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What Attracts Tourists to Paradise?

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Abstract

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This paper investigates the determinants of tourism demand in the Eastern Caribbean Currency Union. We estimate the demand function in a panel setting using annual data from 1979 to 2005. Results show that tourism arrivals are significantly affected by economic developments in the source countries, while price considerations and external shocks (such as hurricanes and wars) are also important. Supply factors, such as developments in foreign direct investment and the number of airlines servicing a destination, are also found to be significant determinants of tourism demand.

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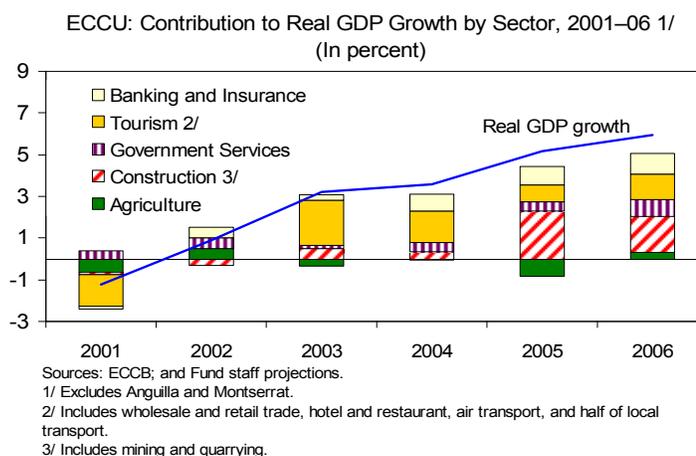
I. INTRODUCTION

Tourism is one of the main economic activities in the Eastern Caribbean Currency Union (ECCU) region.²

Tourism receipts account for a large portion of each country's GDP (ranging from around 40 percent in Antigua and Barbuda, Grenada, and St. Lucia to around 25 percent in the traditional agricultural economies of Dominica and St. Vincent and the

Grenadines). The tourism sector is among the main drivers of economic growth, both directly and through the tourism-related construction activity. Economic cycles and the performance of the tourism sector are also highly correlated, more so for the economies which are more reliant on tourism, such as Antigua and Barbuda (Figure 1). While detailed studies for all ECCU countries are not available, a study by the Caribbean Tourism Organization (CTO, 2000) finds that each Eastern Caribbean (EC) dollar spent on tourism in St. Lucia in 1998 had generated EC\$ 0.65 in income—64 percent through the direct effect (provision of hotel and restaurant services, recreation, transportation and retail trade), 23 percent through the indirect effect (suppliers' provision of inputs to the tourism sector and retailers) and the remaining 13 percent through the multiplier effect (second-round effects through the spending of household income derived from the aforementioned effects).

The tourism sector is also an important source of government revenue. While data on tourism-related tax receipts are not readily available, calculations which include estimated revenues from corporate and



ECCU: Tourism Expenditure, 2004
(In percent of GDP)

Antigua and Barbuda	41.2
Dominica	22.2
Grenada	36.8
St. Kitts and Nevis	26.4
St. Lucia	42.7
St. Vincent and the Grenadines	23.4

Sources: Caribbean Tourism Organization; and Fund staff estimates.

ECCU: Tourism-related Tax Revenue, 2005
(In percent of total tax revenue)

Antigua and Barbuda	55.7
Dominica	51.0
Grenada	58.2
St. Kitts and Nevis	41.6
St. Lucia	40.5
St. Vincent and the Grenadines	41.4

Sources: Country authorities; Caribbean Tourism Organization; and author's estimates.

² The ECCU includes the six Fund-member countries of Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines, and the two U.K. territories of Anguilla and Montserrat. In this paper the ECCU region refers to the six Fund-member countries.

income tax, custom duties, departure taxes and hotel room taxes, suggest that tax revenues from the tourism sector account for a significant portion of each country's tax revenues.³ The importance of the tourism sector as a source of public finance is only expected to intensify in the future, as more economies introduce VAT systems and as some tax concessions are gradually phased out.⁴

The tourism sector is also an important employer in the region. While labor data deficiencies hinder the proper analysis of the contribution of the tourism sector to employment, the CTO (2000) estimated that it accounted for around 20 percent of all St. Lucian jobs in 1998. Official data on employment in the accommodation sector and the National Tourism Offices, as reported by the CTO, understate the importance of the tourism sector in the labor market since they do not take into account tourism-auxiliary sectors (such as goods and services providers and retailers).

ECCU: Employment in Tourism Sector, 2004

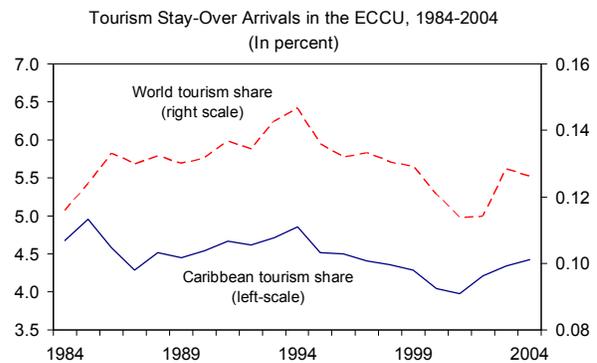
	Employment in Accommodation Establishments 1/	Employment in National Tourism Offices
Antigua and Barbuda	3,649	110
Dominica	929	29
Grenada	1,200	44
St. Kitts and Nevis	1,599	29
St. Lucia	5,200	580
St. Vincent and the Grenadines	...	21

Source: Caribbean Tourism Organization.

1/ Data refer to 2003.

Tourism activity contributes decisively to attenuate the current account deficit of the balance of payments. For example, around 75–80 percent of the exports of goods and services of Grenada and St. Lucia were related to tourism expenditures in 2004. In addition, most of the region's current account deficit is financed by tourism-related foreign direct investment.

A better understanding of the determinants of tourism demand could help policymakers design the appropriate strategies needed to develop this sector further, and correct the slippages that have caused tourism growth to stagnate in recent years. An appropriate policy response is particularly timely at present, given increasing competition from other exotic destinations and the declining agricultural sector, following the erosion of



Sources: Caribbean Tourism Association; and Fund staff estimates.

³ According to the CTO (2000), the tourism sector was estimated to account for around 20 percent of government revenues in St. Lucia in 1998.

⁴ Chai and Goyal (2006, 2008) estimate that revenue losses from concessions on import-related taxes and corporate income tax range between 9½ and 16 percent of GDP a year.

European Union (EU) preferential trade arrangements.

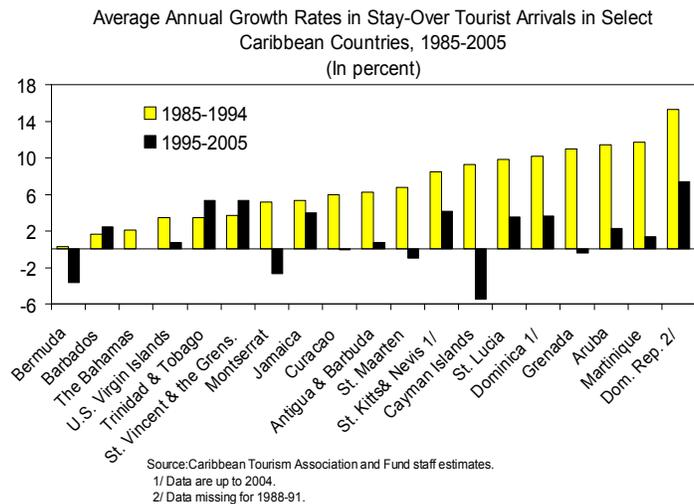
The purpose of this study is to analyze the determinants of stayover tourism demand in the ECCU. Although the importance of tourism in the Caribbean is widely recognized, little attention has been given to explain systematically its determinants. Randall (2006) provides a detailed description of the main trends in the ECCU tourism sector and uses Spearman's rank correlation coefficients to examine the importance of various variables (e.g., cost of international calls, telecommunication costs) on tourism demand. However, the analysis does not provide a complete estimate of the tourism demand function. Mwase (2008) and Romeu (2008) recently analyzed tourism demand on a wider Caribbean level, while Faria (2005) analyzes tourism demand determinants in The Bahamas.

We consider both demand factors (e.g., income in the main trading partners and relative prices) and supply factors, such as airline availability and foreign direct investment, in explaining the attraction of tourism inflows. We utilize a panel dynamic ordinary least-squares (DOLS) estimation approach, which allows for country-specific effects and also captures the long-term tendencies of tourism movements, while correcting for unit root considerations.

The remainder of this paper is structured as follows. Section II provides an overview of the tourism sector in the ECCU.⁵ Section III undertakes a brief literature review on the methodologies used in analyzing the demand for tourism. Section IV presents the sample and model specification. The results are presented in Section V, while the final section concludes.

II. OVERVIEW OF THE TOURISM SECTOR IN THE ECCU

ECCU tourism growth has decreased significantly since the late 1990s. With the exception of St. Vincent and the Grenadines, all ECCU countries that used to be among the best performers (in regional comparisons) in attracting stayover tourists experienced significant declines in their tourist growth rates since the mid-1990s.⁶ While the declining tourism growth rates had been a rather widespread phenomenon in the Caribbean region as a whole, there were some notable exceptions; the Dominican Republic remained the top performer in both



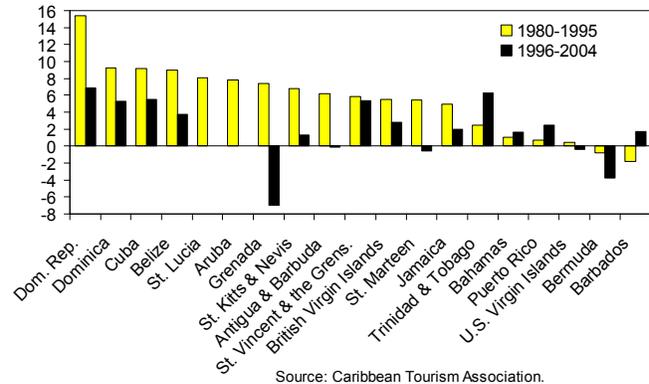
⁵ For an analysis of recent tourism developments, also see Randall (2006) and Mwase (2008).

⁶ Grenada's negative growth rates since the mid-1990s primarily reflect the devastating Hurricane Ivan of 2004, which destroyed a large portion of the country's tourism infrastructure.

decades (in terms of annual growth rates in tourism arrivals), while Trinidad and Tobago, St. Vincent and the Grenadines, and Barbados outpaced their past performances.

Tourism growth has been facilitated by the construction of numerous accommodation establishments in the early 1980s and 1990s.⁷ Since the mid-1990s, capacity growth was subdued, while in some countries (notably Grenada given the impact of Hurricane Ivan), accommodation capacity has actually fallen. Room capacity is expected to rise significantly within the next few years, given the ongoing construction boom in several ECCU islands—mostly in the form of condo-hotel type facilities—partly reflecting the desire of European and American retirees to own a second home in the Caribbean and, for the former, the strong euro appreciation against the EC dollar.

Average Growth Rate in Number of Rooms in Tourist Accommodation, 1980-2004
(In percent)



Tourism development varies across the ECCU. Antigua and Barbuda and St. Lucia boast the highest development in the region while Dominica and St. Vincent and the Grenadines are at the other end of the spectrum. The former are known worldwide as prime honeymoon destinations; almost three quarters of their arrivals stay in a hotel and around half of them are at the age 20–39 years (Caribbean Tourism Organization, 2004). In contrast, only one in five of Dominica’s and St. Vincent and the Grenadines’ visitors stay in a hotel; most of the vacationers are actually from neighboring islands and are visiting family and friends. To enhance tourism development in Dominica and St. Vincent and the Grenadines—two islands with tropical terrain suitable for eco-tourism development—the authorities have started or are considering the construction of an international airport.

The main tourism source markets for ECCU tourism are the United States, the United Kingdom and the larger Caribbean countries of Barbados, Jamaica and Trinidad and Tobago. The reliance on just a few markets, which are themselves highly interlinked, provides an additional vulnerability to the non-sectorally diversified ECCU economy.⁸ This reliance on a few tourism source countries varies by country, with Dominica attracting numerous tourists from other smaller Caribbean islands and few Europeans and North Americans, while St. Kitts and Nevis is primarily reliant on U.S. tourists. In contrast, Antigua and Barbuda attracts mostly visitors from the United Kingdom (Figure 2).

⁷ Most of these establishments have been in the form of large international hotels. For example, based on data from the Caribbean Tourism Organization, more than 70 percent of all rooms in St. Lucia, and around 50 percent of all rooms in Antigua and Barbuda, are located in hotels with 100 rooms or more. However, disparities in room allocations do exist among the ECCU—for instance, there are no large hotels (capacity above 100 rooms) on St. Vincent and the Grenadines.

⁸ Cashin (2006) finds that the ECCU’s main trading partners exhibit synchronized business cycles.

III. THE DEMAND FOR TOURISM: A LITERATURE REVIEW

The number of tourist arrivals, the number of nights spent by visitors, and tourism expenditure are the most widely-used measures of tourism demand.⁹ Gonzales and Moral (1995), modeling Spain's tourism demand, use tourism spending as the dependent variable, defined as the product of three factors: the number of tourists, the length of their stay and their daily average spending. Gonzales and Moral (1995), Cunha (2001), Tse (1999) and Lathiras and Siriopoulos (1998) all note that tourism spending is the most appropriate measure of tourism demand; simply using the number of tourist arrivals ignores the importance of duration and spending behavior. However, according to Crouch and Shaw (1992), almost 70 percent of the studies that estimate tourism demand functions have used the number of visitors as the dependent variable since data on tourism spending are less frequent and reliable (see Qui and Zhand, 1995; Morris et al., 1995; Kulendran, 1996; and Akis, 1998). Ledesma-Rodriguez and Navarro-Ibanez (2001) use the number of visitors lodged (housed overnight) in the destination country as the dependent variable in a panel study of the demand for tourism. Given the data limitations, this study will also use the number of stayover tourist arrivals as the dependent variable and assume that they are all lodged.

Tourism studies using panel data are rare (Mwase, 2008; Proenca and Soukiazis, 2005; Chase et al., 1998; Ledesma-Rodriguez et al., 2001). Most of the studies use time series data for only one country, where the problem of non-stationarity has often been detected. Thus, various techniques have been used from autoregressive integrated moving average and Holt-Winters univariate modeling (Kim, 1999), to two-stage and three-stage least-squares (Tse, 1999) and error-correction models (Kulendran and Wilson, 2000; Lathiras and Siriopoulos, 1998). While some studies have used the gravity model approach (e.g., Witt and Martin, 1989; Mwase, 2008), others point out that the gravity model approach lacks a firm theoretical foundation (Witt and Martin, 1989).

There are numerous factors that could affect tourism demand; and the specification varies according to the countries considered, the time period of study and the type of data (Crouch, 1994a). Most of the studies include variables related to economic factors (such as the income level in the source country, relative prices in the origin and destination countries) and random factors related to external shocks such as hurricanes and terrorists attacks. More specifically:

- *Income Factor.* Many studies use per capita income as the most appropriate indicator to measure the purchasing power of the source country. It is expected that tourism demand will depend positively on income. According to Witt and Witt (1992), tourism is a luxury good with an expected income elasticity of demand above unity. Typical results range between one and two for the income elasticity, however, some studies have found the income elasticity to be well above two, according to a review by Crouch (1995). *We will examine the importance of the income factor for the ECCU countries using a weighted average of real GDP per capita in the most*

⁹The review of the literature draws from Proenca and Soukiazis (2005).

*important source countries (United States, United Kingdom, Canada, Trinidad and Tobago, Jamaica, and Barbados).*¹⁰

- *Price Factor.* The most frequent price considered is the relative price between the receiving and sending country, adjusted by the bilateral exchange rate (Kulendran and Wilson, 2000; Lathiras and Siriopoulos, 1998; Chadee and Mieczkowski, 1987; EIU, 1975), and relative prices between the receiving country and other competitors (Turner et al., 1998; Lathiras and Siriopoulos, 1998; Edwards, 1987).¹¹ In both measures, it is expected that the higher the relative price level in the receiving country, the lower will be the demand for tourism. Price elasticities vary considerably across studies, and in many cases unexpected signs or insignificant values have been recorded (Crouch, 1994b). *We will examine the importance of price movements using competitor-based and customer-based indices of the real effective exchange rate. We also investigate whether oil price changes influence tourism demand, since they would clearly affect the cost of transportation.*
- *Tourism Shocks.* Dummy variables have been frequently introduced to account for the effect of external shocks that might have a transitory influence on tourism demand. Political instability and social conflict, terrorism, travel restrictions, oil crises, world fairs and sporting events are often included as dummy variables. *We include dummy variables for hurricanes, the September 11 terrorist attacks and the wars in Iraq in the early 1990s and 2003, and Afghanistan in 2001.*
- *Supply Factors.* Supply factors from the point of view of the host country could be important in attracting more tourists. However, the inclusion of supply factors is rare in estimating tourism demand. Proenca and Soukiazis (2005) consider two supply factors in estimating tourism inflows to Portugal (accommodation capacity and public investment as a ratio to GDP), but find that only accommodation capacity is important (elasticity of 1.3). *In this analysis we investigate two supply factors: foreign direct investment as a measure of accommodation capacity, and the number of airlines flying into a destination country.*

The log linear specification is most commonly used in estimating the tourism demand function. Witt and Witt (1995) in a review article concluded that 75 percent of the models considered used a log linear functional form, 18 percent a linear specification and the remaining are probit-logit models or semi-log specifications. The straightforward interpretation of the results is the main reason for the popularity of the log-linear form (Kulendran, 1996), which we also follow in this analysis.

¹⁰ Details of all the variables used are provided in the Appendix.

¹¹ Ideally, data in the form of a tourist price index would be preferable (Martin and Witt, 1987). However, given data limitations we instead use consumer price indices. The discrepancy is not expected to be large since Martin and Witt (1987) found that the differential explanatory power of an estimated tourists' cost of living index is not sufficiently large with respect to a simple consumer price index to justify the additional effort required to collect the former data.

IV. DATA AND MODEL SPECIFICATION

A panel data approach is used to estimate the demand for tourism in the ECCU. Annual data for the period 1979–2005 for the six Fund-member ECCU countries are used. We choose annual data so as to avoid seasonality problems (Proenca and Soukiazis, 2005), and due to limitations on the availability of high-frequency data. Throughout the analysis total stayover tourism arrivals are used and no distinction is made between business and leisure tourism. Given that most variables used exhibit unit roots, we follow the DOLS procedure of Stock and Watson (1993), which allows for variables integrated of alternative orders and tackles the problem of simultaneity amongst the regressors.¹² The DOLS approach adds leads and lags of first differences of right-hand side variables to the set of regressors in order to remove the correlation of the residuals with the stationary component of the unit root processes of the explanatory variables. We employ one lead and lag, but we also explore robustness to more leads and lags.

Unit Root Tests

In order to test the integration properties of the series considered we perform unit root tests. Using the Dickey-Fuller (DF) tests of Dickey and Fuller (1979, 1981) and the non-parametric Phillips-Perron (PP) tests of Phillips (1987), Phillips and Perron (1988) and Perron (1988) we find that most variables considered exhibit unit roots; exceptions include competitor-based REER which is $I(0)$. Information on the definition of the variables is provided below and in the Appendix.

Table: Panel Unit Root Tests

	Augmented Dickey-Fuller Test		Phillips-Perron Test	
	Level	First Difference	Level	First Difference
Visitor Arrivals	5.4	41.9 **	1.8	54.7 **
Customer-based REER	15.9	31.9**	9.8	47.7**
Competitor-based REER	26.1*	66.7**	21.8*	61.5**
Oil	1.6	17.9	0.6	49.6 **
FDI	12.7	62.4 **	17.2	138.0**

Source: Fund staff calculations.

Note: The ** (*) indicates rejection of the null hypothesis of a unit root at the 1 (5) percent significance level. The respective lag lengths were selected based on the Akaike Information Criteria and the Schwartz Criteria.

¹² Based on Monte Carlo evidence, Stock and Watson (1993) show that DOLS is more favorable, particularly in small samples, compared to a number of alternative estimators of long run parameters, including those proposed by Engle and Granger (1987), Johansen (1988) and Phillips and Hansen (1990), as noted in Masih and Masih (1996).

Estimation: Stock-Watson Dynamic OLS

Expanding the specification of Proenca and Soukiazis (2005), the following demand equation is estimated:

$$\ln TD_{it} = \beta_{0i} + \beta_1 \ln y_{it} + \beta_2 \ln p_{it} + \beta_3 \ln p^*_{it} + \beta_4 \ln FDI_{it} + \beta_5 \ln OIL_t + \beta_6 \ln(\text{airlines}_{it}) + \sum_{j=1}^n \beta_{6+j} d_{ijt} + \sum_{k=-m_1}^{M_1} \beta_k \Delta \ln(y_{it-k}) + \sum_{k=-m_2}^{M_2} \beta_k \Delta \ln(p_{it-k}) + \sum_{k=-m_3}^{M_3} \beta_k \Delta \ln(p^*_{it-k}) + \sum_{k=-m_4}^{M_4} \beta_k \Delta \ln(FDI_{it-k}) + \sum_{k=-m_5}^{M_5} \beta_k \Delta \ln(OIL_{it-k}) + v_{it}$$

with $t=1, \dots, 27$ (1979-2005) and $i=1, \dots, 6$, and M 's represent the number of lead and lags; where:

- TD_{it} is the number of tourist arrivals in island i at time t ;
- y_{it} is the weighted average of the real GDP per capita of the source countries related to country i at time t , with weight being the tourist arrivals shares from each country;
- p^*_{it} and p_{it} are the customer-based and competitor-based real effective exchange rates, respectively;
- FDI_{it} is the foreign direct investment inflow to country i at time t (expressed in U.S. dollar terms);
- OIL_t is the average oil price at time t ;
- airlines_{it} is the number of airlines serving destination i at time t ;
- d_{ijt} is a dummy variable to capture the wars in Iraq in the early 1990s and 2003, and Afghanistan in 2001; the September 11, 2001 terrorist attack in the United States; and category 3 and above hurricanes in each country;
- Δ denotes the first-difference operator;
- β_{0i} is country fixed effect;
- v_{it} is an error term.

Additional information on the derivation and definition of the data is provided in the Appendix.

V. MODEL ESTIMATION

The estimation results are shown in Table 1.

- *As expected we find that the income elasticity is above one (1.5), suggesting that tourism is a luxury good.* This finding indicates that tourism performance in the ECCU is very dependent on the economic conditions in its main trading partners. When recessions affect the source countries, the impact on tourism arrivals and the economy in general could be detrimental, especially taking into account: (i) that the ECCU's main trading partners exhibit synchronized business cycles; and (ii) the ECCU region is heavily dependent on tourism, particularly following the erosion of EU trade preferences for agricultural exports (IMF, 2008a).
- *FDI developments and the number of airlines servicing a destination are important determinants of tourism arrivals.* We find that FDI has a significant impact on tourism arrivals. This is an expected finding, since FDI-related projects (e.g., hotels, infrastructure improvements) should attract tourists. As expected, we also find that the number of airlines serving a destination affects tourism potential. As more airlines fly to a destination, tourism arrivals are expected to rise for two reasons: (i) the destination becomes more easily accessible; and (ii) public awareness increases for a destination as more airlines undertake expenditure on advertising campaigns.
- *We also find that demand for tourism is affected by price considerations.* For example, deterioration in the ECCU's competitiveness vis-à-vis its tourism customers or competitors has a large negative impact on tourism arrivals, indicating that tourists compare prices among different destinations when making their choices (e.g., visiting Barbados instead of the ECCU, or comparing the ECCU with destinations within their own country). Surprisingly, we find that oil prices, as a proxy for transportation cost, has only a weak impact on tourism flows to the ECCU.
- *Tourism shocks such as hurricanes and terrorist attacks have a negative impact on tourism.* We find that hurricanes, wars, and the September 11 terrorist attacks could have affected tourism flows.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

Tourism is clearly an important industry for the ECCU, and its importance is only expected to intensify in the future given the erosion of EU preferential trade agreements and the ongoing tourism-related construction boom. Given the prominence of the sector the aim of the paper was to estimate the determinants of the demand for tourism in the ECCU. The key determinants identified are largely consistent with the tourism demand literature surveyed in Crouch (1994a, 1994b).

As expected, we find that source countries' income elasticity of tourism demand is above unity, indicating that tourism is a luxury good. This finding indicates that the tourism sector and the ECCU economy could be particularly vulnerable in the event of an economic downturn in its main tourism-source countries. This vulnerability is enhanced by the high degree of synchronization of trading partners' business cycles, the ECCU's reliance on only a few source countries for the bulk of its tourism (notably the United States, United Kingdom, Canada, and some Caribbean islands), and the lack of diversification in the tourism-based ECCU economies. This finding is particularly topical given the increasingly weak near-term global and North American economic outlook (see IMF 2008a, 2008b, 2008c). Thus, diversifying tourism originating markets, as well as the tourism product (such as, promoting the destination for eco-tourism or honeymoon tourism) could help reduce vulnerability to shocks emanating from the source markets themselves (Mwase, 2008).

We also find that price competitiveness is important in tourists' choices. Unlike popular opinion that the ECCU "targets" niche tourism, and as such is not vulnerable to competition from cheaper destinations, we find that competitiveness is of paramount importance in attracting tourism flows. Both measures of competitiveness indicate that enhancing price-competitiveness attracts more tourism inflows. As such, the ECCU could ensure the long-term viability of its tourism industry by implementing measures designed to enhance the industry's price and non-price competitiveness. In that respect, labor reforms, including liberalization of labor markets and productivity-enhancing policies, improvements in the investment climate, and the establishment of regional regulatory frameworks for electricity and telecommunications could lower some of the price pressures (see World Bank, 2005; and IMF, 2008a).¹³ In addition, fiscal consolidation, particularly expenditure restraint, could help alleviate inflationary pressures. Investments in human capital, particularly in the hospitality sector, could also improve non-price competitiveness, facilitate greater quality of the tourism product and attract additional tourist inflows.

We also find that tourism shocks such as hurricanes, wars and the terrorist attack of 2001 also affect tourism demand. Thus enhancing disaster mitigation policies could also be important in facilitating tourism growth (see Rasmussen, 2006).

Regarding supply-side factors, we find that FDI and the number of airlines servicing a destination positively affect tourism flows. These findings call for: (i) an improvement in the cost of doing business and the investment climate; and (ii) increased focus on strengthening the regulatory, administrative, and legal impediments to private business activity.

¹³ Randall (2006) also indicates that the ECCU has high utility rates.

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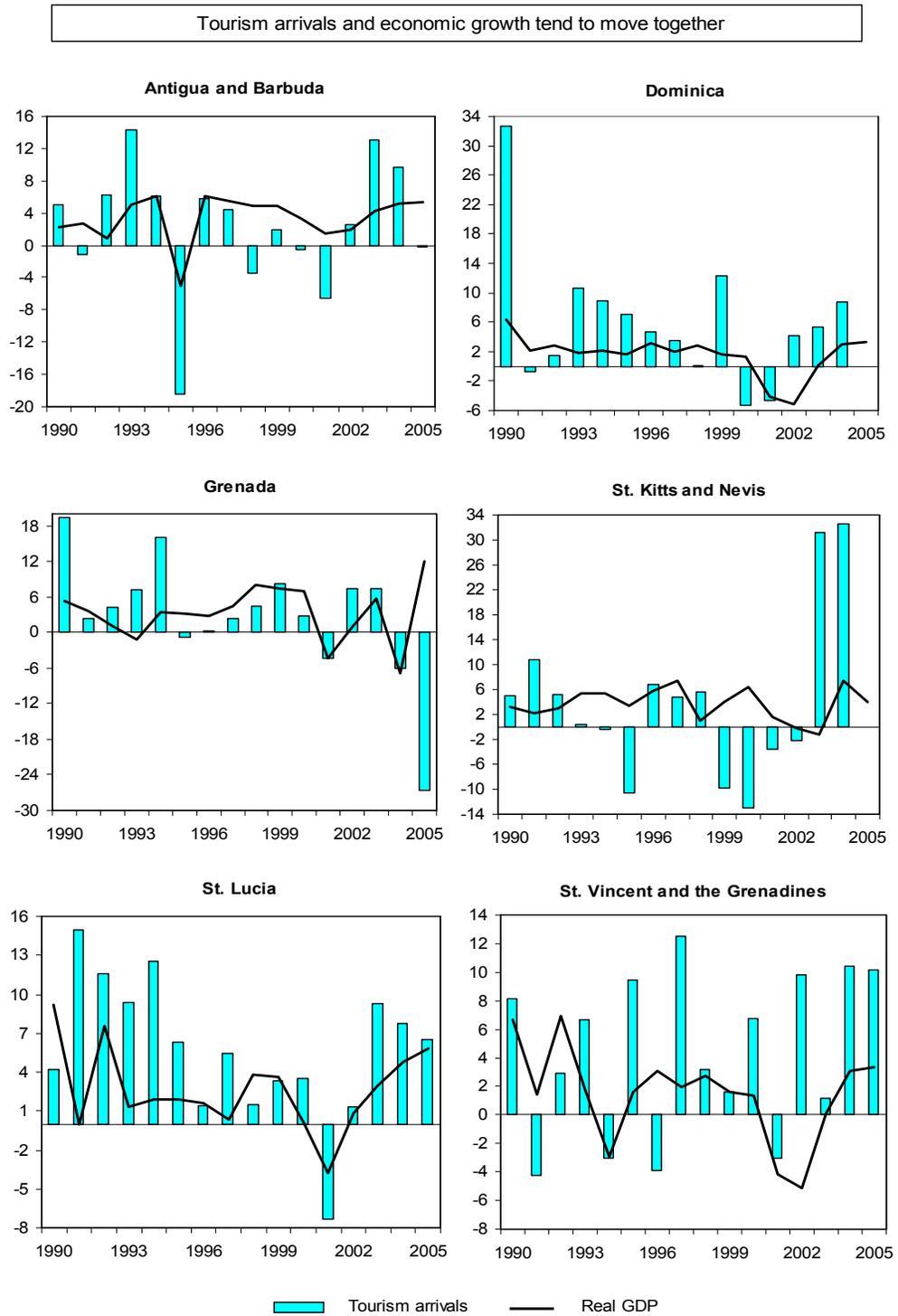
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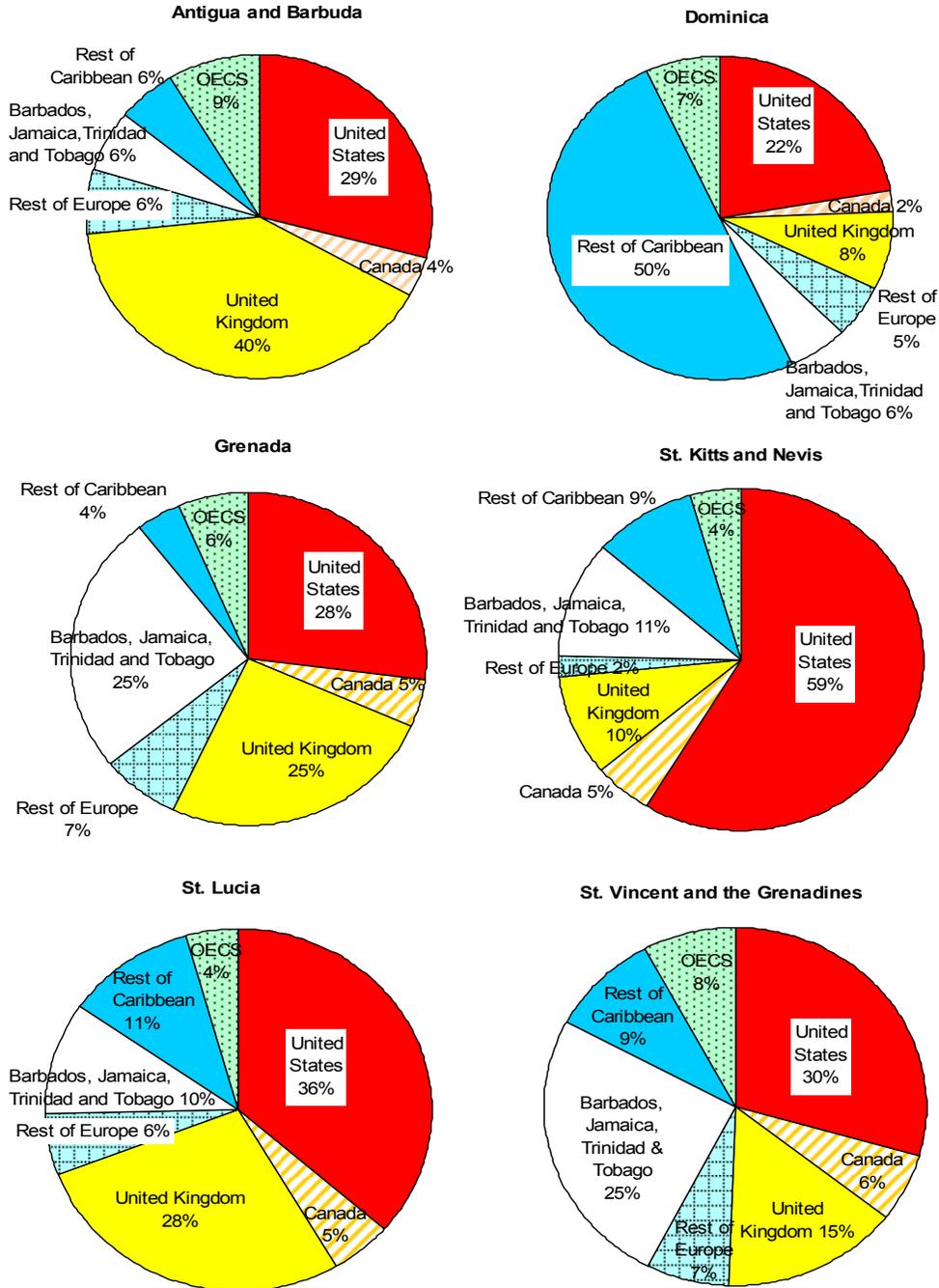
Figure 1. ECCU: Annual Growth Rate in Tourism Arrivals and Real GDP, 1990–2005 1/
(In percent)



Sources: Caribbean Tourism Organization and Fund staff estimates.
1/ Data for stayover arrivals in Dominica and St. Kitts and Nevis are up to 2004 due to data limitations.

Figure 2. ECCU: Tourism Arrivals by Country of Origin, Percent, 2004

Sources of tourism vary considerably across the ECCU



Sources: Caribbean Tourism Organization and Fund staff estimates.

Table 1: Determinants of Tourism Arrivals in the ECCU 1/

	Preferred Specification 2/	Other Specifications		
	Coefficient	Coefficient	Coefficient 2/	Coefficient
Per Capita GDP of Source Countries	1.50 **	1.58 **	0.95 *	1.25 **
Customer-Based Real Effective Exchange Rate	-1.27 **	-1.12 **	-0.31	-0.01
Competitor-Based Real Effective Exchange Rate	-0.83 **	-1.09 **	-1.41 **	-0.86 **
FDI	0.08 **	0.08 **	0.06 *	-0.03
Oil		-0.08	0.01	
Wars		-0.13 *	-0.09	
Hurricanes	-0.13 **	-0.12 **	-0.08	-0.03
Sept. 11 Terrorist attack	-0.13 **	0.03	-0.01	-0.10 **
Number of Airlines				0.08 *
Constant	6.18 *	6.25	9.80	3.15
R-Square	0.99	0.94	0.96	0.99
No. observations	125	125	125	87

Source: Fund staff calculations.

1/ Specifications (if not stated otherwise) include one year leads and lags of the difference of the regressors to correct for unit roots.

2/ Including 2 year lags, which were not found to be statistically significant.

Note: ** (*) implies significance at the 1 (5) percent significance level.

Appendix: Data Sources and Definitions

The data sources and the construction of the variables are as follows:

- **Tourism stayover arrivals** are obtained from the Caribbean Tourism Organization and the Eastern Caribbean Central Bank.
- Data on **per capita real GDP for source countries** were obtained from the International Monetary Fund's *World Economic Outlook* database. The variable used was the weighted average of the real per capita GDP in the countries of origin, where the weights were based on the share of stayover arrivals from the United States, United Kingdom, Canada, Barbados, Jamaica and Trinidad and Tobago for 2004.
- The **oil price index** is the simple average of Brent, Dubai, and WTI oil price indices, and is obtained from the International Monetary Fund's *Global Economic Environment* database.
- **Foreign direct investment (FDI)** data are obtained from the International Monetary Fund's *International Financial Statistics* database.
- **Competitor-based REER** are calculated as weighted average of consumer price index in a common currency. Competitor weights (in parentheses): The Bahamas (23.4 percent), Barbados (8.0 percent), Dominican Republic (43.5 percent), Jamaica (19.4 percent), and Trinidad and Tobago (5.7 percent). Weights represent the share of tourism arrivals to the Caribbean in 2003.
- **Customer-based REER** are calculated as weighted average of consumer price index in a common currency. Customer weights: Antigua and Barbuda (Canada, U.K. and U.S.); Dominica (France, U.K., U.S.); Grenada (Trinidad and Tobago, U.K., U.S.); St. Kitts and Nevis (Canada, U.K., U.S.); St. Lucia (Canada, U.K., U.S.); St. Vincent and the Grenadines (Trinidad and Tobago, U.K., U.S.). Weights are based on the proportion of tourists arriving from each country in 2001.
- The external shock dummy variables capture: the **wars** in Iraq in the early 1990s and 2003, and Afghanistan in 2001; and the **terrorist attacks** on the United States of September 11, 2001; and the **incidence of hurricanes** (data obtained from <http://stormcarib.com/climatology>).
- Data on the **number of airlines** were obtained from: http://www.transtats.bts.gov/DL_SelectFields.asp?Table_ID=260&DB_Short_Name=Air%20Carriers.