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RELATIONSHIP BETWEEN TOURISM AND ECONOMIC GROWTH: A PANEL GRANGER CAUSALITY APPROACH

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ABSTRACT

This paper investigated the causal relationship between tourism revenue and gross domestic product (GDP) using the panel data of 135 countries for the period 1995–2008. For this purpose, Panel Granger causality analysis was applied to 11 groups of countries. This classification was created as America (30 countries), Asia (34 countries), Europe (37 countries), East Asia (13 countries), South Asia (6 countries), Central Asia (5 countries), Latin America & Caribbean (28 countries), Oceania (7 countries), Middle East & North Africa (11 countries), Sub Saharan Africa (24 countries) and the world (135 countries). Results indicated bidirectional causality in Europe between tourism revenue (TR) and gross domestic product (GDP). Findings showed that there is a unidirectional causality in America, Latin America & Caribbean and World from GDP to tourism revenue. While in case of East Asia, South Asia and Oceania the reverse direction of causality was found from tourism revenue to GDP. No causal relationship was found in Asia, Middle East and North Africa, Central Asia and Sub Saharan Africa.

Key Words: Tourism Income, Economic Growth, Panel Unit Root, Panel Causality
Journal of Economic Literature (JEL) Classification Number: C23, L83, O40, O57

INTRODUCTION

Tourism is an important sector in the world economy. Because the millions of tourists travel to the different areas, international tourist arrivals affect the income level of countries. In this paper, it is purposed to investigate the relationship between Tourism and Gross domestic product (GDP) by

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Panel Granger Causality Analysis.Large number of research papers has been devoted to study relationship between tourism and economic growth. There is a broad conclusion about positive impact of tourism on growth derived both from researches on a single country case and studies based on large number of countries. For instance, Balaguer and Cantavella-Jord´a (2002) for Spain; Gunduz and Hatemi-J.(2005) for Turkey; Katircioglu (2009) for Cyprus; Dritsakis (2004) for Greece; Oh (2005) for South Korea; Durbarry (2004) for Mauritis; Kim et al. (2006) and Lee and Chien (2008) for Taiwan; Mishra et al. (2011) for India; Brida et al. (2008) for Mexica. Some studies with panel data along with the conclusion about existence of relationship between tourism and economic growth, state about different directions of the causality and conditionality of this relationship on other factors.

Eugenio-Martin, Morales and Scarpa (2004) using the data on 21 Latin American countries for 1985-1998 years investigate the relationship between tourism and economic growth. Employing Arellano-Bond GMM dynamic panel data estimator they show that tourism has significant positive impact on economic growth performance of Latin American countries. However, further division of this sample into high, medium and low income groups demonstrates high significance of tourism for growth of low and medium income countries. Application of Generalized Leas Squares AR (1) panel data model to explain foreign tourist arrivals confirms the positive relationship between tourism and economic growth. Although for low income countries increase in the number of tourist arrivals depend on the infrastructure, education and safety level in a country.

Lee and Chang (2008) apply heterogeneous panel co-integration technique to research causal relationship between tourism and economic growth for two samples: OECD and non OECD countries. They indicate that in both samples there is panel co-integration between tourism development and GDP. Although, tourism development has greater impact on GDP in non OECD countries. In the long run unidirectional causality relationships from tourism development to economic growth in case of OECD countries is found, while in the sample of non OECD countries bidirectional relationship is indicated.

Cortes-Jimenez (2007) using the data of Spain and Italy regions studies the effect of domestic and international tourism on the regional economic growth. Results of study show that in general tourism is important for regional economic growth. However, importance of domestic and international tourism may vary depending on geographical locations and climatological conditions.

De Mello-Sampayo and De Sousa-Vale (2010) find panel co-integration relation between tourism and economic growth in European countries and indicate that tourism has higher impact on GDP in case of South and North European countries.

Sequeire and Nunes (2008) use the System – GMM and the Corrected LSDV to broad sample, that included 91 countries, and to the sample of small countries and poor countries. Empirical

estimation for broad sample supports the general conclusion on the importance of tourism for economic growth, while its significance in case of small countries is not confirmed.

Chang, Khamkaev and McAleer (2010) use larger panel data that include 159 countries over period 1989-2008. Panel threshold model shows positive relationship between economic growth and tourism. However, instrumental variable estimation of the model indicates that tourism has higher impact on economic growth in countries with lower level of trade openness and investment.

Findings of these studies show that although causal relationship between tourism and economic growth is generally supported, the strength and direction of relationship changes over country groups and conditionality on other possible determinants exists. Based on these evidences this study aims to investigate causal relationship between tourism and economic growth using the panel data for 135 countries for 1995-2008 years, which are grouped into eleven groups.

The remainder of this paper is structured as follows: next two sections describe estimation methodology and data, Section 4 presents results and Section 5 concludes.

METHODOLOGY

The panel causal relationship between tourism revenue and GDP will be examined by a three-stage Panel Granger analysis. The test suggests a three-stage procedure which shows the direction of the relationship between the variables. In the first stage, the panel unit root is investigated for variables. In the second stage panel co-integration analysis is performed for variables integrated into the first order. Pedroni's co-integration method involves the different statistics for the test of the null of no co-integration. The seven of Pedroni's tests are based on the estimated residuals from long run model as follows:

$$y_{it} = \alpha_i + \sum_{j=1}^{m} \beta_{ji} x_{jit} + \varepsilon_{it}$$

The estimated residuals from the panel regression,

$$\varepsilon_{it} = \rho_i \varepsilon_{i(t-1)} + w_{it}$$

Pedroni's tests don't indicate the direction of causality when the variables are co-integrated. In this stage, Panel Granger causality is investigated. If panel co-integration is not found between the variables, the standard Granger Causality test (it is based on the Granger (1969) causality test) is performed:

$$\Delta Y_{i,t} = \theta_{1i} + \sum_{k=1}^{p} \theta_{11ik} \Delta Y_{i,t-k} + \sum_{k=1}^{p} \theta_{12ik} \Delta X_{i,t-k} + u_{1i,t}$$

$$\Delta X_{i,t} = \theta_{2i} + \sum_{k=1}^{p} \theta_{21ik} \Delta X_{i,t-k} + \sum_{k=1}^{p} \theta_{22ik} \Delta Y_{i,t-k} + u_{2i,t}$$

$$Ho: \theta_{12ik} = 0 \; Ho: \theta_{22ik} = 0$$

In these hypothesis, if θ_{12ik} and/or θ_{22ik} are not zero, the causality relationship is determined between the variables. If the panel co-integration is found, a panel-based error correction model (PVECM) is estimated for the panel Granger causality analysis. The VECM results are used to distinguish the short-run and long-run Granger causality. The coefficients of the lagged error correction term show that there is a long-run causal relationship between variables. So then, the following models are estimated:

$$\Delta Y_{i,t} = \theta_{1i} + \lambda_{1i} ECT_{it-1} + \sum_{k=1}^{p} \theta_{11ik} \Delta Y_{i,t-k} + \sum_{k=1}^{p} \theta_{12ik} \Delta X_{i,t-k} + u_{1i,t}$$

$$\Delta X_{i,t} = \theta_{2i} + \lambda_{2i} ECT_{it-1} + \sum_{k=1}^{p} \theta_{21ik} \Delta X_{i,t-k} + \sum_{k=1}^{p} \theta_{22ik} \Delta Y_{i,t-k} + u_{2i,t}$$

where *ECT* is the error correction term. If θ_{12ik} and/or θ_{22ik} and λ_{1i} and/or λ_{2i} are not equal to zero, it is determined to be a causal relationship in the long-run.

DATA

This study use annual data in the period of 1995-2008 for 135 countries classified into eleven groups. These groups are classified as America (30 countries), Asia (34 countries), Europe (37 countries), East Asia (13 countries), South Asia (6 countries), Central Asia (5 countries), Latin America (28 countries), Oceania (7 countries), Middle East & North Africa (11 countries), Sub Saharan Africa (24 countries) and the World (135 countries). The list of countries is presented in Appendix. (The classification of countries is consisted of according to geographic regions in database of World Development Indicators and Global Developments Finance). Real tourism revenue (receipts) and real gross domestic product in constant 2000 U.S dollars are derived from the World Bank database[4]. Real tourism revenue (LTR) is used to measure tourism development and expressed in natural logarithms. Correspondingly, real growth domestic product (LTR) is used for economic growth indicator and expressed in natural logarithm form too.

[4] http://data.worldbank.org/

EMPIRICAL RESULTS

We use Im, Pesaran and Shin (1997) panel unit root test (hereafter IPS) for identification of the order of integration of the series of LGDP and LTR in a three-stage Panel Granger Causality Analysis. Table 1 presents results of the IPS panel unit root test.

Table-1. The Results of IPS Panel Unit Roots Test

Groups	**LGDP**			**LTR**		
	Level	**First Difference**	**Second Difference**	**Level**	**First Difference**	**Second Difference**
America	2.7135 (0.9967)	**-4.0379* (0.0000)**		0.2267 (0.5897)	**-7.6546* (0.0000)**	
Asia	**-2.1942* (0.0141)**			-0.7146 (0.2374)	**-9.0994* (0.0000)**	
Europe	**-2.5735* (0.0050)**			-0.2334 (0.4077)	**-6.0891* (0.0000)**	
East Asia	**-3.8830* (0.0001)**			-0.4374 (0.3309)	**-4.5217* (0.0000)**	
South Asia	2.4577 (0.9930)	**-2.6680* (0.0038)**		-1.3203 (0.0934)	**-3.5001* (0.0002)**	
Latin America & Caribbean	2.3387 (0.9903)	**-4.8151* (0.0000)**		-0.0200 (0.4920)	**-7.1263* (0.0000)**	
Middle East & North Africa	0.0209 (0.5084)	**-5.2188* (0.0000)**		-1.1952 (0.1160)	**-6.9934* (0.0000)**	
Oceania	1.4563 (0.9274)	-1.4349 (0.0756)	**-8.5279* (0.0000)**	0.9080 (0.8181)	**-4.7715* (0.0000)**	
Central Asia	**-1.8006* (0.0359)**			-0.6744 (0.2500)	**-3.4230* (0.0003)**	
Sub Saharan Africa	0.9152 (0.8200)	**-7.2999* (0.0000)**		**-1.6680* (0.0477)**		
World	4.8260 (1.000)	**-9.0958* (0.0000)**			**-2.1409* (0.0161)**	

Note: * denotes the rejection of the null hypothesis of unit root at the 5% level.

The results indicate that both LGDP and LTR are integrated into one (1) for America, South Asia, Latin America & Caribbean, Middle East & North Africa. For further analysis of the long-run relationship between LGDP and LTR in these groups of countries Pedroni (1995, 1999) panel co-integration technique is used. Pedroni (1995, 1999) refers to seven different statistics for panel co-integration analysis: the panel v-statistics, panel rho-statistics, panel PP-statistics, panel ADF-statistics, group rho-statistics, group PP-statistics and group ADF-statistics. Pedroni (1995, 1999) panel co-integration tests are based on the "within dimension" and the "between dimensions" approach. Results of the Pedroni panel co-integration test are presented in Table 2.

Table-2. Results of Panel Co-integration Tests between LGDP and LTR

Groups	Panel Co-integration Test Statistics	No deterministic trend	Deterministic intercept and trend	Nodeterministic intercept or trend
America	Panel v-Statistic	-1.399017	10.52362*	-3.344177
	Panel rho-Statistic	3.509465	3.116535	-0.179260
	Panel PP-Statistic	4.773944	1.357826	-1.889185
	Panel ADF-Statistic	3.634471	-1.317620	-2.763283*
	Group rho-Statistic	4.076247	5.031813	3.410442
	Group PP-Statistic	3.622737	3.113426	-0.198150
	Group ADF-Statistic	2.393526	-2.015217	-0.755242
South Asia	Panel v-Statistic	-1.205369	32.82682*	-0.702019
	Panel rho-Statistic	1.716338	1.349169	-0.398580
	Panel PP-Statistic	2.013445	0.421282	-0.580993
	Panel ADF-Statistic	1.327364	0.052426	-0.826445
	Group rho-Statistic	2.498674	2.305576	1.675232
	Group PP-Statistic	2.911724	1.122940	0.073798
	Group ADF-Statistic	1.864002	0.471761	-0.364754
Latin America & Caribbean	Panel v-Statistic	-1.269448	9.961869*	-3.247618
	Panel rho-Statistic	3.430945	2.973184	-0.170451
	Panel PP-Statistic	4.752686	1.229195	-1.819747
	Panel ADF-Statistic	3.568989	-1.299833	-2.660821*
	Group rho-Statistic	3.926510	4.725485	3.312143
	Group PP-Statistic	3.664385	2.661797	-0.091811
	Group ADF-Statistic	2.733076	-2.214895	-0.544241
Middle East & North Africa	Panel v-Statistic	-1.021365	6.876048*	-1.644145
	Panel rho-Statistic	1.153367	0.709313	-1.335670
	Panel PP-Statistic	0.547584	-1.259531	-1.711968
	Panel ADF-Statistic	-0.016263	-1.676590	-1.956424
	Group rho-Statistic	1.407632	1.595803	1.034022
	Group PP-Statistic	-0.976280	-1.729968	-1.297896
	Group ADF-Statistic	-2.576479*	-3.776710*	-2.077310*

Notes: * denotes the rejection of the null hypothesis of no co-integration at the 5% level. the variance ratio test is right-sided, while the others are left-sided.

The results indicate no co-integration relationship between tourism revenues and real GDP for these groups. Therefore, we use Granger causality analysis taking into account panel VAR in all groups. Before estimating equations, the appropriate laglengths were selected using the Schwartz

criteria[5] for both variables. After defining the appropriate lag lengths, the short-term causality is investigated for all groups. The results of Panel Granger causality tests are presented in Table 3.

Table 3. Results of Panel Granger Causality Test

Groups	**DependentVariable**	**Source of Causation (independent variable)**	
		Short- run	
America		**ΔLGDP**	**ΔLTR**
	ΔLGDP	-	0.3462 (0.8410)
	ΔLTR	**9.9332 (0.0070)***	-
Asia		**LGDP**	**ΔLTR**
	LGDP	-	0.0817 (0.9600)
	ΔLTR	1.8830 (0.3900)	-
Europe		**LGDP**	**ΔLTR**
	LGDP	-	**4.9347 (0.0848)****
	ΔLTR	**12.7508(0.0017)***	-
East Asia		**LGDP**	**ΔLTR**
	LGDP	-	**8.2897 (0.0046)***
	ΔLTR	0.4055 (0.5252)	-
South Asia		**ΔLGDP**	**ΔLTR**
	ΔLGDP	-	**10.2567 (0.0059)***
	ΔLTR	4.4898 (0.1059)	-
Latin America & Caribbean		**ΔLGDP**	**ΔLTR**
	ΔLGDP	-	0.3685 (0.8317)
	ΔLTR	**9.5185 (0.0086)***	-
Middle East & North Africa		**ΔLGDP**	**ΔLTR**
	ΔLGDP	-	0.0103 (0.9948)
	ΔLTR	1.3143 (0.5183)	-
Oceania		**ΔΔLGDP**	**ΔLTR**
	ΔΔLGDP	-	**3.6474 (0.0600)****
	ΔLTR	1.2996 (0.2580)	-
Central Asia		**LGDP**	**ΔLTR**
	LGDP	-	0.1173 (0.7332)
	ΔLTR	1.8071 (0.1841)	-
Sub Saharan Africa		**ΔLGDP**	**LTR**
	ΔLGDP	-	0.5156 (0.7727)
	LTR	0.4815 (0.7860)	-
World	**LGDP**	**LGDP**	**LTR**
		-	2.2981 (0.3169)
	LTR	**21.1926 (0.000)***	-

[5] The appropriate lag length is selected as 2 in all groups (except group of Oceania. Lag length of Oceania is 1).

Notes: * denotes the rejection of the null hypothesis of no causality at the 5% level. ** denotes the rejection of the null hypothesis of no causality at the 10% level.Δ refers first differences.

According to the results, there is bidirectional causality between tourism revenue and GDP in Europe, which is significant in 5 % in case of direction from gross domestic product to tourism revenue and 10% in case of from tourism revenue to gross domestic product. Thus, these results suggest that tourism revenue and gross domestic product affects mutually each other in case of Europe. In America, Latin America & Caribbean and World the unidirectional causality from GDP to tourism revenue is found. Also results show that there is a one-way causality from tourism revenue to GDP in East Asia, South Asia and Oceania. Moreover, there is no causal relationship between variables in Asia, Middle East & North Africa, Central Asia and Sub Saharan Africa.

CONCLUSIONS

In this paper the panel causal relationship between tourism revenue and GDP is examined by a three-stage Panel Granger analysis. This paper differs from previous studies by focusing on larger sample of countries and classifying them into geographical groups.

The results of causality analysis are mixed. In case of Europe bidirectional causality is found, while in America, Latin America & Caribbean and World this causality is found as from only GDP to tourism. Results show analogous unidirectional causality, but with reverse direction - from tourism revenue to GDP, for East Asia, South Asia and Oceania. These findings support the broad conclusion about the relationship between tourism and economic growth. However, estimations on Asia, Middle East & North Africa, Central Asia and Sub Saharan Africa do not confirm existence of causal relationship between tourism and economic growth.

Such mixing results among country groups may be ascribed to different factors. As Eugenio-Martin, Morales and Scarpa (2004) and Chang, Khamkaev and McAleer (2010) correspondingly note importance of tourism for economic growth may differ depending on level of income and trade openness and investment rate. Although in general our results support this argument of conditionality, middle and low income countries included in our analysis do not strongly exhibit this relationship. Therefore, our geographical classification of countries produces different results. Non-existence of causality for some economies may be result of small share of tourism sector in an economy. But this evidence does not imply the unimportance of tourism potential for economic growth for these economies. Empirical estimations from other groups show that tourism is bidirectional or unidirectional linked with economic growth. Therefore, the role tourism may be expended through creation of necessary conditions for its expansion.

Our findings on existence and directions of causality confirm the importance of tourism for economic growth and the conditionality of this relationship on other possible determinants investigated in previous studies.

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Appendix: List of Countries

America	Asia	Europe	East Asia	South Asia
Argentina	Albania	Austria	Cambodia	Bangladesh
Bahamas, The	Armenia	Belarus	China	Bhutan
Barbados	Azerbaijan	Belgium	Hong Kong SAR	India
Belize	Bahrain	Bulgaria	Indonesia	Nepal
Bolivia	Bangladesh	Croatia	Japan	Pakistan
Brazil	Bhutan	Cyprus	Korea, Rep.	Sri Lanka
Canada	Cambodia	Czech Republic	Lao PDR	
Colombia	China	Denmark	Macao SAR, China	
Costa Rica	Egypt, Arab Rep.	Estonia	Malaysia	
Dominica	Hong Kong SAR	Finland	Mongolia	
Dominican Rep.	India	France	Philippines	
Ecuador	Indonesia	Germany	Singapore	
Grenada	Iran, Islamic Rep.	Greece	Thailand	
Guatemala	Israel	Hungary		
Guyana	Japan	Iceland		
Haiti	Jordan	Ireland		
Honduras	Kazakhstan	Italy		
Jamaica	Korea, Rep.	Latvia		
Mexico	Kuwait	Lithuania		
Panama	Kyrgyz Republic	Luxembourg		
Paraguay	Lao PDR	Macedonia, FYR		
Peru	Macao SAR, China	Malta		
St.Kittsand Nevis	Malaysia	Moldova		
St. Lucia	Mongolia	Netherlands		
St. Vincent and the Grenadines	Nepal	Norway		

Suriname	Pakistan	Poland
Trinidad and Tobago	Philippines	Portugal
United States	Singapore	Romania
Uruguay	Sri Lanka	Russian Fed.
Venezuela, RB	Syrian Arab Republic	Slovak Rep.
	Thailand	Slovenia
	Tunisia	Spain
	Turkey	Sweden
	Yemen, Rep.	Switzerland
		Turkey
		Ukraine
		United Kingdom

Latin America &Caribbean	**Middle East &North Africa**	**Oceania**	**Central Asia**	**Sub Saharan Africa**
Argentina	Algeria	Australia	Albania	Angola
Bahamas, The	Bahrain	Fiji	Armenia	Benin
Barbados	Egypt,ArabRep.	New Zealand	Azerbaijan	Botswana
Belize	Iran,IslamicRep.	PapuaNewGuinea	Kazakhstan	Burundi
Bolivia	Israel	Samoa	Kyrgyz Republic	Cameroon
Brazil	Jordan	Solomon Islands		Central African Rep.
Colombia	Kuwait	Tonga		Cote d'Ivoire
Costa Rica	Morocco			Ethiopia
Dominica	SyrianArabRep.			Kenya
Dominican Rep.	Tunisia			Lesotho
Ecuador	Yemen, Rep.			Madagascar
Grenada				Mali
Guatemala				Mauritius
Guyana				Niger
Haiti				Nigeria
Honduras				Rwanda
Jamaica				Senegal
Mexico				Seychelles
Panama				South Africa
Paraguay				Sudan
Peru				Swaziland
St. Kitts and Nevis				Tanzania
St. Lucia				Togo
St. Vincent and the Grenadines				Uganda
Suriname				Venezuela, RB
Trinidadand Tobago				

Uruguay

World		
Albania	Ghana	Norway
Algeria	Greece	Pakistan
Angola	Grenada	Panama
Argentina	Guatemala	Papua New Guinea
Armenia	Guyana	Paraguay
Australia	Haiti	Peru
Austria	Honduras	Philippines
Azerbaijan	Hong Kong SAR, China	Poland
Bahamas, The	Hungary	Portugal
Bahrain	Iceland	Romania
Bangladesh	India	Russian Federation
Barbados	Indonesia	Rwanda
Belarus	Iran, Islamic Rep.	Samoa
Belgium	Ireland	Senegal
Belize	Israel	Seychelles
Benin	Italy	Singapore
Bhutan	Jamaica	Slovak Republic
Bolivia	Japan	Slovenia
Botswana	Jordan	Solomon Islands
Brazil	Kazakhstan	South Africa
Bulgaria	Kenya	Spain
Burundi	Korea, Rep.	Sri Lanka
Cambodia	Kuwait	St. Kitts and Nevis
Cameroon	Kyrgyz Republic	St. Lucia
Canada	Lao PDR	St. Vincent and the Grenadines
Central African Republic	Latvia	Sudan
China	Lesotho	Suriname
Colombia	Lithuania	Swaziland
Costa Rica	Luxembourg	Sweden
Cote d'Ivoire	Macao SAR, China	Switzerland
Croatia	Macedonia, FYR	Syrian Arab Republic
Cyprus	Madagascar	Tanzania
Czech Republic	Malaysia	Thailand
Denmark	Mali	Togo
Dominica	Malta	Tonga
Dominican Republic	Mauritius	Trinidad and Tobago
Ecuador	Mexico	Tunisia
Egypt, Arab Rep.	Moldova	Turkey
Estonia	Mongolia	Uganda
Ethiopia	Morocco	Ukraine
Fiji	Nepal	United Kingdom
Finland	Netherlands	United States
France	New Zealand	Uruguay
Georgia	Niger	Venezuela, RB
Germany	Nigeria	Yemen, Rep.