Acta Univ. Sapientiae, Economics and Business, **11** (2023) 208–226

DOI: 10.2478/auseb-2023-0010

Demand for Kerala's International Tourism by the Top Three Source Markets: A Comparative Analysis

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Abstract. The study examines the role of economy, the environment, and the source country's tourism seasonality in driving the inflow of tourists into Kerala from the top three source countries, viz. the United Kingdom (UK), the United States (US), and France. The methodology employed is the double-log regression technique. It was found that the income of the source countries was merely moderately and selectively related to the predicted variable, while environmental factors, viz. rainfall of the origin countries and the relative temperature, play a decisive role in shaping Kerala's international tourism. At the same time, relative prices were relevant in explaining Kerala's international tourism demand. We conclude that Kerala receives more foreign tourists (especially from the advanced economies in Europe and North America) not because the nominal income of the source markets rises but because Kerala's destinations remain competitive for the tourists from the top three source markets. While climatic factors provide a background for tourism seasonality, it is argued that lower relative prices remain the primary and active force of tourist arrivals.

Keywords: foreign tourist arrivals in Kerala, economic factors, environmental factors, tourism seasonality, double-log regression

JEL Classification: Z3

1. Introduction

Kerala has become the first state in India in 1986 to declare tourism as an industry (Nair and Dhanuraj, 2018). It clearly shows how important the tourism sector is for this South Indian state, which is endowed with various diverse tourism resources. Moreover, the relevance of tourism industry in Kerala is specifically evident from its significant contribution in terms of generation of employment and income. The tourism sector has become a significant contributor to Kerala's economy, as

it contributed a whopping 10% of the state income in 2018–19 as per *Economic Review 2020* (Kerala State Planning Board, Government of Kerala, 2022), and a total of $6.4 billion was generated in 2019, out of which $1.5 billion were foreign exchange earnings as per *Kerala Tourism Statistics 2019* (Department of Tourism, Government of Kerala, 2022). Since tourism has largely been labour-intensive, the development of tourism generates direct, indirect, and induced employment opportunities in the state. It provides employment to 1.5 million people directly in the state (Department of Tourism, Government of Kerala, 2022). Tourism is explicitly an economic activity, as tourists are consumers of goods and services directly or indirectly related to tourism (Bunghez, 2016). Generally, tourism makes a positive impact on economic growth and the development indicators of the destinations, according to Ivanov and Webster (2007). Li et al. (2006) in their study found that tourism has become a significant contributor to the economy of Hong Kong in terms of foreign exchange earnings and contribution to the GDP.

The United Kingdom (UK), the United States (US), and France remained the top three origin countries of foreign tourists who visited Kerala during the 2003–2019 period, with an annual average share of 18.4%, 8.77%, and 8.44%, respectively, as per the data presented in *Kerala Tourism Statistics* published by The Department of Tourism, Government of Kerala (2022). These countries were sending their nationals to Kerala on a consistent basis throughout the mentioned period, unlike the only recently observed phenomenal surge in arrivals of tourists in Kerala from Saudi Arabia, Oman, Russia, the United Arab Emirates (UAE), Malaysia, Canada, and Australia. The present study not only helps identify the determinants of Kerala's international tourism demand from the top three origin markets but also provides a comparative analysis of the determining factors of Kerala's international tourism demand. For the sake of this analysis, we included five variables, viz. income of the source countries, relative prices, Kerala's rainfall, relative temperature, and the source countries' tourism seasonality. There are both economic and non-economic variables on this list. Income and relative prices are the economic variables and mostly used predictors in the tourism demand models. Other variables are environment- and tourism-seasonality-based factors that are important in developing tourism demand models when tourist arrivals are used to proxy tourism demand, as pointed out by Zamparini et al. (2017). These are rainfall levels of the destination, relative temperature, and the source country's tourism seasonality, which are presumed to have a negative effect on tourism demand (see Section 3 for details). The destination's rainfall level is presumed to disrupt the free movement of tourists, so it could affect foreign tourist arrivals negatively. People come (especially from the Arctic countries) to Kerala to experience its relatively stable climate. Hence, the relative temperature will also affect tourism demand negatively. The source country's tourism seasonality is another factor that may affect arrivals from the Arctic countries, where extreme winter is characteristic of a

longer period, from November to March. Kerala records nearly 60% of the arrivals in the same period (of 5 months); advanced economies from Europe and North America remain the major markets as per the data obtained from the Department of Tourism, Government of Kerala (2022).

The current study contributes to the literature by including relative temperature and the source country's tourism seasonality along with the destinations' rainfall levels and other basic economic predictors in developing Kerala's international tourism demand models with respect to the top source countries. The study could contribute to tourism demand literature in the Indian context where tourism econometric studies are not abundantly available. Moreover, tourism demand studies are scarce in Kerala's context as per the review of tourism demand literature. Region-based studies on tourism demand bear great significance, as tourism demand determinants could vary from region to region. The study by Shafiulla et al. (2019) shows that the main determinants of Australia's tourism demand vary from state to state. There are studies in which the standard economic determinants of tourism demand were shown to be insignificantly related (e.g. Garau-Vadell and De-Juar-Vigaray, 2017). Apart from the geographical differences, the present study approaches the source countries' tourism seasonality as a potential determinant in addition to climatic and economic factors.

The paper is organized as follows: Section 2 presents some theoretical considerations; Section 3 discusses the variables used in the literature; Section 4 presents the methodology used; Section 5 discusses the results; Section 6 presents the conclusions.

2. Theoretical Considerations and Literature on Tourism Demand

The present study aims to estimate the international tourism demand of Kerala with respect to tourist arrivals in the state from the top three source markets, i.e. the UK, the US, and France. Tourist arrival data are taken as the proxy to estimate tourism demand based on three factors, viz. tourist arrivals, tourist expenditure, and tourist overnight stays. A large number of studies have been conducted on tourism demand (e.g. Narayan, 2004; Papatheodorou and Song, 2005; Naude and Saayman, 2005; Alegre et al., 2011; Marcussen, 2011; Kim et al., 2011; Vu and Turner, 2006; Gani and Clemes, 2017; Song et al., 2003). We attempt to assess Kerala's international tourism demand from the top three source markets, viz. the UK, the US, and France, using log-linear regression models. All potential variables are grouped into three categories: origin-based variables, destination-based variables, and origin-and-destination-based variables.

Aside from price and income, several other factors could influence meeting this demand. Since the present study looks into the factors responsible for the choices of Kerala destinations by tourists from the top three source countries, the demand function was used to find the determinants of quantity demanded of tourism goods and services. Tourism demand is defined in line with "demand" in economics as the amount of tourism goods and services that tourists are willing and able to purchase at a given price over a certain period of time. Tourism demand can be measured by estimating tourist arrivals, overnight stays, and tourism expenditure. Studies on tourism demand use either of the three segments in most cases. International tourism demand is often measured in terms of the number of tourist arrivals, tourism expenditure, or the number of overnight stays in the destination country, according to Ouerfelli (2008). As per the studies reviewed, many factors are found responsible for fluctuations in the tourism demand of various countries and regions in the world. The determinants may vary from destination to destination, from country to country, from region to region, and even from researcher to researcher. However, international tourism demand is generally measured in the body of research so far as a function of certain standard variables such as income of the tourists, the country of origin, relative tourism prices, exchange rates, transportation cost and distance, and a number of dummy variables (Song et. al., 2003; Naude and Saayman, 2005; Algieri, 2006; Marcussen, 2011; Kim et al., 2011; Alegre et al., 2011; Daniel et. al., 2012; Gani and Clemes, 2017). Relative tourism prices, relative real exchange rates, transportation costs, and air distance can be alternatively proxied for price of tourism that could inversely affect tourism demand as per the demand theory. Though all of the above variables are cost-related, they were used as different predictor variables in the tourism economics literature (Uysal and Crompton, 1984).

In estimating the tourism demand, the constant elasticity demand function is applied in the present research, as it remains a widely accepted measure of estimating the demand function. In order to identify how much of the demand for tourism services responds to changes in price and income, price and income elasticities of tourism service need to be measured (Samuelson and Nordhaus, 2002). The present study measures the degree of responsiveness of quantity demanded of tourism services due to percentage change in tourism prices and income of the tourists in line with the price and income elasticities of demand. Constant elasticities are often useful to work with isoelastic demand curve although there is no reason to expect elasticities of demand to be constant, according to Pindyck et al. (2022). The log-linear demand function can be written as follows:

$$log\ (Q) = a - b \log\ (P) + c \log\ (I),$$

where log (Q) is the logarithmic demand function, and a, b, and c are the constants in the demand function. The slope of the log-linear demand function is determined

by *b*, which is the price elasticity of demand, and *c*, which is the income elasticity of demand (Pindyck et al., 2022).

3. Variables in the Study and Tourism Demand Literature

Being the mostly cited and commonly used variables in tourism economics literature, income and relative prices are used as the primary independent variables (e.g. Nguyen, 2021; Downward and Lumsdon, 2003; Uysal and Crompton, 1984; Daniel and Rodrigues, 2012; Gani and Clemes, 2017; Narayan, 2004; Zamparini et al., 2017). While income is an origin-based variable, relative price is an origin-and-destination-based variable. Gani and Clemes (2017) and Zamparini et al. (2017) found a positive and significant impact of per capita GDP on the tourism demand of New Zealand and Italy. Nguyen (2021) and Narayan (2004) also confirmed the positive role of income in tourism demand. At the same time, there are also studies that failed to confirm this expected positive relation (Dhariwal, 2005; Xie, 2020). According to Dhariwal (2005) and Xie (2020), income has not been significant in influencing tourism demand, although positively related.

Kerala's rainfall and relative temperature are the climatic factors in the model, as both factors can make a stronger impact on tourist arrivals for multiple reasons. As argued by Hamilton and Lau (2004) and Ridderstat et al. (2014), climate is seen as the third most important predictor of tourism demand right after economic variables. The effect of rainfall and temperature in Aruba were significant in measuring tourism demand, according to Sookram (2011). The climate of both the destination and the country of origin was significant in affecting tourism demand in major cities in China (Li et al., 2016). Rainfall and temperature are two typical climatic factors of tourism demand (Butler, 1998; Zhang et al., 2016). Gani and Clemes (2017) used some non-economic variables that are quite different from Zamparini et al. (2017), who used environmental quality and stability of weather as predictor variables and found them significantly related to the arrivals of tourists in various provinces of Italy. Moreover, non-economic factors should also be included in tourism demand models when tourist arrivals or tourist overnight stays are used to proxy tourism demand. According to Zamparini et al. (2017), tourism expenditure is the right measure of tourism demand when only economic variables are treated. Rainfall was the only destination-based variable used in this study, while relative temperature (temperature of the source markets/destinations) was another climatic data belonging to the origin-and-destination-based variables (Xie, 2020; Alegre et al., 2011). Another predictor variable, viz. seasonality of the source markets, belongs to the origin-based variables (Corluka, 2018; Andriotis et al., 2007). This variable was included in the model, as tourist arrivals can be shaped by the seasonality of the origin country besides the destination's season. It is presumed that the seasonality of Kerala's

top three source markets can be negatively related to visitor arrivals, as the source countries are Arctic countries in the West, and the destination state has a more stable climate. This is in line with Kim (1999), who observes that tourist departures from Australia were strongly affected by its seasonality. In addition, it was observed that the top three source countries (the UK, the US, and France) of Kerala's international tourism enjoy peak tourism season (during June–August) when Kerala records low arrival numbers. On the other hand, Kerala registers high arrival numbers during the period from November to February, when its top source countries, which are Arctic countries in the West, have off-season (Thomas Cook, 2023a–c). Therefore, the tourism seasonality of the origin country can be a factor driving tourist arrivals in Kerala from the so-called Arctic countries.

The classification of variables into origin-based, destination-based, and origin-and-destination-based variables is similar to the categorization of Gani and Clemes (2017), who classified the variables as standard demand factors, destination attributes, and other variables. It is true that all the studies on tourism demand adopted both economic and non-economic variables. While income and prices remained the mostly cited economic variables, the destination's environment- and the source country's tourism-seasonality-based factors are also included in the present study.

Based on this discussion, we can formulate the following hypothesis: while income is the only predictor which is expected to impact tourism demand positively, all other predictors in the model are expected to affect tourism demand negatively in all three models (the UK model, the US model, and the France model), with equal impact.

4. Analytical Method and Framework

Log-log regression was run to estimate Kerala's international tourism demand from the top three source markets (the UK, the US, and France) in line with Gani and Clemes (2017). There are several other studies too that have adopted stationarity-adjusted data on tourism demand using several other techniques (e.g. Narayan, 2004; Dhariwal, 2005). Narayan estimated Fiji's tourism demand in the short and long run using auto-regressive distributed lagged (ARDL) approach. Dhariwal, in an attempt to analyse the impact of domestic disorders on tourist arrivals in India, applied regression using stationarity-adjusted dataset. Vector correction models and simultaneous equation models were applied by Daniel and Rodrigues (2012) and Zamparini et al. (2017), respectively, in efforts to estimate tourism demand. Least squares regression was applied in an early study on tourism demand by Uysal and Crompton (1984) for analysing the factors driving tourist flows to Turkey. While all the above researchers adopted tourist arrivals to proxy tourism demand, Downward and Lumdson (2003) pursued visitor spending as the

proxy in their study on the tourism demand of the UK. There are also studies not based on secondary data econometric methods (e.g. Corluka, 2018; Andriotis et al., 2007). While Corluka (2018) provided an extensive review of the literature on tourism seasonality, Andriotis et al. (2007) used univariate and bivariate statistics on the data collected from tourists by way of structured questionnaires. Kim (1999), unlike many other econometric studies on tourism demand, developed time series forecasting models for tourist departures from Australia.

In the present study, the dependent variable and five independent variables were transformed into logarithmic form to fix the issue of no stationarity, as the original data were seasonal. This could enable the dataset to fit the proper time series analysis. Time series analysis with log-transformed dataset estimates the elasticities or sensitiveness of tourism demand to change in the income of the origin markets, relative prices, destinations' rainfall, relative temperature, and the seasonality of the origin markets.

Table 1. *Summary of the variables*

Definition	Type of variable	Unit of measurement	Observations	Source of data
Logarithm of FTAs in Kerala from the UK, the US, and France to the base 10 for the period starting from Jan. 2015 to Dec. 2019	Dependent	Tourist arrivals (total)	60	Department of Tourism, Government of Kerala, 2022
Logarithm of the origin country's consumer price index / India's consumer price index to the base 10	Independent ODV	Ratio of index numbers	60	TheGlobalEconomy.com, 2021a–c
Logarithm of Income to the base 10 using imports of the source markets in USD million as proxy	Independent-OV	Total imports in $ million	60	TheGlobalEconomy.com, 2020
Logarithm of rainfall in Kerala (mm) to the base 10	Independent DV	Millimetre	60	India Meteorological Department, 2021
Logarithm of source countries' temperature / Kerala temperature (^{0}C) to the base 10	Independent ODV	Ratio of temperatures	60	National Oceanic and Atmospheric Administration, 2020
Logarithm of source markets' tourism season proxied by tourism season (total) to the base 10	Independent DV	Overnight stays (total)	60	Eurostat, 2021; CEIC, 2022

Notes: i: the UK; j: the US, k: France; t: period starting from Jan. 2015 to Dec. 2019; OV: origin-based variables; DV: destination-based variables; ODV: origin-and-destination-based variables.

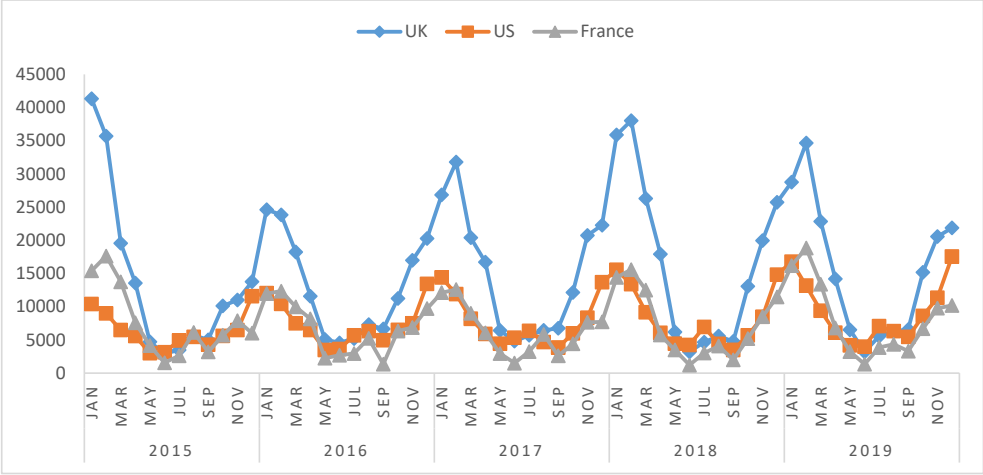
The dependent variable and all potential independent variables are transformed into logarithmic forms to develop valid linear multiple regression models. Three models are developed separately for measuring the determinants of tourist arrivals in Kerala from the top three source markets of the UK, the US, and France. Linear regression was run after transforming the entire dataset into logarithmic form to create a valid model by ensuring the stationarity and normality of the dataset. The month-wise data were collected on one outcome variable and a number of response variables for the time span of 60 continuous months from January 2015 to December 2019. Tourist arrivals in Kerala can possibly be due to the combination of destination-based, origin-based, and origin-and-destination-based variables.

The summary of Kerala's proposed tourism demand models with respect to the UK / the US / France models are presented in *Table 1*.

5. Results and Discussion

5.1 Month-Based Trends of Kerala's Foreign Tourist Arrivals from the Top Three Source Markets

Month-wise arrivals of tourists from the top source markets, viz. the UK, the US, and France, during Jan. 2015–Dec. 2019 are plotted in *Figure 1*. There has not been an upward trend visible in the arrivals of the tourists in Kerala from the UK, the US, and France since January 2015, as presented in the figure. It shows that tourist arrivals from the top source markets look nearly saturated although Kerala's overall tourist arrivals were growing positively until the outbreak of COVID-19 in 2020. The phenomenal growth of tourist arrivals in Kerala from the Middle East (Saudi Arabia, Oman, and the UAE), Russia, Malaysia, Canada, and Australia in the recent period were largely accounted for the growth of Kerala's inbound international tourism as per the data published by the Department of Tourism, Government of Kerala (2022). However, tourist arrivals in Kerala from the top three source markets account for nearly one-third of the total foreign tourist arrivals. While the UK remains the dominant market for Kerala's international tourism with some ups and downs (line with rhombus in the middle), the US and France come as the second and third largest markets (line with square in the middle for the US and line with triangle in the middle for France). May to July remained absolutely off-season for foreign tourist arrivals (FTAs) in Kerala from the top source markets when compared to overall arrivals. Monthly arrivals remained even below 3,000 for this period for the five consecutive years prior to COVID-19. Seasonal monthly arrivals peaked between 15,000 and 20,000 from the US and France and from 25,000 to 35,000 from the UK (during December and January).



Source: Department of Tourism, Government of Kerala (2022)

Figure 1. *Total month-wise foreign tourist arrivals in Kerala from the UK, the US, and France (Jan. 2015–Dec. 2019)*

5.2. Determinants of Kerala's Tourism Demand: The UK, the US, and France Models

The Role of Standard Economic Determinants

Income makes only a mild impact on Kerala's international tourism demand in the log-log regression analysis employed in the current study unlike several other studies on tourism demand (e.g. Roget and Rodriguez, 2006; Nguyen, 2021; Algieri, 2006; Lee, 1996). However, tourist arrivals in Kerala from the UK were positively related to income, with a statistical significance at 5% level, consistent with the economic theory (Samuelson and Nordhaus, 2002) and most previous studies. At the same time, income has but a slightly negative impact in the US model and a slightly positive impact in the France model, with no statistical significance even at 10% level. This implies that the UK tourists are more sensitive to income when compared to the US and France. One per cent change in income would follow 0.12% change in the arrivals of UK tourists in Kerala. This indicates that the positive economic growth in the UK leads to a rise in arrivals of tourists from the country, producing a significant effect. This is, however, not valid for tourist arrivals in Kerala from the US and France, as the income of tourists from these countries clearly has no considerable effect on Kerala's international tourism demand. The income elasticity of tourism demand remains higher according to the studies of Roget and Rodriguez (2006), Nguyen (2021), Algieri (2006), and Lee (1996). The

present study, however, does not fully agree with that. The insignificant relation of income of the US and France to tourism demand cannot be surprising, as Dhariwal (2005) and Xie (2020) argued that an insignificant relation between income and tourist arrivals is possible. Regardless, income makes a positive impact on the arrivals of tourists in Kerala from the UK and a positive though mild impact on the arrivals of tourists from France. Percentage change in income leads to a less than 1% change in tourist arrivals in all three models, while only the UK model shows significance (see *Table 2*).

Tourism price measured by origin country's price level compared to that of the destination (relative prices) is more important in explaining Kerala's tourism demand from the top source markets than income. This has been proven, as relative prices were negatively related to the arrivals of tourists in the Indian state of Kerala from the UK and the US with a statistical significance at 1% level, which falls in line with the economic theory (Samuelson and Nordhaus, 2002) and econometric approaches. Among the top three source markets of Kerala's international tourism, US tourists remained highly sensitive to prices followed by UK tourists. With one per cent rise in relative prices, the number of tourist arrivals in Kerala from the US and the UK drops by 0.40% and 0.23%, respectively, with one per cent significance level in both cases. At the same time, tourists in Kerala coming from France were only slightly related to relative prices, results being statistically insignificant as well. There are studies that have confirmed an insignificant and unexpected relation between price and tourism demand although most studies on tourism demand have found a negative and significant relation. Dhariwal (2005), Algieri (2006), Divisekara and Kulendran (2006), Sharma (2016), Song et al. (2003), Masiero and Nicolau (2012), Malec and Abrham (2016), and Roget and Rodriguez (2006) found in their studies that prices were negatively and significantly related to tourism demand. A significantly negative effect of prices on tourism demand was confirmed by looking into tourist arrivals from the UK and the US. This implies that tourists in Kerala from the UK and the US are relatively more sensitive to prices, while French tourists are the least sensitive in this regard. Given its price sensitivity, Kerala's international tourism competitiveness must be preserved. There are also studies that have not confirmed the positive effect of prices on tourism demand (Shafiulla et al., 2019; Lee, 1996). The less relevance of income as a determinant of Kerala's tourism demand – at least in the US and France models – falls in line with Naude and Saayman (2005), who argue that income and prices are typical determinants of developed countries. It is, however, clear that relative prices are more relevant in explaining the tourism demand of Kerala when compared to nominal income. More specifically, Kerala receives more foreign tourists (especially from the advanced economies in the West), as Kerala's destinations remain more competitive (see *Table 2*).

The Role of Environmental Factors

Although the standard demand determinants of income and prices are only selectively or moderately related, the environmental factors of destination's rainfall and relative temperature remained highly relevant in explaining tourist arrivals in the state from all of the top three source markets. This is exactly in line with Alegre et al. (2011), who found that climate has been a major factor in determining tourism demand in Spain. A higher level of sensitivity of tourist arrivals to environmental factors was also confirmed by Mathivha et al. (2017), who argue that environmental factors among various others (social, economic, etc.) remain fragile in terms of the tourism industry. Both rainfall in Kerala and relative temperature (source country's / Kerala's temperature) are negatively related to tourism demand in all three tourism demand models, as expected. However, not all tourists are equally sensitive to environmental factors. While both UK and US tourists are more sensitive to rainfall and relative temperature, French tourists in Kerala were found less sensitive to both climatic variables. One per cent change in Kerala's rainfall and relative temperature leads to 0.42% and 0.45% change, respectively, in the arrival of tourists from the UK. Tourists from the US in Kerala were also highly sensitive to climatic factors when compared to French tourists. One per cent change in rainfall in Kerala and relative temperature lead to change in arrivals of US tourists by 0.48% and 0.39% respectively. The estimates were significant at 1% level too. Both environmental factors are negatively related to the arrivals of tourists from France too although both were statistically significant only at the 10% level. Results on the effect of environmental factors imply that tourist arrivals increase depending on the variations in rainfall and relative temperature. Tourism demand rises when rainfall and relative temperature decrease in the state of Kerala (see *Table 2*). There are several other studies that have confirmed a stronger effect of climatic factors on tourism demand (Sookram, 2011; Li et al., 2016; Corluka, 2018).

Effect of the Tourism Seasonality of Source Markets

The tourism seasonality of the source countries is negatively related to Kerala's tourism demand from the UK and France, as expected. One per cent change in the source countries' tourism seasonality causes 0.17% and 0.32% change in the arrivals of UK and French tourists. While the tourism seasonality of France was significant at 5% level, seasonality in the UK was significant only at 10% level. The seasonality of the US (tourist departures from the US were taken as the proxy, and a positive relation was expected; the positive impact of tourist departures from the US was considered to be inversely related to the US tourism seasonality: the higher the number of departures, the weaker the tourism season, and vice versa) was slightly and positively related with no statistical significance, even at 10% level.

As per the data presented in *Table 2*, the tourist departures from the US were negatively (although slightly) related to tourism demand. Hence, it is clear that US tourism seasonality was positively but slightly related to Kerala's international tourism demand. This implies that the tourism seasonality of the source market of Kerala's international tourism was only relevant in the case of the arrivals of UK and French tourists. Nevertheless, tourism seasonality has consistently influenced tourism demand worldwide, as stated by Corluka (2018). Although the destination's tourism seasonality measured by environmental attributes is relevant, the present study examined the effects of the source countries' seasonality on Kerala's tourism demand. It was found that this can be valid in cases of tourist arrivals from the UK and France in Kerala considering the top three source markets (see *Table 2*). It was hypothesised that the source country's tourism seasonality remains negatively related to the arrivals of tourists in Kerala from the main source countries. This holds true for the arrivals of tourists from the UK and France, showing statistical significance. US tourists, at the same time, were insignificantly but negatively related to the tourism seasonality of the source country.

Table 2. *Results of the log-log regression on Kerala's international tourism demand from the top 3 source markets (the UK, the US, and France)*

		Income (Y)	Relative price (P)	Rainfall (RNF)	Relative temperature	Tourism season
UK model	**Coeff.**	.124	-.227	-.416	-.447	-.170
	t	2.067	-3.662	-4.471	-4.115	-1.761
	Sig.	.044	.001	.000	.000	.084
US model	**Coeff.**	-.073	-.405	-.476	-.388	-.042
	t	-.774	-4.174	-4.607	-4.042	-.418
	Sig.	.442	.000	.000	.000	.678
France model	**Coeff.**	.020	-.042	-.249	-.336	-.299
	t	.177	-.375	-1.759	-1.922	-2.074
	Sig.	.861	.709	.084	.060	.043

Source: authors' estimates

Hypothesis Testing Results

While null hypothesis of no effect of both standard economic determinants, viz. income and relative prices, stands rejected in the UK model, the US model remains significantly related to Kerala's tourism demand only in the case of relative prices out of the two standard economic determinants. The null hypothesis is accepted in the France model for both of the variables, as no significant relation was found. Overwhelming relevance of environmental factors (relative temperature and rainfall) in affecting tourism demand leads to the rejection of the null hypothesis of no relation in all three models. The null hypothesis gets rejected in terms of

the significant effect of the source country's tourism season on Kerala's tourism demand in the case of the UK and France models. It, however, stands accepted in the US model. It can be generalized that there has been a significant effect of the selected economic and non-economic factors, the destination-based, origin-based, and origin-and-destination-based variables, on Kerala's international tourism.

Among the three models of Kerala's international tourism as per the log-log regression analysis, the UK model remains more relevant, as its adjusted R-squared value (0.8) shows a greater significance in explaining tourist arrivals. This is followed by the US model with the adjusted R-squared value of 0.71 and the France model with 0.63. Since F changes are significant at 1% level in all three models, the models are accurate in terms of their predictability. The Durbin–Watson values fall in the acceptable range in all of the three models (see *Table 3*).

Table 3. *Model summary: the UK, US, and France models of Kerala's international tourism demand*

Model	Adjusted R-square	F change	Sig. F change	Durbin–Watson
UK model	.803	48.259	.000	1.662
US model	.710	28.908	.000	1.908
France model	.629	20.646	.000	2.081

Source: authors' estimates

6. Conclusions

The income level of the source markets has only a mild impact on Kerala's international tourism demand, as the income elasticity of tourism demand remains lower (below 1) in all of the three models (the UK, the US, and the France model). This holds true even as income stands significantly related to Kerala's international tourism demand in the UK model. The effect of the income level of the source markets on Kerala's tourism demand was negligible. The moderate effect or low relevance of income on Kerala's tourism demand falls in line with Roget and Rodriguez (2006), Nguyen (2021), Algieri (2006), and Lee (1996). At the same time, the lower impact of income is not surprising, as there are studies to have failed to ascertain a significant relation between income and tourism demand (Dhariwal, 2005; Xie, 2020; Naude and Saayman, 2005). Naude and Saayman (2005) argued that the standard determinants of tourism, viz. income and prices, are determinants of the developed countries, which implies that both standard factors make a stronger impact on the tourism demand of advanced economies than that of developing countries.

Relative tourism prices make a stronger impact on Kerala's tourism demand, as tourist arrivals from the UK and the US (Kerala's top two source markets of

international tourism) are relatively more sensitive to relative prices, with a statistical significance at 1% level. French tourists in Kerala were not significantly sensitive to prices at the same time, even though negatively related, as expected. Relative prices being highly relevant compared to the income level of the source countries, the destination country must ensure that Kerala's tourism export competitiveness remains on a sufficiently high level to deal with the increasing arrivals of foreign tourists in the future. It has been, however, revealed that relative prices, and not the income level of the source markets, was a more relevant economic variable. This implies that people travelled to Kerala (from its top three source countries) not because they were rich but because they had a greater purchasing power in Kerala than in their home countries, as prices in India remain lower when compared to those of the top tourist-sending countries, which are developed economies. The negative relation between relative prices and tourism demand is consistent with the studies of Dhariwal (2005), Algieri (2006), Divisekara and Kulendran (2006), Sharma (2016), Song et al. (2003), Masiero and Nicolau (2012), Malec and Abrham (2016), and Roget and Rodriguez (2006). Hence, it is obvious that keeping the destinations competitive is of utmost importance, as relative prices play a significant role in driving tourist arrivals. It is the real income, caused by lower prices, rather than nominal income, that played a greater and more significant role in shaping Kerala's international tourism demand. All three top source countries of Kerala's international tourism are developed economies where the cost of living remains higher than in developing economies such as India (*The Economic Times*, 2017). Therefore, the affordability of Indian destinations for the visitors from Western developed economies has been crucial in explaining Kerala's international tourism demand.

Environmental factors remain more relevant in Kerala's international tourism demand when compared to the standard determinants of income and prices. Both rainfall in Kerala and relative temperature were statistically significant in driving the arrivals of tourists from the UK, the US, and France. This is consistent with the seasonality nature of Kerala's international tourism and previous studies on tourism demand (Alegre et al., 2011; Mathivha et al., 2017; Sookram, 2011; Li et al., 2016; Corluka, 2018). They have found a stronger impact of climatic factors, including rainfall and temperature of the destination, on tourism demand. While taking into account these studies, the present study points out that not only the destination's but also the source country's climate has an influential role in shaping Kerala's international tourism demand. Tourists in Kerala from its top source markets arrive to experience its comfortable weather and get away from the extreme winter in their home countries. At the same time, the source markets' tourism seasonality could affect tourism demand. In line with this notion, French tourists are more sensitive to the seasonality of France with 1% level of significance when compared to tourists from the UK and the US.

UK tourists in Kerala are more sensitive to source markets' tourism seasonality than US tourists, as the estimate was significant at 10% level. Among the top three source markets of Kerala's international tourism, the elasticities of the UK tourists were relatively higher, with a greater significance level. This is confirmed by the significant p values and greater adjusted R-squared values presented in *tables 2 and 3* respectively.

We conclude that although climatic factors (rainfall and relative temperature) appear to have an extensive and strong impact on tourist arrivals in Kerala from the top source countries, the higher international tourism export competitiveness of Kerala marked by lower prices than in the source countries acted as the true primary driving force of tourist arrivals in the Indian state of Kerala. This assertion remains valid, as climate has significantly contributed to attracting tourists to Kerala, while the region's tourism competitiveness has successfully secured tourist arrivals. This pattern holds true, at least in the models for tourist arrivals from the UK and the US. Besides the environmental factors, French tourists mainly responded to France's tourism seasonality. Economic predictors (income and relative price) were insignificantly but negatively related in the France model. Regardless, the role of relative prices in affecting tourist arrivals in Kerala cannot be neglected in any of the three models although French tourists were insignificantly sensitive to it.

The study gives a clear understanding of the factors (economic, environmental, and tourism-seasonality-based) driving Kerala's international tourism demand. It shows how tourist arrivals are affected and how foreign tourists are responding to the primary variables such as income and relative prices. The study also reveals how tourists remain sensitive to the climatic and tourism seasonality factors. Despite the data being continuous, the tourist arrivals dataset had to be limited to 60 observations due to availability constraints. Kerala's tourism demand based on three source markets may not be perfectly applied to the overall tourism demand of Kerala, as the three source markets constitute not more than 35% of the total arrivals. Despite this shortcoming, the present study may facilitate better international tourism management in Kerala. Also, the study urges tourism managers and authorities in Kerala to make sure that tourist destinations remain competitive. More importantly, it could form a bridge between tourism demand literature and tourism demand models of Kerala. This study used the source country's tourism seasonality as a variable in addition to economic and environmental factors. The significance of tourism competitiveness was firmly established in the study on tourism demand in Kerala. Specifically, competitive tourism prices in the developing region continue to be highly relevant for influencing tourist arrivals from developed Western countries.

Acknowledgements

This paper was prepared on the basis of a PhD thesis submitted in April 2023 to the University of Calicut, Kerala, India. The authors received no financial support for the research, authorship, and/or publication of this article.

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