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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

Pn608jr

[1]The 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 occuring 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 comparisson 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 & McAleer, 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 &

Ferrante, 2011; De Cantis et al., 2011) domestic demand has also been included in the analysis. With the exception of Koc & Altinay (2007), these studies have alsmost 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 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 Pearsons 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 rations 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 comparissons. 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 km^2 (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 (Meterorological Department of Atruba, 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 holdidays, 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.

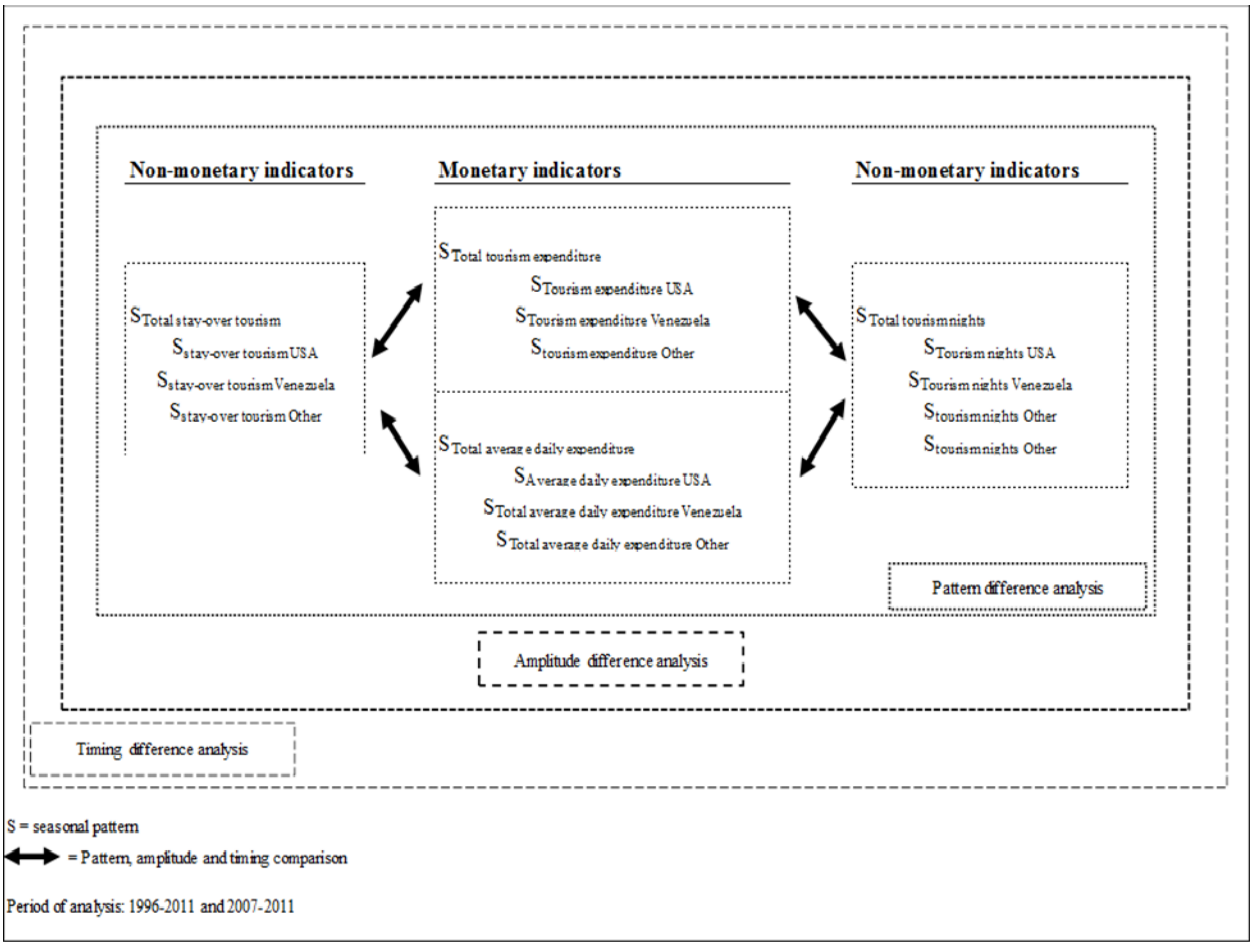

Fig. 1: Conceptual framework of the analysis of the seasonality relation between monetary and non-monetary indicators of tourism development

The non-monetary statistics (number of stay-over visitors, and visitors' nights) are also segmented into a total, US; Venezuela and others components (respectively STAYVIS_TOT, STAYVIS_USA, STAYVIS_VEN, STAYVIS_OTH, NIGHTS_TOT, NIGHTS_USA, NIGHTS_VEN, 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 1: Variables used in the analysis

Variable	Description	Mean	Median	Maximum	Minimum	Standard deviation	Coefficient of variation (in %)
LSTAYVIS_TOT	Logarithm of the total number of stay-over visitors	12.1	12.1	12.3	11.9	0.1	0.9
LSTAYVIS_USA	Logarithm of the number of stay-over visitors from the US market	11.7	11.7	12.0	11.2	0.2	1.4
LSTAYVIS_VEN	Logarithm of the number of stay-over visitors from the Venezuelan market	9.9	9.9	10.8	9.0	0.4	4.5
LSTAYVIS_OTH	Logarithm of the number of stay-over visitors from the other markets	10.6	10.6	11.0	10.2	0.2	1.9
LNIGHTS_TOT	Logarithm of total nights stayed by all stay-over visitors	14.1	14.1	14.4	13.8	0.1	0.9
LNIGHTS_USA	Logarithm of total nights stayed by stay-over visitors from the USA	13.3	13.6	14.0	11.6	0.8	5.7
LNIGHTS_VEN	Logarithm of total nights stayed by stay-over visitors from Venezuela	11.4	11.5	12.6	9.0	0.9	7.7
LNIGHTS_OTH	Logarithm of total nights stayed by stay-over visitors from the other markets	13.1	12.9	14.3	12.5	0.5	3.9
LTOUREXP_TOT	Logarithm of total expenditures made in Aruba by all stay-over visitors	11.9	11.9	12.3	11.6	0.1	1.1
LTOUREXP_USA	Logarithm of total expenditures made in Aruba by stay-over visitors of the USA	11.4	11.5	12.0	10.9	0.2	2.0
LTOUREXP_VEN	Logarithm of total expenditures made in Aruba by stay-over visitors of Venezuela	9.9	9.9	10.7	9.1	0.4	4.3
LTOUREXP_OTH	Logarithm of total expenditures made in Aruba by stay-over visitors of the other markets	10.5	10.4	11.0	10.1	0.2	1.7
LADE_TOT	Logarithm of total average daily expenditures	4.7	4.7	5.0	4.4	0.1	2.5
LADE_USA	Logarithm of average daily expenditures by visitors from the USA	4.7	4.6	4.9	4.4	0.1	2.5
LADE_VEN	Logarithm of average daily expenditures by visitors from Venezuela	5.0	5.0	5.5	4.6	0.2	3.9
LADE_OTH	Logarithm of average daily expenditures by visitors from the other markets	4.0	4.2	4.8	0.8	0.6	13.9

Note: the coefficient of variation is equal to the ratio between the 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.

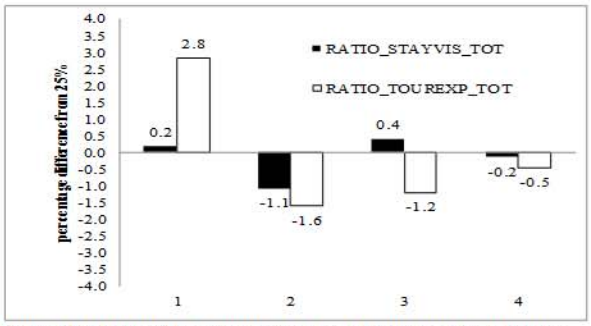

Chart 1a: Quarterly ratios between total tourism expenditures and total stay-over (1996-2011)

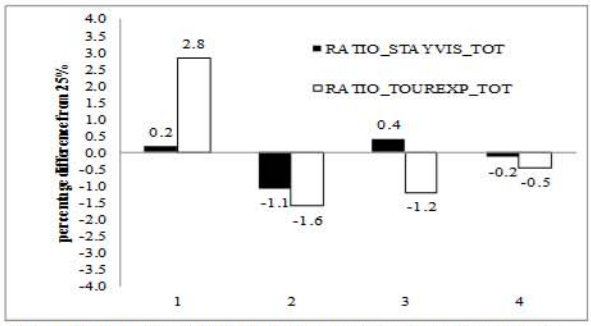

Chart 1b: Quarterly ratios between total tourism expenditures and total stay-over (2007-2011)

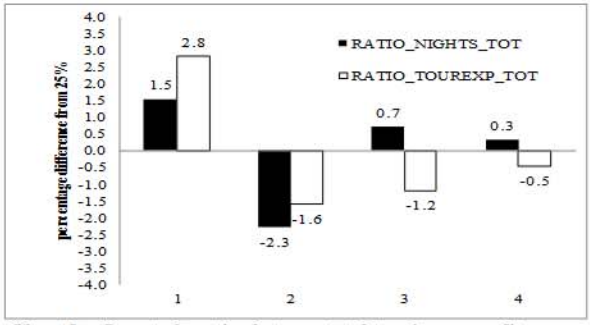

Chart 2a: Quarterly ratios between total tourism expenditures and total tourism nights (1996-2011)

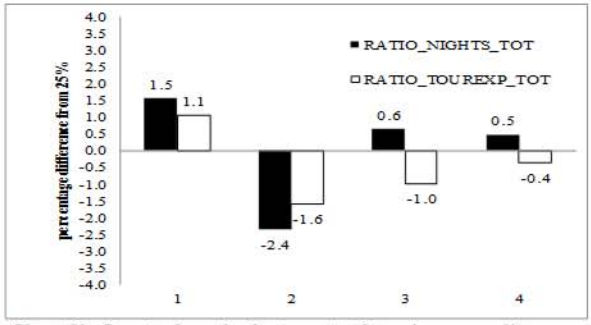

Chart 2b: Quarterly ratios between total tourism expenditures and total tourism nights (2007-2011)

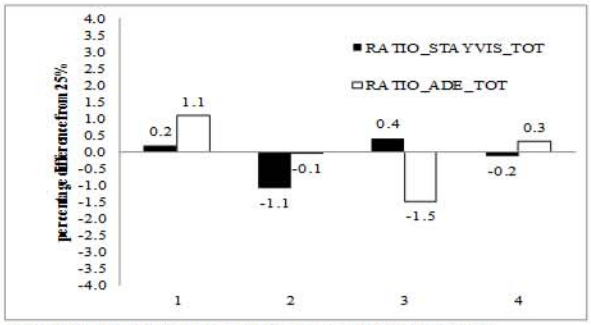

Chart 3a: Quarterly ratios between total average daily expenditure and total stay-over tourism (1996-2011)

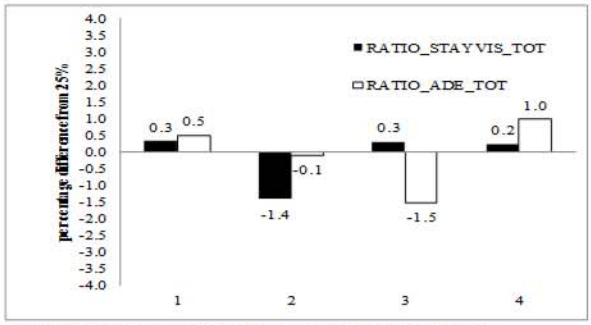

Chart 3b: Quarterly ratios between total average daily expenditure and total stay-over tourism (2007-2011)

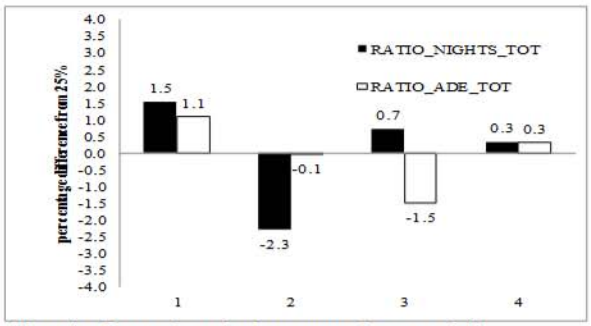

Chart 4a: Quarterly ratios between total average daily expenditure and total tourism nights (1996-2011)

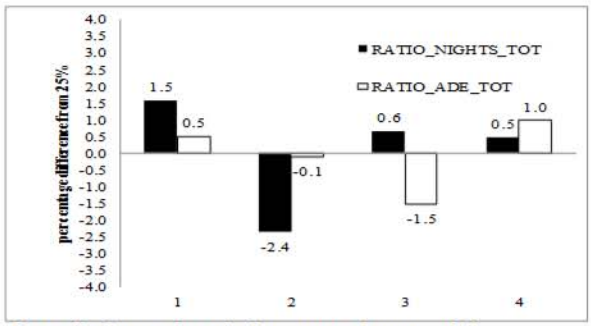

Chart 4b: Quarterly ratios between total average daily expenditure and total tourism nights (2007-2011)

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:

$$Y_{4t} = \pi_1 Y_{1t-1} + \pi_2 Y_{2t-1} + \pi_3 Y_{3t-1} + \pi_4 Y_{4t-1} + u_t \quad (1)$$

Where

$$Y_{4t} = (1 - L^4)Y_t = Y_t - Y_{t-4} \quad (2)$$

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

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

$$Y_{3t-1} = -(1 - L^2)Y_{t-2} = -(1 - L)(1 + L)Y_{t-2} = -Y_{t-2} + Y_{t-4} \quad (5)$$

$$Y_{4t-1} = -(1 - L^2)Y_{t-1} = -Y_{t-1} + Y_{t-3} \quad (6)$$

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-test
2. $H_0: \pi_2 = 0, H_1: \pi_2 < 0 \rightarrow$ t-test
3. $H_0: \pi_3 = 0, H_1: \pi_3 \neq 0 \; and \; \pi_4 \neq 0 \rightarrow$ F-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:

$$S = T \times C \times S \times I \tag{7}$$

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:

$$S = T + C + S + I \tag{8}$$

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:

$$|Y - Y_T| = \alpha + \beta Y_T + \varepsilon_t \tag{9}$$

where:

Y = the original value of the time series;

Y_T = the centralized moving average of Y over a period of a year;

α, β = coefficients;

ε = error term.

If Y and Y_T are uncorrelated, meaning that the coefficient β is not significantly different from zero, the model type is additive. If β 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:

$$AD_t = \frac{|SM_t - SNM_t|}{|SM_t|} x100\% \quad (10)$$

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 ADt = 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:

$$Y_{t,r} = 1 \; if \; Y_t > (Y_{t+1}, Y_{t+2}, Y_{t+3}); \quad (11)$$

$$Y_{t,r} = 2 \; if \; Y_{t+1} > Y_t > (Y_{t+2}, Y_{t+3}) \quad (12)$$

$$or \; Y_{t+2} > Y_t > (Y_{t+1}, Y_{t+3}) \quad (13)$$

$$or \; Y_{t+3} > Y_t > (Y_{t+1}, Y_{t+2}) \quad (14)$$

$$Y_{t,r} = 3 \; if \; (Y_{t+2}, Y_{t+3}) > Y_t > Y_{t+1} \quad (15)$$

$$or \; (Y_{t+3}, Y_{t+1}) > Y_t > Y_{t+2} \quad (16)$$

$$or \; (Y_{t+1}, Y_{t+2}) > Y_t > Y_{t+3} \quad (17)$$

$$Y_{t,r} = 4 \; if \; Y_t < (Y_{t+1}, Y_{t+2}, Y_{t+3}) \quad (18)$$

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.

Table 2: Seasonal unit root test results

	Null hypothesis			Integration
Variables	$\pi_1=0$	$\pi_2=0$	$\pi_3=0, \pi_4=0$	
Stay-over tourism				
LSTAYVIS_TOT	7.1383 *	-6.91E+13 *	8.67E+27 *	I(0,0,0)
LSTAYVIS_USA	-0.5482	-3.6318 *	134.3726 *	I(1,0,0)
LSTAYVIS_VEN	1.0052	-4.3378 *	79.43426 *	I(1,0,0)
LSTAYVIS_OTH	-7.0430 *	-1.26E+15 *	1.07E+30 *	I(0,0,0)
Tourism nights				
LNIGHTS_TOT	1.8131	-2.08E+15 *	9.01E+30 *	I(1,0,0)
LNIGHTS_USA	6.5395 *	-5.12E+15 *	3.71E+31 *	I(0,0,0)
LNIGHTS_VEN	-5.6159 *	-4.43E+15 *	3.04E+31 *	I(0,0,0)
LNIGHTS_OTH	-6.4571 *	-2.59E+15 *	1.07E+31 *	I(0,0,0)
Total expenditure in Aruba expenditure by place of residence				
LTOUREXP_TOT	-0.0381	-10.1942 *	71.4643 *	I(1,0,0)
LTOUREXP_USA	-0.7091	-8.0463 *	40.0476 *	I(1,0,0)
LTOUREXP_VEN	-0.4839	-8.3012 *	29.4543 *	I(1,0,0)
LTOUREXP_OTH	-0.7692	-11.0288 *	36.4765 *	I(1,0,0)
Average daily expenditure by place of residence				
LADE_TOT	-0.4224	-8.3763 *	39.4386 *	I(1,0,0)
LADE_USA	-0.1996	-8.4933 *	37.5492 *	I(1,0,0)
LADE_VEN	0.0371	-12.7093 *	28.9120 *	I(1,0,0)
LADE_OTH	-0.0773	-12.7680 *	27.7250 *	I(1,0,0)

Note: The regression includes an intercept, three seasonal dummies and a time trend. The number of observations is 64. The critical values are taken from Hylleberg et al. (1990) for 100 observartions at the 5% level: $t(\pi 1) = -3.53$, $t(\pi 2) = -2.94$, $t(\pi 3, \pi 4) = 6.60$. * indicates that the t-value is larger than the critical value, meaning that there is stationarity.

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 in contrasts with Baron (1975) who argued that most tourism-related time series could be best modeled using the multiplicative approach.

Table 3: Model type determination

Variable type	Regression result of β	Model type
Stay-over tourism		
LSTAYVIS_TOT	-0.0290	additive
LSTAYVIS_USA	-0.1001 **	multiplcative
LSTAYVIS_VEN	0.0095	additive
LSTAYVIS_OTH	0.0507	additive
Tourism nights		
LNIGHTS_TOT	-0.0157	additive
LNIGHTS_USA	-0.1590 *	multiplicative
LNIGHTS_VEN	-0.0751 ***	multiplicative
LNIGHTS_OTH	0.0890 **	multiplicative
Total expenditure in Aruba expenditure by place of residence		
LTOUREXP_TOT	0.0258	additive
LTOUREXP_USA	-0.0840	additive
LTOUREXP_VEN	-0.0014	additive
LTOUREXP_OTH	0.0735	additive
Average daily expenditure by place of residence		
LADE_TOT	0.0275	additive
LADE_USA	0.0880 ***	multiplicative
LADE_VEN	0.0570	additive
LADE_OTH	-0.6502 *	multiplicative

Note: The symbols *, **, and *** indicate, respectively, 1%, 5% and 10% significance levels.

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_OTH, LTOUREXP_OTH, 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.

Table 4: Seasonality test results based on Census X12-Arima

Series	Stable seasonality F-test	p-value *(0.1% level)*	Kruskal-Wallis test χ^2	p-value *(1% level)*	Moving seasonality F-test	p-value *(5% level)*	Ratio of moving seasonality to stable seasonality
Stay-over tourism							
LSTAYVIS_TOT	29.265	0.0000 *	41.704	0.0000 *	0.743	0.7290	0.3970
LSTAYVIS_USA	82.268	0.0000 *	54.099	0.0000 *	0.916	0.5533	0.2430
LSTAYVIS_VEN	141.001	0.0000 *	54.366	0.0000 *	0.242	0.9978	0.1660
LSTAYVIS_OTH	108.067	0.0000 *	42.328	0.0000 *	1.903	0.0489 *	0.2420
Tourismnights							
LNIGHTS_TOT	149.060	0.0000 *	54.923	0.0000 *	1.08	0.4005	0.1850
LNIGHTS_USA	2.935	0.0405	26.649	0.0000 *	1.109	0.3764	1.3260
LNIGHTS_VEN	51.484	0.0000 *	46.238	0.0000 *	1.598	0.1127	0.3380
LNIGHTS_OTH	8.826	0.0001 *	28.353	0.0000 *	0.726	0.7461	0.7210
Total expenditure in Aruba expenditure by place of residence							
LTOUREXP_TOT	49.020	0.0000 *	44.086	0.0000 *	1.997	0.0375 *	0.3640
LTOUREXP_USA	90.800	0.0000 *	48.897	0.0000 *	1.827	0.0532	0.2640
LTOUREXP_VEN	20.834	0.0000 *	36.09	0.0000 *	0.803	0.6683	0.4200
LTOUREXP_OTH	9.808	0.0000 *	26.238	0.0000 *	0.679	0.7904	0.6790
Average daily expenditure by place of residence							
LADE_TOT	17.711	0.0000 *	29.235	0.0000 *	2.209	0.0207 *	0.6200
LADE_USA	27.564	0.0000 *	38.176	0.0000 *	1.721	0.0807	0.4700
LADE_VEN	9.696	0.0000 *	20.1870	0.0002 *	1.6230	0.1056	0.7820
LADE_OTH	2.510	0.0672	8.4310	0.0379	1.9900	0.0383 *	1.6070

Note: * indicates significance at the level of testing. The ratio ofmoving seasonality to stable seasonality should be less than 1 to confirm the presence of seasonality (McDonald-Johnson et al., 2010).

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.

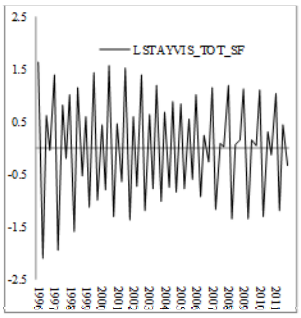

Chart 5a: Standardized seasonal factors total stay-over tourism

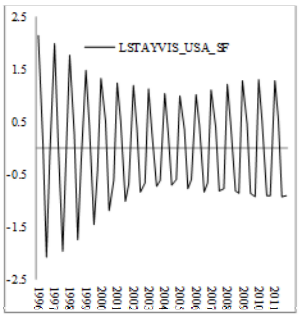

Chart 5b: Standardized seasonal factors US stay-over tourism

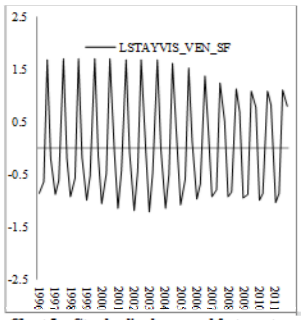

Chart 5c: Standardized seasonal factors stay-over tourism Venezuela

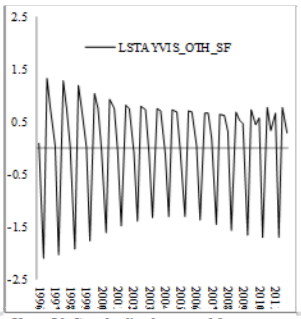

Chart 5d: Standardized seasonal factors stay-over tourism other markets

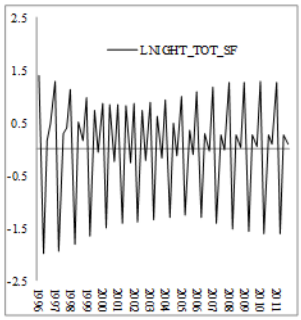

Chart 6a: Standardized seasonal factors total tourism nights

Excluded from further analysis

Chart 6b: Standardized seasonal factors US tourism nights

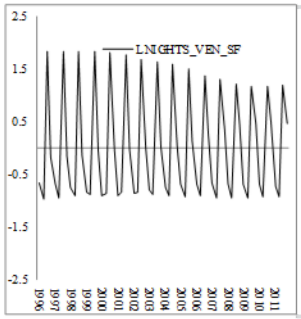

Chart 6c: Standardized seasonal factors tourism nights Venezuela

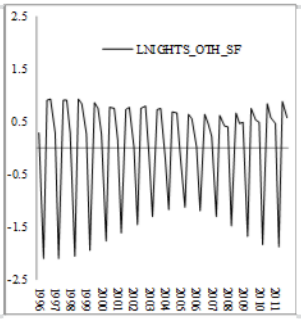

Chart 6d: Standardized seasonal factors tourism nights other markets

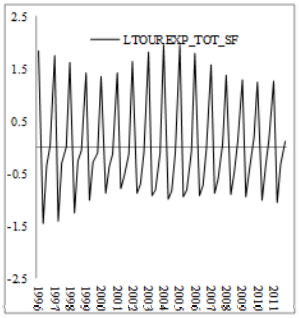

Chart 7a: Standardized seasonal factors total tourism expenditures

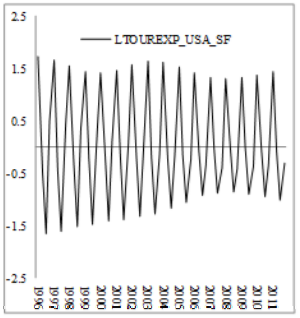

Chart 7b: Standardized seasonal factors US tourism expenditures

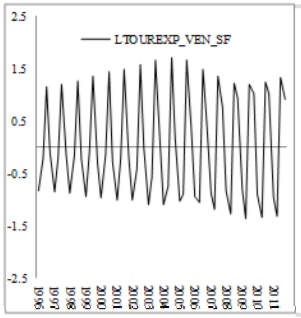

Chart 7c: Standardized seasonal factors tourism expenditures Venezuela

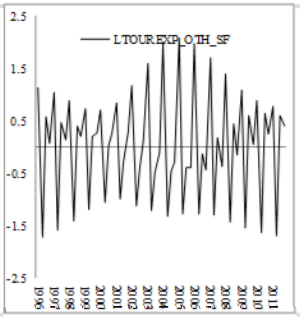

Chart 7d: Standardized seasonal factors tourism expenditures other markets

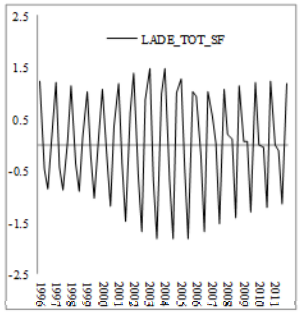

Chart 8a: Standardized seasonal factors total average daily expenditures

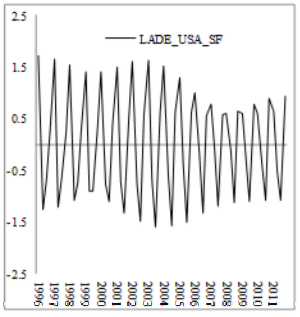

Chart 8b: Standardized seasonal factors US average daily expenditures

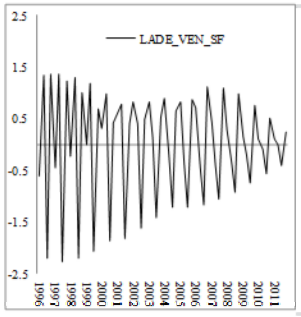

Chart 8c: Standardized seasonal factors average daily expenditures Venezuela

Excluded from further analysis

Chart 8d: Standardized seasonal factors average daily expenditures other markets

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

Series	LTOUREXP_TOT	LTOUREXP_USA	LTOUREXP_VEN	LTOUREXP_OTH	LADE_TOT	LADE_USA	LADE_VEN
First quarter							
1996-2011							
LSTAYVIS_TOT	0.0736				-0.3811		
LSTAYVIS_USA		0.4938 ***				0.3962	
LSTAYVIS_VEN			0.9061 *				-0.7958 *
LSTAYVIS_OTH				-0.3269			
LNIGHTS_TOT	-0.2096				-0.6098 **		
LNIGHTS_VEN			0.4970 ***				-0.2958
LNIGHTS_OTH				-0.7166 *			
2007-2011							
LSTAYVIS_TOT	**0.4529**				**0.5214**		
LSTAYVIS_USA		**0.4692**				**-0.8900** **	
LSTAYVIS_VEN			**0.8930** ***				**0.8174** ***
LSTAYVIS_OTH				-0.9978 *			
LNIGHTS_TOT	**-0.9812** *				**-0.6098** **		
LNIGHTS_VEN			0.7220				**0.8472** *
LNIGHTS_OTH				-0.8829 **			
Second quarter							
1996-2011							
LSTAYVIS_TOT	**0.8777** *				-0.2309		
LSTAYVIS_USA		**0.8414** *				0.6077 **	
LSTAYVIS_VEN			**0.8275** *				0.4866 ***
LSTAYVIS_OTH				**0.6147** **			
LNIGHTS_TOT	**0.8772** *				0.2120		
LNIGHTS_VEN			0.4380 ***				0.8842 *
LNIGHTS_OTH				0.9279 *			
2007-2011							
LSTAYVIS_TOT	-0.0691				-0.5661		
LSTAYVIS_USA		-0.9668 *				-0.9983 *	
LSTAYVIS_VEN			0.9930 *				-0.6809
LSTAYVIS_OTH				0.9762 *			
LNIGHTS_TOT	0.8678 ***				0.4721		
LNIGHTS_VEN			-0.2185				0.6924
LNIGHTS_OTH				0.9976 *			
Third quarter							
1996-2011							
LSTAYVIS_TOT	0.0538				-0.5754 **		
LSTAYVIS_USA		0.8041 *				0.7917 *	
LSTAYVIS_VEN			0.3594				0.0965
LSTAYVIS_OTH				0.4028			
LNIGHTS_TOT	-0.1098				-0.4042		
LNIGHTS_VEN			0.1484				-0.2381
LNIGHTS_OTH				0.6052 **			
2007-2011							
LSTAYVIS_TOT	0.8491 ***				0.5940		
LSTAYVIS_USA		0.9596 *				-0.9635 *	
LSTAYVIS_VEN			0.6537				-0.7454
LSTAYVIS_OTH				0.9093 **			
LNIGHTS_TOT	-0.4563				-0.3665		
LNIGHTS_VEN			0.7244				-0.6701
LNIGHTS_OTH				0.8425 ***			
Fourth quarter							
1996-2011							
LSTAYVIS_TOT	0.8677 *				0.2456		
LSTAYVIS_USA		0.9183 *				-0.8984 *	
LSTAYVIS_VEN			0.9816 *				-0.1933
LSTAYVIS_OTH				-0.1974			
LNIGHTS_TOT	0.5341 **				-0.4042		
LNIGHTS_VEN			0.9694 *				-0.2381
LNIGHTS_OTH				0.5330 **			
2007-2011							
LSTAYVIS_TOT	0.0111				-0.4088		
LSTAYVIS_USA		-0.4823				-0.8088 ***	
LSTAYVIS_VEN			0.9233 **				-0.7943
LSTAYVIS_OTH				-0.9993 *			
LNIGHTS_TOT	0.6129				0.8902 **		
LNIGHTS_VEN			0.9397 **				-0.7425
LNIGHTS_OTH				0.9835 *			

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).

Table 6: Amplitude and timing differences per quarter

	1996-2011			2007-2011		
	Median amplitude distance (in %)	Median variance	Median of frequency timing difference	Median amplitude distance (in %)	Median variance	Median of frequency timing difference
First quarters						
LTOUREXP_TOT_SF versus LSTAYVIS_TOT_SF	40.2	0.6862	COINCIDENT	12.1	0.1640	COINCIDENT
LTOUREXP_USA_SF versus LSTAYVIS_USA_SF	16.0	0.1212	COINCIDENT	6.1	0.0789	COINCIDENT
LTOUREXP_VEN_SF versus LSTAYVIS_VEN_SF	6.5	0.0649	COINCIDENT	10.7	0.0917	LEAD 1 QUARTER
LTOUREXP_OTH_SF versus LSTAYVIS_OTH_SF	97.8	1.0061	LEAD 2 QUARTERS	57.0	0.6201	LEAD 2 QUARTERS
LTOUREXP_TOT_SF versus LNIGHTS_TOT_SF	30.6	0.4634	COINCIDENT	3.5	0.0080	COINCIDENT
LTOUREXP_VEN_SF versus LNIGHTS_VEN_SF	150.4	2.2907	COINCIDENT	113.1	2.0164	COINCIDENT
LTOUREXP_OTH_SF versus LNIGHTS_OTH_SF	128.0	-1.1594	LEAD 2 QUARTERS	168.1	-1.3065	LEAD 2 QUARTERS
LADE_TOT_SF versus LSTAYVIS_TOT_SF	57.2	0.0295	LEAD 2 QUARTERS	27,627.2	-1.0424	LEAD 2 QUARTERS
LADE_USA_SF versus LSTAYVIS_USA_SF	25.2	-0.1494	COINCIDENT	159.4	-0.6377	LEAD 1 QUARTER
LADE_VEN_SF versus LSTAYVIS_VEN_SF	295.7	1.2836	LEAD 2 QUARTERS	4,239.4	1.1545	LEAD 3 QUARTERS
LADE_TOT_SF versus LNIGHTS_TOT_SF	32.7	-0.0336	COINCIDENT	31,417.7	-1.2067	LEAD 3 QUARTERS
LADE_VEN_SF versus LNIGHTS_VEN_SF	159.8	2.2631	LEAD 1 QUARTER	345.3	1.3092	LEAD 1 QUARTER
Median of frequencies of all differences	**48.7**	**0.2923**	**COINCIDENT**	**136.3**	**0.0853**	**LEAD 1 QUARTER**
Second quarters						
LTOUREXP_TOT_SF versus LSTAYVIS_TOT_SF	21.6	0.1303	COINCIDENT	32.5	0.2956	COINCIDENT
LTOUREXP_USA_SF versus LSTAYVIS_USA_SF	367.4	-0.5632	LEAD 2 QUARTERS	2,006.7	-0.4747	COINCIDENT
LTOUREXP_VEN_SF versus LSTAYVIS_VEN_SF	35.1	-0.1803	COINCIDENT	35.0	-0.4643	LAG 1 QUARTER
LTOUREXP_OTH_SF versus LSTAYVIS_OTH_SF	11.2	0.1524	COINCIDENT	7.7	0.1191	COINCIDENT
LTOUREXP_TOT_SF versus LNIGHTS_TOT_SF	53.6	0.5404	COINCIDENT	66.3	0.5807	COINCIDENT
LTOUREXP_VEN_SF versus LNIGHTS_VEN_SF	453.2	0.7105	COINCIDENT	165,508.2	0.9252	COINCIDENT
LTOUREXP_OTH_SF versus LNIGHTS_OTH_SF	90.9	0.6502	COINCIDENT	16.8	0.3152	COINCIDENT
LADE_TOT_SF versus LSTAYVIS_TOT_SF	349.1	1.0010	LEAD 2 QUARTERS	36,731.6	1.2734	LEAD 2 QUARTERS
LADE_USA_SF versus LSTAYVIS_USA_SF	167.0	-1.0162	LEAD 2 QUARTERS	1,199.9	-0.6910	LEAD 1 QUARTER
LADE_VEN_SF versus LSTAYVIS_VEN_SF	152.8	0.8114	COINCIDENT	1,478.6	0.6728	COINCIDENT
LADE_TOT_SF versus LNIGHTS_TOT_SF	429.8	1.4224	LEAD 1 QUARTER	42,358.0	1.5586	LEAD 1 QUARTER
LADE_VEN_SF versus LNIGHTS_VEN_SF	44.3	0.2685	LEAD 1 QUARTER	1,232.4	0.7097	LEAD 1 QUARTER
Median of frequencies of all differences	**121.9**	**0.4045**	**COINCIDENT**	**1,216.1**	**0.4480**	**COINCIDENT**
Third quarters						
LTOUREXP_TOT_SF versus LSTAYVIS_TOT_SF	234.3	-1.2554	LAG 1 QUARTER	135.5	-0.6789	LEAD 1 QUARTER
LTOUREXP_USA_SF versus LSTAYVIS_USA_SF	14.9	-0.0791	LAG 2 QUARTERS	7.1	-0.0651	LEAD 1 QUARTER
LTOUREXP_VEN_SF versus LSTAYVIS_VEN_SF	11.0	0.0412	COINCIDENT	8.9	0.1061	COINCIDENT
LTOUREXP_OTH_SF versus LSTAYVIS_OTH_SF	252.5	-0.8029	COINCIDENT	31.9	-0.1891	LAG 2 QUARTERS
LTOUREXP_TOT_SF versus LNIGHTS_TOT_SF	172.9	-0.9509	LEAD 1 QUARTER	358.3	-0.7061	LEAD 1 QUARTER
LTOUREXP_VEN_SF versus LNIGHTS_VEN_SF	226.8	-2.8418	COINCIDENT	246.0	-2.1206	COINCIDENT
LTOUREXP_OTH_SF versus LNIGHTS_OTH_SF	45.5	0.6020	LEAD 1 QUARTER	31.7	0.4561	LEAD 1 QUARTER
LADE_TOT_SF versus LSTAYVIS_TOT_SF	156.8	-1.9773	LEAD 1 QUARTER	85.6	-1.5191	LEAD 1 QUARTER
LADE_USA_SF versus LSTAYVIS_USA_SF	39.5	-0.2695	COINCIDENT	20.5	-0.2527	LEAD 1 QUARTER
LADE_VEN_SF versus LSTAYVIS_VEN_SF	217.6	-2.9528	LAG 2 QUARTERS	331.9	-1.8292	LAG 2 QUARTERS
LADE_TOT_SF versus LNIGHTS_TOT_SF	124.8	-1.7738	LEAD 1 QUARTER	91.7	-1.5713	LAG 2 QUARTERS
LADE_VEN_SF versus LNIGHTS_VEN_SF	209.6	-2.6313	LEAD 1 QUARTER	185.6	-2.2852	LAG 3 QUARTERS
Median of frequencies of all differences	**164.8**	**-1.1032**	**LEAD 1 QUARTER**	**88.6**	**-0.6925**	**LEAD 1 QUARTER**
Fourth quarters						
LTOUREXP_TOT_SF versus LSTAYVIS_TOT_SF	567.5	0.4602	LAG 1 QUARTER	81.8	0.1407	LEAD 1 QUARTER
LTOUREXP_USA_SF versus LSTAYVIS_USA_SF	159.6	0.5538	LAG 2 QUARTERS	145.1	0.5481	LEAD 1 QUARTER
LTOUREXP_VEN_SF versus LSTAYVIS_VEN_SF	44.5	0.1072	COINCIDENT	24.0	0.2358	COINCIDENT
LTOUREXP_OTH_SF versus LSTAYVIS_OTH_SF	274.5	-0.5963	COINCIDENT	269.8	-0.3802	LAG 2 QUARTERS
LTOUREXP_TOT_SF versus LNIGHTS_TOT_SF	72.6	0.0329	LAG 1 QUARTER	405.4	0.0852	LAG 1 QUARTER
LTOUREXP_VEN_SF versus LNIGHTS_VEN_SF	145.0	-0.1965	COINCIDENT	589.6	-0.8344	COINCIDENT
LTOUREXP_OTH_SF versus LNIGHTS_OTH_SF	328.6	-0.5885	LAG 3 QUARTERS	47.1	0.4420	LAG 3 QUARTERS
LADE_TOT_SF versus LSTAYVIS_TOT_SF	193.6	1.3320	LAG 2 QUARTERS	90.8	1.1861	LAG 3 QUARTERS
LADE_USA_SF versus LSTAYVIS_USA_SF	209.7	1.2244	LAG 2 QUARTERS	273.8	1.7181	LAG 3 QUARTERS
LADE_VEN_SF versus LSTAYVIS_VEN_SF	106.0	0.5715	LAG 1 QUARTER	48.8	-0.0159	LAG 1 QUARTER
LADE_TOT_SF versus LNIGHTS_TOT_SF	111.5	1.0911	LAG 2 QUARTERS	78.6	1.1135	LAG 2 QUARTERS
LADE_VEN_SF versus LNIGHTS_VEN_SF	95.1	0.4106	LAG 3 QUARTERS	52.3	0.3284	LAG 3 QUARTERS
Median of frequencies of all differences	**152.3**	**0.4354**	**LAG 2 QUARTERS**	**86.3**	**0.2821**	**LAG 2 QUARTERS**

Note: Calculations are based on standardized values. The median variance is caclulated to determine which seasonal pattern (monetary or non-monetary) is the largest. A "-" signs indicates in this case that the value of the seasonal pattern of the non-monetary variable is larger than the monetary variable.

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 occuring in these two periods.

Table 7: Possible management strategies to close the gap between monetary and non-monetary seasonal factors (2007-2011)

Period of analysis	Main variables' seasonal factors involved	Type of analysis	Findings	Most probable causing variable(s)	Possible strategy
First quarter	Total tourism expenditure versus total stay-over tourism	Correlation	No significant correlation	No significant correlation in US market. Also, correlations in Venezuelan and other markets are cancelling each other out	US and Venezuelan markets: synchronizing tourism price development with (expected) development in US and Venezuelan tourism
		Amplitude differences	Seasonal factor of total tourism expenditure is about 12.1% larger than that of total stay-over tourism	Seasonal factors of US and Venezuelan tourism expenditure, which are, respectively, 6.1% and 10.7% larger than their respective seasonal factors of stay-over tourism	No specific action required
		Timing differences	Coincident	Coincident US market	No specific action required
	Total tourism expenditure versus total tourism nights	Correlation	Significant negative correlation	Significant negative correlation other markets	Other markets: (1) Synchronizing tourism price development with (expected) development in tourism nights in other markets; (2) introduction of seasonal (room) tax
		Amplitude differences	Seasonal factor of total tourism expenditure is about 3.5% larger than that of total tourism nights	Amplitude differences other markets (not included in the analysis)	No specific action required
		Timing differences	Coincident	Coincident US market	No specific action required
	Total average daily expenditure versus total stay-over tourism	Correlation	No significant correlation	Significant negative correlation in the US market cancelling out correlation in Venezuelan market	US market: (1) Synchronizing tourism price development with (expected) development in stay-over tourism in US market; (2) introduction of seasonal (room) tax
		Amplitude differences	Seasonal factor of total average daily expenditure is about 27,627% smaller than that of total stay-over tourism	Amplitude differences other markets (not included in the analysis) and to a lesser extent difference in US and Venezuelan markets	All markets: determining optimal market mix to increase income
		Timing differences	Seasonal factor total average daily expenditure leads over that of total stay-over tourism by 2 quarters	US (lead = 1 quarter), Venezuelan (lead = 3 quarters) and possibly also the other markets (not included in the analysis)	(1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in stay-over tourism per market
	Total average daily expenditure versus total tourism nights	Correlation	Significant negative correlation	Possibly, negative correlation in US and other markets	US and other markets: (1) synchronizing tourism price development with development in total tourism nights; (2) introduction of seasonal (room) tax
		Amplitude differences	Seasonal factor of total average daily expenditure is about 31,417% smaller than that of total tourism nights	Amplitude differences in US market and /or other markets (both not included in the analysis)	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
		Timing differences	Seasonal factor total average daily expenditure leads over that of total tourism nights by 3 quarters	Venezuelan market (lead = 1 quarter); Possibly also US and other markets (both of which not included in the analysis)	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

Table 7: Possible management strategies to close the gap between monetary and non-monetary seasonal factors (2007-2011) *(continued)*

Period of analysis	Main variables' seasonal factors involved	Type of analysis	Findings	Most probable causing variable(s)	Possible strategy
Second quarter	Total tourism expenditure versus total stay-over tourism	Correlation	No significant correlation	Significant negative correlation US market may be cancelling out the results in the other markets	US market: (1) synchronizing tourism price development with (expected) development in US stay-over tourism; (2) introduction of seasonal (room) tax
		Amplitude differences	Seasonal factor of total tourism expenditure is about 32.5% larger than that of total stay-over tourism	Amplitude differences in Venezuelan and other markets	No specific action required
		Timing differences	Coincident	Coincident US and other markets	No specific action required
	Total tourism expenditure versus total tourism nights	Correlation	Significant correlation	Significant correlation in other markets	No specific action required
		Amplitude differences	Seasonal factor of total tourism expenditure is about 66.3% larger than that of total tourism nights	Amplitude differences other markets and possibly US market (not included in the analysis)	No specific action required
		Timing differences	Coincident	Coincident Venezuelan and other markets, and possibly also the US market (not included in the analysis)	No specific action required
	Total average daily expenditure versus total stay-over tourism	Correlation	No significant correlation	No significant correlation in the Venezuelan market, and possibly also in US and other markets	US, Venezuelan and other markets: Synchronizing tourism price development with (expected) development in stay-over tourism in each market
		Amplitude differences	Seasonal factor of total average daily expenditure is about 36,731% larger than that of total stay-over tourism	Amplitude differences other markets (not included in the analysis), and to some extent also the Venezuelan and US markets	US, Venezuelan and other markets: (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/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total average daily expenditure leads over that of total stay-over tourism by 2 quarters	US (lead = 1 quarter), Venezuelan (coincident) and possibly also the other markets (not included in the analysis)	US and other markets: (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/or tax incentives on a temporal basis
	Total average daily expenditure versus total tourism nights	Correlation	No significant correlation	No significant correlation in Venezuelan market; Possibly also the case with the US and other markets (not included in the analysis)	US, Venezuelan and other markets: synchronizing tourism price development with development in tourism nights per market
		Amplitude differences	Seasonal factor of total average daily expenditure is about 42,358% smaller than that of total tourism nights	Amplitude differences in US market and/or other markets (both not included in the analysis), and to some extent also the Venezuelan market	US and other markets: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in stay-over tourism per market;
		Timing differences	Seasonal factor total average daily expenditure leads over that of total tourism nights by 1 quarter	Venezuelan market (lead 1quarter); Also, possible effects by US and other markets (both not included in the analysis)	US, Venezuelan and other markets: (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/or tax incentives on a temporal basis

Table 7: Possible management strategies to close the gap between monetary and non-monetary seasonal factors (2007-2011) *(continued)*

Period of analysis	Main variables' seasonal factors involved	Type of analysis	Findings	Most probable causing variable(s)	Recommended strategy
Third quarter	Total tourism expenditure versus total stay-over tourism	Correlation	Significant correlation	Significant correlations in US and other markets	No specific action required
		Amplitude differences	Seasonal factor of total tourism expenditure is about 135.5% larger than that of total stay-over tourism	Possibly the fact that the median variance for both the US and other markets are negative, meaning that their seasonal 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.	US and other markets: (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/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total tourism expenditure leads over that of total stay-over tourism by 1 quarters	US market (lead 1 quarter)	US market: (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/or tax incentives on a temporal basis
	Total tourism expenditure versus total tourism nights	Correlation	No significant correlation	No significant correlation in Venezuelan market possibly cancelling out the positive correlation in other markets. Possibly, the US market also has no significant correlation (not included in the analysis)	Venezuelan (and possibly US) markets: synchronizing tourism price development with development in tourism nights per market;
		Amplitude differences	Seasonal factor of total tourism expenditure is about 358.3% smaller than that of total tourism nights	Amplitude differences in Venezuelan market, and possibly the US market as well (not included in the analysis)	Venezuelan (and possibly US) markets: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in tourism nights per market;
		Timing differences	Seasonal factor total tourism expenditure leads over that of total tourism nights by 1 quarters	Other markets (lead = 1 quarter) and possibly also the US market (not included in the analysis)	Other markets: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in tourism nights per market; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
	Total average daily expenditure versus total stay-over tourism	Correlation	No significant correlation	No significant correlation in Venezuelan market, and possibly also in the other markets (not included in the analysis) cancelling the significant negative correlation in the US market	US, Venezuela and other markets: (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/or tax incentives on a temporal basis
		Amplitude differences	Seasonal factor of total average daily expenditure is about 85.6% smaller than that of total stay-over tourism	Amplitude differences in Venezuelan an possibly other markets (not included in the analysis)	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; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total average daily expenditure leads over that of total stay-over tourism by 1 quarter	US (lead = 1 quarter), and possibly also the other markets (not included in the analysis)	US market: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in stay-over tourism; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
	Total average daily expenditure versus total tourism nights	Correlation	No significant correlation	No significant correlation in Venezuelan market, possibly also not in the US and other markets (both not included in the analysis)	US, Venezuelan and other markets: synchronizing tourism price development with (expected) volume development
		Amplitude differences	Seasonal factor of total average daily expenditure is about 91.7% smaller than that of total tourism nights	Amplitude differences in Venezuelan market, and possibly also in US and other markets (both not included in the analysis)	Venezuelan market: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in tourism nights; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total average daily expenditure lags over that of total tourism nights by 2 quarters	Venezuelan market (lag = 3 quarters); also possible lags in US and other markets (not included in the analysis)	Venezuelan market: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in tourism nights; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis

Table 7: Possible management strategies to close the gap between monetary and non-monetary seasonal factors (2007-2011) *(continued)*

Period of analysis	Main variables' seasonal factors involved	Type of analysis	Findings	Most probable causing variable(s)	Recommended strategy
Fourth quarter	Total tourism expenditure versus total stay-over tourism	Correlation	No significant correlation	Significant correlation Venezuelan market market may be cancelled out by significant negative correlation other markets. Also no significant correlation with US market	US and other markets synchronzing tourism price development with (expected) stay-over development in both markets
		Amplitude differences	Seasonal factor of total tourism expenditure is about 81.8% larger than that of total stay-over tourism	Combination of amplitude differences in all three analyzed markets	US, Venezuelan and other markets: (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/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total tourism expenditure leads over that of total stay-over tourism by 1 quarter	US market (lead 1 quarter)	US market: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in stay-over tourism; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
	Total tourism expenditure versus total tourism nights	Correlation	No significant correlation	Most probably no significant correlation in US nights (not included in the analysis) cancelling out the positive correlations in Venezueland and other markets	US market: synchronizing tourism price developments with (expected) development in tourism nights
		Amplitude differences	Seasonal factor of total tourism expenditure is about 405.4% larger than that of total tourism nights	Amplitude differences Venezuelan market and possibly also US market (not included in the analysis)	Venezuelan market: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in tourism nights; (3) promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total tourism expenditure lags over that of total tourism nights by 1 quarter	Other markets (lag = 3); possibly also the US market (not included in the analysis)	Other markets: (1) Financial planning and budgeting to manage physical/financial difference; (2) Synchronizing tourism price development with development in tourism nights per market; (3) promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
	Total average daily expenditure versus total stay-over tourism	Correlation	No significant correlation	Possibly significant positive correlation in other markets cancelling out the negative correlations in US and Venezuelan markets	US, Venezuelan and other markets: synchronizing tourism price developments with (expected) stay-over tourism development in these markets
		Amplitude differences	Seasonal factor of total average daily expenditure is about 90.8% larger than that of total stay-over tourism	Amplitude differences in US, Venezuelan market and possibly also other markets (not included in the analysis)	US, Venezuelan and other markets: (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/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total average daily expenditure lags over that of total stay-over tourism by 3 quarters	US (lag = 3 quarter), Venezuelan market (lag = 1 quarter) and possibly also the other markets (not included in the analysis)	US, Venezuelan and other markets: (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/or tax incentives on a temporal basis
	Total average daily expenditure versus total tourism nights	Correlation	Significant positive correlation	Possibly significant poitive correlations in US/other markets (not included in the analysis)	No specific action required
		Amplitude differences	Seasonal factor of total average daily expenditure is about 76.8% larger than that of total tourism nights	Amplitude differences in Venezuelan market, and possibly also in US and other markets (both not included in the analysis)	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; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis
		Timing differences	Seasonal factor total average daily expenditure lags over that of total tourism nights by 2 quarters	Venezuelan market (lag = 3 quarters). Also, possible effects by US and other markets (both not included in the analysis)	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; (3)promotional pricing (e.g., discount or free offers) and/or tax incentives on a temporal basis

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.

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