratio between moving seasonality and stable seasonality (according to the U.S. Bureau of Census (2010), this ratio should be less than 1). The two last tests provide information about the degree of variance of the seasonal factor from year to year (Bloem et al., 2001). These four tests will allow us to decide whether seasonality has a key role in the analysis of the monetary and non-monetary variables.

The next analyses are done per quarter to provide a better understanding of seasonality within this timeframe. The seasonal factors of both monetary and non-monetary indicators were first standardized in order to make an adequate comparison with each other. Three types of analyses will be conducted on the standardized data. The first evaluation involves the comparison of the seasonal patterns of the monetary against the non-monetary indicators. The aim here is to assess how much the monetary indicators move in concert with the non-monetary ones. The analysis of the differences in pattern between the standardized monetary and non-monetary indicators is done by calculating the Pearson’s correlation statistics, which measures the strength of the association between combinations of monetary and non-monetary indicators.

The second analysis compares the amplitudes of the seasonal patterns of both types of indicators (whereby amplitude is defined here as the difference between the points on the seasonal patterns and zero). The amplitude differences are determined by first calculating the relative differences between the standardized seasonal patterns of both monetary and non-monetary indicators of tourism demand, using the following formula:
where:
AD = Amplitude Difference;
SM = Seasonal pattern of monetary indicators of tourism development;
SNM = Seasonal pattern of non-monetary indicators of tourism development;
t = Time.

Basically, the AD determines the absolute difference between the monetary and non-monetary seasonal pattern in percent of the monetary seasonal pattern of tourism development. For instance, if $SM_t = 0.05$ and $SNM_t = 0.07$, the $AD_t = 40\%$ of the $SM_t$. We calculate the median value of the amplitude differences per quarter in order to get a one-dimensional overview of the results. The median is used here as the preferred measure of central tendency, because it is less subject to large fluctuations than the mean. Additionally, we calculate the median variance statistics for each quarter to determine which seasonal factor (monetary or non-monetary) has the largest amplitude. This is important when discussing strategies to synchronize seasonality in both monetary and non-monetary tourism indicators.

The third analysis encompasses determining the timing difference of occurrence of the seasonal patterns of the monetary versus the non-monetary indicators. The aim here is to measure whether the seasonal patterns of the monetary indicators have a lag, lead or coincident relation with those of the non-monetary indicators. To determine the timing difference between the seasonal patterns of monetary indicators and non-monetary indicators, the seasonal factors for each of the variables are first transformed using a ranking procedure to distinguish between the highest (value=1) and lowest (value=4) positions during a year. In formula:

\[
Y_{t,r} = 1 \text{ if } Y_t > (Y_{t+1}, Y_{t+2}, Y_{t+3});
\]
\[
Y_{t,r} = 2 \text{ if } Y_{t+1} > Y_t > (Y_{t+2}, Y_{t+3})
\]
\[
or \ Y_{t+2} > Y_t > (Y_{t+1}, Y_{t+3})
\]
\[
or \ Y_{t+3} > Y_t > (Y_{t+1}, Y_{t+2})
\]
\begin{align*}
Y_{t,r} &= 3 \text{ if } (Y_{t+2}, Y_{t+3}) > Y_t > Y_{t+1} \quad (15) \\
& \quad \text{or } (Y_{t+3}, Y_{t+1}) > Y_t > Y_{t+2} \quad (16) \\
& \quad \text{or } (Y_{t+1}, Y_{t+2}) > Y_t > Y_{t+3} \quad (17) \\
Y_{t,r} &= 4 \text{ if } Y_t < (Y_{t+1}, Y_{t+2}, Y_{t+3}) \quad (18)
\end{align*}

where \( r \) stands for ranked value. Subsequently, we determine the level of lag, lead or coincidence between the monetary and non-monetary seasonal factors, based on their ranking difference over time. For example, if \( Y_t \) is ranked 4th and \( X_{t+3} \) is also ranked at the same number, then \( Y_t \) is leading \( X_{t+3} \) by 3 quarters. Similarly, if \( Y_{t+3} \) is ranked 2nd and \( X_t \) is ranked 2nd, we can conclude that \( Y_{t+3} \) is lagging on \( X_t \) by 3 quarters. Again, we calculate here one-dimensional median timing differences for each quarter to assist the analysis.

5. **Empirical Results**

All estimates were obtained from Eviews 7.0 and Microsoft Excel 2010. Seasonal unit root test results show the non-rejection of the first hypothesis for the variables LSTAYVIS_USA, LSTAYVIS_VEN, LNIGHTS_TOT, and all monetary variables, implying that these variables have a unit root at the zero frequency, or a non-seasonal unit root (Table 2). However, the second and third hypotheses are rejected in all cases, meaning that there is no seasonal unit root at the semi-annual and annual frequencies. Given that we intend to work with seasonal factors only, and the absence of seasonal unit roots, there is no further transformation to the data necessary.
Prior to applying the seasonal decomposition procedure, we tested the data for the type of model (additive or multiplicative) they belong to. According to the results shown in Table 3, most of the variables were of the additive form. This contrasts with Baron (1975) who argued that most tourism-related time series could be best modeled using the multiplicative approach.
With these results, we proceeded to apply the Census X12-ARIMA technique, with the seasonality test results incorporated in Table 4. The F-test for stable seasonality showed significant results in almost all cases, except for LNIGHTS_USA and LADE_OTH. The seasonal factors of these two variables appear to be unstable. The Kruskal-Wallis test shows no evidence of seasonality under the assumption of stability for LADE_OTH, while the F-test for moving seasonality shows little evidence of this event, with the exception of LSTAYVIS_TOT, LTOUREXP_TOT, LADE_TOT and LADE_OTH. The last test, the ratio between moving seasonality and stable seasonality is larger than 1 for LNIGHTS_USA and LADE_OTH. Based on the above-detailed results, we decided to drop the variables LNIGHTS_USA and LADE_OTH from the further analysis in this study. This means that pattern, amplitude, and timing comparisons of seasonal factors between tourism expenditures US market and tourism nights US market, tourism expenditures other markets and tourism nights other markets, average daily expenditures US market and tourism nights US market, average daily expenditures other markets and stay-over other markets, and average daily expenditures other markets and tourism
nights other markets are not possible in this study, which is considered a delimitation for the ensuing analysis.

Charts 5a to 8d show the seasonal factors for total stay-over tourism, tourism nights, tourism expenditure and average daily rates. Visual inspection shows changing seasonal patterns over time, whereby amplitudes seem to become smaller in most of the cases. For example, in the case of the seasonal factor of stay-over tourism from Venezuela, amplitude differences show a contracting movement, particularly as of 2004/2005. The seasonal factors in these charts confirm the position of Salish & Rodrigues (2011) that seasonality is not necessarily fixed over time. This is, according to (Franses, 1996), because certain seasonal fluctuations may be triggered by the behavior of economic agents, which may not be constant over time. The ensuing statistical analysis will provide more clues about the patterns, amplitude and timing differences between the monetary and non-monetary seasonal factors.
For the correlation analysis, we transformed the data so that we now have all first, second, third and fourth quarter data separated from each other. The reason for this form of analysis is because
we want to test whether the correlation varies per quarter, as suggested by the initial analysis in Charts 1-4. Applying a correlation analysis on a normal time series would produce information on the level of association for all quarters together, but could hide details about lack of seasonal association during a specific quarter. The latter could prove important when considering synchronization strategies and anti-seasonal policies. Subsequently, we conducted the Pearson’s correlation analysis to determine the level of association of combinations of both seasonal factors of monetary and non-monetary indicators. The results are presented in Table 5, for both the whole period (1996-2011) and the sub period (2007-2011). The significant correlation cases are indicated with line borders). The table shows a number of interesting features. Firstly, the level of association is not the same each quarter (in line with the initial analysis in Charts 1-4), indicating variations in the strength of the linear relation between the seasonal monetary and non-monetary variables. For example, while during the first quarter, the seasonal factor of total tourism expenditure shows no significant association with both factors of stay-over tourism and tourism nights for the period 1996-2001, the fourth quarter shows significant relations between both combinations. Similarly, while during the first quarter of the sub period, the Venezuelan market showed significant association (both for stay-over and tourist nights) with the seasonal factor of average daily expenditure by this market, the second, third, and fourth quarters show no significant correlations. Secondly, there are several cases where the associations are significant, but negative, indicating that the direction of one variable is opposite to the other. For example, during the second quarter, the correlation between the seasonal factors of tourism expenditure and stay-over tourism of the US market was negative 0.9668, indicating that when the seasonal factor of one indicator was moving upwards, the other was almost completely going the opposite direction. Thirdly, the number of significant correlations in the total is larger when the monetary seasonal factor is total tourism expenditure. The relatively low numbers of significant correlations with total average daily expenditure as the monetary seasonal variable is likely to be the result of significant negative correlations in some markets that are cancelling out the significant positive correlations in other markets. These findings provide further clues that a differentiating anti-seasonal approach per quarter may be necessary to tackle these distinguishing outcomes.
Table 5: Pearson’s correlation coefficients of seasonal factors

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>LTA/AVB_TOT</td>
<td>LTA/AVB_USA</td>
<td>LTA/AVB_VEN</td>
<td>LTA/AVB_OTH</td>
<td>LAG TOT</td>
</tr>
<tr>
<td>First quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996-2011</td>
<td>0.0736</td>
<td>0.0938***</td>
<td>0.9061</td>
<td>-0.3289</td>
<td>-0.7098**</td>
</tr>
<tr>
<td>2001-2011</td>
<td>0.4529</td>
<td>0.4692</td>
<td>0.6720***</td>
<td>-0.9986**</td>
<td>0.8572**</td>
</tr>
<tr>
<td>2007-2011</td>
<td>-0.0012*</td>
<td>0.7220</td>
<td>-0.8870**</td>
<td>0.8572**</td>
<td></td>
</tr>
<tr>
<td>Second quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996-2011</td>
<td>0.0077</td>
<td>0.8418</td>
<td>0.6217**</td>
<td>0.4866***</td>
<td></td>
</tr>
<tr>
<td>2001-2011</td>
<td>-0.0691</td>
<td>-0.9668*</td>
<td>0.9930</td>
<td>-0.9983*</td>
<td></td>
</tr>
<tr>
<td>2007-2011</td>
<td>0.8678***</td>
<td>0.9736</td>
<td>0.9279*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996-2011</td>
<td>0.0538</td>
<td>0.8041*</td>
<td>0.3594</td>
<td>0.4028</td>
<td>-0.4042</td>
</tr>
<tr>
<td>2001-2011</td>
<td>-0.1098</td>
<td>0.1484</td>
<td>0.6012**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2011</td>
<td>0.8491***</td>
<td>0.5964</td>
<td>-0.8553*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996-2011</td>
<td>0.8677*</td>
<td>0.9183*</td>
<td>0.0816*</td>
<td>-0.1974</td>
<td>-0.4042</td>
</tr>
<tr>
<td>2001-2011</td>
<td>0.5341**</td>
<td>0.9694*</td>
<td>0.5330**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2011</td>
<td>0.0111</td>
<td>-0.4823</td>
<td>-0.8088***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *, ** and *** indicate, respectively, 1%, 5% and 10% significance (two-tailed).
The notable differences in significant association between the monetary and non-monetary seasonal factors may be further explained by analyzing these factors in terms of their amplitude and timing differences. Table 6 provides the median results of these calculations, per timeframe (1996-2011 and 2007-2011), per quarter, and per market. Median amplitude differences were calculated for the total and all markets selected in the study. Additionally, the median variances were calculated to determine which seasonal factor, monetary or non-monetary was the largest in terms of their amplitude. The results first show significant differences in median amplitudes between the monetary and non-monetary seasonal factors per quarter, but also per period of analysis. For the period 1996-2011, the largest median amplitude differences are found in the third and fourth quarters, while the first quarter has the smallest amplitude differences. When analyzing the sub period, the smallest amplitude differences were found in the third and fourth quarters, while the first and second quarters had the largest amplitude differences. The latter is because there are some significantly large amplitude differences, particularly when the monetary seasonal factor is the average daily expenditure. The calculated median variances show the monetary seasonal factor is larger than the non-monetary seasonal factor in the first, second and fourth quarters, for both period of analysis, meaning no change in the structure of the relation between both monetary and non-monetary seasonal factors. The non-monetary seasonal factor is larger than the monetary seasonal factor in the third quarter, again for both periods.

The results of the timing differences between the seasonal factors of both monetary and non-monetary indicators are also incorporated in Table 6. While for the period 1996-2011, the median timing differences for both seasonal factors of monetary and non-monetary indicators seem to coincide in the first and second quarters, the seasonal patterns of the monetary indicators generally lead those of the non-monetary indicators by 1 quarter in the third quarter, while lagging by 2 quarters in the fourth quarter. For the sub period, the monetary seasonal indicators lead those of the non-monetary indicators by 1 quarter in the first and third quarters. The timing in the second quarter is the same as in the whole period (coincident). The timing difference between the whole period and sub period in the fourth quarter remains the same (lag of 2 quarters).
Having identified the differences between seasonality of monetary and non-monetary tourism indicators, the final step is to delineate a cluster of possible strategies to mitigate the gap between
the seasonal factors of monetary and non-monetary indicators, from the perspective of the sub period (2007-2011). This period is selected here under the assumption that this period provides a better indication of current seasonal developments, given its more recent occurrence, and is then more suitable for policy purposes. The approach here is to consider each quarter of the sub period separately, while involving all influential markets in the strategy formulation. The proposed strategies are based in part on the literature on anti-seasonal policies (e.g., Koenig-Lewis & Bischoff, 2005; Lee et al., 2008; Cannas, 2012). However, for the sake of better understanding, these proposed measures should not be considered as anti-seasonal policy recommendations, but as strategies aimed at reducing the differences in seasonal factors between both monetary and non-monetary indicators. The results are included in Table 7. The proposed strategies depend on the outcome of the specific measurement dimensions (correlation, amplitude or timing), and also on the markets possibly affecting the overall outcome in these measures. The first and second quarters have some incidences where no specific actions were required. For example, no specific actions were deemed necessary in the case of both amplitude and timing differences for the combination of the seasonal factors of total tourism expenditure and total stay-over tourism in the second quarter. Most of the strategies were proposed in the third and fourth quarters, indicative of the largest number of disruptions in all three applied measures occurring in these two periods.
<table>
<thead>
<tr>
<th>Period of analysis</th>
<th>Main variables/seasonal factors involved</th>
<th>Type of analysis</th>
<th>Findings</th>
<th>Most probable causing variables</th>
<th>Possible strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First quarter</td>
<td>Total tourism expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>No significant correlation in US market. Also, correlation in Venezuelan market and other markets are canceling each other out</td>
<td>US and Venezuelan market: synchronizing tourism price development with (expected) development in US and Venezuelan tourism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of total tourism expenditure is about 1.5 times larger than that of total stay-over tourism</td>
<td>Seasonal factors of US and Venezuelan tourism expenditure, which are, respectively, 6% and 8% larger than their respective seasonal factors of stay-over tourism</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Coincident</td>
<td>Coincident US market</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td>Total tourism expenditure versus total tourism nights</td>
<td>Correlation</td>
<td>Significant negative correlation</td>
<td>Significant negative correlation in other markets</td>
<td>Other markets: (1) Synchronizing tourism price development with (expected) development in tourism nights in other markets; (2) introduction of seasonal (stay-over) tax</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of total tourism expenditure is about 3.5 times larger than that of total tourism nights</td>
<td>Amplitude differences in other markets (not included in the analysis)</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Coincident</td>
<td>Coincident US market</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td>Total average daily expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>Significant negative correlation in US market, canceling out correlation in Venezuelan market</td>
<td>Other markets: (1) Synchronizing tourism price development with (expected) development in stay-over tourism in US market; (2) introduction of seasonal (stay-over) tax</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of total average daily expenditure is about 2% (2%) smaller than that of total stay-over tourism</td>
<td>Amplitude differences in other markets (not included in the analysis)</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>seasonal factor total average daily expenditure leads over that of total stay-over tourism by 2 quarters</td>
<td>US (lead = 1 quarter), Venezuela (lead = 3 quarters) and possibly also in other markets (not included in the analysis)</td>
<td>(1) Financial planning and budgeting to manage physical financial difference; (2) Synchronizing tourism price development with development in stay-over tourism per market</td>
</tr>
<tr>
<td></td>
<td>Total average daily expenditure versus total tourism nights</td>
<td>Correlation</td>
<td>Significant negative correlation</td>
<td>Possibly, negative correlation in US and other markets</td>
<td>US and other markets: (1) Synchronizing tourism price development with development in total tourism nights; (2) introduction of seasonal (stay-over) tax</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of total average daily expenditure is about 3% (3%) smaller than that of total tourism nights</td>
<td>Amplitude differences in US market and to other markets (both not included in the analysis)</td>
<td>US and other markets: (1) Synchronizing tourism price development with development in tourism nights; (2) seasonal pricing to increase average daily expenditure in line with tourism nights development in both markets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Seasonal factor total average daily expenditure leads over that of total tourism nights by 3 quarters</td>
<td>Venezuelan market (lead = 1 quarter, possibly also US and other markets (both of which not included in the analysis)</td>
<td>US, Venezuelan and other markets: (1) financial planning and budgeting to manage physical financial difference; (2) Synchronizing tourism price development with development in tourism nights per market</td>
</tr>
<tr>
<td>Period of analysis</td>
<td>Main variables/seasonal factors involved in analysis</td>
<td>Type of analysis</td>
<td>Findings</td>
<td>Most probable causing variable(s)</td>
<td>Possible strategy</td>
</tr>
<tr>
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</tr>
<tr>
<td>Second quarter</td>
<td>Total tourism expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>US market (1) synchronizing tourism price development with expected development in US stay-over tourism (2) introduction of seasonal tourist tax</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude</td>
<td>Seasonal factor of total tourism expenditure is about 32.5% larger than that of total stay-over tourism</td>
<td>Amplitude differences in Venezuelan and other markets</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing</td>
<td>Coincidentally</td>
<td>Coincident US and other markets</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td>Total tourism expenditure versus total tourism stays</td>
<td>Correlation</td>
<td>Significant correlation</td>
<td>No specific action required</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude</td>
<td>Seasonal factor of total tourism expenditure is about 68.3% larger than that of total tourism stays</td>
<td>Amplitude differences other markets and possibly US market (not included in the analysis)</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing</td>
<td>Coincidentally</td>
<td>Coincident Venezuela and other markets, and possibly also the US market (not included in the analysis)</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td>Total average daily expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>US market and other markets: synchronizing tourism price development with expected development in stay-over tourism per market</td>
<td>US market and other markets: (1) Financial planning and budgeting to manage physical/financial differences (2) Synchronizing tourism price development with development in stay-over tourism per market (3) Promotional pricing (e.g., discount or free offers) and/or incentives on a temporal basis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude</td>
<td>Seasonal factor of total average daily expenditure is about 42.3% larger than that of total stay-over tourism</td>
<td>Amplitude differences other markets (not included in the analysis) and to some extent also the Venezuelan and US markets</td>
<td>US market and other markets: (1) Financial planning and budgeting to manage physical/financial differences (2) Synchronizing tourism price development with development in stay-over tourism per market (3) Promotional pricing (e.g., discount or free offers) and/or incentives on a temporal basis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing</td>
<td>Coincidently</td>
<td>Coincident US and other markets (not included in the analysis)</td>
<td>US market and other markets: (1) Financial planning and budgeting to manage physical/financial differences (2) Synchronizing tourism price development with development in stay-over tourism per market (3) Promotional pricing (e.g., discount or free offers) and/or incentives on a temporal basis</td>
</tr>
</tbody>
</table>
Table 7: Possible management strategies to close the gap between monetary and non-monetary seasonal factors (2017-2018) (continued)

<table>
<thead>
<tr>
<th>Period of analysis</th>
<th>Macroeconomic factors involved</th>
<th>Type of analysis</th>
<th>Findings</th>
<th>Most probable causing variable(s)</th>
<th>Recommended strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third quarter</td>
<td>Total tourism expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>Significant correlation</td>
<td>Significant correlations in US and other markets</td>
<td>No specific action required</td>
</tr>
<tr>
<td></td>
<td><strong>Amplitude differences</strong></td>
<td>Seasonal factor of total tourism expenditure is about 30% larger than that of total stay-over tourism</td>
<td>Possibly the fact that the median variance for both the US and other markets is negative, meaning that the seasonality factors of tourism expenditure is generally smaller than those of stay-over tourism. In the case of the Venezuelan market, this is the other way around.</td>
<td>US market (1st quarter)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Timing differences</strong></td>
<td>Seasonal factor total tourism expenditure leads over that of total stay-over tourism by 1 quarters</td>
<td>US market (1st quarter)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total tourism expenditure versus total tourism nights</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>No significant correlation in Venezuelan market possibly canceling out the positive correlation in other markets. Possibly, the US market has no significant correlation (not included in the analysis)</td>
<td>Venezuelan market (and possibly US market)</td>
<td>Synchronizing tourism price development with development in tourism nights per market;</td>
</tr>
<tr>
<td></td>
<td><strong>Amplitude differences</strong></td>
<td>Seasonal factor of total tourism expenditure is about 30% smaller than that of total tourism nights</td>
<td>Possible the US market is also not included in the analysis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Timing differences</strong></td>
<td>Seasonal factor total tourism expenditure leads over that of total tourism nights by 1 quarters</td>
<td>Other markets (all except US market) (not included in the analysis)</td>
<td>Other markets (1st quarter) and possibly all the other markets (not included in the analysis)</td>
<td>Other markets (1st quarter) and possibly all the other markets (not included in the analysis)</td>
</tr>
<tr>
<td>Total average daily expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>No significant correlation in Venezuelan market, and possibly also in the other markets (not included in the analysis)</td>
<td>US, Venezuela and other markets (2nd quarter)</td>
<td>(1) Financial planning and budgeting to manage physical financial difference; (2) Synchronizing tourism price development with development in stay-over tourism per market; (3) Promotional pricing (e.g., discount or free offers) and tax incentives on a temporal basis</td>
</tr>
<tr>
<td></td>
<td><strong>Amplitude differences</strong></td>
<td>Seasonal factor of total average daily expenditure is about 30% smaller than that of total stay-over tourism</td>
<td>Venezuelan and other markets (1st quarter) and possibly all the other markets (not included in the analysis)</td>
<td>Venezuelan and other markets (1st quarter) and possibly all the other markets (not included in the analysis)</td>
<td>Venezuelan and other markets (1st quarter) and possibly all the other markets (not included in the analysis)</td>
</tr>
<tr>
<td></td>
<td><strong>Timing differences</strong></td>
<td>Seasonal factor total average daily expenditure leads over that of total stay-over tourism by 1 quarters</td>
<td>US market (1st quarter)</td>
<td>US market (1st quarter)</td>
<td>(1) Financial planning and budgeting to manage physical financial difference; (2) Synchronizing tourism price development with development in stay-over tourism per market; (3) Promotional pricing (e.g., discount or free offers) and tax incentives on a temporal basis</td>
</tr>
<tr>
<td>Total average daily expenditure versus total tourism nights</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>No significant correlation in Venezuelan market, and possibly also in the other markets (both not included in the analysis)</td>
<td>Venezuelan market (2nd quarter)</td>
<td>Synchronizing tourism price development with expected vocation development</td>
</tr>
<tr>
<td></td>
<td><strong>Amplitude differences</strong></td>
<td>Seasonal factor of total average daily expenditure is about 30% smaller than that of total tourism nights</td>
<td>Venezuelan and other markets (both not included in the analysis)</td>
<td>Venezuelan and other markets (both not included in the analysis)</td>
<td>Venezuelan and other markets (both not included in the analysis)</td>
</tr>
<tr>
<td></td>
<td><strong>Timing differences</strong></td>
<td>Seasonal factor total average daily expenditure leads over that of total tourism nights by 2 quarters</td>
<td>Venezuelan market (2nd quarter), also possibly less in US and other markets (not included in the analysis)</td>
<td>Venezuelan market (2nd quarter), also possibly less in US and other markets (not included in the analysis)</td>
<td>Venezuelan market (2nd quarter), also possibly less in US and other markets (not included in the analysis)</td>
</tr>
<tr>
<td>Period of analysis</td>
<td>Main variables</td>
<td>Seasonal factors</td>
<td>Type of analysis</td>
<td>Findings</td>
<td>Most probable causing variable(s)</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>----------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Fourth quarter</td>
<td>Total tourism expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>Significant correlation: Venezuelan market may be translated out by significant negative correlation; other markets. Also no significant correlation with US market.</td>
<td>US and other markets' synchronizing tourism price development with expected stay-over development in both markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of tourism expenditure is about 9.8% larger than that of total stay-over tourism</td>
<td>Combination of amplitude differences in all three analyzed markets</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Seasonal factor of tourism expenditure lags over that of total stay-over tourism by 1 quarter</td>
<td>US market (lag = 1 quarter)</td>
<td>US market.</td>
</tr>
<tr>
<td></td>
<td>Total tourism expenditure versus total tour nights</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>Most probable negative correlation in US markets (not included in the analysis) in the positive correlations in Venezuela and other markets.</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of tourism expenditure is about 4.5% larger than that of total tour nights</td>
<td>Amplitude differences in US, Venezuela and possibly also US market (not included in the analysis)</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Seasonal factor of tourism expenditure lags over that of total tour nights by 1 quarter</td>
<td>Other markets (lag = 1, possibly also the US market (not included in the analysis))</td>
<td>Other markets.</td>
</tr>
<tr>
<td></td>
<td>Total average daily expenditure versus total stay-over tourism</td>
<td>Correlation</td>
<td>No significant correlation</td>
<td>Possibly significant positive correlation in other markets (as flagging the positive correlations in US and Venezuelan markets).</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of total average daily expenditure is about 9.8% larger than that of total stay-over tourism</td>
<td>Amplitude differences in US, Venezuela and possibly also other markets (not included in the analysis)</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Seasonal factor of total average daily expenditure lags over that of total stay-over tourism by 3 quarters</td>
<td>US (lag = 3 quarters), Venezuelan market (lag = 1 quarter) and possibly also the other markets (not included in the analysis)</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td>Total average daily expenditure versus tour nights</td>
<td>Correlation</td>
<td>Significant positive correlation</td>
<td>Possibly significant positive correlations in US other markets (not included in the analysis).</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amplitude differences</td>
<td>Seasonal factor of total average daily expenditure is about 10.5% larger than that of tour nights</td>
<td>Amplitude differences in Venezuela, market, and possibly also in US and other markets (both not included in the analysis)</td>
<td>US and other markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timing differences</td>
<td>Seasonal factor of total average daily expenditure lags over that of tour nights by 2 quarters</td>
<td>Venezuelan market (lag = 2 quarters). Also, possible effects by US and other markets (both not included in the analysis)</td>
<td>US and other markets.</td>
</tr>
</tbody>
</table>
6. Conclusion

Seasonality in tourism is more than just a recurring physical aspect. It is both a monetary and a non-monetary matter, and inconsistencies between the seasonal factors of both can produce suboptimal situations, with less best options when formulating and implementing anti-seasonal policies. This study investigated the discrepancies between seasonal factors of monetary and non-monetary indicators of tourism development in Aruba, by analyzing the pattern, amplitude and timing differences. The results show important differences in all three dimensions of analysis when comparing the seasonal factors of both monetary and non-monetary tourism indicators. These results were found to differentiate between timeframe of analysis (1996-2011 versus 2007-2011), quarter of analysis (first, second, third and fourth quarter), variable of analysis (stay-over tourism, tourism nights, tourism expenditures, average daily expenditures) and market of analysis (US, Venezuela and other markets). The latter differentiation was found to either mitigate or exacerbate the aggregate market results, depending on both the timeframe and quarter being considered.

The findings are important, not only because they shed light into the relation between the seasonal factors of a number of monetary and non-monetary tourism indicators, but also because they have important managerial implications. Firstly, the findings imply a need for strategies to synchronize the seasonal movements in both monetary and non-monetary tourism indicators to mitigate as much as possible the differences between the two types of indicators. These strategies could involve, among others, measures such as synchronizing physical developments with price developments and introducing seasonal taxes and/or promotional prices to allow for a more closely related co-circulation of both types of tourism indicators. Secondly, the findings point towards a more specific approach when it comes to delineating an anti-seasonal policy, which on itself has gained momentum over time (Ashworth & Thomas, 1999). The specificity has to do with a dynamic system of events that discriminates between quarters, markets and type of indicators. This approach would likely provide better results than a one-size-fits-all policy concept.

Some delimitation may apply to the data involved in this study. Firstly, the published data was available only on a quarterly basis, which hampers an analysis of the seasonal differentiation on a more frequent level of periodicity, for example, on a monthly basis. This inhibits a more in-depth level of diversification within the anti-seasonal policy. Access to monthly data could
strengthen the results. Secondly, the seasonality tests have excluded the variables of US tourism nights and average daily rates of the other markets from further analysis, resulting in the need to make presumptions in the end about possible causality effects involving these two markets. Access to monthly data could perhaps also solve this problem of identifying significant seasonal patterns for these two variables. Thirdly, the US and Venezuelan markets accounted for more than 75% of the total stay-over tourism in Aruba, and were, therefore, presented separately, while the other markets have remained in an aggregate form in this study to avoid complications in the analysis due to data overflow. The results have suggested a role for the other markets in explaining seasonal differences in the aggregate of both monetary and non-monetary tourism indicators. Additional studies to analyze seasonality in the markets grouped under this heading could strengthen the anti-seasonal policy when it comes to guidelines specifically intended for this group of markets.

Future research should focus on extending this investigation to target the markets incorporated under the other markets category, which could ultimately improve the quality of the anti-seasonal policy. Moreover, this study could be expanded to include other destinations, for example, other Caribbean islands, so to compare the findings with the results in these destinations. This could assist in benchmarking Aruba’s tourism performance in terms of seasonality with its competitors. The latter could also benefit the anti-seasonal policy, while it could contribute to the literature on the relationship between the seasonal factors of monetary and non-monetary tourism indicators.
References


