



Impacts of seasonal patterns of climate on recurrent fluctuations in tourism demand: Evidence from Aruba



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H I G H L I G H T S

- Climate is a significant push and pull factor affecting tourism demand.
- Tourism demand and climate are bounded by intertemporal climate constraints.
- Seasonality matters for short-term tourism demand movements.
- A continued stream of general information on current and average climate conditions during the year is needed.

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A B S T R A C T

This study estimates the effect of seasonal patterns of pull and push climate elements (rainfall, temperature, wind, and cloud coverage) on recurrent fluctuations in tourism demand from the United States (USA) and Venezuela to Aruba. The seasonal patterns were first isolated from the series using the Census X-12 decomposition method, after which the analysis included panel data unit root testing, panel data regression, and Euclidean distance calculation. The results show that both pull and push seasonal factors of climate were relevant in determining the seasonal variations in tourism demand from both countries. The study derives two theoretical propositions: (1) climate is a significant push and pull factor affecting tourism demand; and (2) tourism demand and climate are bounded by intertemporal climate constraints.

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1. Introduction

The purpose of the study is to investigate how seasonal patterns of climate influences tourism demand seasonality in small island destinations. ‘Climate’ is the prevailing condition of the atmosphere drawn from long periods of observation, contrary to the term ‘weather’, which is the state of the atmosphere at a given time and in a given place (Belén Gómez Martín, 2005). Climate and weather are notable and influential factors in tourists’ consumer behavior (Amelung, Nicholls, & Viner, 2007; Hamilton & Tol, 2007; Hamilton, Maddison, & Tol, 2005; Kulendran & Dwyer, 2010; Scott, McBoyle, &

Schwartzentruber, 2004). The effects of the interaction between climate/weather and tourism are substantial and require close scrutiny in so far as climate and weather may strongly contribute to the determination of the tourist’s destination choice. Small island destinations, for example, are cognizant of the importance of weather and climate. In fact, the Caribbean and the Mediterranean are the two largest global geographical densities propagating climate and weather as crucial attributes of their tourism product (i.e. Sun, Sand, Sea (SSS)). In addition, the combination of favorable weather and an SSS product results in image building. For example, Barbados uses “good weather” as a selling point with a money back guarantee in the event that the weather fails (Scott & Lemieux, 2009).

There is considerable research with regards to the impact of weather and climate on tourism and the environmental resources that are critical attractions for tourism: for example, snow conditions, wildlife productivity and biodiversity, as well as quality water

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and its levels (UNWTO & UNEP, 2008). Past researchers (Belén Gómez Martín, 2005; Kulendran & Dwyer, 2010; Scott, McBoyle, & Schwartzentruber, 2004) reveal that climate attracts visitors who expect favorable weather conditions at the destination. However, climate may also encourage people to stay in their own country rather than travel abroad (Hamilton & Tol, 2007). Hence, climate acts as both a pull and a push factor that affects the motivations of tourists in their decision first to travel and in their destination selection (Amelung, Nicholls, & Viner, 2007; Hamilton, Maddison, & Tol, 2005).

Climate and weather have, however, not been integrated in the mainstream tourism demand literature. This omission is surprising because seasonality triggered by climatic conditions has been recognized in the literature as a major challenge for tourism destinations; and, seasonality is closely associated with climate and weather. Seasonality is a concept that is well studied and documented in the literature. It is defined here as a pattern that repeats itself over fixed intervals of time (Makridakis, Wheelwright, & McGee, 1983), and is revealed in recurring variations in natural phenomena, such as, climate (Butler, 2001). Typical seasonal variables include cycles or patterns of differences in temperature, rainfall, snowfall, sunlight, and daylight. Such variables influence a destination's seasonal demand where swings in demand may produce situations of overcapacity, reduced utilization of infrastructure, decrease in the workforce, and absence of investments during low seasons (Pegg, Patterson, & Vila Gariddo, 2012), causing reduced profitability and productivity (Karamustafa & Ulama, 2010). On the other hand, peak seasons may be characterized by overuse of public utilities (e.g. water supply, waste management, and road use), causing dissatisfaction for residents and tourists alike, while the environment may suffer irreversible damage because of tourism pressures (Cuccia & Rizzo, 2011). Thus, the relationship between climate/weather and seasonal demand patterns becomes clear.

Most studies on the determinants of tourism demand have concentrated on economic factors (e.g. income and price) (Goh, 2012), while remaining particularly silent on the potential impact of climate on the choice of destinations (Kulendran & Dwyer, 2010). For example, Song, Witt, & Li (2009) and Song et al. (2012), in reviewing the determinants of tourism demand models, do not consider climate as a relevant factor. Shareef, Hoti, & McAleer (2008) examined 53 papers published about tourism demand in small islands, which omitted climate as a determinant of tourism demand. On the other hand, studies by Kulendran & Dwyer (2010), Yu, Schwartz, & Walsh (2010), Buckley & Foushee (2011), Hadwen et al., (2011), and Goh (2012) have shown that climate exerts an influence on the seasonal pattern of tourism. Only a handful of studies, however, have considered climate and weather thus far as important factors affecting tourism demand (Lohmann & Kaim, 1999; Scott & Lemieux, 2009).

Understanding seasonal patterns which impact tourism consumption and production is crucial for tourism enterprises and regions (Chan & Lim, 2011; Cuccia & Rizzo, 2011; Dritsakis, 2008; Hadwen et al., 2011; Yu, Schwartz, & Walsh, 2009). A large number of tourism demand studies are based on annual data (Bicak, Altinay, & Jenkins, 2005; Croes, 2010; Croes & Vanegas, 2005; Lim, 1997; Petrevska, 2012; Song & Li, 2008; Sookram, 2011; Vanegas & Croes, 2000). It is not possible to study seasonal influences when only considering annual time series data. Rather, more frequent observed time series data than annual time series are required for the understanding of the complete effects of seasonality that would include climate and weather (Dritsakis, 2008).

Studies that have resonated with the interaction of climate and tourism demand share some common core assumptions. First, climate is articulated as a pull factor but does not take into account

the possible push of climate as a factor of seasonality in tourism. Second, seasonal climatic patterns are assumed to be similar in overall effect (i.e. seasonal, cyclical, trend, and irregular components), to the logic of income and price that exhibit trend effects rather than seasonality effects. Yu, Schwartz, & Walsh (2010) make the case, however, to define the focus of their investigation on seasonal patterns of climate variables because weather impacts are often contained in the seasonal components. And, third, climate seasonality studies have been based mainly on investigating tourism demand in large destinations (e.g. Australia and the USA).

In view of the dearth of studies that investigate how climate influences seasonal patterns of tourism demand in small island destinations, there is a case to better understand the drivers of tourism demand in small island economies. This study investigates whether seasonal patterns of pull and push climate elements (including rainfall, wind, temperature and cloud coverage) affect the seasonal deviations of tourism demand for a small island destination. The study accesses Aruba as the case of interest. According to Yin (2009), individual case studies may contribute to scientific generalizations through the replication effect, where the mode of generalization is analytic (i.e. analytical generalization). The goal then is to expand and generalize theories, and not to enumerate frequencies (statistical generalizations). According to Eisenhardt and Graebner (2007), building theory from case studies is a research strategy that requires at least one case to create theoretical constructs, propositions, and/or midrange theory from case-based empirical evidence.

The methodology involves data decomposition using the Census X-12 technique with subsequent transformation of time series data into panel data, followed by panel unit root testing, panel regression, and Euclidean distance calculation. The analysis strategy employed here is novel when considering studies on the effect of climate on short-term tourism demand. The novelty is in the solving of the issue of seasonal unit roots that may cause permanent changes in seasonal patterns.

The investigation makes three key contributions to the tourism literature. First, it contributes to the further understanding of the specific role of seasonal patterns of climate variables on the seasonality of tourism demand. Second, this investigation simultaneously analyzes the impact of both pull and push climate factors on tourism demand seasonality, which departs from mainstream time series-/panel-based studies on this relationship. Third, the study postulates a novel research strategy calibrating the effects of both pull and push seasonal factors on tourism demand seasonality.

The rest of this paper is organized as follows. Section 2 presents an overview of the literature covering the empirical relationship between climate and tourism seasonal movements. Section 3 discusses climate and tourism conditions in Aruba, while Section 4 reviews the data and the applied methodology. Section 5 presents the empirical results. Finally, Section 6 concludes and indicates some policy implications and lines for future research.

2. Tourism and climate seasonality in the literature

The literature on the impact of climate on tourism demand generally adopts either a micro- or a macro-approach. Pivotal for the micro-approach is the measurement of people's responses to a set of questions, where they report their own subjective state and values (Stiglitz, Sen, & Fitoussi, 2009). People's perceptions of climate conditions are likely to play a central role in their decision-making process as tourists (UNWTO & UNEP, 2008). For example, Behringer, Buerki, & Fuhrer (2000) interviewed 1000 skiers and snowboarders in five resorts in Central Switzerland, and their findings suggest climate change leading to less snow would have serious implications as a result of lower demand. Moreno Sánchez

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