MODELLING TOURISM DEMAND FROM MAJOR INTERNATIONAL MARKETS TO THE ECCU

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WORK IN PROGRESS

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Abstract

The aim of the paper is to examine the nature of tourism demand in the major non-banana producing countries (Anguilla, Antigua and Barbuda, and St Kitts and Nevis) in the Eastern Caribbean Currency Union (ECCU) from three of its main international markets: the USA, Canada and the UK. The paper uses regression analysis with time series data (1990 to 2003) to estimate the quantitative relationship between the level of visitor arrivals to these countries and some hypothesised determinants. The results show that visitors to St Kitts and Nevis are most sensitive to tourism price, followed by income. Barbados, Bahamas, Jamaica, Dominican Republic and Mexico (as a composite group) are substitute destinations for visitors from the main international markets travelling to St Kitts and Nevis. Visitors to Antigua and Barbuda are most sensitive to income (using the visitor expenditure approach). UK and Canadian visitors are most sensitive to the five composite substitute destinations to Antigua and Barbuda. Visitors to Anguilla are most sensitive to price. UK visitors are most sensitive to the five-composite substitute destinations to Anguilla.

Keywords: tourism demand, income, tourism price, transportation cost, exchange rate, substitute price, ordinary least squares

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I. INTRODUCTION

Tourism has become the most important economic activity for many Caribbean islands, including the member countries of the Eastern Caribbean Currency Union (ECCU), attributed in part to the decline in the terms of trade for traditional agricultural and manufactured products (sugar, bananas, bauxite and oil). The increased tourism activity is also reflective of the importance given to recreation and leisure as world income levels rise. Accurate measures of the direct contribution of tourism to the ECCU are not readily available. However, tourism has contributed to increased employment, income and foreign exchange earnings, investments in infrastructure and tourism related developments, and generated additional government revenues from various taxes and fees.

Gross receipts from tourism represented 61.7 per cent of total export receipts to the ECCU in 2003; this compares with 5.7 per cent worldwide. In the ECCU, tourist arrivals (i.e stay over visitors) increased from 636,246 in 1990 to 947,427 in 2003, which is at an annual average growth rate of 3.2 per cent. Over the same period, gross travel receipts rose from US$526.7 million to US$972.0 million, representing an annual average growth rate of 5.6 per cent. In terms of world market share, the ECCU attracted just under one fifth of international tourist arrivals and was ranked at number 52 in the world's travel service exports, measured in terms of travel credits (International Monetary Fund, Balance of Payments Statistics Yearbook, 2004). Between 1990 and 2003, the ECCU experienced annual average growth rates in tourist arrivals of 2.8 per cent from the USA, 8.2 per cent from the UK, 4.3 per cent from the Caribbean and 1.8 per cent from Canada.

Historically the USA has been and continues to be the most important source of tourists to the ECCU. However, its share of tourist arrivals has fallen from 33.9 per cent in 1990 to 32.0 per cent in 2003. This is partly due to the Caribbean losing market share from the United States to Europe, Mexico and other destinations.

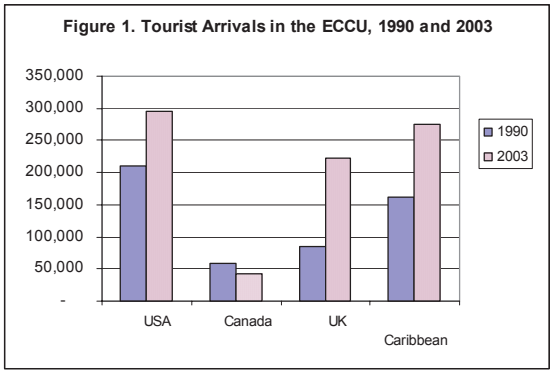
Because of tourism's importance in the ECCU, forecasting tourism demand is a strategic imperative. It is accepted that accurate forecasts of tourism demand are essential for efficient

planning by tourism-related businesses and to avoid the financial costs of excess capacity or the opportunity costs of unfilled demand (Frechtling, 2001). Companies such as airlines, tour operators, hotels, cruise ship lines and recreation facility providers are interested in the demand for their products by tourists (Song 2004). Investment in infrastructure, such as airports, highways and rail-links, requires long-term financial commitments and the sunk costs can be very high if the investment projects fail to fulfil their design capacities. Therefore, the prediction of long-term demand for tourism related infrastructure often forms an important part of project appraisal. Accurate forecasts of tourism demand will help governments in destination countries to formulate and implement appropriate medium-term tourism strategies.

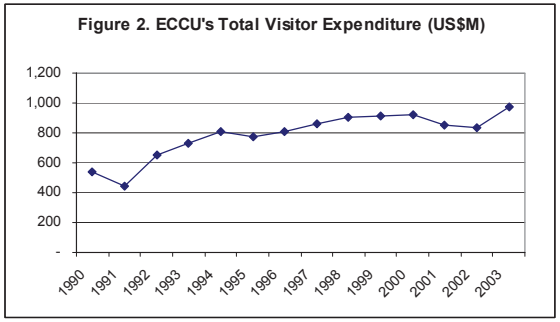
Multiple aggregate variables such as income, tourism prices, transportation costs, exchange rates and substitution prices are examined to explain tourist arrivals from the USA, Canada, the UK and the Caribbean to the major non-banana producing countries (Anguilla, Antigua and Barbuda, and St Kitts and Nevis) in the ECCU. The rest of the paper is organised as follows: the contribution of tourism to the ECCU is discussed in Section II. In Section III theoretical issues regarding tourism demand are presented. The variables that are used in these countries, an explanation of the data and methodology, and the results are presented in Section IV. Section V concludes. Areas for further research are discussed in Section VI.

II. TOURISM'S PERFORMANCE IN THE ECCU

Tourism is the largest invisible export and tourism expenditure in the ECCU is estimated at US$972.0 million (or 31.6 per cent of GDP) in 2003. Tourist arrivals have grown on average around 3.2 per cent in the period 1990 – 2003. Discounting the decline in tourist arrivals in 1999 after hurricanes George and Lenny, and in 2001 after September 11, the average rate of growth increased to around 7.1 per cent. Tourists originate mainly from the USA, Caribbean, UK, and Canada. Figure 1 shows the number of tourist arrivals in 1990 and 2003 for these four main markets. Together these countries account for nearly 91% of total stay-over tourists visiting the ECCU annually.

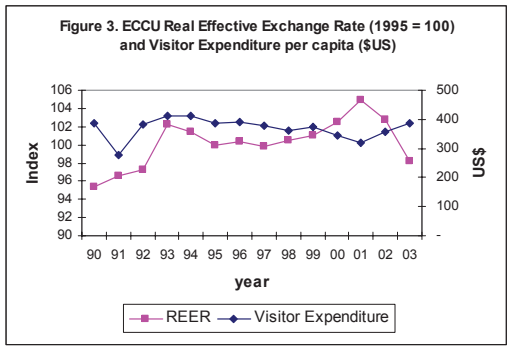


The ECCU's tourism receipts increased from US$542.4 million in 1990 to US$972.0 million in 2003, roughly 85.0 per cent more than the amount recorded in 1990. However during the period declines were recorded in 1990 and 1995 due in part to hurricanes Gustav and Luis respectively, and in 2001 to 2002 as a result of September 11 (Figure 2).



In addition, the ECCU's external value is an additional factor affecting the tourism sector. Exchange rates are important variables in consumers' decisions to choose a particular destination(s). The consumer knows how much his or her currency is worth in terms of the currency of the destination country. The relationship between the real effective exchange rate

and average tourism expenditures is depicted in Figure 3, which shows that in general, increasing tourism receipts are associated with low value of the EC dollar and that falling tourism receipts are associated with high value of the EC dollar. During the period 2001 – 2003, visitor expenditure per capita declined, given an appreciation of the dollar.



Historically, the USA has been the ECCU's major source market for tourists and continues to be tourism's largest export market. The Caribbean, UK and Canada are the other major source markets. In 2003 stay over visitor arrivals from the USA reached a record high of 296,034, representing 32.0 per cent of total stay over arrivals to the ECCU. However, the share of USA stay over visitors has declined, while those of Caribbean and UK visitors have been increasing over the years. The loss of share to other markets (Latin America and Europe) contributed to the decline in USA tourist travel to the ECCU.

Undoubtedly, tourism is an important industry for the ECCU, being one of the major forces driving the country's economic expansion. Moreover, even with the industry's vulnerability to both internal and external factors, tourism earnings peaked in 2003.

III. LITERATURE REVIEW

1. Econometric Methods

The importance of forecasting flows in tourism has long been recognized in the literature. Archer (1977), Sheldon and Var (1985), and Witt and Witt (1995) summarise the numerous empirical studies done in the past thirty years. They discuss various models for tourism demand, highlighting the benefits of each and documenting the development of the methods.

Sheldon and Var (1985) provide an overview of time series forecasting methods. They identify the ARIMA methodology as the most sophisticated time series method and prefer it when modeling tourism. Witt and Witt (1995) discuss multiple regression forecasting, using time series data to estimate the demand for tourism as a function of a number of variables, and use the estimates and parameters to forecast tourism flows. They gave examples of determinants such as income, prices and other variables that would influence the decision of tourists.

In the mid 1990s dynamic specifications such as the autoregressive disturbed lag model and the error model, began to appear in the tourism literature. Kim and Song (1998), Kulendran (1996) and Kulendran and King (1997), Seddighi and Shearing (1997), Syriopoulos (1995), and Vogt and Wittayakorn (1998) were the first authors to apply recent advances in econometrics, such as cointegration and error correction techniques, to tourism forecasting.

Durbarry (2000) introduces a gravity-based model for the UK, which had not been applied in the field of tourism. Kanada (2003) gives details of other models such as physical models, probability-based forecasting methods and subjective judgement and their drawbacks.

Most econometric analyses of tourism demand have used the ordinary least squares single-equation approach. A review of 100 empirical tourism studies by Lim (1997b) indicated that 81% of these studies used single-equation models in linear and/or log-linear specifications. The latter yields estimated elasticities, which measures the percentage change in tourism demand as a result of a percentage change in an independent variable. Regression analysis using ordinary least squares will be used in this study.

2. Variables

Tourism demand has been measured by a host of variables including the total number of visits, arrivals or tourists (Gunhadi and Boey, 1986; and Kliman, 1991), visit per head of the origin's population (Martin and Witt, 1987), total expenditure or receipts (Artus, 1972; Barry and O'Hagan, 1972; Gray, 1966; Jud and Joseph, 1974f; Loeb, 1982; and Uysal and Crompton, 1984), and per capita real expenditure (Artus, 1972; Loeb, 1982; and Lee et al., 1996). Most of the studies use time series analysis; others have used pooled and cross-sectional data. The demand variable measured by total tourist arrivals is, however, the most frequently used measure of tourism demand, followed by tourism expenditure. As cited in Song (2004), Li (2004) pointed out in his literature survey that amongst the 45 selected studies published after 1990, 37 of them used tourist arrivals as the dependent variables, while only 6 employed tourist expenditure as the dependent variable.

Movements in the demand for tourism are influenced by many factors[1], but most studies concentrate on the economic factors in estimating a satisfactory explanation. Growth in international tourism is closely aligned to economic variables, which at a microeconomic level influence the consumer's decision to undertake overseas travel. The three most frequently used explanatory variables are income, tourism prices and air transportation costs (Lim 1999). In the underlying economic framework, the demand for international travel is positively related to income in the country of origin, and negatively related to relative prices and air transportation costs. Crouch (1994) reveals that income is the most important explanatory variable. However, elasticity estimates vary a great deal, but generally exceed unity and below 2.0, confirming that international travel is a luxury good (Halicioglu 2004).

There are two relevant price components, namely the cost of travel to the destination and the cost of local goods and services adjusted for the exchange rate. These are expected to have negative influences on demand (Song et al 2004). Due to the complexities of the price structure of air transportation, no consistent data exists on transportation prices. Instead, researchers have often used the distance of travel, price of airline tickets, or crude oil prices as a suitable proxy for transportation costs (Halicioglu 2004).

[1] See Lim (1997) for a summary of the variables used in the analysis of tourism demand since the 1960s

Usually the consumer price index in a destination country is taken to be a proxy for the cost of tourism in that country on account of lack of more suitable data, and Martin and Witt (1987) have shown this to be a reasonable approximation. The consumer price index is then adjusted by the exchange rate between the origin and the destination currencies. If data relating to the price of the tourist's basket of goods and services are available these would be more appropriate, but usually such data do not exist. Estimated price elasticities vary dramatically both within and across studies. For example, they are in the range of –0.05 to 6.36 (Halicioglu, 2004).

Exchange rates are also sometimes used separately to represent tourist living costs (Song et al 2004). The justification is that consumers are more aware of exchange rates than destination costs of living for tourists, and hence are driven to use the exchange rate as a proxy variable. However, the use of exchange rates alone can be misleading because even though the exchange rate in a destination may become more favourable, this could be counterbalanced by a relatively high inflation rate. Bond et al (1977) and Gerakis (1965) study the effects of consumer prices and exchange rates on travel. They found the devaluation of a destination country's currency does not affect tourism demand to that destination. Tourism demand is only affected when the currency of the country of origin is devalued, not that of the destination country. When the currency of the country of origin is devalued, tourism demand out of the country to higher price destinations decreases while tourism demand to lower price destinations increases.

There are other factors that have been considered to capture the simple dynamics of tourism. These include, but are not limited to, a lagged dependent variable, substitute price, marketing, and one-off shocks such as natural disasters. Other countries in the Caribbean are competing to increase their tourism market share. Therefore, it is important to examine whether travel demand for these other countries by the major tourist markets is at the expense of (namely a substitute), or is complementary to the destination countries in the ECCU. In particular, it would be useful to examine the effects of relative price changes in the substitute countries and the ECCU countries on international travel demand for the ECCU countries. For example, if a fall in the relative tourism prices in Barbados reduces the demand for tourism demand for Antigua and Barbuda, Barbados could be considered as Antigua and Barbuda's competing (or substitute) destination for the USA tourist market. Specifically, USA tourists may consider Barbados as a

substitute overseas destination for Antigua and Barbuda. When a fall in Barbados' relative tourism prices increases international tourism demand for Antigua and Barbuda, the two countries are complementary destinations for Antigua and Barbuda's tourists. It is imperative from the tourism marketing analysis to examine whether these countries are each other's substitutes or complements.

Promotional expenditure is expected to play a positive role in determining the level of international tourism demand. Data is not readily available and is not used in this study. A lagged dependent variable, that is an autoregressive term, can be justified on the grounds of habit persistence (Song et al 2004). Persons tend to return to a particular country if they like it, as there is much less uncertainty associated with holidaying again in that country compared with travelling to a previously unvisited foreign country. These visitors also promote that country, through "word of mouth", encouraging potential visitors to that country. Further, Song et al (2004) explains a second justification for the inclusion of a lagged dependent variable in tourism demand functions, coming from the supply side:

> *"Supply constraints may take the form of shortages of hotel accommodation, passenger transportation capacity and trained staff, and these often cannot be increased rapidly". Time is also required to build up contracts among tour operators, hotels, airlines and travel agencies. Similarly, once the tourist industry in a country has become highly developed it is unlikely to dwindle rapidly. If a partial mechanism is postulated to allow for rigidities in supply, this results in the presence of a lagged dependent variable in tourism demand function, with the parameter between zero and unity (Song and Witt, 2000, pp. 7 – 8)".*

Natural disasters could deter potential tourists and given that the Caribbean has experienced seven hurricanes during 1990 to 2003, a dummy variable for the hurricanes should be included.

Dwyer et al (2001) distinguishes several other determinants of the demand for tourism such as leisure time, education, occupation, tourist appeal, image, quality of tourist services, destination marketing and promotion, cultural ties and so on. The strength of these factors will reflect changing fashions and tastes (Crouch 1992, 1994).

IV. MODELLING TOURISM DEMAND IN THE ECCU

1. Variables

Tourism Demand: This study uses both tourist arrivals (TA) and visitor expenditure (VE) as the dependent variable, as each has somewhat different impacts on and implications for the destination. In Equations 1A to 3C, the number of stay-over tourists serves as a dependent variable and as a lagged independent variable. This study deals with the number of tourists who visit Anguilla, Antigua and Barbuda and St Kitts and Nevis annually (1990 to 2003) from three of their main international markets (USA, Canada and the UK). In Equations 4 to 6,the total expenditure serves as the dependent variable.

Income: For the number of tourists from a particular country at a particular time, the GDP per capita for the country of origin represents income from that group of tourists. Gross domestic product per capita at 2000 prices in the country of origin is used in this study (GDPC), and is expected to have a positive influence on tourism demand. As a proxy for income in equations 4 to 6, the weighted average real gross domestic product (GDPT) of the destination country's major trading partners is used.

Tourism price: Three different variables are used to represent tourism price in this study. The consumer price indices (CPI) of the destination country and the CPI of the country of origin are used as the proxy for the relative price variable (RP) represented by Equations 1A, 2A and 3A. Also, the CPI ratio is adjusted for difference in exchange rates between the origin and destination currencies (RER) (represented by Equations 1B, 2B, 3B) and the exchange rate (ER) between the country of origin and the destination country is also used to represent tourism price (Equations 2B and 3B[2]). Tourism prices are measured by the real effective exchange change rate (REER) of

[2] The EC dollar is pegged to the US dollar, therefore the ER is the same throughout the sample period.

the destination country's main trading partners in Equations 4 to 6. These are expected to have negative influences on demand.

Transportation price: Since the cost of travel is not available in time series format, average world oil prices in 2000 US prices (OIL) is used in this study. For people travelling by air, high oil costs will likely be reflected in high priced air tickets. The data for the price of oil only varies by year and is fixed across countries. These are expected to have negative influences on demand.

Substitute prices: In this study, substitute prices (SP) are used and calculated by a weighted average cost of tourism in the destination relative to a weighted average cost of tourism in five substitute destinations: Barbados, Jamaica Dominican Republic, Mexico and the Bahamas. A composite index of the price of the destinations was derived by allocating weights to these alternative destinations for each for the three international markets and then, adding the CPIs of each country multiplied by their respective weights. The weights were based on market shares and allowed to vary over time. The substitute countries were chosen based on their proximity to the ECCU member countries and market share in the international markets.

Qualitative effects: A dummy variable is used to capture hurricanes during the sample period (HUR), taking the value 1 in the year of a hurricane(s) and 0 otherwise.

2. Methodology and Data

There has been strong preference in the tourism demand literature for a log-linear model because of the ease of interpretation of the coefficients as estimated elasticities (except for the dummy variable). Therefore, all data are expressed in logarithms. Using EVIEWS (5) software package to estimate a single-equation model by ordinary least squares, Equations 1A to 3C are independent equations explored for Anguilla, Antigua and Barbuda and St Kitts and Nevis. Equation 4 represents the demand model for Anguilla, Equation 5 for Antigua and Barbuda and Equation 6 for St Kitts and Nevis using visitor expenditure as the dependent variable. Data for all the variables are obtained from the ECCB Statistical database and the IMF's IFS CD Rom. Annual data from 1990 to 2003 are used.

Equation 1A. $LN\ TA_{tUSA} = a_1 + b_1\ LN\ GDPC_{tUSA} + b_2\ LN\ RER_{tUSA} + b_3\ LN\ TA_{(t-1)USA} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tUSA} + b_6\ HUR_t + u_t$

Equation 1B. $LN\ TA_{tUSA} = a_1 + b_1\ LN\ GDPC_{tUSA} + b_2\ LN\ RP_{tUSA} + b_3\ LN\ TA_{(t-1)USA} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tUSA} + b_6\ HUR_t + u_t$

Equation 1C. $LN\ TAt_{USA} = a_1 + b_1\ LN\ GDPC_{tUSA} + b_2\ LN\ ER_{tUSA} + b_3\ LN\ TA_{(t-1)USA} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tUSA} + b_6\ HUR_t + u_t$

Equation 2A. $LN\ TA_{tUK} = a_1 + b_1\ LN\ GDPC_{tUK} + b_2\ LN\ RER_{tUK} + b_3\ LN\ TA_{(t-1)UK} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tUK} + b_6\ HUR_t + u_t$

Equation 2B. $LN\ TA_{tUK} = a_1 + b_1\ LN\ GDPC_{tUK} + b_2\ LN\ RP_{tUK} + b_3\ LN\ TA_{(t-1)UK} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tUK} + b_6\ HUR_t + u_t$

Equation 2C. $LN\ TA_{tUK} = a_1 + b_1\ LN\ GDPC_{tUK} + b_2\ LN\ ER_{tUK} + b_3\ LN\ TA_{(t-1)UK} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tUK} + b_6\ HUR_t + u_t$

Equation 3A. $LN\ TA_{tCAN} = a_1 + b_1\ LN\ GDPC_{tCAN} + b_2\ LN\ RER_{tCAN} + b_3\ LN\ TA_{(t-1)CAN} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tCAN} + b_6\ HUR_t + u_t$

Equation 3B. $LN\ TA_{tCAN} = a_1 + b_1\ LN\ GDPC_{tCAN} + b_2\ LN\ RP_{tCAN} + b_3\ LN\ TA_{(t-1)CAN} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tCAN} + b_6\ HUR_t + u_t$

Equation 3C. $LN\ TA_{tCAN} = a_1 + b_1\ LN\ GDPC_{tCAN} + b_2\ LN\ ER_{tCAN} + b_3\ LN\ TA_{(t-1)CAN} + b_4\ LN\ OIL_t + b_5\ LN\ CP_{tCAN} + b_6\ HUR_t + u_t$

where

TA_t = Visits from the origin to the destination during the time period *t*

$GDPC_t$ = Real GDP per capita in the origin in period *t*

RP_t = relative prices (CPI of destination/CPI of origin) in period *t*

RER_t = real exchange rate (CPI of destination/CPI of origin * 1/ER) at time *t*

ER_t = exchange rate (denominated in local currency – eg, EC$ per pound) at time *t*

OIL_t = average world oil in 2000 US prices in period *t*

CP_t = real competitive prices at time *t*

HUR_t= Dummy variable; hurricane year = 1, otherwise = 0

u_t = stochastic disturbance term

Equation 4, 5, 6 $\mathbf{LN\ VE_{td} = a_1 + b_1\ LN\ GDPT_{td} + b_2\ LN\ REER_{td} + b_3\ LN\ OIL_{td} + b_4\ HUR_t + u_t}$

where

d = Anguilla, Antigua & Barbuda, St Kitts & Nevis

VE_{td} = tourism expenditure from the origin to the destination *d* during the time period *t*

$GDPT_{td}$ = trade-weighted real GDP of the destination *d* country's major trading partners in period *t*

OIL_t = average world oil in 2000 US prices in period *t*

$REER_{td}$ = real effective exchange rate of destination *d* at time *t*

HUR_{td}= Dummy variable; hurricane year in destination *d* = 1, otherwise = 0

u_t = stochastic disturbance term

3. Results and Interpretation

Anguilla

Using stay-over visitor arrivals as the dependent variable, the demand for tourism services of Anguilla by USA visitors seems to be inelastic to changes in transportation cost, given the significant coefficient of 0.26 (Table 2). A possible explanation is that Anguilla is regarded as an upscale destination catering to high-end tourists who seem not to be sensitive to transportation cost increases. The positive significant coefficient of the substitute price variable, when using relative price as the tourism price variable, indicates that visitors from the UK do respond to the price levels in substitute destinations. However, the magnitude of this coefficient suggests a less than proportionate response in absolute terms. All other variables, which were in line with priori expectations, were not significant in these models.

Using visitor expenditure as the dependent variable, the demand for tourism seems to be inelastic to changes in income and price as measured by transportation cost, given their significant coefficients of 0.68 and –0.30 respectively. This seems to suggest that visitors to Anguilla have already established a foreign holiday as part of their income and are also not sensitive to transportation cost changes. The tourism price (using the REER as a proxy) is significant and surprisingly has a positive sign. This may suggest that some visitors to Anguilla are in the high-income range and prefer to travel to a country offering high-priced tourism services.

Antigua and Barbuda

Using stay-over visitor arrivals as the dependent variable, the significant coefficient on the hurricane variable confirms priori expectations. Although hurricane is a deterrent to tourists to Antigua and Barbuda, its impact on demand for its tourism is small. The positive significant coefficient of the substitute price variable, when using relative price as the tourism price variable, indicates that visitors from the UK to Antigua and Barbuda do respond to the price levels in substitute destinations, while the negative significant coefficient of the same variable indicates that these alternative destinations are complementary destinations for tourists from Canada.

Using visitor expenditure as the dependent variable, the demand for tourism seems to be inelastic to changes in income, given the significant coefficient of 0.72. That is, if income increases by 1 per cent, demand for tourism services increases by 0.72 per cent. This may suggest that visitors may prefer to spend their vacation in Antigua and Barbuda, and already have it incorporated as part of their disposable income.

St Kitts and Nevis

Using stay-over visitor arrivals as the dependent variable, all coefficients for the USA visitors were significant using both the relative price and real exchange rate variables. The demand for

tourism by USA visitors seems to be elastic to changes in income (although surprisingly the incorrect sign) and tourism price by these visitors, given the significant coefficient of -3.63 and -6.05 respectively. One possible explanation for the incorrect income sign could be the omission of variables such as marketing expenditure and the number of hotel rooms available. Demand for tourism services from the USA is inelastic to changes in prices as measured by transportation cost and substitute prices. Demand for tourism services by UK visitors seems to be sensitive to changes in income and exchange rate, given the significant coefficient of –7.55 and –8.01. Similarly, the demand for tourism by Canadian visitors seems elastic to changes in income, the real exchange rate and the nominal exchange rate, given the significant coefficient of –3.92, 6.79 and –4.05 respectively. The positive significant coefficient of the substitute price variable indicates that visitors from the three international markets to St Kitts and Nevis do respond to the price levels in substitute destinations.

Using visitor expenditure as the dependent variable, the demand for tourism seems to be elastic to changes in income and tourism price as measured by the real effective exchange rate indices, and inelastic to changes in transportation cost as measured by oil prices, given their significant coefficients. If tourism price and transportation cost increases by 1 per cent, demand for tourist services decreases by 4.25 per cent and 0.56 per cent respectively. If income per capita of visitors to St Kitts rises by 1 per cent, demand for tourism services increases by 1.55 per cent.

V. CONCLUSIONS

The variables used in this study best explain tourism demand from international markets to St Kitts and Nevis. Visitors to this destination are most sensitive to tourism price, followed by income. Barbados, Bahamas, Jamaica, Dominican Republic and Mexico (as a composite group) are substitute destinations for international visitors to St Kitts and Nevis. Visitors to Antigua and Barbuda are most sensitive to income (using the visitor expenditure approach). UK and Canadian visitors are most sensitive to these substitute destinations to Antigua and Barbuda. Visitors to Anguilla are most sensitive to price. UK visitors are most sensitive to the substitute destinations to Anguilla.

It should be noted that there are certain limitations of this study. Firstly, the use of the CPI, RER, and REER index as proxies for relative prices may distort results, given that they do not truly capture relative tourism prices – a hotel price index would have been preferred. Secondly, the cost of travel, using airfares would have also been preferred. Thirdly, the unexpected signs in the income variables suggest that there may have been omission of relevant variables (marketing expenditure, number of rooms). Further, it would have been better to use monthly or quarterly data, to capture seasonal effects.

V. FUTURE RESEARCH

This study was a first attempt to quantitatively ascertain the determinants of the demand for tourism services in three of the ECCU member countries. The study would be extended to include the other service countries such as St Lucia, Dominica and Grenada. Given data availability, demand models with expenditure by markets should be explored. Use of other econometric techniques such as vector autoregressive model (VAR) and gravity models would be compared with the results in the regression analysis in this study. Given the short data series available in some of these countries, a panel analysis would be considered. Finally, this paper is intended to be the groundwork for further analysis into the sensitivity of tourism price in the ECCU member countries, and for investigating the impact of tourism price shocks on macroeconomic variables in the ECCU.

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Table 1. Ranking in world travel service exports, measured in terms of travel credits

	Dec-03	
Country	**Rank**	**$US Millions**
USA	1	84,123
Spain	2	41,770
France	3	37,038
Italy	4	31,222
Germany	5	23,002
United Kingdom	6	22,752
Mainland China	7	17,406
Austria	8	13,958
Turkey	9	13,203
Greece	10	10,766
Canada	11	10,579
Australia	12	10,313
ECCU	**52**	**972**
of which:		
Anguilla	109	60.25
Antigua & Barbuda	82	299.82
Dominica	116	55.41
Grenada	99	106.91
Montserrat	121	7.33
St Kitts & Nevis	106	75.34
St Lucia	83	282.08
St Vincent & the Grenadines	102	91.19

Table 2
Statistical Analysis of the Determinants of Tourism Visits to Anguilla from Selected Countries (1990 - 2003)

	USA		UK			Canada		
Explanatory Variables	Eqn. 1A	Eqn. 1B	Eqn. 2A	Eqn. 2B	Eqn. 2C	Eqn. 3A	Eqn. 3B	Eqn. 3C
Constant	-8.77 (-0.48)	-14.01 (-0.80)	17.02 (2.07)*	15.38 (1.66)	15.42 (1.41)	0.63 (0.04)	9.87 (0.56)	5.54 (0.29)
GCAP_?	1.55 (1.02)	1.55 (1.02)	-0.90 (-1.12)	-0.66 (-0.57)	-0.67 (-0.46)	0.50 (0.31)	-0.61 (-0.34)	-0.11 (-0.05)
RER_?		5.28 (1.80)		-0.18 (-0.15)			0.02 (0.01)	
RP_?	5.28 (1.80)		-0.52 (-0.15)			3.39 (0.88)		
ER_?					0.14 (0.10)			0.43 (0.29)
OIL	-0.26 (-2.51)**	-0.26 (-2.52)**	-0.13 (-0.71)	-0.16 (-0.97)	-0.16 (-0.82)	-0.22 (-0.65)	-0.04 (-0.13)	-0.09 (-0.28)
TA (-1)	0.24 (0.93)	0.24 (0.93)	0.15 (0.35)	0.05 (0.10)	0.06 (0.10)	0.22 (0.40)	0.61 (1.33)	0.48 (0.89)
CP_?	-0.34 (-0.68)	-0.34 (-0.68)	0.56 (2.05)*	0.51 (1.72)	0.51 (1.44)	-0.15 (-0.33)	0.18 (0.56)	0.10 (0.24)
HUR	-0.10 (-1.81)	-0.10 (-1.81)	-0.01 (-0.19)	-0.01 (-0.12)	-0.00 (-0.08)	0.06 (0.62)	0.03 (0.26)	0.04 (0.36)
Adjusted R squared	0.81	0.81	0.57	0.57	0.57	0.60	0.55	0.55
F	9.70***	9.70***	3.63*	3.63*	3.62*	3.97*	3.41*	3.47*
AIC	-2.60	-2.60	-2.07	-2.07	-2.07	-1.18	-1.06	-1.08
SBC	-2.30	-2.30	-1.77	-1.77	-1.76	-0.88	-0.76	-0.77
Durbin Watson	1.84	1.84	2.36	2.35	2.34	2.46	2.64	2.52

*** Significant at the 1%, ** at the 5%, and * at the 10% level
The quantities in brackets are the t-values

Table 3
Statistical Analysis of the Determinants of Tourism Visits to Antigua and Barbuda from Selected Countries (1990 - 2003)

	USA		UK			Canada		
Explanatory Variables	Eqn. 1A	Eqn. 1B	Eqn. 2A	Eqn. 2B	Eqn. 2C	Eqn. 3A	Eqn. 3B	Eqn. 3C
Constant	6.45 (0.33)	5.39 (0.28)	28.92 (1.54)	33.62 (1.74)	23.98 (1.05)	22.06 (1.00)	51.85 (2.60)**	48.03 (1.67)
GCAP_?	0.14 (0.08)	0.14 (0.08)	-1.83 (-1.25)	-2.18 (-1.29)	-0.95 (-0.41)	-0.85 (-0.46)	-3.97 (-1.90)	-3.17 (-1.04)
RER_?		1.08 (0.66)		-0.12 (-0.08)			1.59 (0.96)	
RP_?	1.08 (0.66)		2.05 (0.74)			3.96 (1.43)		
ER_?					1.51 (0.70)			-0.45 (-0.23)
OIL	-0.10 (-0.64)	-0.10 (-0.64)	-0.13 (-0.42)	-0.27 (-0.89)	-0.29 (-1.10)	0.01 (0.02)	0.29 (0.39)	-0.07 (-0.09)
TA (-1)	0.32 (1.06)	0.32 (1.06)	0.23 (0.71)	0.22 (0.57)	0.05 (0.11)	-0.40 (-0.67)	-0.04 (-0.05)	-0.40 (-0.45)
CP_?	-0.09 (-0.17)	-0.09 (-0.17)	1.24 (1.97)*	1.25 (1.80)	1.02 (1.41)	-0.75 (-2.24)*	0.12 (0.20)	-0.21 (-0.25)
HUR	-0.14 (-2.17)*	-0.14 (-2.17)*	-0.01 (-0.10)	0.04 (0.31)	0.04 (0.32)	-0.25 (-1.73)	-0.09 (-0.89)	-0.08 (-0.56)
Adjusted R squared	0.51	0.51	0.76	0.74	0.76	0.48	0.39	0.30
F	3.09*	3.09*	7.33**	6.65**	7.26**	2.83	2.29	1.88
AIC	-2.17	-2.17	-0.66	-0.58	-0.66	-0.58	-0.43	-0.29
SBC	-1.86	-1.86	-0.36	-0.27	-0.35	-0.28	-0.12	0.01
Durbin Watson	1.83	1.83	2.03	2.58	2.62	1.98	1.64	1.94

*** Significant at the 1%, ** at the 5%, and * at the 10% level
The quantities in brackets are the t-values

Table 4
Statistical Analysis of the Determinants of Tourism Visits to St Kitts and Nevis from Selected Countries (1990 - 2003)

	USA		UK			Canada		
Explanatory Variables	Eqn. 1A	Eqn. 1B	Eqn. 2A	Eqn. 2B	Eqn. 2C	Eqn. 3A	Eqn. 3B	Eqn. 3C
Constant	48.56 (3.77)***	54.56 (4.02)***	37.13 (1.53)	51.76 (1.48)	71.02 (2.14)*	6.28 (0.23)	50.60 (3.02)**	42.75 (1.81)
GCAP_?	-3.63 (-3.23)**	-3.63 (-3.23)**	-2.77 (-1.22)	-5.56 (-1.33)	-7.55 (-1.99)*	-0.38 (-0.16)	-3.92 (--2.69)**	-3.17 (-1.57)
RER_?		-6.05 (-1.95)*		7.30 (1.46)			6.79 (4.02)***	
RP_?	-6.05 (-1.95)*		-16.61 (-1.64)			-2.19 (-0.40)		
ER_?					-8.01 (-2.15)*			-4.05 (-2.37)*
OIL	-0.47 (-3.91)***	-0.47 (-3.91)***	-0.05 (-0.12)	-0.17 (-0.42)	-0.01 (-0.02)	-0.09 (-0.16)	-0.39 (-1.29)	-0.30 (-0.73)
TA (-1)	0.35 (2.22)*	0.35 (2.22)*	0.28 (1.09)	0.93 (1.62)	1.05 (2.27)*	0.86 (1.30)	-0.12 (-0.32)	0.01 (0.01)
CP_?	1.17 (2.90)**	1.17 (2.90)**	1.78 (2.00)*	2.20 (1.79)	2.94 (2.47)**	0.59 (0.76)	0.36 (1.01)	0.67 (1.35)
HUR	-0.16 (-3.00)**	-0.16 (-3.00)**	-0.01 (-0.06)	0.17 (1.09)	0.08 (0.52)	-0.13 (-0.80)	0.03 (0.32)	0.02 (0.12)
Adjusted R squared	0.89	0.89	0.45	0.41	0.55	0.45	0.85	0.71
F	16.48***	16.48***	2.63	2.39	3.44*	2.65	12.10***	5.88**
AIC	-2.36	-2.36	0.19	0.26	-0.01	0.12	-1.16	-0.52
SBC	-2.06	-2.06	0.50	0.56	0.29	0.42	-0.86	-0.21
Durbin Watson	2.92	2.92	2.84	2.22	2.75	2.68	2.31	2.33

*** Significant at the 1%, ** at the 5%, and * at the 10% level
The quantities in brackets are the t-values

Table 5

Statistical Analysis of the Determinants of Visitor Expenditure in Anguilla (1990 - 2003)

Total (VE)	
	Model 4
C	-13.51 (-4.59)
GDPT	0.68 (4.56)*
REER	2.54 (2.82)**
OIL	-0.30 (-4.67)*
HUR	-0.01 (-0.46)
Adjusted R squared	0.94
F	51.10
AIC	-3.05
SBC	-2.82
Durbin Watson	2.46

*** Significant at the 1%, ** at the 5%, and * at the 10% level
The quantities in brackets are the t-values

Table 6

Statistical Analysis of the Determinants of Visitor Expenditure in Antigua & Barbuda (1990 - 2003)

Total (VE)	
	Model 4
C	-3.11 (-0.67)
GDPT	0.72 (3.89)***
REER	0.44 (0.72)
OIL	-0.16 (-0.99)
HUR	-0.01 (-0.31)
Adjusted R squared	0.70
F	8.44
AIC	-1.94
SBC	-1.71
Durbin Watson	1.61

*** Significant at the 1%, ** at the 5%, and * at the 10% level
The quantities in brackets are the t-values

Table 7

Statistical Analysis of the Determinants of Visitor Expenditure in St Kitts & Nevis (1990 - 2003)

Total (VE)	
	Model 4
C	9.25 (2.17)*
GDPT	1.55 (3.10)**
REER	-4.25 (-2.30)**
OIL	-0.56 (-3.44)***
HUR	-0.05 (-0.89)
Adjusted R squared	0.54
F	4.85
AIC	-1.26
SBC	-1.03
Durbin Watson	3.01

*** Significant at the 1%, ** at the 5%, and * at the 10% level
The quantities in brackets are the t-values

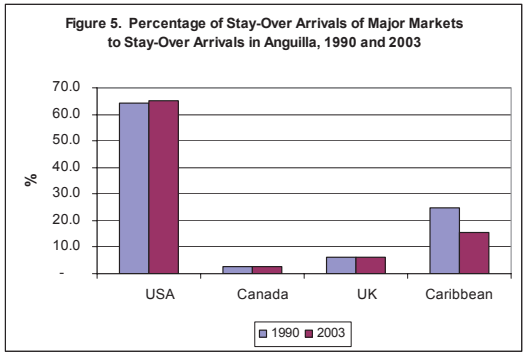
Figure 5. Percentage of Stay-Over Arrivals of Major Markets to Stay-Over Arrivals in Anguilla, 1990 and 2003
70.0
60.0
50.0
40.0
30.0
20.0
10.0
-
%
USA
Canada
UK
Caribbean
1990
2003

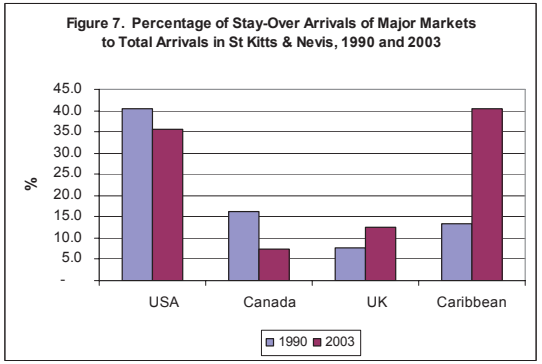
Figure 7. Percentage of Stay-Over Arrivals of Major Markets to Total Arrivals in St Kitts & Nevis, 1990 and 2003
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
-
%
USA
Canada
UK
Caribbean
1990
2003

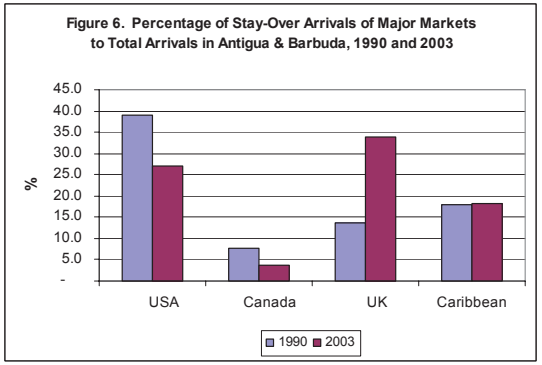
Figure 6. Percentage of Stay-Over Arrivals of Major Markets to Total Arrivals in Antigua & Barbuda, 1990 and 2003
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
-
%
USA
Canada
UK
Caribbean
1990
2003