TOURISM DEVELOPMENT AND ECONOMIC GROWTH IN DEVELOPING COUNTRIES

E. M. Ekanayake, Bethune-Cookman University
Aubrey E. Long, Bethune-Cookman University

ABSTRACT

The objective of this study is to investigate the relationships between tourism development and economic growth in developing countries using the newly developed heterogeneous panel cointegration technique. This study examines the causal relationship between tourism development and economic growth using Granger causality tests in a multivariate model and using the annual data for the 1995–2009 period. The study finds no evidence to support the tourism-led growth hypothesis. The results of the FMOLS show that, though the elasticity of tourism revenue with respect to real GDP is not statistically significant for all regions, its positive sign indicates that tourism revenue makes a positive contribution to economic growth in developing countries. The results of the study suggest that governments of developing countries should focus on economic policies to promote tourism as a potential source of economic growth.

JEL: F43, L83, O40

KEYWORDS: Tourism, economic growth, panel cointegration, causality

INTRODUCTION

Tourism industry has emerged as one of the leading service industries in the global economy in recent decades. Economic flows generated by international tourism have become vital factors in economic growth and international economic relations in many developing countries. For example, according to the World Tourism Organization (2010), as a result of an ever increasing number of destinations opening up and investing in tourism development, modern tourism has become a key driver for socio-economic progress through the creation of jobs and enterprises, infrastructure development, and the export revenues earned. In addition, the contribution of tourism to worldwide economic activity is estimated at some 5% while its contribution to employment is estimated in the order of 6-7% of the overall number of direct and indirect jobs worldwide. According to the World Tourism Organization, between 1970 and 2009, there was a 48-fold increase in international tourism receipts rising from US$17.9 billion in 1970 to US$852 billion in 2009.

The importance of the tourism sector can further be understood based on recent statistics available from the World Travel & Tourism Council. According to the World Travel & Tourism Council's latest economic impact report (The World Travel & Tourism Council, 2011), the industry's direct contribution to global GDP increased by 3.3% in 2010 to US$1,770 billion and is expected to rise further by 4.5% to US$1,850 billion in 2011, creating an additional 3 million direct industry jobs. In addition, taking into account its wider economic impacts, travel and tourism's total economic contribution in 2011 is expected to account for US$5,987 billion or 9.1% of global GDP, and for 258 million jobs. The report also predicts that the direct contribution of travel and tourism to GDP is expected rise by 4.2% annually to US$2,860.5 billion (in constant 2011 prices) in 2021. In addition, the total contribution of travel and tourism to employment, including jobs indirectly supported by the industry, is forecast to be 258.6 million jobs (8.8% of total employment), visitor exports are expected to generate US$1,162.7 billion (5.8% of total exports), and total industry investment is estimated at US$652.4 billion or 4.5% of total investment in 2011.

Thus the tourism sector has become increasingly important industry to many developing countries as a source of revenue as well as a source of employment. Tourism generates a vital amount of foreign exchange earnings that contributes to the sustainable economic growth and development of developing countries. Given its increasing importance in the global economy, tourism sector has gained much attention in recent academic literature. According to Balaguer and Cantavella-Jorda (2002), international tourism would contribute to an income increase at least in two different ways as the export-led growth hypothesis postulates. First, enhancing efficiency through competition between local firms and the ones corresponding to other international tourist destinations, and second, facilitating the exploitation of economies of scale in local firms. The objective of this study is to investigate the relationships between tourism development and economic growth in developing countries. This study examines the causal relationship between tourism development and economic growth in developing countries in a multivariate model using the annual data for the 1995–2009 period.

The remainder of the paper is organized as follows: Section 2 provides a brief literature review. In Section 3, the empirical framework of the current study is set out by specifying model as well as the econometric methodology. Section 4 discusses the variable definitions and outlines the data sources. Empirical results of panel unit root tests, panel cointegration tests, and error-correction model estimates are presented in Section 5. The last section, Section 6 presents a summary and a brief conclusion as to the results obtained in this study.

REVIEW OF LITERATURE

There are a large number of studies done on tourism and economic growth. These studies can be grouped into two broad categories, namely, single-country studies and country-group studies. Due to the limitation of resources, this review is limited to some of the most recent studies. The empirical results from previous studies on the causal relationship between tourism expansion and economic growth are mostly mixed. For example, Kreishan (2010), Lee and Chang (2008), Kim, et al. (2006), Dritsakis (2004), Durbarry (2004), and Balaguer and Cantavella-Jorda (2002) find evidence supporting the tourism-led economic growth hypothesis. The economic-driven tourism growth hypothesis is supported in studies by Katircioglu (2009), Oh (2005), Narayan (2004), and Lanza et al. (2003). Although relatively few, the reciprocal hypothesis is still supported by, for example, Arslanturk, et al. (2011), Kim, et al. (2006) and Shan and Wilson (2001). The Granger causality test has been widely used in the literature in analyzing the relationship between tourism and economic growth. For a comprehensive survey of current literature on tourism demand and is impact on the economy, please see Song and Li (2008) and Li, Song, and Witt (2005).

A recent study by Schubert, Brida, and Risso (2011) examines the impacts on economic growth of a small tourism-driven economy caused by an increase in the growth rate of international tourism demand. The study uses annual data of Antigua and Barbuda from 1970 to 2008. The model shows that an increase in the growth of tourism demand leads to transitional dynamics with gradually increasing economic growth and increasing terms of trade. The authors perform a cointegration analysis to look for the existence of a long-run relationship among variables of economic growth, international tourism earnings and the real exchange rate. The exercise confirms the theoretical findings.

Arslanturk, Balcilar, and Ozdemir (2011) investigates the causal link between tourism receipts and GDP in Turkey for the period 1963-2006. The study uses the rolling window and time-varying coefficients estimation methods to analyze the Granger causality based on Vector Error Correction Model (VECM). The findings of the paper indicate that there is no Granger causality between the series, while the findings from the time-varying coefficients model based on the state-space model and rolling window technique show that GDP has no predictive power for tourism receipts. However, tourism receipts have a positive–predictive content for GDP following early 1980s.

A study by Kreishan (2010) examines the causality relations between tourism earnings and economic growth for Jordan, using annual data covering the period 1970-2009. The findings of the study showed that there is a positive relationship between tourism development and economic development in the long-run. Moreover, the Granger causality test results revealed the presence of unidirectional causality from tourism earnings to economic growth. In a similar study, Zortuk (2009) focuses on investigating the contribution of tourism sector to economic growth in Turkey. The data pertaining to 1990Q1 and 2008Q3 periods were used in the study and the relationship between the expansion in tourism and economic growth was investigated using granger causality test based on vector error-correction model and finds evidence for unidirectional causality from tourism development to economic development exists between the two variables.

Katircioglu (2009) employs the bounds test for cointegration and Granger causality tests to investigate a long-run equilibrium relationship between tourism, trade and real income growth, and the direction of causality among themselves for Cyprus. Data used in the study are annual figures covering the period 1960–2005. The results of the study reveal that tourism, trade and real income growth are cointegrated; thus, a long-run equilibrium relationship can be inferred between these three variables. In addition, Granger causality test results suggest that real income growth stimulates growth in international trade (both exports and imports) and international tourist arrivals to the island.

A study by Lee and Chang (2008) applies the new heterogeneous panel cointegration technique to re-investigate the long-run comovements and causal relationships between tourism development and economic growth for OECD and non-OECD countries (including those in Asia, Latin America and Sub-Sahara Africa) for the 1990–2002 period. The study finds that tourism development has a greater impact on GDP in non-OECD countries than in OECD countries, and when the variable is tourism receipts, the greatest impact is in Sub-Sahara African countries. Additionally, in the long run, the panel causality test shows unidirectional causality relationships from tourism development to economic growth in OECD countries, bidirectional relationships in non-OECD countries, but only weak relationships in Asia.

Sequeira and Nunes (2008) use panel data methods to study the relationship between tourism and economic growth. The study uses annual data for a group of countries covering the period 1980-2002 and shows that tourism is a positive determinant of economic growth both in a broad sample of countries and in a sample of poor countries. However, contrary to previous contributions, tourism is not more relevant in small countries than in a general sample.

Employing the Engle and Granger two-stage approach and a bivariate VAR model of real aggregate tourism receipts and real GDP, Oh (2005) investigates the causal relations between tourism growth and economic expansion for the Korean economy. Using quarterly data from 1975Q1 to 2001Q1, the results of cointegration test indicate that there is no long-run equilibrium relationship between these two series. In addition, the results of Granger causality test imply the existence of a one-way causal relationship in terms of economic-driven tourism growth. The hypothesis of tourism-led economic growth, therefore, is not held in the Korean economy.

Balaguer and Cantavella-Jorda (2002) use a trivariate model of real GDP, real international tourism earnings, and the real effective exchange rate to examine the role of tourism in the Spanish long-run economic development and confirms the tourism-led growth hypothesis through cointegration and causality testing. The study uses quarterly data for the period 1975Q1-1997Q4 and finds that economic growth in Spain has been sensible to persistent expansion of international tourism. Their results for the Granger causality test indicate that tourism affects Spain’s economic growth unidirectionally and thus supports the tourism-led growth hypothesis.

As pointed out by Po and Huang (2008), since the relationship between tourism and economic growth is inherently a long-term one, a biased estimate may be the result of an insufficiently large sample size in the time series, the existence of structural changes, or short-term economic fluctuations. To tackle the insufficient sample size problem, researchers have started to use panel data. In this article we employ recently developed panel data techniques and closely follow empirical growth literature to test the influence of tourism development on economic growth in a broad panel data. Our panel data set includes 140 developing countries and 15 years covering the period from 1995 to 2009.

METHODOLOGY

Model Specification

This section discusses the model specifications to examine the relationship between tourism development and economic growth. The model is derived, in conventional manner, from a production function in which tourism receipts is introduced as an input in addition to labor and domestic capital.

In the usual notation the production function can be written as follows:

$$Y = f(L, K, TR) \qquad (1)$$

where Y is the real gross domestic product (GDP) in constant 2000 dollars, L is the labor force in millions, K is the real gross fixed capital formation (K) in constant 2000 U.S. dollars, and TR is the real tourism receipts in constant 2000 dollars.

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:

$$\ln Y_{it} = \alpha_i + \delta_i t + \beta_{1i} \ln L_{it} + \beta_{2i} \ln K_{it} + \beta_{3i} \ln TR_{it} + \varepsilon_{it} \qquad (2)$$

where 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 140 countries and covers 15 years from 1995 to 2009. According to economic theory, the expected signs of the coefficients β_1 and β_2 are positive. If tourism is expected to contribute to economic growth, the expected sign of β_3 is positive. The parameters α_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:

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

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:

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

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:

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

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. Following Pedroni (1999, 2004), the heterogeneous panel and heterogeneous group mean panel of rho (ρ), parametric (ADF), and nonparametric (PP) statistics are calculated as follows:

Panel ν - statistic:

$$Z_{\nu} = \left(\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \, \hat{e}_{it-1}^{2} \right)^{-1} \tag{6a}$$

Panel ρ - statistic:

$$Z_{\rho} = \left(\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \, \hat{e}_{it-1}^{2} \right)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \, (\hat{e}_{it-1} \, \Delta\hat{e}_{it} - \hat{\lambda}_i) \tag{6b}$$

Panel *ADF* - statistic:

$$Z_t = \left(\tilde{s}_{NT}^{*2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \; \hat{e}*_{it-1}^{2} \right)^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \; \hat{e}_{it-1}^{*} \; \Delta \hat{e}_{it}^{*} \tag{6c}$$

Panel *PP* - statistic:

$$Z_{pp} = \left(\tilde{\sigma}_{NT}^{2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \; \hat{e}_{it-1}^{2} \right)^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \; (\hat{e}_{it-1} \; \Delta \hat{e}_{it} - \hat{\lambda}_i) \tag{6d}$$

Group ρ - statistic:

$$\tilde{Z}_{\rho} = \sum_{i=1}^{N} \left(\sum_{i=1}^{T} \hat{e}_{it-1}^{2} \right)^{-1} \sum_{i=1}^{T} (\hat{e}_{it-1} \; \Delta \hat{e}_{it} - \hat{\lambda}_i) \tag{6e}$$

Group *ADF* - statistic:

$$\tilde{Z}_t = \sum_{i=1}^{N} \left(\sum_{i=1}^{T} \bar{s}_i^{*2} \; \hat{e}_{it-1}^{*2} \right)^{-\frac{1}{2}} \sum_{i=1}^{T} \hat{e}_{it-1}^{*} \; \Delta \hat{e}_{it}^{*} \tag{6f}$$

Panel *PP* - statistic:

$$\tilde{Z}_{pp} = \sum_{i=1}^{N} \left(\sum_{i=1}^{T} \hat{\sigma}_i^{2} \; \hat{e}_{it-1}^{2} \right)^{-\frac{1}{2}} \sum_{i=1}^{T} (\hat{e}_{it-1} \; \Delta \hat{e}_{it-1} - \hat{\lambda}_i) \tag{6g}$$

where

$$\hat{\lambda}_i = \frac{1}{T} \sum_{j=1}^{k_i} \left(1 - \frac{j}{k_i + 1} \right) \sum_{t=j+1}^{T} \hat{\mu}_{it} \hat{\mu}_{i,t-j} \; ; \; \hat{s}_i^2 = \frac{1}{T} \sum_{t=1}^{T} \mu_{it}^2 \; ; \; \hat{\sigma}_i^2 = \hat{s}_i^2 + 2\hat{\lambda}_i \; ; \; \tilde{\sigma}_{NT}^2 = \frac{1}{N} \sum_{i=1}^{N} \hat{L}_{11i}^{-2} \hat{\sigma}_i^2 \; ; \; \hat{s}_i^{*2} = \frac{1}{T} \sum_{t=1}^{T} \hat{\mu}_{it}^{*2} \; ;$$

$$\tilde{s}_{NT}^{*2} = \frac{1}{T} \sum_{i=1}^{N} \hat{s}_i^{*2} \; ; \text{and } \hat{L}_{11i}^{2} = \frac{1}{T} \sum_{t=1}^{T} \hat{\eta}_{it}^2 + \frac{2}{T} \sum_{j=1}^{k_i} \left(1 - \frac{j}{k_i + 1} \right) \sum_{t=j+1}^{T} \hat{\eta}_{it} \hat{\eta}_{i,t-j} \; .$$

The error terms $\hat{\mu}_{i,t}$, $\hat{\mu}_{i,t}^{*}$, and $\hat{\eta}_{i,t}$ are respectively derived from the following auxiliary regressions: $\hat{\varepsilon}_{it} = \hat{\rho}_i \hat{\varepsilon}_{i,t-1} + \hat{\mu}_{it}$; $\hat{\varepsilon}_{it} = \hat{\rho}_i \hat{\varepsilon}_{i,t-1} + \sum_{j=1}^{k_i} \hat{\rho}_{ik} \Delta \hat{\varepsilon}_{i,t-j} + \hat{\mu}_{it}$; and $\Delta y_{it} = \sum_{m=1}^{M} \hat{\gamma}_{mi} \Delta x_{mit} + \hat{\eta}_{it}$.

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

Annual data from 1995 to 2009 were obtained from the *World Bank Development Indicators* database for 140 developing countries. Additional information is collected from the United Nations Conference on Trade and Development (UNCTAD) database at http://unctadstat.unctad.org. The list of the countries is presented in the Appendix. The data is compiled within a panel data framework in light of the relatively short time span of the data. The multivariate framework includes the real GDP in constant 2000 U.S. dollars, the real gross fixed capital formation in constant 2000 U.S. dollars, the labor force in millions, and the real international tourism receipts in constant 2000 U.S. dollars. The real gross fixed capital formation in constant 2000 U.S. dollars series was calculated in two steps: First, since the information on gross fixed capital formation was given as a share of GDP, nominal gross fixed capital formation was calculated by multiplying the gross fixed capital formation to GDP share by nominal GDP. Second, the nominal gross fixed capital formation series was deflated by the GDP deflator (2000 = 100) to derive the real gross fixed capital formation in constant 2000 U.S. dollars. The real international tourism receipts in constant 2000 U.S. dollars was derived by deflating the nominal international tourism receipts by the GDP deflator.

EMPIRICAL RESULTS

Panel Unit Root Tests

The starting point of our econometric analysis is to check whether the variables included in Equation (1) contain panel unit roots. In other words, in Equation (1), we need to check whether [Y, L, K, TR] contains a unit root. While there are several panel unit root tests are available, this study uses the IPS unit root tests. In order to compare the results for different regions, the total sample was sub-divided into six regions, namely, East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, and Sub-Saharan Africa. The regions were defined using the classifications used by the World Bank. Table 1 shows the summary statistics of the main variables for each of the six regions. Table 2 reports the results of these panel unit root tests which include individual effects. The panel unit root tests indicate all the variables are integrated of order one.

Panel Cointegration Tests

With the respective variables integrated of order one, the heterogeneous panel cointegration test advanced by Pedroni (1999, 2004), which allows for cross-section interdependence with different individual effects, is performed and the results are presented in Table 3. Though the panel cointegrations tests were performed for all six regions and for all countries, only the results for the full sample are presented in Table 3. The results for both within and between dimension panel cointegration test statistics are given in the table. All seven test statistics reject the null hypothesis of no cointegration at the 1% significance level, indicating that the four variable are cointegrated.

After having found consistent evidence of cointegration, the fully modified OLS (FMOLS) technique for heterogeneous cointegrated panels is estimated, following Pedroni (2000). The results of the FMOLS are presented in Table 3. All the coefficients are positive and statistically significant either at the 1% or at 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 real tourism revenue increases real GDP by 0.04%; a 1% increase in real gross fixed capital formation increases real GDP by 0.87%; and a 1% increase in the labor force increases real GDP by 0.09%. When we compare the six regions selected, the elasticity of tourism revenue with respect to real GDP ranges from high of 0.1383 for Latin America and the Caribbean to 0.0048 for Middle East and North Africa.

Table 1: Basic Summary Statistics

	East Asia and Pacific				**Europe and Central Asia**			
	Ln(L)	**Ln(K)**	**Ln(Y)**	**Ln(TR)**	**Ln(L)**	**Ln(K)**	**Ln(Y)**	**Ln(TR)**
Mean	1.8356	6.6320	8.3817	5.8425	0.4116	6.4170	7.8295	4.2990
Median	1.8500	6.6412	8.3491	6.0719	0.4066	6.2420	7.7713	4.3925
Maximum	2.0515	7.3420	8.9116	6.8484	0.4805	7.5584	8.4546	5.2242
Minimum	1.5952	5.8763	7.8619	4.0201	0.3605	5.6144	7.3059	2.7851
Std. Deviation	0.1434	0.4943	0.3577	0.9390	0.0422	0.6629	0.3894	0.8096
Skewness	-0.1805	-0.0925	0.0901	-0.6698	0.2552	0.4052	0.2240	-0.5023
Kurtosis	1.7480	1.7120	1.6310	2.0101	1.5338	1.6300	1.5637	1.9962
Jarque-Bera	24.4043	24.3398	27.4065	39.8792	34.6470	36.4200	32.5405	28.9939
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sum	633.2838	2288.0350	2891.6940	2015.6510	142.0058	2213.8560	2701.1820	1483.1610
Sum Sq. Dev.	7.0710	84.0666	44.0124	303.3082	0.6119	151.1468	52.1686	225.5002
Observations	345	345	345	345	345	345	345	345
	Latin America and the Caribbean				**Middle East and North America**			
	Ln(L)	**Ln(K)**	**Ln(Y)**	**Ln(TR)**	**Ln(L)**	**Ln(K)**	**Ln(Y)**	**Ln(TR)**
Mean	-3.3630	5.9529	6.6062	5.6585	2.4689	9.7950	11.0054	4.5209
Median	-3.3688	5.8790	6.5454	5.6651	2.4838	9.8177	10.9829	4.6406
Maximum	-3.2475	6.7168	6.9505	5.7835	2.7096	10.3599	11.2471	5.1851
Minimum	-3.4699	5.2080	6.2874	5.5805	2.1931	9.3143	10.7572	3.3578
Std. Deviation	0.0712	0.4673	0.2060	0.0510	0.1574	0.2874	0.1627	0.5100
Skewness	0.1441	0.2159	0.3143	0.4848	-0.1826	0.1883	0.0384	-1.1019
Kurtosis	1.7158	1.9149	1.8749	3.3347	1.8511	2.0854	1.5655	3.1051
Jarque-Bera	40.0617	31.5418	38.4080	24.3312	14.5332	9.7834	20.6375	48.6787
Probability	0.0000	0.0000	0.0000	0.0000	0.0007	0.0075	0.0000	0.0000
Sum	866.4771	3303.8841	3666.4652	3140.4772	592.5454	2350.7912	2641.2893	1085.0181
Sum Sq. Dev.	2.8115	120.9587	23.4993	1.4407	5.9200	19.7444	6.3301	62.1558
Observations	555	555	555	555	240	240	240	240
	South Asia				Sub-Saharan Africa			
	Ln(L)	Ln(K)	Ln(Y)	Ln(TR)	Ln(L)	Ln(K)	Ln(Y)	Ln(TR)
Mean	4.1963	9.3556	10.8352	4.0492	1.8972	7.6105	9.3934	4.1371
Median	4.1968	9.3561	10.8194	4.0951	1.8944	7.6875	9.2863	3.9183
Maximum	4.3647	9.8172	11.2289	4.4308	2.1102	8.2716	10.1052	5.4883
Minimum	4.0293	8.8164	10.4709	3.1480	1.6906	7.0293	8.8222	3.2939
Std. Deviation	0.1065	0.3082	0.2363	0.3629	0.1318	0.4096	0.4072	0.6456
Skewness	0.0063	-0.1688	0.1107	-1.0963	0.0338	0.0556	0.5826	0.9606
Kurtosis	1.7026	1.8635	1.8109	3.5082	1.7296	1.5878	1.9800	2.7250
Jarque-Bera	6.3132	5.2711	5.4862	18.9960	34.3931	42.6408	50.9538	80.0462
Probability	0.0426	0.0717	0.0644	0.0001	0.0000	0.0000	0.0000	0.0000
Sum	377.6627	842.0002	975.1680	364.4290	967.5477	3881.3500	4790.6410	2109.9460
Sum Sq. Dev.	1.0090	8.4563	4.9690	11.7210	8.8434	85.3865	84.3957	212.1824
Observations	90	90	90	90	510	510	510	510

Note: This table shows the summary statistics of the main variables for each of the six regions.

Though the elasticity of tourism revenue with respect to real GDP is not statistically significant for all regions, its positive sign indicates that tourism revenue makes a positive contribution to economic growth in developing countries.

Table 2: Panel Unit Root Tests Results

Variable	Level	First Difference
All Countries		
Real GDP (Y)	-0.354	-2.646***
Labor Force (L)	-0.352	-2.581***
Real Capital Stock (K)	-2.015	-4.001***
Real Tourism Receipts (TR)	-2.127	-2.727***
East Asia and the Pacific		
Real GDP (Y)	-0.936	-3.214***
Labor Force (L)	-1.124	-2.475***
Real Capital Stock (K)	-0.559	-4.839***
Real Tourism Receipts (TR)	-1.564	-2.809***
Europe and Central Asia		
Real GDP (Y)	-0.645	-2.648***
Labor Force (L)	-0.055	-8.371***
Real Capital Stock (K)	-0.969	-3.127***
Real Tourism Receipts (TR)	-0.215	-4.485***
Latin America and the Caribbean		
Real GDP (Y)	-0.043	-2.499***
Labor Force (L)	-0.895	-9.062***
Real Capital Stock (K)	-0.211	-3.719***
Real Tourism Receipts (TR)	-0.321	-7.787***
Middle East and North Africa		
Real GDP (Y)	-0.191	-2.276***
Labor Force (L)	-0.119	-2.715***
Real Capital Stock (K)	-0.245	-8.627***
Real Tourism Receipts (TR)	-0.790	-5.851***
South Asia		
Real GDP (Y)	-0.784	-5.981***
Labor Force (L)	-1.308	-2.854***
Real Capital Stock (K)	-0.203	-2.651***
Real Tourism Receipts (TR)	-1.114	-3.222***
Sub-Saharan Africa		
Real GDP (Y)	-1.378	-2.604***
Labor Force (L)	-0.839	-2.617***
Real Capital Stock (K)	-0.203	-2.462***
Real Tourism Receipts (TR)	-0.113	-6.850***

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

Table 3: Heterogeneous Panel Cointegration Test Results (Full Sample)

Panel cointegration statistics (within-dimension)	**Test Statistic**
Panel ν-statistic	10.071 (0.000)***
Panel ρ-statistic	-7.621 (0.000)***
Panel *t*-statistic	-10.132 (0.000)***
Panel *t*-statistic	-5.110 (0.000)***
Panel cointegration statistics (within-dimension)	
Group PP type ρ-statistic	-3.789 (0.000)***
Group PP type *t*-statistic	-10.452 (0.000)***
Group ADF type *t*-statistic	-3.143 (0.000)***

*Notes: 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.*

Granger Causality Tests

The procedures described above are only able to indicate whether or not the variables are cointegrated and a long-run relationship exists between them. To test for panel causality, a panel vector error correction model (VECM) proposed by Pesaran et al. (1999) is estimated to perform Granger-causality tests.

Table 4: Panel FMOLS Long-Run Estimates

Region	Constant	ln (L)	ln (K)	ln (TR)	Adjusted R^2
All Countries	2.1741***	0.0918***	0.8756***	0.0361**	0.9722
	(8.995)	(6.410)	(9.505)	(2.367)	
East Asia and the	2.2716***	0.0436	0.8865***	0.0107	0.9828
Pacific	(9.611)	(1.269)	(8.730)	(1.293)	
Europe and Central	2.4246***	0.1388***	0.7847***	0.0998***	0.9717
Asia	(7.573)	(4.999)	(9.928)	(3.906)	
Latin America and	2.3124***	0.2009***	0.7761***	0.1383**	0.9842
the Caribbean	(9.815)	(6.306)	(8.047)	(4.177)	
Middle East and	1.8425***	0.0744**	0.9725***	0.0048	0.9221
North Africa	(5.517)	(2.169)	(9.901)	(1.021)	
South Asia	2.5577***	0.2409***	0.7301***	0.0857***	0.9919
	(5.538)	(4.283)	(9.208)	(2.629)	
Sub-Saharan Africa	2.6329***	0.1400***	0.8136***	0.0229	0.9334
	(8.264)	(4.979)	(8.695)	(1.345)	

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

The Engle and Granger (1987) two-step procedure is undertaken by first estimating the long-run model specified in Eq. (2) in order to obtain the estimated residuals. Next, defining the lagged residuals from Eq. (2) as the error correction term, the following dynamic error correction model is estimated:

$$\Delta Y_{it} = \alpha_{1i} + \sum_{j=1}^{p} \theta_{11ij} \Delta Y_{it-j} + \sum_{j=1}^{p} \theta_{12ij} \Delta L_{it-j} + \sum_{j=1}^{p} \theta_{13ij} \Delta K_{it-j} + \sum_{j=1}^{p} \theta_{14ij} \Delta TR_{it-j} + \lambda_{1i}\varepsilon_{it-1} + u_{1it} \tag{7a}$$

$$\Delta L_{it} = \alpha_{2i} + \sum_{j=1}^{p} \theta_{21ij} \Delta Y_{it-j} + \sum_{j=1}^{p} \theta_{22ij} \Delta L_{it-j} + \sum_{j=1}^{p} \theta_{23ij} \Delta K_{it-j} + \sum_{j=1}^{p} \theta_{24ij} \Delta TR_{it-j} + \lambda_{2i}\varepsilon_{it-1} + u_{2it} \tag{7b}$$

$$\Delta K_{it} = \alpha_{3i} + \sum_{j=1}^{p} \theta_{31ij} \Delta Y_{it-j} + \sum_{j=1}^{p} \theta_{32ij} \Delta L_{it-j} + \sum_{j=1}^{p} \theta_{33ij} \Delta K_{it-j} + \sum_{j=1}^{p} \theta_{34ij} \Delta TR_{it-j} + \lambda_{3i}\varepsilon_{it-1} + u_{3it} \tag{7c}$$

$$\Delta TR_{it} = \alpha_{4i} + \sum_{j=1}^{p} \theta_{41ij} \Delta Y_{it-j} + \sum_{j=1}^{p} \theta_{42ij} \Delta L_{it-j} + \sum_{j=1}^{p} \theta_{43ij} \Delta K_{it-j} + \sum_{j=1}^{p} \theta_{44ij} \Delta TR_{it-j} + \lambda_{4i}\varepsilon_{it-1} + u_{4it} \tag{7d}$$

where Δ is the first-difference operator, p is the lag length set at two based on likelihood ratio tests, ε_{it} are the residuals of the individual FMOLS long-run relations in Table 4, and u is the serially uncorrelated error term. Based on the above four equations, short-run causality is determined by the statistical significance of the partial F-statistics associated with the corresponding right hand side variables. Long-run causality is revealed by the statistical significance of the respective error correction terms using a t-test.

The empirical results of the panel Granger causality tests are presented in Table 5. In the long run, we observe there is no Granger causality relationship between Y and L, K and TR, as the coefficient of the error correction term (ECT) in the equation with Y as dependent variable is not statistically significant. Similar to the long-run, in the short run, there is no significant causal relationship between Y and L, K, and R, based on the Chi-square statistics of the coefficients of the three variables. In regard to relationship between TR and the three variables, Y, L, and K, we find a similar absence of long run causality running from the latter three to TR. However, we note in the short run the causality runs only from Y to TR and K to TR, where there is no such short-run causality linkage running from L to TR. The results for the individual regions show no evidence of causality either in the long-run or in the short-run.

SUMMARY AND CONCLUSIONS

The objective of this study is to investigate the relationships between tourism development and economic growth in developing countries using the newly developed heterogeneous panel cointegration technique. This study examines the causal relationship between tourism development and economic growth using Granger causality tests in a multivariate model and using the annual data for the 1995–2009 period. The study uses a sample of 140 developing countries. The sample of countries were grouped into six major regions following the classification used by the World Bank, in order to compare any differences of findings between regions. The multivariate framework includes the real GDP in constant 2000 U.S. dollars, the real gross fixed capital formation in constant 2000 U.S. dollars, the labor force in millions, and the real international tourism receipts in constant 2000 U.S. dollars.

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 four variable are cointegrated. The results of the FMOLS show that, though the elasticity of tourism revenue with respect to real GDP is not statistically significant for all regions, its positive sign indicates that tourism revenue makes a positive contribution to economic growth in developing countries. The results of the study suggest that governments of developing countries should focus on economic policies to promote tourism as a potential source of economic growth. The study finds no evidence to support the tourism-led growth hypothesis.

Table 5: Panel Granger Causality Test Results

	Dep. Var.	Sources of causation (Independent variables) - Short-run ΔY	ΔL	ΔK	ΔTR	Long-run ECT
All Countries	ΔY	-	0.407 (0.815)	4.169 (0.124)	0.427 (0.807)	-0.0816 (0.134)
	ΔTR	7.428 (0.024)	0.896 (0.638)	11.863 (0.002)	-	-0.0675 (0.263)
East Asia and Pacific	ΔY	-	0.125 (0.939)	4.074 (0.130)	0.303 (0.859)	-0.2718 (0.200)
	ΔTR	1.341 (0.511)	0.091 (0.955)	2.835 (0.242)	-	-0.2662 (0.202)
Europe and C. Asia	ΔY	-	0.200 (0.904)	0.105 (0.948)	0.252 (0.881)	-0.2108 (0.164)
	ΔTR	0.509 (0.775)	1.546 (0.461)	4.757 (0.092)	-	-0.0856 (0.699)
Latin Amer. & Caribbean	ΔY	-	0.241 (0.886)	0.606 (0.738)	0.780 (0.677)	-0.1476 (0.358)
	ΔTR	4.090 (0.129)	2.077 (0.354)	1.560 (0.458)	-	-0.0536 (0.583)
Middle East & N. Africa	ΔY	-	0.038 (0.982)	0.794 (0.672)	0.150 (0.928)	-0.1650 (0.195)
	ΔTR	0.191 (0.909)	0.077 (0.961)	0.070 (0.965)	-	-0.0564 (0.795)
South Asia	ΔY	-	0.071 (0.965)	2.273 (0.320)	0.665 (0.717)	-0.1302 (0.835)
	ΔTR	0.730 (0.694)	0.051 (0.975)	1.053 (0.590)	-	-0.1090 (0.768)
Sub-Saharan Africa	ΔY	-	0.229 (0.891)	1.409 (0.494)	0.912 (0.822)	-0.0098 (0.898)
	ΔTR	0.964 (0.810)	0.161 (0.922)	2.063 (0.356)	-	-0.0389 (0.727)

Notes: The figures in the parentheses are the probability of rejection of Granger non-causality. Estimates are based on the panel data for the period 1995-2009.

Tough the results of the study finds no evidence to support the tourism-led growth hypothesis, it is worth noting that establishing the relationship between tourism and economic growth is essential concerning the importance that policy makers are attributing to this sector and the rates at which it is growing. 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 focusing on few selected countries which has relevant data for a longer time period. This would help us uncover the real impact on economic growth in developing countries.

REFERENCES

Arslanturk, Y., Balcilar, M. and Ozdemir, Z. A. (2011). Time-varying linkages between tourism receipts and economic growth in a small open economy. *Economic Modelling*, 28(2), 664-671.

Balaguer, J. and Cantavella-Jorda, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. *Applied Economics*, 34, 877–884.

Dritsakis, N. (2004). Tourism as a long-run economic growth factor: An empirical investigation for Greece using a causality analysis. *Tourism Economics*, 10, 305–316.

Durbarry, R. (2004). Tourism and economic growth: The case of Mauritius. *Tourism Economics*, 10, 389–401.

Engle, R. F. and Granger, C. W. J. (1987). Cointegration and error correction: Representation, estimation, and testing. *Econometrica*, 2, 251–276.

Im, K. S., Pesaran, M. H., and Shin, Y. (2003). Testing for unit roots in heterogenous panel. *Journal of Econometrics*, 115, 53–74.

Katircioglu, S. T. (2009). Revisiting the tourism-led-growth hypothesis for Turkey using the bounds test and Johansen approach for cointegration. *Tourism Management*, 30, 17–20.

Kim, H. J., Chen, M. H., and Jang, S. C. (2006). Tourism expansion and economic development: The case of Taiwan. *Tourism Management*, 27(5), 925–933.

Kreishan, F. M. M. (2010). Tourism and Economic Growth: The Case of Jordan, *European Journal of Social Sciences*, 15 (2), 229-234.

Lanza, A., Templec, P., and Urgad, G. (2003). The implications of tourism specialization in the long-run: An econometric analysis for 13 OECD economies. *Tourism Management*, 24, 315–321.

Lee, C. C. and Chang, C. P. (2008). Tourism development and economic growth: A closer look at panels, *Tourism Management*, 29, 180–192.

Levin, A. and Lin, C. F. (1993). Unit root tests in panel data: asymptotic and finite-sample properties. Unpublished manuscript, University of California, San Diego.

Levin, A., Lin, C. F., and Chu, C. S. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24.

Li, G., Song, H., and Witt, S. F. (2005). Recent developments in econometric modeling and forecasting. *Journal of Travel Research*, 44, 82–99.

Narayan, P. K. (2004). Economic impact of tourism on Fiji's economy: Empirical evidence from the computable general equilibrium model. Tourism Economics, 10, 419–433.

Oh, C. O. (2005). The contribution of tourism development to economic growth in the Korean economy. *Tourism Management*, 26, 39–44.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61, 653–670.

Pedroni, P. (2000). Full modified OLS for heterogeneous cointegrated panels. In *Advances in Econometrics: Vol. 15. Nonstationary panels, panel cointegration and dynamic panels*, 93–130. JAI Press.

Pedroni, P. (2004). Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric Theory*, 20(3), 597–625.

Po, W-C. and Huang, B-N. (2008). Tourism development and economic growth – a nonlinear approach. *Physica A*, 387, 5535–5542.

Vanegas, M. and Croes, R. R. (2003). Growth, development and tourism in a small economy: Evidence from Aruba. *International Journal of Tourism Research*, 5, 315–330.

Schubert, S. F., Brida, J. G. and Risso, W. A. (2011). The impacts of international tourism demand on economic growth of small economies dependent on tourism. *Tourism Management*, 32, 377-385.

Shan, J. and Wilson, K. (2001). Causality between trade and tourism: empirical evidence from China. *Applied Economics Letters*, 8, 279–283.

Song, H. and Li, G. (2008). Tourism demand modelling and forecasting - A review of recent research. *Tourism Management*, 29, 203–220.

The United Nations Conference on Trade and Development database at http://unctadstat.unctad.org.

The World Tourism Organization (2010), *Tourism Highlights*, 2010 Edition.

The World Travel & Tourism Council (2011), *Travel & Tourism Economic Impact 2011*.

WTO. (2010). *Yearbook of tourism statistics*. Madrid: World Tourism Organization.

WTTC. (2011). *Annual reports, progress and priorities 2009-10*. The World Travel and Tourism Council.

Zortuk, M. (2009). Economic impact of tourism on Turkey's economy: evidence from cointegration tests. *International Research Journal of Finance and Economics*, 25, 231-239.

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. Aubrey E. Long is a Professor and the Dean, School of Business at Bethune-Cookman University, Daytona Beach, Florida, USA. He earned his Ph.D. at the Ohio 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: longa@cookman.edu.