SERIES

# STUDIES AND PERSPECTIVES

## ECLAC SUBREGIONAL HEADQUARTERS FOR THE CARIBBEAN

# Towards diversification of the tourism sector

## A recreational demand study of yachting and marina services in the Caribbean

Willard Phillips

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# Abstract

Although tourism has been a major economic sector in the Caribbean since the mid-1960s, the sector now faces significant challenges as competition intensifies in the global tourism market. These challenges include environmental impacts, and the need for continued high levels of public investment in order to sustain the tourism product. The precariousness of the sector was made starkly evident with the onset of the global recession in 2009, when the sector recorded significant decline. Notwithstanding some limited recovery since that time, the recent experience highlighted the need for Caribbean countries to undertake more vigorous efforts towards diversifying their economies in general, and enhancing their tourism sectors in particular. One area identified for specific development is yachting and marina services, a sub-sector which is widely regarded as having significant economic potential. Towards this end, the present study seeks to examine the nature of recreational demand for yachting and marina services in the Caribbean. In order to achieve this, a simple demand model is estimated, and elasticities calculated for three demand variables. Using data from eight countries, the model identified income in the source market, airline ticket cost, and the frequency of hurricanes as the three most critical variables which influenced consumers' decision to seek yachting and marina services in the Caribbean.

# I.   Tourism and marina services in the Caribbean

Although tourists first began visiting the Caribbean towards the end of the nineteenth century, evidence of a fledging tourism sector only became apparent by the 1950s as tourism began to replace sugar as the main foreign exchange earner in the region (Patullo, 1996). By that time, Cuba, Jamaica, the Bahamas, Barbados, Martinique and Curaçao had all begun to receive regular visitors, and had at least the beginnings of an organized stay-over industry with purpose-built accommodations to cater to the needs of wealthy American and European tourists. The introduction of regular international jet services to the Caribbean in the 1960s along with the subsequent development of the cruise sector saw the rapid development of tourism, so that by the 1990s the Caribbean had become one of the most tourism dependent regions in the world with tourism having fully replaced agriculture as the dominant economic sector in all but a few countries.[1] Moreover, the region has remained one of the most competitive tourism regions globally, having attracted roughly 3 per cent of global tourism visits over the past 40 years (WTTC, 2011). While the sector suffered the vagaries of the global economic contraction between 2009 and 2010, it has shown resilience receiving 20.8 million stay-over visitors in 2011 (UNWTO, 2012).

At the same time, growth in cruise passengers has closely rivalled that of stay-over visitors, amounting to 20.6 million between 2010 and 2011 (Travel Weekly, 2012), and the Caribbean remains the world's largest cruise destination, attracting up 39.8 per cent of all itineraries in 2011. Further, by taking advantage of its proximity to the large North-American source market, its large number of relatively close destinations, and its pristine environment and year round warm climate, the region has managed to sustain annual growth rates of cruise passengers of over 7 per cent since 1980 (FCCA, 2012).

Among the islands, the bigger destinations to the north receive the largest share of stay-over visitors, with the Dominican Republic (20.6 per cent), Cuba (12.9 per cent), Jamaica (9.4 per cent) and the Bahamas (6.5 per cent) being the main recipients in 2011(UNWTO, 2012)[2]. Among the smaller destinations, the United States Virgin Islands, Aruba, Barbados, Martinique, Antigua and Barbuda and

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[1]   These exceptions include Trinidad and Tobago (Tobago has since evolved as a specialized tourism destination); Guyana, Suriname, Belize.

[2]   While data are unavailable for 2011, Puerto Rico is also a main tourist destination, having received over 18 per cent of Caribbean visitors in 2009 and 2010 (UNWTO, 2013).

Saint Lucia have all emerged as important tourist destinations over the past two decades. Table 1 below shows stay-over arrivals for selected Caribbean countries from 2009 to 2011.

**TABLE 1**
**INTERNATIONAL TOURIST ARRIVALS – SELECTED CARIBBEAN DESTINATIONS, 2009 – 2011**
*(Thousands of people)*

| Destinations | International tourist arrivals | | |
|---|---|---|---|
| | 2009 | 2010 | 2011 |
| Anguilla | 58 | 62 | 66 |
| Antigua and Barbuda | 234 | 230 | 241 |
| Aruba | 813 | 825 | 871 |
| Bahamas | 1 327 | 1 370 | 1 344 |
| Barbados | 519 | 532 | 568 |
| Bermuda | 236 | 232 | 236 |
| British Virgin Islands | 309 | 330 | - |
| Cayman Islands | 272 | 288 | 309 |
| Cuba | 2 405 | 2 507 | 2 688 |
| Curacao | 367 | 342 | 390 |
| Dominica | 75 | 77 | 73 |
| Dominican Republic | 3 992 | 4 125 | 4 306 |
| Grenada | 109 | 105 | 112 |
| Guadeloupe | 347 | 392 | - |
| Haiti | 387 | 255 | - |
| Jamaica | 1 831 | 1 922 | 1 952 |
| Martinique | 442 | 476 | 495 |
| Puerto Rico | 3 550 | 3 679 | - |
| Saint Lucia | 278 | 306 | 290 |
| Saint Kitts and Nevis | 93 | 99 | 98 |
| Sint Maarten | 440 | 443 | 424 |
| Saint Vincent and the Grenadines | 75 | 72 | 74 |
| Trinidad and Tobago | 419 | 386 | - |
| Turks and Caicos | 351 | 281 | 354 |
| United States Virgin Islands | 563 | 590 | 536 |

Source: UNWTO, 2012.

Tourism also plays an important role in the Caribbean as it is the largest contributor to gross domestic product (GDP), employment creation and investment for many countries. According to the World Travel and Tourism Council (WTTC), the direct contribution[3] of travel and tourism to the GDP of Caribbean economies ranged between US$ 14.9 and US$ 16.2 billions between 2006 and 2011, and represented an average of 4.5 per cent of GDP in 2011 (WTTC, 2012). In terms of employment, the sector generated between 614 and 690 thousand jobs over the same period, contributing to 12.1 per cent of total employment for the region in 2011. Tourism also contributed significantly to capital investment in many Caribbean countries attracting between US$ 4.9 and US$ 6.1 billion worth of capital investments between 2006 and 2011, with the share of capital investment standing at 11.8 per cent in 2011. These contributions along with other estimates for 2012 are summarized in table 2 below.

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[3]    Measured in real 2011 prices.

**TABLE 2**
**SUMMARY OF CONTRIBUTIONS OF TRAVEL AND TOURISM TO CARIBBEAN ECONOMIES,**
**2011 AND 2012**

| Caribbean | 2011 Billions of dollars[a] | 2011 Percentages of total | 2012 Growth (percentages)[b] |
|---|---|---|---|
| Direct contribution to GDP | 15.1 | 4.5 | 2.6 |
| Total contribution to GDP | 47.1 | 13.9 | 2.0 |
| Direct contribution to employment (000s jobs) | 614 | 3.8 | 1.7 |
| Total contribution to employment (000s jobs) | 1,976 | 12.1 | 0.9 |
| Visitor exports | 24.7 | 15.4 | 2.3 |
| Domestic spending | 10.1 | 3.0 | 4.1 |
| Leisure spending | 32.8 | 9.7 | 2.8 |
| Business spending | 3.1 | 0.9 | 4.0 |
| Capital investment | 5.6 | 11.8 | -0.3 |

Source: WTTC, 2012.

[a] Constant prices and exchange rates.
[b] Real growth adjusted for inflation.

## A.    The marina sector in the Caribbean

The marina sector is part of the tourism services complex which generates economic and social benefits for the Caribbean. Marinas are fairly evenly distributed throughout the region- from Cuba in the north, through the Eastern Caribbean to Trinidad and Tobago in the South, and to Aruba in the South-West. Considering number of sites, there appears to be no advantage in terms of size of the island, since the largest number of marinas —8 or more— are to be found in Anguilla (11), Antigua and Barbuda (9), the Bahamas (10), Cuba (9) Grenada (11), Sint Maarten (13), and the United States Virgin Islands (11). On the contrary, geographic advantages such as highly indented coastlines which afford safe access, anchorage and shelter, as well as nautical benefits such as easy sailing conditions, and reliable prevailing winds, are strong factors which influence the development of marinas in the Caribbean. Such benefits are further enhanced, where marinas can be located to allow for easy access to multiple destinations, which can provide all the necessary safety, services and amenities for the nautical enthusiast.

The influence of these latter factors is also more apparent in terms of the number of berths that are provided to yachts. In this regard, Sint Maarten offers both the largest number of marinas as well as berths, with 1, 020 berths for rent to visiting yachters. Other large berth providers include the Bahamas (845); the Dominican Republic (878); the United States Virgin Islands (842); and Cuba (786). The smaller islands of the Eastern Caribbean provide a wider range of berths from 36 for Saint Kitts and Nevis, up to 462 berths for the British Virgin Islands. The distribution of marinas in the Caribbean is summarized in table 3 below.

**TABLE 3**
**DISTRIBUTION OF MARINAS IN THE CARIBBEAN**

| Country | Number of marinas | Number of berths |
|---|---|---|
| Anguilla | 11 | 113 |
| Antigua and Barbuda | 9 | 340 |
| Aruba | 3 | 125 |
| Bahamas | 10 | 845 |
| Barbados | 2 | 100 |
| Bonaire | 3 | 100 |
| British Virgin Islands | 5 | 462 |
| Cayman Islands | 2 | 85 |
| Cuba | 9 | 786 |
| Curacao | 1 | 128 |

Table 3 (concluded)

| Country | Number of marinas | Number of berths |
|---|---|---|
| Dominican Republic | 7 | 878 |
| Grenada | 11 | 407 |
| Jamaica | 7 | 182 |
| Puerto Rico | 4 | 458 |
| Saint Kitts and Nevis | 1 | 36 |
| Saint Lucia | 2 | 293 |
| Sint Maarten | 13 | 1 020 |
| Saint Vincent and the Grenadines | 7 | 30 |
| Trinidad and Tobago | 2 | 108 |
| Turks and Caicos Islands | 2 | - |
| United States Virgin Islands | 11 | 842 |
| TOTAL | 140 | 7 340 |

Source: Author's compilation based on data from World Marine Guide (http://www.worldmarineguide.com); and port booker.com (http://www.portbooker.com).

Given the extensive scope of Caribbean marinas, the sector has the capacity to accommodate a wide range of sailing and related water crafts. Hathaway (2012) in a recent survey observed that the marinas in the region are able to accommodate crafts ranging from as low as 40 feet length-overall (LOA) up to a maximum of 360 feet LOA, with drafts of up to 30 feet. Among the range of yachts which typically visit the region, Hathaway identifies the 40ft monohull sailing yacht, the 46ft catamaran, and the 65ft monohull motor yacht as the most common. Over the past decade, the Caribbean has also been increasingly visited by the larger 130ft mid-range mega-yacht, and many destinations are now providing or developing specialized facilities and services to accommodate such vessels.

## B.   The marina business in the Caribbean

In order to develop a relevant context for the analysis of demand for yachting and marina services in the Caribbean, it is necessary to understand the nature of this business.  Although, few formal studies exist on the sector, and data are extremely difficult to obtain, ECLAC (2004) in a regional overview for the Eastern Caribbean sub-region appraised the sector on the basis of service and product offering, clustering of services, and seasonality.

Regarding service and product, Caribbean marinas offer ostensibly five business services: (i) wet storage and anchorage; (ii) charter services; (iii) boat servicing, repairs, and chandlery; (iv) accommodation and recreational amenities; and (v) hurricane shelter. Wet storage is the main revenue generator, and many Caribbean facilities provide standard electricity and drinking-water hook ups at all berths, in addition to cable television and wireless internet connectivity. Increasingly, marinas also provide visitor accommodation in addition to bars, restaurants, gift shops, showers and laundry facilities.  In recent years, marinas have also extended their services to include banking, postal services, in additional to personal care services such as hair-dressing and spas. The provision of charter services for yachts is another major revenue centre for many marinas, as many global yacht charter companies use the region for staging yachts for bareboat charters to Caribbean visitors. Considering services for boats, many marinas have installed fuel docks, pump-out and haul-out equipment, and also provide an extensive range of repairs including electrical services, mechanical and diesel, scraping and painting, sail making and repairs, upholstery, and woodworking. Further, varying degrees of chandlery and dry storage services are also to be found in many marinas in the region.

In addition to the man-made offerings, the yachting business benefits significantly from the abundance of natural attractions, and unique advantages for cruising which are promoted as an integral part of the product offering in the Caribbean. These include numerous pristine beaches, cays and small islands, marine parks, generally calm waters year round, closely located islands, exquisite views and vistas, and myriad destination services on land. This adds significantly to the appeal of the region since most yachters main objective for coming to the Caribbean is for recreational sailing and fishing, or to

experience the hospitality of multiple destinations, while enjoying their accommodation facilities aboard yachts. Additionally, many marinas provide seasonal safe harbours for boats during the hurricane season, as well as repairs and rental services.

As noted by ECLAC (2004), the evolution of the yachting sector has also led to the clustering of services, varying from mainly recreational and accommodation, to more industrial repairs and services. This trend has intensified over the past decade, as destinations seek to attract more business from the rapidly growing global mega-yacht subsector. Increasingly, clustering of services in recreational marinas is being adopted in order to enhance the experience of visitors.

With respect to seasonality, the peak business season in the region is from July to December, during which time occupancy of berths ranges from 70 per cent to100 per cent. This corresponds to the hurricane season, when many sailors/boat owners move their boats to lower latitudes or wet-store them at marinas. It is these boats that are then available for offer to the bare-boat charter markets.  Marinas which provide mainly repair services, also have the same peak period, since yacht owners who do not offer boats for charter seek to effect repairs during the shelter period.

Apart from the product and service offerings, technical specifics, and physical attributes of Caribbean marinas, the sector exhibits specific business characteristics related to the nature of its source markets, the profile of its clients and the main revenue and cost centres.   Because unlike the United States of America and Europe, there is no tradition of shipbuilding in the Caribbean,[4] there are very few regionally owned and operated yachts. Hence, marina services are provided primarily to accommodate visiting cruisers and sailors. Most yachts come from the United States of America, particularly Florida, the eastern seaboard and the Gulf Coast of the United States of America, and the United Kingdom of Great Britain and Norther Ireland. Nevertheless, the region also receives visiting yachts from France, Germany, Italy and Scandinavia (CTO, 2012). While there is increasing diversity with respect to the range of consumers, most sailors tend to come from "higher socio-economic groups, and are skewed towards males rather than females" (CTO, 2012).  The marina business comprises mainly yacht-charter consumers, and yacht owners who tend to be in the 55 and over age group, and younger dinghy sailors dominated by persons from the 16 to 34 age group. Additionally, a newly emerging segment of the market is the family with teenage children, who typically engage in "flotilla" activities.

With respect to financing and ownership, the majority of marinas in the Caribbean are privately-owned facilities, often established though foreign-direct investment of global corporations into the regional tourism sector. Although specific Caribbean figures are unavailable, Graves (2012) in developing a profile of the business in the United States, notes that investments costs are high, averaging between US$ 50,000 and US$ 60,000 per berth. Further establishment costs include land acquisition and development of landside amenities such as parking, waterside equipment and buildings. Moreover, marinas typically require high maintenance costs, especially ocean-based marinas, which are subject to the rigours of daily tidal changes, and seasonal storm surges. All of these costs are likely to be higher in the Caribbean, where suitable coastal areas for such investments are in short supply, and extreme weather events occur annually.

In terms of revenues and costs, Caribbean marinas generate most of their revenues from the rental of berths, charter of boats, provision of utility services, sale of fuel, food and restaurant services, chandlery, and storage and repairs. As summarized by Hathaway (2012), rental fees for berths vary considerably, depending on season, length and type of craft, and the range of services offered by the marina. For the high season, average rental rates range from US$ 7 to US$ 8 per foot per day for vessels up to 40 feet LOA, while similar vessels pay roughly US$ 7 per day during the low season. Larger boats up to 130 feet LOA pay between US$ 23 and US$ 32 per foot per day during the high season, with a range of US$ 17 to US$ 18 per foot per day during the low season. Overall, the high investment and operational costs, and seasonal revenue structures of marinas make high long term occupancy a critical requirement for financial success.

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[4]   Many Caribbean countries have a well-established tradition of artisanal and small boat building. This however has not been developed to the skill level to turn out yachts of the standard and design of the luxury yachts which visit the region.

Having outlined very cursorily the nature of the marina business and its wider context in the Caribbean, we turn now to the theoretical framework which informs the analysis of recreational demand for marina services in the Caribbean. This issue is elaborated in the section which follows.

# II. The demand for marina services in the Caribbean – theoretical framework

According to economic theory, the demand for any good or service generally depends on its price, the price of other substitute goods or services, consumer's income, and consumer's tastes and preferences. Because an individual needs to consume a wide range of goods and services in order to maximize welfare, she/he is forced to make choices over bundles of goods and services, such that the maximum benefit of each unit of good or service is obtained, at minimum cost. Given that individuals have fixed incomes over the short term, the consumption of a particular good or service typically declines as its price increases, with the consumer switching to a cheaper substitute in order to maximize welfare. At the same time, consumers may also increase overall consumption of all goods in a choice bundle if income increases in the medium to long term.

There are of course significant departures from the above generalities, with such differences manifesting themselves depending on the nature of the good or service, and its responsiveness to price or income changes. The responsiveness of consumer demand to changes in price or income is known as its elasticity. Price elasticity measures the responsiveness of a good to changes in price, while income elasticity measures the responsiveness of a good to changes in consumer income. Mathematically, price elasticity ($\rho$) and income elasticity ($\lambda$) are determined by the following equations:

Price elasticity $(\rho) = [(\partial Q/Q)/\partial P/P]$          (1)

and,

Income elasticity $(\lambda) = [(\partial Q/Q)/\partial I/I]$          (2)

where,

$Q$ = Quantity of goods demanded per period;

$P$ = Price of goods at a particular period;

$I$ = Income of consumers at a particular period;

In terms of price, the demand for a good generally decreases with increase in price, resulting in the classical inverse demand function, with negative price elasticity. The consumption of a good that is a substitute however would *increase* with a price increase, resulting in a positive *cross-price elasticity*.

This is classically observed in the case of meats, where the consumption of fish increases due to an increase in the price of chicken. Other goods are perfect complements in which a price increase of Good A, results in a *decrease* in consumption of *both* Good A and Good B, since Good A and B are normally consumed together. In this instance, Good B is a complement of Good A and has a negative cross-price elasticity. Bread and butter are two commodities which typically represent this relationship in consumer demand.

In terms of consumer response to income changes, the consumption of most goods increases[5] with an increase in income. These are known as normal goods. However, distinctions are still to be made based on the *degree* of responsiveness to the income change, so that normal goods are further categorized into necessary goods, and luxury goods. For necessary goods, the proportion of income spent on the good *decreases* with increases in income, while for luxury goods, the proportion of income spent increases with increases in income. Perez-Labajos and Blanco (2009) provide an excellent summary of the various income-elasticity goods classes, elasticity conditions, and their interpretation. These are presented in table 4 below.

**TABLE 4**
**DEMAND-INCOME ELASTICITY OF VARIOUS GOODS**

| Type of goods | Condition | Interpretation |
| --- | --- | --- |
| Basic goods | $\lambda(Q) < 0$ | Demand for these goods fall when income increases; elasticity of these goods is always negative. |
| Normal goods with unsatisfied demands | $\lambda(Q) > 0$ | Demand for these goods increases when income increases; elasticity of these goods is always positive. |
| Necessary goods | $0 < \lambda(Q) < 1$ | Normal goods whose demand increases proportionally less than the increase in income. As income increases, the share of necessary goods in the consumer's budget decreases. |
| Luxury goods | $\lambda(Q) > 1$ | Normal goods whose demanded quantity increases proportionally more than the increase income. As income increases, the share of luxury goods in the consumer's budget will also increase. |
| Normal goods with satisfied demand | $\lambda(Q) = 0$ | Goods whose demand remains unaltered when income increases. The elasticity of these goods always equals zero. |

Source: Perez-Labajos and Blanco, 2009.

Apart from income and price, consumer tastes and preferences also influence demand. Tastes and preferences are largely immeasurable but powerful constructs which affect consumer choice, and are based upon the socio-cultural and experiential framework through which consumers perceive their world.

The demand for marina services in the Caribbean is a *derived* demand reflecting the demand for yacht charters and related amenities, the need for storage, servicing and repairs, and the need for hurricane shelters. Since the marina business in the Caribbean is dominated by these three aspects, factors which influence the demand for these services will ultimately determine the overall demand for marina services.

Recreational marine activities are luxury-type services, which have high income elasticities —greater than one— and are typically demanded by the higher income segment of the market. High incomes also imply higher willingness to pay for goods and services so that recreational marine services are also anticipated to have relatively low (small negative) price elasticity.

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[5]   There is a small group of goods for which an increase in income will result in a decrease in demand. These are known as giffen goods, for which a classical example is cabbage. Such goods are perceived to have a strong quality correlation with price, so that as income increases, consumers switch to a more expensive alternative, thus reducing consumption of the giffen good.

# III. Specifying the demand model

The literature is quite sparse with respect studies on demand for yachting and marina services. Bell and Leeworthy (1987) constructed a probability demand model for marina services, by estimating the likelihood that boaters will use marinas in the State of Florida, United States of America (the), and projected such use onto possible impacts on wetlands of that state. This model used the number of boats in the state as the dependent variable and estimated a three-stage conditional probability demand function for storage services only at marinas in Florida.

While not a specific study of demand, Payeras, Jacob and others (2011), undertook a SWOT analysis of the yacht-charter business in the Balearic Islands. This study noted the importance of geographic and climatic features, safety and security of the region, as well as the availability of related amenities as key factors in boosting the demand for nautical tourists. Perez-Labajos and Blanco (2009) also conducted a study to measure the demand-income elasticity for boat construction, as a predictive model for the evolution of a recreational fleet in Spain, based on changes in income. This research comes closest to the methodological approach considered in this study, and identifies along with income, prices of recreational crafts; prices of substitutes and complementary goods for recreational crafts; and tastes and preferences as important demand variables. This study also used the number of recreational crafts per period as the dependent variable in the model. However, no study has been cited which examines the demand for yacht charters in a specific region, based on yacht charter passengers. It is this relationship which this study seeks to explore, and in this regard, an understanding of the yacht charter business is critical to informing model specification.

In order to provide yachts for charter, many Caribbean marinas shelter yachts during periods when such vessels are not in use by their owners. These boats are then chartered to nautical enthusiasts who visit the region for the specific purpose of sailing. Yachts are chartered under a range of conditions such as bareboat, where the charterer takes full control of the vessel, or crewed, in which the yacht is provided with a crew, such as sailor, cook and other attendants, and other provisions. After booking a yacht, charterers typically travel to the country by air, and then board the vessel at the marina for a fixed-period cruise, usually ranging from 5 to 10 days. During this period, sailors may visit several countries before returning the yacht either to the original country and marina, or depositing it at another facility in another country, from where they would depart on a return flight home.

Given this arrangement, and the theoretical framework outlined above, what then are the most likely factors which inform the demand for yacht charter services in the Caribbean? Table 5 below summarizes the possible variables and rationale which are likely to inform the specification of a demand model for the Caribbean.

**TABLE 5**
**POSSIBLE VARIABLES AND RATIONALE FOR DEMAND MODEL**

| Variable | Rationale |
|---|---|
| Yachting arrivals to the Caribbean | The number of persons arriving in the Caribbean who declare their purpose of visit to be engaging in yachting activities. This is the dependent variable (left hand side) of the model |
| Incomes in source market | Higher incomes are likely to increase the demand for luxury goods and services. Real incomes in the source market are expected to be positively correlated with yacht charter demand |
| Price of jet fuel (as a proxy for cost of airline tickets)[a] | Since most yachting passengers travel by air to the Caribbean to begin their yachting activities, the cost of travel will likely be a factor in the demand for yachting services. |
| Frequency of hurricanes | The Caribbean is frequented by hurricanes and tropical storms which affect sailing experience and increase risk of losses to boats. A higher frequency of these events is likely to deter yachting enthusiasts to the region. At the same time, many marinas (especially in lower latitudes) provide safe shelter for boats during the hurricane season, thereby affording a key benefit to yacht owners during this time of year) |
| Price of charter services | Higher costs of charters are likely to reduce demand for such services |
| Tastes and preferences | These relate to all natural and man-made characteristics which draw visitors to the region, including sailing conditions, weather, distance between islands, entertainment and other service amenities, availability of repair and provisioning services, communication, and administrative procedures which will enhance the appeal of the destination. |

Source: Author's compilation.

[a] The cost of jet-fuel has been estimated to be between 30 per cent and 35 per cent of airline ticket costs.

Although, the above variables were deemed to be important in estimating demand, data inadequacy forced the elimination of many of these variables, and warranted a number of assumptions. Firstly, persons participating in yachting activities were all assumed to have arrived in the region by air. This therefore does not take into account those marine recreationists who arrive aboard yachts, and while this is assessed to be substantial, the absence of specific data did not allow for their inclusion in the modelling exercise.

Secondly, noting that yachting is a luxury service which was demanded by the higher incomes demographic of the source market, it was considered that *corporate profits* rather than per capita GDP would have better served the estimation of the model. These data were therefore used to represent incomes in the model. Also, although data were not disaggregated by source market, given the dominance of the United States of America as an overall tourism source market, as well as its relative closeness to the Caribbean, only corporate profits from the United States of Amrica were used in the model.

Thirdly, while economic theory indicates that prices of both a good and its substitute are key elements of demand, the scope and diversity of product/service offerings in the Caribbean yacht charter market did not allow for the generation of an extended data series for charter prices. Further, with respect to prices of substitutes, air travel ticket costs from North America to the Mediterranean – the main competing, and therefore main substitute charter market of the Caribbean, were also unavailable and also could not be included in the model.

Finally, the Caribbean region was considered to be contiguous and undifferentiated for the purpose of sailing, offering a largely similar experience in terms of geographic and climatic conditions, as well as amenities and services. Hence, it was assumed that all yachting vacationers who came to the Caribbean were similar in terms of preferences, and therefore could not be differentiated on the basis of

tastes and preferences. This, along with the difficulty in identifying a single measurable variable for taste and preferences also led to its exclusion from the model. Based on all of the above, the econometric model for estimation was therefore specified as follows:

$$Y_t = \beta_1 CP_t + \beta_2 FP_t + \beta_3 H_t + \varepsilon_t \qquad (3)$$

Where:

$Y_t$ = Number of yacht passenger arrivals in the Caribbean in period t.

$\beta_1$ = Coefficient for Corporate Profit in period t.

$CP_t$    = Corporate Profits (United States of America) in period t.

$B_2$ = Coefficient for Fuel Price in period t.

$FP_t$ = Airline fuel price[6] per gallon in period t.

$B_3$ = Coefficient for Hurricanes in period t.

$H_t$ = Number of hurricanes and tropical storms in period t.

$\varepsilon_t$ = Residual or unexplained variation in period t.

## A.   Data for the model

Given the seasonal nature of tourism activities in the Caribbean, a ten-year quarterly data series from 2003 to 2012 was employed in the model estimation. For yacht passenger arrivals, quarterly estimates were generated from monthly tourism arrivals data compiled by the Eastern Caribbean Central Bank. These data are aggregated for the eight countries of the Eastern Caribbean Currency Union (ECCU)[7]. Airline fuel cost data for United States of America based air carriers to the Caribbean were similarly obtained from the United States Bureau of Transportation Statistics, while data on gross quarterly corporate profits[8] were sourced from the United States Bureau of Economic Analysis. Data on the frequency of hurricanes and tropical storms in the Caribbean were obtained from the United States' National Oceanic and Atmospheric Administration (NOAA). Data trends were examined for consistency as shown in figures 1 – 4 below.

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[6]   For a number of airlines which fly to Caribbean destinations.
[7]   The eight countries are Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines.
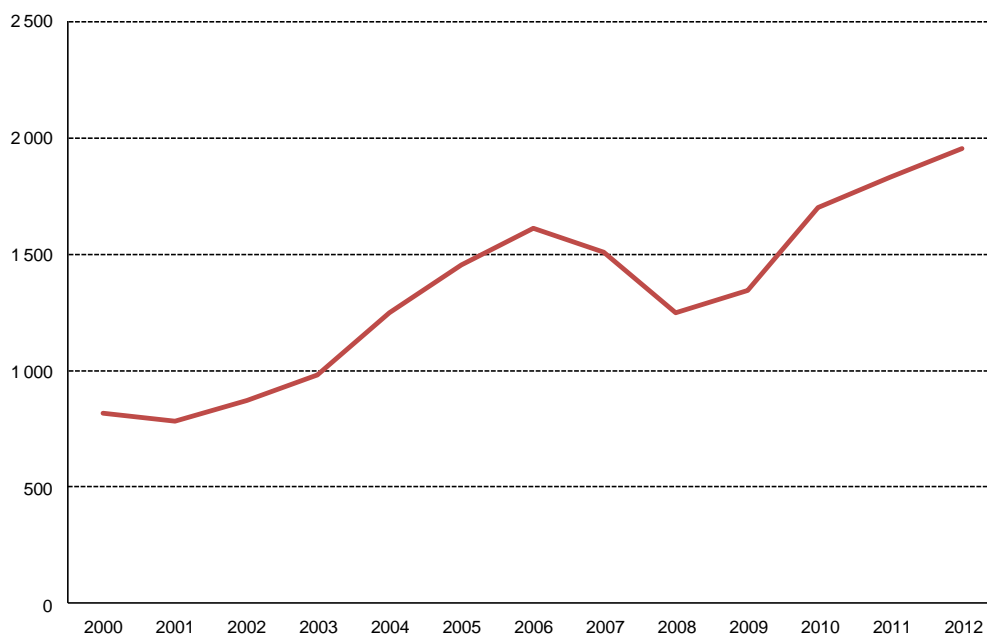[8]   Adjusted for inventory valuation and capital consumption.

**FIGURE 1**
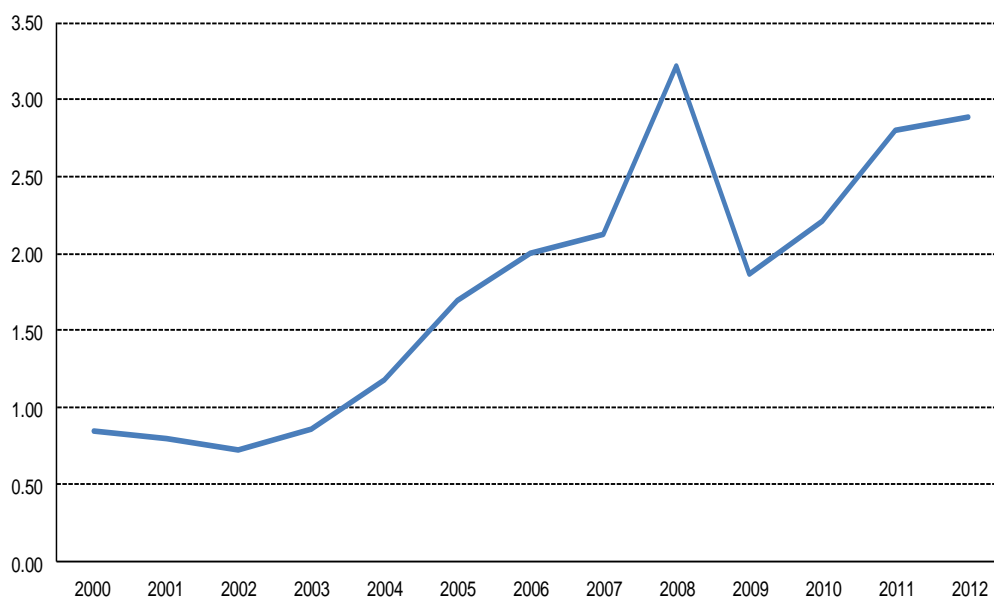**YACHT PASSENGER ARRIVALS, ECCU, 2000-2012**
*(Thousands)*
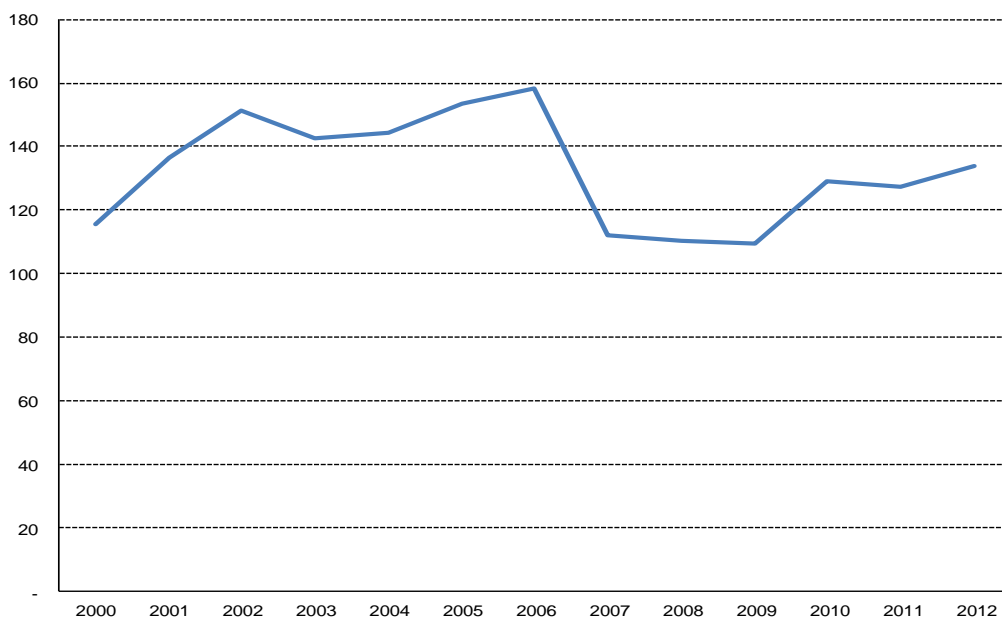


Source: Author's compilation based on official figures.

**FIGURE 2**
**UNITED STATES OF AMERICA ANNUAL ADJUSTED CORPORATE PROFITS, 2000-2012**
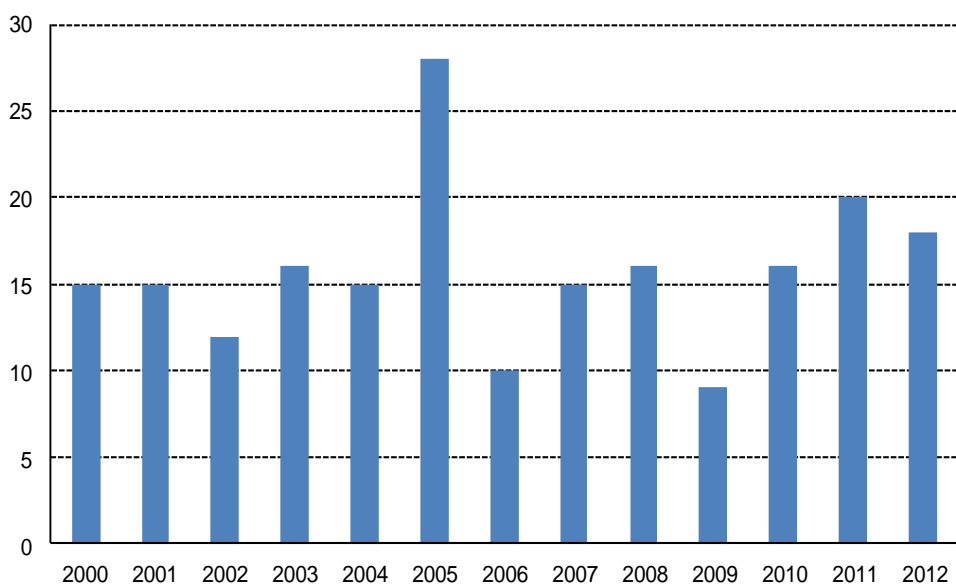*(Billions)*



Source: Author's compilation based on official figures.

**FIGURE 3**
**AIRLINE FUEL PRICE PER GALLON, 2000-2012**
*(Dollars)*



Source: Author's compilation based on official figures.

**FIGURE 4**
**FREQUENCY OF HURRICANES AND TROPICAL STORMS IN THE CARIBBEAN, 2000-2012**
*(Number)*



Source: Author's compilation based on official figures.

# IV. Model estimation and results

The model was estimated as a logarithmic transformation of equation (3) above, thus yielding coefficients which are the elasticities of the independent variables. Deriving these parameters is consistent with the study objective of determining those factors that are mostly important in influencing yachters' decisions to visit the Caribbean. Hence the following model was estimated by ordinary least squares (OLS), using Eviews™.

$$logY_t \ = \ \beta_1 logCP_t + \beta_2 logFP_t + \beta_3 H_t + \varepsilon_t \qquad\qquad (4)$$

Since the frequency of hurricanes is discrete data, the hurricanes variable was entered into the model without transformation. Further, the corporate profits variable was lagged by three quarterly time periods in order to take into account the average one year or less time frame over which yachters make decisions to charter a yacht in the Caribbean. The results of model estimation are presented in table 6.

Overall, the model provides a good explanation of yachter's decisions to seek recreational services from Caribbean marinas, with an adjusted $R^2$ of 60 per cent. A Durbin Watson statistic of 1.69 also indicates the absence of positive serial correlation within the data. A graph of the residuals from the model estimation is shown in Figure 5 below. All three independent variables were significant, with the expected mathematical signs, consistent with economic demand theory. The generated elasticities, measured by the coefficients, show *corporate profits* (0.83) to be significant at the 95 per cent confidence level, with a p-value of 0.05. This indicates that the arrival of yachters is strongly positively correlated with increases in corporate profits in the United States of America market.

**TABLE 6**
**ESTIMATED COEFFICIENTS AND LEVELS OF SIGNIFICANCE:**
**DEMAND MODEL FOR MARINA SERVICES**

| Variable | Coefficient | Standard error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 4.984556 | 2.871838 | 1.735668 | 0.0917 |
| CP | 0.832757 | 0.414087 | 2.011067 | 0.0523 |
| FP | -0.580237 | 0.244923 | -2.369062 | 0.0237 |
| H | -0.072796 | 0.010394 | -7.003813 | 0.0000 |
| R-Squared | 0.628342 | | | |
| Adjusted R-Squared | 0.595548 | | | |
| S.E. of Regression | 0.316307 | | | |
| Durbin-Watson Stat. | 1.692717 | | | |
| Mean Dependent Variable | 10.30309 | | | |
| S.D. Dependent Variable | 0.497365 | | | |
| F-Statistic | 19.16063 | | | |
| Prob. (F-Statistic) | 0.000000 | | | |

Source: Author's compilation.

**FIGURE 5**
**PLOT OF MODEL RESIDUALS**
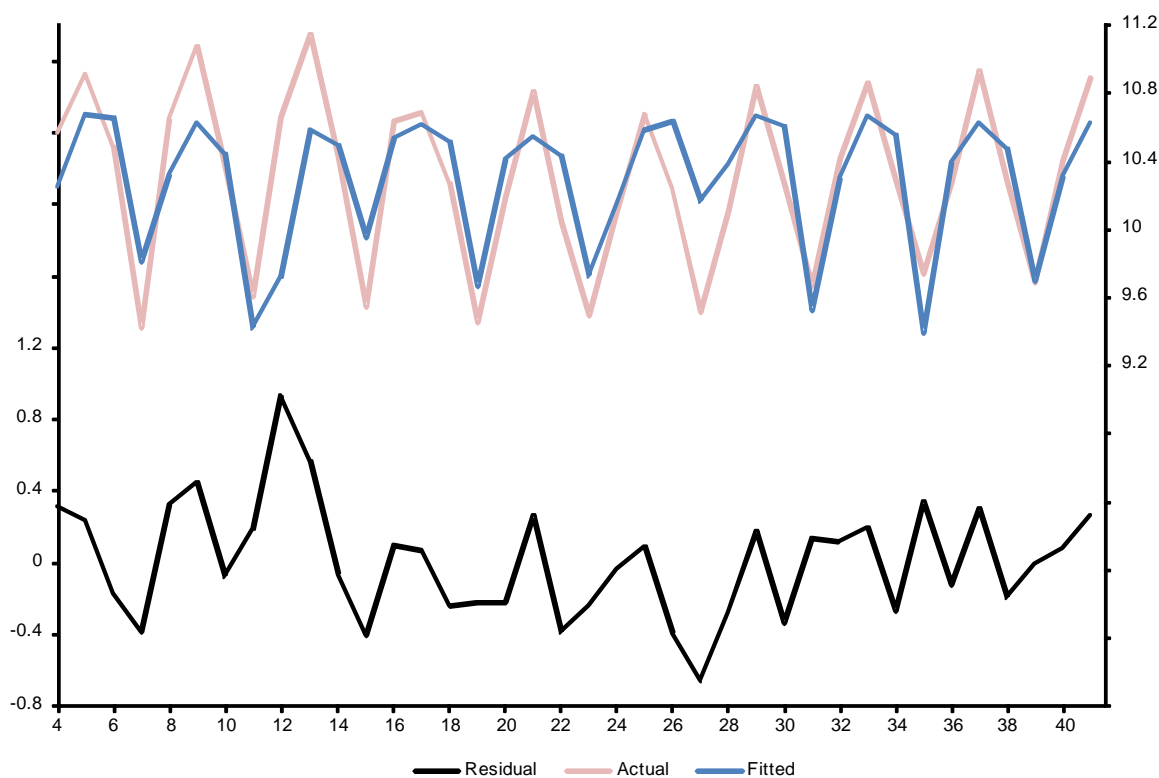


Source: Eviews™ based on data input from author.

Airline fuel price is also significant (-0.58) at the 99 per cent confidence level having a p-value of 0.02, and reflecting the expected negative relationship between consumption of a good or service and price. Hurricanes in the Caribbean also have a marginally negative impact on yachters recreational service demand, having a small, but significant coefficient (-0.07) at a p-value of 0.00.

# V.  Policy implications and recommendations

The elasticities generated in the model suggest a number of policy implications for the future development of the yachting and marina sector in the Caribbean. Firstly, the estimated income elasticity —measured by corporate profits— is greater than 0 but less than 1 ($0 < \lambda(Q) < 1$), suggesting that for visiting yachters, recreational services in the Caribbean are more likely necessary rather than luxury goods. This implies that this clientele is not likely to increase its demand for charter services in direct proportion to increased incomes, and would likely significantly reduce demand with reduced incomes.

Secondly, this market segment also shows some responsiveness to changes in airline ticket costs, as indicated by an airline fuel price elasticity of -0.58 per cent. Taken together, both the income and price elasticity hint at the possibility that this group of marine recreationists does not represent the highest income echelons of the yacht vacationing market. And given the luxury nature of yachting services which cannot be discounted on the basis of price,[9] it may be necessary for Caribbean destinations to engage in more focussed targeting of an even higher end of the market in order to ensure medium to long run growth. Indeed some countries[10] have already begun to encourage visits for of megayachts, presumably towards this end.

Thirdly, the elasticity for the impact of hurricanes and tropical storms on regional demand for yachting services is also instructive. While negative, thus indicating that yachters are likely to be somewhat deterred by their passage through the region, the very small measure does not fully reflect the more profound influence of hurricanes on the yachting business in the Caribbean. But as noted by Hathaway in a preliminary review of the study, the passage of hurricanes and tropical storms has a major influence on the yacht charter business in the Caribbean. Hence it is possible that the exclusion from the model of yachting destinations at both the far north and far south of the region has masked the full impact of hurricanes on the demand for yacht charter services. An important policy implication of this observation is the potential of some destinations to serve as shelters for charter yachts during the hurricane season. In this way, the charter business can benefit from the facility of some countries

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[9]    Yachting and marina services are possibly of the goods class known as "snub goods" for which price discounting could drive away the highest income earners.

[10]    Anguilla, Saint Kitts and Nevis, Sint Maarten, Saint Lucia.

sheltering yachts in the Caribbean, and thereby obviating the need to transfer them out of the region during the hurricane season.

Finally, recalling that the model was estimated using a three-quarterly period lag on the income variable (corporate profits), the model results indicate that United States of America yacht charterers make decisions to undertake Caribbean vacations up to nine months prior to their arrival in the region.

Given that the peak charter season is between December and May each year, the period from June to September each year appears to be an optimal promotional period to potential yachters in the United States of America market.

# VI. Conclusion and limitations of the research

The aim of this research was to estimate a demand model for yachting and marina services in the Caribbean. The analysis sought to model the variables which influenced yachters' decisions to visit the region for the purpose of engaging in nautical activities. The assessment showed high incomes along with price of airline fuel, as a proxy for airline ticket cost, and the passage of hurricanes and tropical storms to be all significant, and noted the possible need for targeting of an even higher income market segment as part of the medium- to longterm development strategy for the sector. The model was however estimated with several practical and methodological constraints which should be taken into account when interpreting the results. These are summarized as follows:

- The study used as the target group those yacht visitors arriving to the Caribbean by air, and declaring their purpose of visit as engaging in yachting activities. This is a limited segment of the market which utilizes yachting and marina services in the region, and does not include other users who arrive at regional marinas by other means, such as sailing. The study also does not capture the services provided to other non-charter clients.

- Caribbean marinas also provide myriad other services such as repairs, hosting and entertainment, food and drink, communications, anchorage and shelter, and other administrative services, which may not be demanded by many yacht charterers. This aspect of yachting and marina services demand would not have been fully captured by this study.

- The study was limited to data on yacht passenger arrivals obtained from the Eastern Caribbean Currency Union only. Other major yachting and marina destinations were not included in the research on account of the unavailability of data.

- Similarly, the study also used data from the United States of America as the principal source market for yacht visitors. The region however also receives yachters from Canada, Europe, and even Oceania. The lack of data from these regions however did not allow for their inclusion in the estimation.

- In terms of methodology, the study also excluded important economic demand variables. Chief among these was a substitute, which will allow for gauging the trade-off effects among consumers for changes in prices for Caribbean yachting and marina services relative to other

yachting regions around the world. Further, the complexity of the product offering in the business did not allow for the incorporation of a direct price for services in the demand model. This challenge was exacerbated by the absence of any extended series on prices for the analysis.

• Finally, it was not possible to model the value of tastes and preferences – reflected in consumer's preferences for the environmental, climatic, cultural and amenities values - as a core variable in the demand for Caribbean yachting and marina services. While this is recognized as a major drawing card to the region, the difficulty of measuring this factor across a time series forced its elimination from the research.

Notwithstanding these several limitations, it is anticipated that this research provides a broad analytical framework for further investigation towards the crafting of feasible policies for the future development of yachting and the marina sector, and by extension the tourism sector in the Caribbean.

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