Investigating the influence of tourism on economic growth and carbon emissions: Evidence from panel analysis of the European Union

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HIGHLIGHTS

► Tourism and FDI have high significant positive effect on economic growth in the EU.
► Economic growth shows a high significant positive effect on CO_2 emissions in the EU.
► Tourism is inversely related to CO_2 emissions in the EU.
► FDI incurs a high significant negative impact on CO_2 emissions in the EU.
► A long-run equilibrium relationship exists among tourism, CO_2 emissions, economic growth and FDI in the EU.

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ABSTRACT

The study investigates the influence of tourism on economic growth and CO_2 emissions. In the empirical analysis, unit root and cointegration tests using panel data of European Union countries from 1988 to 2009 are performed to examine the long-run equilibrium relationship among tourism, CO_2 emissions, economic growth and foreign direct investment (FDI). Results from panel cointegration techniques and fixed-effects models indicate that a long-run equilibrium relationship exists among these variables. Furthermore, tourism, CO_2 emissions and FDI have high significant positive effect on economic growth. Economic growth, in turn, shows a high significant positive impact on CO_2 emissions while tourism and FDI incur a high significant negative impact on CO_2 emissions.

1. Introduction

In the 21st century, the globalization of capitalism, the movement of populations and advances in transportation and communications technology have helped develop the travel and tourism sector into one of the world's largest. Tourism has made a significant contribution to the economies of many communities around the world because of its ability to create income, taxes, hard currency and jobs (Choi & Sirakaya, 2006; Dwyer & Forsyth, 2008). Bramwell and Lane (1993) reported that tourism can contribute to sustainable development when it operates within natural capacities for the regeneration and future productivity of natural resources.

According to a tourism report (Blanke, Chiesa, & Herrera, 2009), four European Union (EU) member countries – Austria, Germany, France, and Spain – are ranked among the top countries that are continuing to lead the way in the travel and tourism competitiveness global index in the overall rankings of 133 countries. The governments prioritize the tourism sector with very supportive policymaking, make strong efforts to attract international tourists through strong tourism destination marketing campaigns, and showcase the country's presence at many international tourism exhibitions, fairs, and forums.

As a result, the tourism industry has become a key sector of the European economy. The travel and tourism sector contributes US$1248 billion to the EU gross domestic product (GDP) or 7.8 percent of the total (World Travel and Tourism Council, 2011). The council estimates that the travel and tourism sector contributes to creating over 9.7 million jobs in the EU, 8.4 percent of the total employment in 2011. This information is useful to define the relationship between economic growth and tourism development because the tourism sector in the EU is prioritized as a significant source of revenue, employment and economic growth.

The main sources of carbon dioxide (CO_2) are burning of fossil fuels. The EU has experienced steady increase in fossil fuel CO_2 emissions with an average growth rate of 6 percent annually during

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1990–2008 (Boden, Marland, & Andres, 2011). Among the top 20 national fossil fuel CO_2 emitters, the United Kingdom, Italy, France, and Spain lead in CO_2 fossil fuel emissions. In 2008 the total CO_2 emissions of the EU reached 712 million metric tons. Emissions from all fuel sources have grown in the EU region over time, with gas fuels now accounting for approximately 28.1 percent of the regional total (Boden et al., 2011). Table 1 presents some context for the CO_2 emissions. From 1988 to 2009, the average CO_2 per capita among 27 EU members is 8.58 metric tons with the range of 3.50 in Latvia to 22.71 metric tons in Luxembourg.

Participating in a global market has consequences for a country's economic evolution, both for the value of the output produced and the resulting consumption. The question here is whether the economic growth and, social and environmental indicators improve over time or whether they decline. Recently, CO_2 emissions levels have been growing at varying degrees throughout the EU. Environmental issues are complex in nature and transcend national boundaries. In order to optimize healthy economic growth, policy responses must consider current environmental problems, climate change and CO_2 emissions from industries while promoting sustainable growth. The increased economic importance of tourism raises new questions for policy makers regarding the best practice to promote economic growth and reduce CO_2 emissions.

There has not been a time series approach to analyze the relationship among tourism, CO_2 emissions and economic growth for EU countries. This research questions whether tourism induces an increase in the CO_2 emissions and economic growth of the region. The questions are vital to disentangle the effect of tourism on both

environment and economic growth in the region, where governments often make legislative responses to current environmental issues.

2. Literature review

The literature review section summarizes and pulls together the relevant literature in relation to the objectives of the paper as stated above. Besides the influence of tourism on economic growth and CO_2 emissions, foreign direct investment (FDI) is included to eliminate the omitted variable bias. Cointegration concept is reviewed in order to construct the last hypothesis related to the long-run relationships among these time series variables.

2.1. Tourism and economic growth

Previous studies have reported that tourism positively affects economic growth in the EU countries (Albalate & Bel, 2010; Holzner, 2011), in Eastern Europe (Hall, 1998), in Austria (Falk, 2010), in Greece (Dritsakis, 2004a,b), in Italy (Bernini, 2009), in Spain (Balaguer & Cantavella-Jordá, 2002) and in the United Kingdom (Blackstock, White, McCrum, Scott, & Hunter, 2008). They propose a tourism-led economic growth hypothesis that assumes tourism to be a major factor in overall long-run economic growth. Mihalic (2002) discussed several advantages of tourism as a growth strategy compared with the export of goods and services. In this regard, Sahli and Nowak (2007) reported that many governments have engaged in tourism development for the purpose of economic growth.

International tourism is a prime source of foreign exchange earnings and generates export revenues. The principal economic benefits derived from tourism include foreign exchange earnings, employment, and income (Archer, 1995; West, 1993). Tang and Jang (2009) reported that there exists a temporal hierarchy among tourism-related industries and that tourism can ignite the development of other industries and the overall economy (Holzner, 2011; Sequeira & Nunes, 2008). Lee and Chang (2008) also reported that tourism development not only stimulates the growth of the sector, but also triggers the overall economic growth of countries. These studies substantiate that tourism positively affects the national economy.

Hypothesis 1: Tourism directly affects economic growth.

2.2. Economic growth and CO_2 emissions

Historically, there has been a close correlation between economic growth and CO_2 emissions. As economies grow, the environment declines (Adams & Jeanrenaud, 2008). This trend can be demonstrated on charts of human population, economic growth, and environmental indicators. Recent studies have examined the time series dynamics between economic growth and CO_2 emissions to infer the direction of causality (Akbostanci, Turut-Asik, & Tunc, 2009; Coondoo & Dinda, 2008; Lee & Lee, 2009; Luzzati & Orsini, 2009). The empirical results seem to be inconclusive. Therefore, the reliability of these estimates has been challenged on technical grounds (Harbaugh, Levinson, & Wilson, 2002; Millimet, List, & Stengos, 2003).

In addition, studies using time series at the country level have found less robust relationships between GDP per capita and CO_2 emissions per capita. Existing studies (Swart, Robinson, & Cohen, 2003; Wilbanks, 2003) have introduced the relationship between sustainable development and climate change with an emphasis on the degree to which climate change mitigation can have so-called co-benefits. Moomaw and Unruh (1997) reported that international oil price shocks, not per capita GDP growth, explain most of

Table 1
Summary statistics, European Union member countries, 1988–2009.

Country	GDP[a]	Tourism receipts[b]	FDI[c]	CO_2 emissions[d]	Tourism to GDP[e]
Austria	29,470	1765	1178	7.96	5.03
Belgium	27,967	712	6223	10.84	2.56
Bulgaria	2604	206	320	6.81	4.89
Cyprus	16,173	1874	748	6.98	9.52
Czech Rep.	8647	336	449	12.11	3.23
Denmark	36,389	773	975	10.07	2.47
Estonia	7962	491	670	12.81	3.01
Finland	29,206	440	649	11.12	2.54
France	26,967	533	579	6.37	4.23
Germany	28,227	307	367	10.48	1.89
Greece	15,141	748	137	7.97	5.75
Hungary	6569	329	1084	5.89	3.96
Ireland	29,298	935	1189	9.82	2.12
Italy	23,885	483	174	7.64	3.50
Latvia	4788	125	245	3.50	1.47
Lithuania	5072	140	202	4.30	2.08
Luxembourg	57,456	1638	132,652	22.71	2.15
Malta	11,257	1954	1005	6.51	16.75
Netherlands	29,337	670	1538	10.85	2.25
Poland	5283	156	178	8.81	2.41
Portugal	13,255	626	299	5.36	4.86
Romania	2949	37	148	5.28	1.44
Slovakia	6999	148	289	7.45	1.98
Slovenia	13,191	608	239	7.59	2.96
Spain	18,626	774	496	6.87	5.68
Sweden	32,715	636	1536	6.04	1.64
United Kingdom Consolidated	26,483	435	1019	9.43	2.85
Mean	19,108	663	5725	8.58	2.83
St. Deviation	12,899	531	24,918	3.63	3.07
Minimum	2604	37	137	3.50	1.44
Maximum	57,456	1954	132,652	22.71	16.75

[a] GDP per capita (current US$).
[b] International tourism real receipts per capita (current US$).
[c] Foreign direct investment net inflows per capita (current US$).
[d] CO_2 emissions per capita (metric tons).
[e] Tourism direct contribution to GDP (% to GDP).