Granger Causality Analysis of the Economic Cycles of the Tourism Industry and the EU Regional Economy

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ABSTRACT: The relationship between tourism and economic growth has become an important topic of many empirical studies, and various models of analysis can help us understand the contribution of tourism to economic growth, due to the methodological approaches used by researchers. This article analyzed the causal relationship between the economic cycles of the tourism industry and those of regional economic growth between 2004-2016 using the Granger causality test and validated all the causal hypotheses between tourism and economic growth for 21 countries and 158 of regions in the European Union.

KEYWORDS: tourism industry, EU regional economy, economic cycles

Introduction

The first and most popular interpretation of the relationship between tourism and the economy is the causal link according to which tourism is a major factor of economic growth, also called the TLEG hypothesis which suggests that tourism activities can form a strategic direction to stimulate economic development of destinations. and the empirical works that validated this hypothesis analyzed in particular developed and developing countries.

Brida & Pulina (2010) analyzed the relationship between tourism activity and economic growth through a review of the literature comprising 38 empirical econometric studies covering the period 2002-2010. They concluded that the studies are mainly based on econometric techniques, such as cointegration and error correction models, and that in most studies evidence of a strong relationship between tourism revenues and economic growth was confirmed.

Similar results are also reported by Croes & Vanegas (2008) for Nicaragua and Fayissa, Nsiah, & Tadesse (2011) for countries in the Latin American region. In addition, Schubert, Brida, & Risso (2011) argue that an increase in tourist demand in Antigua and Barbuda leads to economic development and better trade conditions. In the Mediterranean, Dritsakis (2012) focused mainly on tourism revenues, tourist arrivals, exchange rates and GDP per capita for seven countries, covering the period 1980-2007, to confirm the hypothesis. the contribution of tourism to economic growth. Thus, it used FMOLS type panel (the least normal squares completely modified), and the estimates of the cointegration panel found that there is evidence of the relationship between tourism development and GDP in the case of seven Mediterranean countries.

Eeckels, Filis, & Leon (2012) provided favorable evidence for the TLEG hypothesis by examining the cyclical components of GDP and tourism income in Greece with an analysis covering a 1976 interval. until 2004. Read more Parrilla, Font, & Nadal (2007) found a positive link to the impact of tourism on the development of Spanish regions. Similarly, Mello-Sampayo & Sousa-Vale (2012) verified the growth induced by tourism in Europe concluding that impact levels are higher in the north than in the south. Continuing on the same hypothesis, (Surugiu & Surugiu 2013) analyzed tourism spending, GDP growth rate and real exchange rate between 1988 and 2009, to demonstrate a positive causality of tourism on the economy Romanian. In addition, Ivanov & Webster (2013) evaluate the positive contribution of tourism to real capital growth in 167 countries. Pratt (2011) also documents that the higher the level of tourist arrivals in Hawaii, the greater the impact of tourism on the

economy. Finally, Matarrita-Cascante (2010), recognizes the potential role of tourism as a catalyst for economic growth.

Eryiğit & Eryiğit (2011) demonstrated the long-term relationship between tourism revenues and economic development by using a sample of Mediterranean countries for the period 1995-2009 and by applying unitary root tests of the type panel and panel techniques based on error correction

Gökovali & Bahar (2006) empirically investigated the TLGH hypothesis for Mediterranean countries for the period 1987-2002 through research based on a panel approach, and their study validated the hypothesis that tourism is an important factor in economic growth. Aslan (2014) investigated the causal relationship between tourism and economic growth for a group of 12 Mediterranean countries covering the period 1995-2010. In his study, the results of Granger causality indicated that an increase in tourism leads to economic growth for the Mediterranean countries.

Although the economic impact of tourism on economic growth is positively assessed in most studies, there are also negative aspects of tourism criticized in the literature. In the event of a shortage of resources, tourism can compete with the development of other sectors of the economy. Wall & Mathienson (2006) consider that tourism can cause an increase in prices or even a negative impact on the country's economy if it is dependent on tourism or there is a high seasonality. However, the negative effects of tourism are not addressed in this research.

Even if many studies validate the TLEG hypothesis, there are also studies in the literature, which paint the opposite picture, namely that the tourism sector is positively affected by economic fluctuations.

Payne & Mervar (2010) explain the hypothesis (GLTH) by which economic growth contributes to the development of tourism and argues that the development of a country is the result of the application of well-designed economic policies. They create a socio-economic climate that encourages tourism activities to proliferate and flourish, given the availability of resources, infrastructure and political stability. On the empirical side, Narayan (2004) through his study of Fiji during the period 1970-2000 reveals that the increase in per capita income has contributed to a higher number of tourist arrivals on the island. In South Korea, Oh (2005) uses quarterly data from 1975-2001 to propose that the country's economic expansion has had a positive short-term effect on international visits. Similar observations are made by Payne, & Mervar (2010), which focuses on Croatia in the period 2000-2008 and observed a positive impact of GDP on the country's tourism revenues.

Moreover, Tang (2011), using monthly data from Malaysia between 1995 and 2009, provides evidence that tourism markets support the long-term GLTH hypothesis.

A two-way causality (RH) could also exist between tourism revenues and economic growth according to Chen & Chiou-Wei (2009) and Ridderstaat, Croes & Nijkamp (2014). From a political point of view, a reciprocal relationship between tourism and the economy implies that government agendas should be responsible for promoting both areas simultaneously. The evidence supporting this claim can be found, among others, in the work of Apergis & Payne (2012), which recognizes a short long-term bidirectional effect in nine Caribbean countries throughout the period 1995-2007.

Tugcu (2014) analyzed the relationship between tourism and economic growth for the case of the Mediterranean region. The results showed bi-directional causality for tourism revenues and economic growth in European Mediterranean countries, bidirectional causality for tourism expenditures and economic growth in Mediterranean Asian countries.

Also, Chen & Chiou-Wei (2009) redefined the tourism-economy connection in South Korea as mutually beneficial, which contradicts the previous results of Oh (2005) in favor of the GLTH hypothesis. Moreover, Lee & Chang (2008) identified bidirectional relationships in non-OECD countries between 1990 and 2002, and Ridderstaat, Croes, & Nijkamp (2014) found bidirectional causality by their study in Aruba from 1972 to 2011. Seetanah (2011)

reinforced these findings, confirming a bi-causal link between tourism and economic growth through a sample of island economies for the time period 1990-2007.

However, it is worth noting that his evidence contradicts the studies of Holzner (2011), Mello-Sampayo & Sousa-Vale (2012), Narayan (2004) and Schubert, Brida & Risso (2011).

There are also some studies that do not support any of the hypotheses mentioned above, and they claim that there is no long-term causality (NC). Based on this view, the relationship between the impact of tourism and economic growth is insignificant. A study that supports the neutral hypothesis is Figini & Vici (2009), which uses cross-sectional data on GDP per capita and tourism revenues during 1980-2005. Unlike Holzner (2011), Figini & Vici (2009) he argues that tourism-dependent countries do not grow differently from countries where the tourism sector is less developed. Similarly, Po & Huang (2008) also use cross-sectional annual data for 1995-2005. They support the neutral hypothesis in countries that share specific characteristics, small and medium-sized countries, scattered incomes and low rates of services / GDP and forest area areas. In addition, the study Katircioglu (2009), in Turkey, which covers the period 1960-2006, finds no connection between international tourism and economic expansion. Moreover, Tang & Jang (2009) conclude that the neutral hypothesis is found in the United States, by analyzing the long-term relationship of tourism growth at the level of sub-industries.

Some authors, however, have begun to question the stability of the long-term growth connection of tourism. Specifically, Arslanturk, Balcilar, & Ozdemir (2011), using Vector Error Correction Model, show that the impact of tourism revenue on Turkish GDP is negative until 1983 and turns into an effect positive in the post-1983 period. Lean & Tang (2010) use Granger TYDL causality analysis with monthly industrial production data and international tourist arrivals from January 1989 to February 2009 for Malaysia. Although their conclusions support the TLEG hypothesis, they show that the link between tourism and economic growth changes over time, becoming more or less pronounced. Tang & Tan (2013) also focus on Malaysia, using a Granger-recursive causality test to study the time variation of the relationship between international tourist arrivals and industrial production. Their results show that the positive effect of tourism on economic growth is not stable over time.

Results

Granger causality is a statistical concept of causality that is based on prediction and assumes that if an X1 "Granger-causes" (or "G-causes") signal is an X2 signal, then the previous values of X1 should contain information that helps X2 prediction and beyond the information contained in the previous values of X2 alone. Its mathematical formulation is based on linear regressive modeling of stochastic processes.

Applying this test in our analysis can give us a detailed picture of the relationship between the cycles of the regional economy and the economic cycles of Direct and Total Tourism. For the application of the method we used as measurement indicators the Domestic Product (GDP), annual time series at NUTS2 level (179 series) for 21 countries in the period 2004-2016, taken from Eurostat, Direct Contribution of Tourism in GDP and Contribution Total tourism in GDP at national level.

To determine the Contribution of Tourism at regional level we calculated the distribution of accommodation nights in each region relative to the total number of nights of accommodation at national level, and the Direct and Total Contribution of tourism to GDP at national level is calculated as a percentage by WTTC (World Travel and Tourism Council).

Table 1. Causal testing between EU regional economy and the economic cycles of Direct and Total Tourism

Granger Causality Test Result											
Direct Tourism						Total Tourism					
G->D			D->G		D<->G	T->G		G->T			G<->T
AT31	IT	ITI1	AT13	DEB3	AT12	AT13	DE93	AT	HR	ITH2	CZ04
BG	ITC1	ITI2	BE10	DEC0	BG42	BE31	DEA2	AT22	HR03	ITH3	DEA5
DE13	ITC2	PT	CZ02	DEF0	DE40	CZ03	DEA4	AT32	HR04	ITH4	RO11
DE27	ITC3	PT11	DE25	DK02	CZ06	DE14	DED2	AT33	IT	ITH5	RO12
CZ07	ITC4	PT16	DE12	ES12	DE11	DE21	DED4	CZ07	ITC1	ITI1	
CZ08	ITF1	PT17	DE21	ES51	DE40	DE	DED5	DE12	ITC3	ITI2	
DEA2	ITF1	PT20	DE25	ES53	ES22	DE13	DEE0	ES22	ITC4	ITI3	
DEA5	ITH2	RO11	DE27	ES70		DE14	PT15	ES23	ITF2	PT	
DK	ITH4	RO12	DE72	ITI3		DE72	SE21	ES43	ITF3	PT16	
ES21	ITH5	RO21	DEA3	MT		DE73		ES51	ITF6	RO41	
		RO42	DEA4	SE12		DE92		ES70	ITH1	SI04	
			DEB1								

Source: Own representation

Conclusions

Granger causality testing was performed for all 179 time series (Table 1) resulting in 61 regions where causal relationships were identified between the regional economy and Direct Tourism, 57 regions where causal relationships were identified between the regional economy and Total Tourism, and in the rest of the series analyzed, the causal relationship is not significant in the long run. Following the causal analysis, the series were divided according to the relationship between the regional economy and Direct or Total Tourism depending on the type of relationship between them and we can validate the existence of all the above hypotheses. In 31 regions we can claim that an increase in the economy causes an increase in Direct Tourism, for 23 regions the increase in Direct Tourism causes an increase in the regional economy, and in 7 regions we can find bi-directional relations.

Total Tourism is found in a causal relationship with the regional economy for 57 regions, and an increase in it causes an increase in the economy in 20 regions, for 33 regions an increase in the economy causes an increase in Total Tourism, and for 4 regions we find a bi-directional relationship.

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