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E. M. Ekanayake
Bethune-Cookman University, ekanayakee@cookman.edu

Mihalis Halkides
Bethune-Cookman University, halkidesm@cookman.edu

John R. Ledgerwood
Embry-Riddle Aeronautical University, ledgerwj@erau.edu

INBOUND INTERNATIONAL TOURISM TO THE UNITED STATES: A PANEL DATA ANALYSIS

E. M. Ekanayake, Bethune-Cookman University
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ABSTRACT

The objective of this paper is to analyze the demand for tourist arrivals to the United States, using the panel cointegration technique. The study attempts to identify and measure the impact of the main determinants of inbound international tourism flows to the United States. The study uses annual data from 1986 to 2011 for tourist arrivals from 50 major countries of tourist origin. The specified model includes several country-specific determinants. The panel unit root tests indicate all the variables are integrated of order one. The panel cointegration tests show that all seven test statistics reject the null hypothesis of no cointegration at the 1% significance level, indicating that the five variables are cointegrated. The results suggest that tourism demand to the United States must be considered as a luxury good and is highly dependent on the evolution of relative prices and cost of travel between origin and destination country. The results also show that tourism demand is elastic with respect to income but inelastic with respect to tourism price, real exchange rate, and travel costs.

JEL: L83, O51

KEYWORDS: Tourism demand, Panel data, Panel cointegration, United States

INTRODUCTION

The Tourism industry has emerged as one of the leading service industries in the global economy, as well as in the United States economy in recent decades. Economic flows, generated by international tourism, have become vital factors in economic growth and international economic relations in many countries. Tourism, is now one of the largest foreign exchange earners in the United States, generating $434.4 billion or 2.9% of GDP in 2011(World Travel and Tourism Council, 2012). indeed, a major source of economic and employment growth. For example, according to the U.S. Bureau of Economic Analysis, direct tourism employment in the United States was 5.41 million and a total tourism-related employment of 7.63 million in 2011, accounting for about 5.5% of total employment. According to the U.S. Department of Commerce, Office of Travel and Tourism Industries, between 1986 and 2011, international tourist arrivals to the United States increased from 25.7 million to 63.2 million, growing an annual average growth rate of 3.5% (see Table 1). Based on the latest forecast by the U.S. Department of Commerce, the United States is expected to see a 5% annual growth rate in visitor volume between 2012 and 2016, producing 81.5 million visitors by 2016.

Given the importance of the travel and tourism industry to the United States, Congress introduced the Travel Promotion Act of 2009 (TPA) authorizing the creation of a public-private partnership, and the establishment of a new non-profit Corporation for Travel Promotion (CTP) to further promote tourism. The CTP's main goal is to promote the United States as a premier travel destination to international travelers. According to the U.S. Department of Commerce press release on President Obama's signing the TPA Act into law, in March 2010, each year "oversees visitors spend an average of $4,500 per person." The Department forecasts that the TPA will "generate $4 billion in new visitor spending and 4,000 new jobs. However, the impacts are expected to be minimal in 2012 and increase as a proportion of normal expected growth through 2014 and then decline through 2016.

Table 1: International Visitors to the United States, 1986-2011

Year	Visitor Arrivals (Thousands)	Year	Visitor Arrivals (Thousands)
1986	25,716	1999	47,870
1987	27,634	2000	51,200
1988	33,717	2001	46,900
1989	36,062	2002	43,600
1990	39,030	2003	41,200
1991	42,338	2004	46,100
1992	46,943	2005	49,200
1993	45,390	2006	51,000
1994	44,696	2007	56,000
1995	43,061	2008	57,900
1996	46,067	2009	55,000
1997	47,295	2010	59,700
1998	45,751	2011	62,300

Note: This table shows the international tourist arrivals to the United States. Source: The U.S. Department of Commerce, ITA, Office of Travel and Tourism Industries.

North America has been the largest source of tourist arrivals to the United States during the period 1990-2011, although its share dropped from 61.7% in 1990 to 49.3% in 2000 (see Table 2). The three largest regions of tourist arrivals, North America, Western Europe, and Asia, account for more than 85% of total tourist arrivals to the United States. Regions such as Eastern Europe and Africa record the lowest number of tourists to the United States between 1990 and 2011. Canada, Mexico, and the United Kingdom are the three largest sources of tourists to the United States, accounting for more than 61% of total international visitors in 2011 (see Table 3). The remainder of the paper is organized as follows: Section 2 provides a brief literature review. Section 3, the empirical framework of the current study, specifies the model and the econometric methodology. Section 4 discusses the variable definitions and outlines the data sources. Section 5 presents empirical results of panel unit root tests, panel cointegration tests, and panel OLS estimates. The last section, Section 6, presents a summary and a brief conclusion on the obtained results.

REVIEW OF LITERATURE

There is a large number of studies exploring tourism demand. Much of the literature in international travel research tends to rely on demand-side theories and models to explain international tourism flows. In its majority, tourism demand research has dealt with demand at the national level, although several studies have addressed demand at the regional and local levels focusing on amenities, attractions, events, accommodations, seasonality, ecological concerns, etc. Demand-side studies have dealt with both outbound and inbound tourism demand, with the overwhelming majority of studies focusing on the latter. The main criticism of much of the demand-side literature is that it is excessive in its use of aggregate concepts as well as aggregate measurements, masking the many particularities of complementary destinations (Marcouiller et al., 2004 and Cortés-Jiménez and Blake, 2011).

Table 2: International Visitors to the United States by Region of Residency, 1990-2011

	1990		2000		2011	
Region of Residence	Number of Visitors	Share (%)	Number of Visitors	Share (%)	Number of Visitors	Share (%)
North America	24,303,659	61.7	25,262,000	49.3	34,442,000	55.3
Western Europe	6,460,065	16.4	11,175,161	21.8	11,986,795	19.2
Asia	4,359,609	11.1	7,554,444	14.7	7,246,776	11.6
South America	1,327,609	3.4	2,941,471	5.7	3,756,689	6.0
Oceania	661,696	1.7	731,263	1.4	1,243,433	2.0
Caribbean	1,136,673	2.9	1,331,297	2.6	1,091,419	1.8
Middle East	365,150	0.9	702,105	1.4	810,688	1.3
Central America	412,337	1.0	821,614	1.6	747,168	1.2
Eastern Europe	198,731	0.5	421,959	0.8	673,105	1.1
Africa	137,140	0.3	295,387	0.6	327,084	0.5
Total Arrivals	**39,362,669**	**100.0**	**51,236,701**	**100.0**	**62,325,157**	**100.0**

Note: This table shows the trend in tourism arrivals to the United States from the major regions of residence. Source: The U.S. Department of Commerce, ITA, Office of Travel and Tourism Industries.

Table 3: Top 10 Sources of Visitor Arrivals to the United States, 2003-2011

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011
Canada	12,666	13,856	14,862	15,992	17,759	18,915	17,977	19,964	21,028
Mexico	10,526	11,907	12,665	13,317	14,327	13,686	13,229	13,469	13,414
United Kingdom	3,936	4,303	4,345	4,176	4,498	4,565	3,899	3,851	3,835
Japan	3,170	3,748	3,884	3,673	3,531	3,250	2,918	3,386	3,250
Germany	1,180	1,320	1,416	1,386	1,524	1,782	1,687	1,726	1,824
Brazil	349	385	485	525	639	769	893	1,198	1,508
France	689	775	879	790	998	1,244	1,204	1,342	1,504
South Korea	618	627	705	758	806	759	744	1,108	1,145
China	157	203	270	320	397	493	525	802	1,089
Australia	406	520	582	603	670	690	724	904	1,038

Note: This table shows the trend in tourism arrivals to the United States from top 10 countries. Source: The U.S. Department of Commerce, ITA, Office of Travel and Tourism Industries.

Efforts at tourism demand forecasting have used both qualitative and quantitative methods, with the majority of studies favoring quantitative approaches (Song and Turner, 2006). Researchers modeling demand have mostly used non-causal longitudinal analysis, causal econometric models, and gravitational techniques. Each of these techniques has merits. The degree to which they lend themselves to accurate demand forecasting, and therefore policy decision making, depends on their ability to accurately measure economic theory tenets. As expected, there is no single technique that is confirmed to be best on all counts over all others (Song and Li, 2008).

The majority of studies tend to analyze flow demand in terms of departures and arrivals, and tourism expenditures and receipts by destination and country of origin. Historically, demand studies tend to use number of tourists as the dependent variable (Crouch and Shaw, 1992). Demand-side research, although with limitations (Papatheodorou, 2001; Trauer and Ryan, 2005; Yoon and Uysal, 2005; Crouch and Ritchie, 1999), has been widely used by destination marketers to create short-term tourism forecasts by measuring elasticities. Researchers have used various economic variables in their studies. Some of these variables include income, population, cost of living differences, transportation cost, currency exchange rate and other price factors (Zhang and Jensen, 2007), distance (Yan, 2011; Becken and Lennox, 2012), destination attractiveness (Enright and Newton, 2004), seasonality patterns (Alegre and Pou, 2005), length of stay (Roselló, Riera, and Sansó, 2004; Alegre and Pou, 2011), purpose of visit (Cortés-Jiménez and Blake, 2011), loyalty for a destination (Garín-Muñoz and Montero-Martín 2007; Brida and Risso, 2009), and socioeconomic and other constraints to vacation (Alegre, Mateo, and Pou, 2010).

Song and Li (2008), in their exceptionally comprehensive study of the tourism demand forecasting literature, report that since the 1970s, time-series models have been widely used in the field. Time-series frameworks have used either single equations or systems of equations, with several researchers preferring multivariate regressions. Single equation models, used in earlier studies, tended to use ad hoc approximations to explain flows of bilateral tourism demand, and therefore, resulted in simplistic, yet, dissimilar findings, only partly accounting for economic theory. Critics suggest that single equation models fail to yield consistent parameter estimates and fail to address demand for complementary and competing destinations (O'Hagan and Harrison, 1984).

Cointegration techniques along with other econometric methods have been used to determine short-term and long-term relationships. "However, the identification of structural relationships is often problematic" (Bonham, Gangnes and Zhou, 2009). While models using systems of equations are more comprehensive than single equation models, they too have limitations. Some studies fail to account for the single most important cost for international tourism, namely, the cost of international travel. Studies that account for cost differences driving tourist demand by destination, tend to use Consumer Price Indices, although the 'baskets of goods and services' differ from country to country, are not consumed in similar proportions by locals and tourists alike, and lack measurement uniformity (Divisekera, 2003).

Econometric models have also been widely used, utilizing various techniques such as ordinary least squares, autoregressive distributed lag models, error-correction models, vector autoregressive models, Baysian VAR, time varying parameter models, and variations (Song and Witt, 2006) and most of them are single equation models. System-of-equations models such as the almost ideal demand system (AIDS), good at forecasting demand for destinations within a region from a source market or a group of source markets, is a much stronger modeling approach. More recent variations of the original AIDS model have not only improved on the variables used but most importantly have taken into account the dynamic nature of the tourism industry by combining several techniques. AIDS models are well fitting in exploring substitution effects and destination competitiveness (Song and Li, 2008). The structural equation model has been used by Turner and Witt (2001) to analyze causal relationships between holidays, business visits and visiting friends and relatives. It appears that time-series models are better for short-term forecasting but rely on historical patterns instead of dynamic structural relationships, while more structural models tend to poorly forecast short-term. According to Cortés-Jiménez and Blake (2011), time varying parameter models and panel data models are better at estimating inbound demand and AIDS models tend to be better in analyzing outbound demand.

Panel data analysis, by incorporating structural econometric models that include both cross-sectional and time-series techniques, has distinct benefits over other models. However, as its forecasting ability has yet to be confirmed, it has not been widely used in tourism demand research. Song and Li (2008), in their comprehensive literature review, have found a handful of studies that have used panel data analysis between 2000 and 2007. Among them, Ledesma-Rodríguez, Navarro-Ibáñez, and Pérez-Rodríguez (2001) modeled demand for Tenerife tourism through both static and dynamic panel data analysis. They found that in the long-term inbound demand is elastic with respect to income and inelastic when it came to prices and travel costs. Garín-Muños (2006) studied the factors affecting inbound demand for the Canary Islands, and found that in the short-term demand was inelastic, but in the long-term, income and price elasticity were greater than one, while changes in travel costs were important, in both the short and long term. Roget and Gonzalez (2006) panel data analysis examined rural tourism demand in Galicia, Spain, and found that the number of overnight stays depends on economic determinants like tourist income, transportation costs to the destination, and the cost of services at the destination, with tourist income being most elastic. Garín-Muñoz and Montero-Martín (2007) who measured the impact of main determinants on inbound tourism demand to the Balearics, Spain, found that there is a strong repeat loyal visitor base driving demand, and recommended for tourism suppliers to increase the quality of their products and services to sustain that demand. Brida and Risso (2009) studying German tourism demand for South Tyrol, Italy, found that loyalty is a significant factor driving demand, while the cost of travel and the prices at the destination have significant negative effects on demand. Seetaram (2010), studying Australian inbound tourism, found that demand is inelastic with respect to income, real-exchange rates, and airfares in both the short and long term. In this paper we employ recently developed panel data techniques to test the influence of various factors that determine inbound tourism to the United States. Our panel data set includes 50 countries and 26 years, spanning the period from 1986 to 2011.

METHODOLOGY

Model Specification

This section discusses the model specification to identify the determinants of tourist arrivals to the United States. The study uses annual data from 1986 to 2011 for tourist arrivals from 50 major countries of origin. Tourist arrivals from these 50 countries account for more than 95% of total tourist arrivals to the United States. In the usual notation, the tourism demand function can be written as follows:

$$TA = f(PCI, PT, RER, TRC, VS) \qquad (1)$$

where, TA is the number of visitors, PCI is the real GDP per capita, PT is the tourism price, RER is the real exchange rate, TRC is the travel cost, and VS is a dummy variable, representing visa requirements.

The data is compiled within a panel data framework, in light of the relatively short time span of the data. Assuming (1) to be linear in logs, the estimated model can be written as:

$$lnTA_{it} = \mu_i + \delta_i t + \beta_1 lnPCI_{it} + \beta_2 lnPT_{it} + \beta_3 lnRER_{it} + \beta_4 lnTRC_{it} + \beta_5 VS_{it} + \epsilon_{it} \qquad (2)$$

where, TA_{it} is the natural log of number of visitors from country i to the U.S. in period t, PCI_{it} is the natural log of real GDP per capita of country i in period t, PT_{it} is the natural log of tourism price of country i in period t, RER_{it} is the real exchange rate between the U.S. and country i in period t, TRC_{it} is the travel cost from country i to the U.S. in period t, VS_{it} is a dummy variable, representing whether or not nationals of country i, are required to have a visa to enter the United States, i = 1, 2, 3, .., N for each country in the panel and t = 1, 2, 3, ..., T refers to the time period. Our panel data set includes 50 countries and covers 26 years from 1986 to 2011. According to economic theory, the expected sign of the coefficient β_1 is positive, while the other four parameters, β_2, β_3, β_4, and β_5 are expected to have negative signs. The parameters μ_i and δ_i allow for country-specific fixed effects and deterministic trends, respectively, while ε_{it} denote the estimated residuals which represent deviations from the long-run relationship.

Panel Unit Root Tests

Before proceeding to cointegration techniques, we need to verify that all of the variables are integrated to the same order. In doing so, we have used panel unit roots tests due to Im, Pesaran, and Shin (2003) (hereafter, IPS). These tests are less restrictive and more powerful than the tests developed by Levin and Lin (1993) and Levin, Lin, and Chu (2002), which do not allow for heterogeneity in the autoregressive coefficient. The tests proposed by IPS permit to solve Levin and Lin's serial correlation problem by assuming heterogeneity between units in a dynamic panel framework. The IPS test will be considered more important because it is appropriate for a heterogeneous regressive root under an alternative hypothesis. The basic equation for the panel unit root tests for IPS is as follows:

$$\Delta y_{i,t} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{p} \rho_{ij} \Delta y_{i,t-j} + \varepsilon_{i,t} \qquad i = 1,2,3,....,N \qquad t = 1,2,3,....,T \qquad (3)$$

where $y_{i,t}$ stands for each variable under consideration in our model, α_i is the individual fixed effect, and p is selected to make the residuals uncorrelated over time. The null hypothesis is that $\beta_i = 0$ for all i versus the alternative hypothesis that $\beta_i < 0$ for some i. The IPS statistic is based on averaging individual Augmented Dickey-Fuller (ADF) statistics and can be written as follows:

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_{iT} \quad (4)$$

where t_{iT} is the ADF t-statistic for country i based on the country specific ADF regression, as in Eq. (3). IPS show that under the null hypothesis of non-stationary in panel data framework, the t statistic follows the standard normal distribution asymptotically. The standardized statistic t_{IPS} is expressed as:

$$t_{IPS} = \frac{\sqrt{n}\left(\bar{t} - \frac{1}{N}\sum_{i=1}^{N} E[t_{iT} | \rho_i = 0]\right)}{\sqrt{\frac{1}{N}\sum_{i=1}^{N} Var[t_{iT} | \rho_i = 0]}} \quad (5)$$

Panel cointegration tests

We investigate the existence of cointegrating relationship using the standard panel tests for no cointegration proposed by Pedroni (1999, 2004). These tests allow for heterogeneity in the intercepts and slopes of the cointegrating equation. Pedroni's tests provide seven test statistics: Within dimension (panel tests): (1) Panel ν-statistic; (2) Panel Phillips–Perron type ρ-statistics; (3) Panel Phillips–Perron type t-statistic; and (4) Panel augmented Dickey–Fuller (ADF) type t-statistic. Between dimension (group tests): (5) Group Phillips–Perron type ρ-statistics; (6) Group Phillips–Perron type t-statistic; and (7) Group ADF type t-statistic. These statistics are based on averages of the individual autoregressive coefficients associated with the unit root tests of the residuals for each country in the panel. All seven tests are distributed asymptotically as standard normal. Of the seven test statistics, except for the panel ν-statistic, the other six Pedroni test statistics are left-tailed tests. In order to find evidence for long-run relationship between the variables, the null hypothesis of no cointegration for these tests should be rejected. If the null hypothesis cannot be rejected, there is no long-run relationship between the variables.

DATA SOURCES AND VARIABLES

The study uses annual data from 1986 to 2011 for tourist arrivals from 50 major countries of origin of tourists. The list of the countries is presented in the Appendix. Annual data on tourist arrivals to the United States were collected from the U.S. Department of Commerce, International Trade Administration, *Office of the Travel and Tourism Industries*. Data on real per capita income (real GDP per capita at 2005 constant dollars) were collected from the United Nations Conference on Trade and Development, *UNCTADSTAT Database* at http://unctadstat.unctad.org. Tourism prices, which represent the cost of goods and services purchased by tourists at the destination, are measured by relative prices. The relative price variable is given by the ratio of the tourism price index of the United States and the consumer price indices (CPI) of the origin countries. The information on the tourism price index of the United States was obtained from the U.S. Department of Labor, *Bureau of Labor Statistics* while the data on consumer price indices (CPI) of the origin countries were obtained from the International Monetary Fund, *World Economic Outlook Database* (September 2011).

Following Lim and Macleer (2001), the real exchange rate, RER_{it}, was constructed as,

$$RER_{it} = \frac{CPI_{US,t}}{CPI_{it}} \times \frac{1}{ER_{it}} \quad (6)$$

where RER_{it} is the real exchange rate between country i and the U.S. in time t, ER_{it} is the bilateral nominal exchange rate (measured as the number of foreign currency units per U.S. dollar) with country i at time t, $CPI_{US,t}$ is the consumer price index (2005=100) of the U.S. and CPI_{it} is the consumer price index of i^{th} country at time t. The data on nominal exchange rates and consumer price indexes were taken from the International Monetary Fund, *International Financial Statistics database*. The cost of travel variable was calculated combining the distance between a given country and the U.S. and the price of oil. Though some studies have used price of oil as a proxy for cost of travel (for example, see Garin-Munoza and Montero-Martin, 2007), this study estimates the cost of travel by multiplying distance between the two countries by the price of a barrel of oil. The data on oil prices were taken from the International Monetary Fund, *International Financial Statistics database*. The final variable, VS, takes the value of 1 if an entry visa is required for nationals from a country i to enter the United States or takes the value of zero (0), otherwise.

EMPIRICAL RESULTS

In this section, we discuss the study's findings and empirical results. Table 4 presents the summary statistics of the variables used in the analysis—the summary statistics, calculated for the common sample.

Panel Unit Root Tests

The starting point of our econometric analysis is to check whether the variables included in Equation (2) contain panel unit roots. In other words, in Equation (2), we need to check whether [TA, RPCI, PT, RER, TRC] contains a unit root. While there are several panel unit root tests available, this study uses the Im, Pesaran, and Shin (IPS) unit root tests. Table 5 reports the results of these panel unit root tests that include individual effects. None of the five variables are stationary at the levels. However, IPS statistic is statistically significant at the 1% level of significance for all variables indicating that they are stationary at the first difference. Thus, the panel unit root tests indicate that all the variables are integrated of order one. Having tested for the unit roots of each variable, the next step is to test whether the variables included in Equation (2) are cointegrated.

Table 4: Basic Summary Statistics

Measure	lnTA	lnPCI	lnPT	lnRER	lnTRC
Mean	12.549	9.302	0.258	-0.039	7.816
Median	12.670	9.805	0.095	0.182	7.535
Maximum	13.188	11.170	5.151	8.014	9.163
Minimum	11.704	5.821	-2.303	-2.303	7.088
Standard Deviation	0.483	1.256	0.856	1.534	0.622
Skewness	-0.273	-0.719	1.540	1.185	0.922
Kurtosis	1.609	2.492	12.032	7.112	2.433

Note: This table shows the summary statistics of the main variables for the common sample.

Table 5: Panel Unit Root Tests Results

Variable	IPS (Level)	IPS (First Difference)
lnTA	2.485	-6.383***
	(0.06)	(0.00)
lnPCI	2.487	-19.746***
	(0.99)	(0.00)
lnPT	2.075	-13.798***
	(0.98)	(0.00)
lnRER	1.401	-13.049***
	(0.92)	(0.00)
lnTRC	4.254	-21.414***
	(0.99)	(0.00)

*Notes: This table presents the results of the IPS panel unit root and stationary tests as proposed by Im, Pesaran and Shin (2003), using the Equations (3)-(5). IPS is the Im, Pesaran and Shin (2003) panel unit root test statistic. Panel unit root test includes intercept and trend. The null hypothesis of unit root (non-stationary) is used. Figures in parentheses are the p-values and *** indicates the statistical significance at the 1 percent level of significance.*

Panel Cointegration Tests

With the respective variables integrated of order one, we performed the heterogeneous panel cointegration test advanced by Pedroni (1999, 2000, 2004), which allows for cross-section interdependence with different individual effects. The results are presented in Table 6. The results for both within and between dimension panel cointegration test statistics are given in the table. All of the seven tests reject the null hypothesis of no cointegration at the 1% level of significance. It is concluded that either there exists a long-run relationship among the variables, or that the five variables in our panel are cointegrated.

Table 6: Heterogeneous Panel Cointegration Test Results (Full Sample)

Panel Cointegration Statistics (within-Dimension)	Test Statistic
Panel ν-statistic	5.310 (0.0000)***
Panel ρ-statistic	-6.147 (0.0000)***
Panel *t*-statistic	-16.354 (0.0000)***
Panel *t*-statistic	-15.825 (0.0000)***
Panel Cointegration Statistics (within-Dimension)	
Group PP type ρ-statistic	-3.397 (0.0000)***
Group PP type *t*-statistic	-18.156 (0.0000)***
Group ADF type *t*-statistic	-15.919 (0.0000)***

*Notes: This table presents the results of the heterogeneous panel cointegration tests as proposed by Pedroni (1999, 2000, 2004). Of the seven tests, the panel ν-statistic is a one-sided test where large positive values reject the null hypothesis of no cointegration whereas large negative values for the remaining test statistics reject the null hypothesis of no cointegration. The number of lag length was selected automatically based on SIC with a maximum lag of 15. The figures in the parentheses are p-values. *** indicates the statistical significance at the 1 percent level of significance.*

After having established consistent evidence of cointegration, we use the panel OLS technique for heterogeneous cointegrated panels to estimate the model. In order to identify the impact of relatively restrictive tourist visa policy after September 2001, two separate models have also been estimated for pre- and post-2001 periods. The results of this analysis are presented in Table 7. Let us first, discuss the results of the full sample covering the period from 1986 to 2011. All the coefficients have the expected signs and are statistically significant either at the 1% or 5% significance level. Given that the variables are expressed in natural logarithms, the coefficients can be interpreted as elasticity estimates. The results indicate that, for the full sample, a 1% increase in foreign income increases tourism arrivals by 1.27%; a 1% increase in tourism price decreases tourism arrivals by 0.01%; a 1% increase in real exchange rate decreases tourism arrivals by 0.01%; and a 1% increase in travel cost decreases tourism arrivals by 0.16%. The results suggest that tourism demand to the United States must be considered a luxury good. When the models are estimated to the 1986-2001 and 2002-2011 periods, two of the variables, i.e., tourism price and real exchange rate, become statistically insignificant, though they still maintain the expected signs.Next the model was estimated including a dummy variable representing the visa requirements. The results of this analysis are presented in Table 8. The inclusion of the visa variable has not made any significant change in the results presented in Table 7. However, this variable has the expected negative sign, although, it is not statistically significant.

SUMMARY AND CONCLUSIONS

The objective of this paper is to analyze the demand for tourist arrivals to the United States, using the panel cointegration technique. The study attempts to identify and measure the impact of the main determinants of inbound international tourism flows to the United States. The study uses annual data from 1986 to 2011 for tourist arrivals from 50 major countries of origin. These 50 countries account for more than 95% of the tourist arrivals to the United States. The multivariate framework includes the tourism arrivals, real GDP per capita in constant 2005 U.S. dollars, the tourism price, the real exchange rate, and the cost of travel.

Table 7: Empirical Results: Panel Least Squares Estimates (Dependent variable: TA ; Excluding VS variable)

Variable	1986-2011	1986-2001	2002-2011
Constant	3.334***	0.343	4.414***
	(9.41)	(1.31)	(8.40)
*ln*PCI	1.208***	1.275***	1.548***
	(9.22)	(7.42)	(7.79)
*ln*PT	-0.018***	-0.011	-0.001
	(2.60)	(1.34)	(1.07)
*ln*RER	-0.007*	-0.003	-0.002
	(1.85)	(0.75)	(1.34)
*ln*TRC	-0.158***	-0.165***	-0.603***
	(9.41)	(5.07)	(9.59)
Adjusted R^2	0.8949	0.9045	0.8949
Number of Observations	1,055	688	367

Notes: This table shows the panel regression estimates of the equation:

$$lnTA_{it} = \mu_i + \delta_i t + \beta_1 lnPCI_{it} + \beta_2 lnPT_{it} + \beta_3 lnRER_{it} + \beta_4 lnTRC_{it} + \epsilon_{it}$$

The figures in parentheses are the absolute values of t-statistics. *** and * indicate the statistical significance at the 1 and 10 percent level, respectively.

Table 8: Empirical Results: Panel Least Squares Estimates (Dependent Variable: TA ; Including VS variable)

Variable	1986-2011	1986-2001	2002-2011
Constant	3.338***	0.344	4.195***
	(9.32)	(1.31)	(9.83)
*ln*PCI	1.208***	1.275***	1.548***
	(9.21)	(7.41)	(7.73)
*ln*PT	-0.017**	-0.011	-0.001
	(2.49)	(1.27)	(1.09)
*ln*RER	-0.008*	-0.004	-0.002
	(1.91)	(0.76)	(1.36)
*ln*TRC	-0.158***	-0.165***	-0.603***
	(9.40)	(5.06)	(9.88)
VS	-0.004	-0.002	-0.001
	(1.42)	(1.17)	(1.13)
Adjusted R^2	0.8947	0.9044	0.9444
Number of Observations	1,055	688	367

Notes: This table shows the panel regression estimates of the equation:

$$lnTA_{it} = \mu_i + \delta_i t + \beta_1 lnPCI_{it} + \beta_2 lnPT_{it} + \beta_3 lnRER_{it} + \beta_4 lnTRC_{it} + \beta_5 VS_{it} + \epsilon_{it}$$

The figures in parentheses are the absolute values of t-statistics. ***, ** and * indicate the statistical significance at the 1, 5 and 10 percent level, respectively.

The panel unit root tests indicate all the variables are integrated of order one. The panel cointegrations tests show that all seven test statistics reject the null hypothesis of no cointegration at the 1% significance level, indicating that the five variables are cointegrated. All the coefficients have the expected signs and are statistically significant either at the 1% or 5% significance level. Given that the variables are expressed in natural logarithms, the coefficients can be interpreted as elasticity estimates. The results indicate that, for the full sample, a 1% increase in foreign income increases tourism arrivals by 1.27%; a 1% increase in tourism price decreases tourism arrivals by 0.01%; a 1% increase in real exchange rate decreases tourism arrivals by 0.01%; and a 1% increase in travel cost decreases tourism arrivals by 0.16%. The results suggest that tourism demand to the United States must be considered a luxury good. When the models are estimated to the 1986-2001 and 2002-2011 periods, two of the variables, i.e., tourism price and real exchange rate, become statistically insignificant though they still maintain the expected signs. The findings of the study could have been different if we had used a longer time period. Future research could concentrate in expanding the time period as well as the coverage of countries, or alternatively, could focus on a few selected countries for which more relevant and extensive data exist, for a longer time period. This could expose additional variables that determine tourist arrivals to the United States.

Appendix Table 1: List of Countries

Argentina	Costa Rica	Hong Kong	Nigeria	South Korea
Australia	Denmark	India	Norway	South Africa
Austria	Dominican Republic	Ireland	Panama	Spain
Bahamas	Ecuador	Israel	Peru	Sweden
Belgium	El Salvador	Italy	Philippines	Switzerland
Brazil	Finland	Jamaica	Poland	Taiwan
Canada	France	Japan	Portugal	Trinidad & Tobago
Chile	Germany	Mexico	Russia	Turkey
China, PRC	Guatemala	Netherlands	Saudi Arabia	United Kingdom
Colombia	Honduras	New Zealand	Singapore	Venezuela

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BIOGRAPHY

Dr. E. M. Ekanayake is an Associate Professor of Economics at Bethune-Cookman University, Daytona Beach, Florida, USA. He earned his Ph.D. in Economics at the Florida International University, Miami in 1996. He has many publications to his credit. Contact information: School of Business, Bethune-Cookman University, 640 Dr. Mary McLeod Bethune Blvd., Daytona Beach, FL 32114, USA. Phone: (386) 481-2819. E-mail: ekanayakee@cookman.edu.

Dr. Mihalis Halkides is an Associate Professor of Management and Entrepreneurship, School of Business at Bethune-Cookman University, Daytona Beach, Florida, USA. He earned his Ph.D. at the Florida State University. Contact information: School of Business, Bethune-Cookman University, 640 Dr. Mary McLeod Bethune Blvd., Daytona Beach, FL 32114, USA. Phone: (386) 481-2801. E-mail: halkidesm@cookman.edu.

John R. Ledgerwood is an Associate Professor of Accounting at Embry-Riddle Aeronautical University, Daytona Beach, Florida. He earned a Master of Science in Accounting from the University of Central Florida and is a Certified Public Accountant. He is a member of the Florida Institute of Certified Public Accountants, the Volusia Chapter of the Florida Institute of Certified Public Accountants, and the Institute of Management Accountants. Contact information: College of Business, Embry-Riddle Aeronautical University, 600 South Clyde Morris Blvd., Daytona Beach, FL 32114, USA. Phone: (386) 226-4965. E-mail: ledgerwj@erau.edu.