

CAUSALITY BETWEEN ECONOMIC GROWTH AND TOURISM EXPANSION: EMPIRICAL EVIDENCE FROM SOME COLOMBIAN REGIONS*

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Abstract: *This paper analyses the effects in the long-run between tourism and the economic growth in the regions of Antioquia, Bolívar, Bogotá, Magdalena and San Andrés and Providencia of Colombia. Using annual data from 1990 to 2005, the study uses cointegration analysis to consider the existence of Vector Error Correction Model (VEC) among real per capita Gross Domestic Product (GDP), tourism expenditures and real exchange rates. We show that the causality relationship is positive and unidirectional for all the regions but the values of elasticity are considerable different. Finally, we compare our study with similar papers also investigating the tourism-led growth hypothesis.*

Key words: *Economic Growth; Tourism Earnings; Johansen Cointegration Test; Elasticity; Colombia*

Introduction

The importance of tourism in the long-run economic growth of countries is well documented and empirically tested. This proves that tourism can promote or cause long-run economic growth and is known in the literature as the tourism-led growth hypothesis (TLGH), maintaining that international tourism is a strategic factor for long-run economic growth (Shan, Wilson 2001; Balaguer, Cantavella-Jordà 2002; Dritsakis 2004;).

There is a recognized relationship between economic growth and international (and also domestic) tourism. For example, the World Tourism Organization (UNWTO) formulates it in terms of a statistical relationship between arrivals and the growth rate of domestic output. Thus, accordingly, there seems to exist a stable asymmetric relationship between the short run growth rates of those variables. As the "tourism volume" can be reformulated in terms of the more appropriate measure of tourism expenditure, a similar asymmetric relationship may exist between GDP and receipts from international tourism. Hence, the

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above "law" can be phrased as a dynamic relationship between the rates of growth of GDP and of receipts from international tourism. A version of this relationship will be discussed in this paper, replacing GDP growth rate with the rate of growth of per capita income, a measure of welfare, and introducing the real exchange rate to take into account international competitiveness. With such reformulation, the question enters into the realm of the vast literature on factors contributing to growth, of which growth accounting is just one and perhaps the best known. We will look at tourism's contribution to sustaining a country's growth, a question that the current situation puts on the forefront. Tourism suffers from all sorts of factors of variability, and it has an inherent tendency to volatility. Therefore, we can only ascertain its impact upon a country's growth if we take a long run perspective.

International tourism is recognized to have a positive effect on long-run economic growth through different channels. First, tourism is a significant foreign exchange earner contributing to capital goods that can be used in the production process. Second, tourism has an important role in stimulating investments in new infrastructure and competition. Third, tourism stimulates other economic industries by direct, indirect and induced effects. Fourth, tourism contributes to the generation of employment and the rise in incomes. Fifth, tourism causes positive economies of scale. Finally, tourism is an important factor in the diffusion of technical knowledge, stimulation of research and development, and the accumulation of human capital. (Noriko, Mototsugu, 2002, 2007; Durbarry 2004; Kim *et al.* 2006)

The purpose of this study is to analyze the importance of the tourism sector and investigate the TLGH for the most touristic Colombian destination, comparing the results with similar papers for other Latin-American destinations. Although the tourism industry has grown significantly in Colombia, tourism researchers have not paid much attention to the empirical assessment of the contribution that the tourism sector makes to the different regions of the country. This note aims to answer the following questions. First, is it important the tourism sector in the destinations under study? Second? How much this sector contributes to economic growth? Third, is there a long-run equilibrium relationship between tourism and economic growth in the destinations under study? And finally, if a stable long-run relationship exists, what is the direction of the causal relationship between these two variables?

To answer the first two questions, we use a growth accounting methodology that allows us to measure the relevance of the different sectors of the economy and the contribution of each sector to the economic growth. On the other

hand, to try to find a long-run relation between the variables we are considering, we apply cointegration analyses, following Johansen (1988) and Johansen and Juselius (1990). This process consists in the construction of a VEC between degree one integrated series and to consider the possibility of a cointegration relation between the variables under review. Once we prove the existence of the cointegration relation, is possible to establish a long-run relation and to test different restriction, tool that will allow us to determine the direction of the casual relationship.

The rest of the paper is organized as follows. In the next section, we present some information about tourism's economic evolution and progress in Colombia's tourism sector, using the accounting growth approach mentioned. In section 3, we show the applying of the cointegration methodology, discussing at the same time the obtained results. Finally, in the last section, we present conclusions and future lines of research.

Tourism and economic growth in Colombia

Colombia has a rich diversity of natural and cultural tourism attractions, including coasts on the Pacific and Atlantic Oceans, over a thousand rivers, the highest coastal mountain in the world, 53 natural areas in National Parks System covering 9% of all national territory, hundreds of sites deemed properties of cultural interest, and many other attractions. According to the statistics provided by the Ministry of Commerce, Industry and Tourism (MCIT), during the 1990's, the tourism sector generated export incomes similar to traditional exports, earning 20-30% of total foreign currency generated by all exports, an amount equivalent to 3% of GDP. In this paper we have selected as a case study the five regions of the country with higher participation and development of the tourism sector: Antioquia, Bogotá, Bolivar, Magdalena and San Andrés-Providencia.

Traditionally, a large proportion of tourist expenditures go into clearly defined tourism sectors such as transport, hotels and recreation, but tourists also spend money in other sectors that are not normally associated with tourism. Given that the economic contribution of tourism is spread across a variety of different sectors, it is consequently very difficult to pinpoint how tourism can contribute to an economy. This is the first caveat of our exercise; using data from systems of regional accounts, we will consider as "tourism" only what might be classified as tourism-related sectors.

Tourism expenditure and economic growth can be related in several ways. We consider the proportion of overall GDP that stems from activities traditionally associated with the tourism sector. This participation could be defined as:

$$p_r^T = \left(\frac{\frac{Y_{r(p_0)}^T}{N_r}}{\frac{Y_{r(p_0)}}{N_r}} \right)$$

where the first term in the numerator is the product of the tourism sector in the r period at constant prices p_0 and N is the population in the r period.

After that, we use the mentioned growth accounting method for measuring the contribution of tourism to economic growth, as introduced in Ivanov and Webster (2007). To do that, we have first to define the economic growth rate as follow

$$g_r = \left(\frac{\frac{\sum_t Y_{r(p_0)}^t}{N_r} - \frac{\sum_t Y_{r-1(p_0)}^t}{N_r}}{\frac{\sum_t Y_{r-1(p_0)}^t}{N_r}} \right)$$

We consider t as each sector of the economy. Now, the next step consists : divide the tourism sector from the rest of the economy:

$$g_r = \left(\frac{\frac{Y_{r(p_0)}^T}{N_r} - \frac{Y_{r-1(p_0)}^T}{N_{r-1}}}{\frac{Y_{r-1(p_0)}}{N_{r-1}}} + \frac{\frac{\sum_{t \neq T} Y_{r(p_0)}^t}{N_r} - \frac{\sum_{t \neq T} Y_{r-1(p_0)}^t}{N_{r-1}}}{\frac{Y_{r-1(p_0)}}{N_{r-1}}} \right)$$

The first term is the contribution of the tourism to the economic growth:

$$c_r^T = \left(\frac{\frac{Y_{r(p_0)}^T}{N_r} - \frac{Y_{r-1(p_0)}^T}{N_{r-1}}}{\frac{Y_{r-1(p_0)}}{N_{r-1}}} \right)$$

The described methodology has a limitation in the sense that tourism sector not only includes traditional aspects, like hostels, transport and recreation, but also other sectors closely related. Those aspects difficult our analyses because Nation Accounts in Colombia only consider as tourism sector the expenditure in hotels and restaurants. In spite of that situation, we can consider the hotels and restaurants expenditure as a good approach to the tourism sector taking into consideration the available data. Once we have presented the methodology in this section, we could apply this to the destinations we are considering. We use annual data temporal series from 1990 to 2005. This information is at constant

prices (base 1994). We obtained annual data of the tourism expenditure (as we mentioned hotels and restaurants), GDP and population provided by the National Statistical Direction of Colombia (DANE).

Our intention is to compare the evolution of the obtained indicators during the last two decades, so we divide the series with the objective of compare what have happened during the 90s with the last decade. Table 1 summarizes the values of these indicators for the regions under analysis.

Table 1. Participation of tourist and contribution to economic growth

Region	(A)	(B)	(C)	(D)	(E)	(F)
Colombia	2.60	2.13	1.50	2.11	-0.02	0.04
Antioquía	1,96	1,59	0,28	2,45	-0,05	0,04
Bogotá	1,93	1,91	1,01	1,60	0,04	0,06
Bolívar	5,54	4,01	2,82	2,98	-0,19	0,23
Magdalena	6,02	5,92	3,47	1,75	0,15	0,15
San Andrés and Providencia	20,68	25,30	1,55	2,60	0,58	0,91

Source: Author's calculations.

(A)Average TE/GDP relation 1990-1998 (%). (B)Average TE /GDP relation 1999-2007 (%). (C)Growth GDP per capita rate 1991-1998 (%). (D)Growth GDP per capita rate 1999-2007 (%). (E)Tourism contribution to economic growth 1991-1998 (%). (F)Tourism contribution to economic growth 1999-2007 (%).

Table 1 shows that there is a tendency of increase in the GDP per cápita in Colombia in the last decade, while the participation of tourism in the GDP has decreased. In spite of that, the mentioned economic growth process makes that the contribution of tourism to economic growth is positive instead of the adverse effect occurred during the 90s. This concept could be extended to main of the region considered.

We also can see a considerable participation of the tourism on the GDP in three of the considered regions: Bolivar, Magdalena and San Andrés and Providencia, where the tourism is one of the main activities. Antioquia and Bogotá are the most industrialized regions of Colombia and then there tourism contribution to GDP is low. Particularity, in San Andrés and Providencia tourism is the most important activity and employees a big amount of workers. The importance of tourism in this region has been increased in the last years. At the same time, in the regions where the participation of tourism is high, this sector contributes

considerably to the economic growth of the region (see columns (E) and (F) in Table 1). Again, it is very impressive the case of San Andrés and Providencia with an average contribution of tourism to the growth rate of per capita GDP of the region of 0.91% during the last decade.

Long-run relationship and empirical results.

We consider the annual data temporal series used in the first section. The change of base made by the DANE -2000 instead of 1994- and the not availability of comparable data for 2006 and 2007 impossibility us to include the data for those years. Because of that, we use data only from 1990 to 2005. The characteristics of the methodology applied in this section make that the absence of this data does not modified sensitively the results and political implications of this section. In spite of that, the shortage of data represents a limitation for our analysis. Additionally, we use -as an indicator of the relative international prices- a real exchange rate measure elaborated by the Colombia Central Bank that consider the prices of 21 countries that are related with Colombia.

Table 2. Johansen Cointegration Test

Trace test: Antioquia		
<i>Hypothesis</i>	<i>Trace Statistic</i>	<i>Critical Value</i>
None*	62.77216	42.91525
At most 1*	29.08995	25.87211
At most 2*	12.55149	12.51798
Maximum Eigenvalue		
<i>Hypothesis</i>	<i>Max-Eigen Statistic</i>	<i>Critical Value</i>
None*	33.68221	25.82321
At most 1	16.53846	19.38704
At most 2*	12.551	12.51798
* denotes rejection of the hypothesis at the 0.05 level		

Trace test: Bogotá		
<i>Hypothesis</i>	<i>Trace Statistic</i>	<i>Critical Value</i>
None*	57.45971	29.79707
At most 1	13.41733	15.49471
At most 2	0.302679	3.841466
Maximum Eigenvalue		
<i>Hypothesis</i>	<i>Max-Eigen Statistic</i>	<i>Critical Value</i>
None*	44.04238	21.13162
At most 1	13.11465	14.26460
At most 2	0.302679	3.841466
* denotes rejection of the hypothesis at the 0.05 level		

Trace test: Bolivar		
<i>Hypothesis</i>	<i>Trace Statistic</i>	<i>Critical Value</i>
None*	93.61487	29.79707
At most 1*	16.43610	15.49471
At most 2	3.302245	3.841466
Maximum Eigenvalue		
<i>Hypothesis</i>	<i>Max-Eigen Statistic</i>	<i>Critical Value</i>
None*	77.17877	21.13162
At most 1	13.13386	14.26460
At most 2	3.302245	3.841466
* denotes rejection of the hypothesis at the 0.05 level		

Trace test: Magdalena		
<i>Hypothesis</i>	<i>Trace Statistic</i>	<i>Critical Value</i>
None*	55.78793	42.91525
At most 1	25.67575	25.87211
At most 2	6.710394	12.51798
Maximum Eigenvalue		
<i>Hypothesis</i>	<i>Max-Eigen Statistic</i>	<i>Critical Value</i>
None*	30.11218	25.82321
At most 1	18.96535	19.38704
At most 2	6.710394	12.51798
* denotes rejection of the hypothesis at the 0.05 level		

Trace test: San Andrés		
<i>Hypothesis</i>	<i>Trace Statistic</i>	<i>Critical Value</i>
None*	49.65071	42.91525
At most 1	15.76191	25.87211
At most 2	4.312569	12.51798
Maximum Eigenvalue		
<i>Hypothesis</i>	<i>Max-Eigen Statistic</i>	<i>Critical Value</i>
None*	33.88880	25.82321
At most 1	11.44934	19.38704
At most 2	4.312569	12.51798
* denotes rejection of the hypothesis at the 0.05 level		

Source: Author's calculations.

We first proceed to identify the order of integration of the series by applying the Augmented Dick y Fuller (ADF) unit root test following the technique of Dolado, Jenkinson y Sosvilla-Rivero (1990), detecting that the series are integrated of order 1. The second step consists in the application of the cointegration tests proposed by Johansen (1988), which identify a unique cointegration relationship among the per capita *GDP*, the real tourism expenditure (*TE*) and the real exchange rate (*RER*) for each region. We estimate a VAR with 2 lags (according to the minimum AIC) and test the cointegration relationship. Table 2 indicates that one co-integrating relationship is obtained.

To do inference, we need to conduct the weakly exogeneity test on *TE* and *RER*. The results are included in the following table 3.

Table 3. Likelihood ratio (LR) test

<i>Region</i>	<i>X square</i>	<i>P-value</i>
<i>Antioquia</i>	7,431	0,024
<i>Bogotá</i>	3,926	0,340
<i>Bolívar</i>	4,466	0,307
<i>Magdalena*</i>	30.54	0,005
<i>San Andrés and Providencia*</i>	30.23	0,006
*denotes rejection of the hypothesis at the 0.01 level		

Source: Author's calculations.

Null hypothesis: Weak exogeneity of both *TE* and *RER*

We find that the real tourism expenditure variable is weakly exogenous for each region. For Magdalena and San Andrés y Providencia, the overall likelihood ratio test indicates that we can reject the null hypothesis of weak exogeneity of *TE* and *RER*. In all these cases, the cause of rejection is the *RER* variable. Given that we are mostly interested in the long run relation between *TE* and per capita *GDP*, this situation is not relevant.

From the other hand, the weak exogeneity of *TE* is an important fact, allowing us to draw inference in respect to the effects of the real tourism expenditure on economic growth. We also use the Likelihood Ratio (LR) test to verify the existence of a lineal trend, obtaining that this element is present in each region except for Magdalena.

We can write the mentioned cointegration relationship as the following equation (1):

$$(GDP)_t = \beta_0 + \beta_1(TE)_t + \beta_2(RER)_t + \beta_3(trend)_t$$

where -in particular- β_1 is the elasticity of per capita *GDP* with respect to *TE* and represents the % long run increase in per capita *GDP* produced by an increase of 1% in *TE*. Table 4 shows the values of parameters β_0 , β_1 , β_2 y β_3 for the different regions.

Table 4: Parameters of equation (1) for the different regions

Region	β_0	β_1	β_2	β_3
Antioquia	6,9923	0,6216	-0,0007	0,0094
Bogotá	7,0864	0,6268	-0,0004	-0.0192
Bolívar	11,3254	0,2062	0,0219	0,0227
Magdalena	7,8935	0,5657	-0,0030	-
San Andrés and Providencia	33,3408	1,7990	0,0011	0,1095

Source: Author's calculations.

At this point we can answer affirmatively the two questions formulated in the introduction related to this section: 1) there is a long run equilibrium relationship between tourism and economic growth in all the regions under study; 2) there is a unidirectional causal relationship from tourist to economic growth. In particular this implies that the TLGH cannot be rejected for the five regions.

We can also observe that the value of the elasticity β_1 is considerable for all regions. Special attention requires the region of San Andrés and Providencia, presenting an impressive value of elasticity- 1.79- implying that an increase of 1% in tourism expenditure in San Andrés generates an increase of 1.79% in per capita *GDP* of the region. This implies that tourism could be considered as an strategic sector to elaborate development policies for this region. Additionally, we include the values of β_0 , β_2 y β_3 , the parameters related to the constant, *RER* and a linear trend in the VEC respectively. Those parameters allow us to write the long run relationship between the considered variables.

Note the fact that a high participation of tourism in per capita *GDP* (i.e., TE/GDP where *TE* is the portion of *GDP* generated by the tourist sector) is compatible with a low elasticity (β_1) of *GDP* with respect to tourism. This is the case of Bogotá. By the contrary, Bolivar presents high participation of tourism and a relatively low elasticity. Any combination is possible given that the elasticity β_1 is the product of two factors: the ratio TE/GDP and the derivative $\partial GDP/\partial TE$:

$$\beta_1 = \frac{\partial GDP}{\partial TE} \frac{TE}{GDP}$$

In addition, a low share TE/GDP can be compensated by a high $\partial GDP/\partial TE$ to produce a high value of β_1 . Then when TE/GDP is low and β_1 is high, an increment of one unit in TE can produce a high impact on the growth of GDI because of the magnitude of $\partial GDP/\partial TE$.

The effect of RER on GDP is different depending on the considered region. While in three of the regions –Antioquia, Bogotá y Magdalena- there is a negative coefficient, in Bolivar and San Andrés and Providencia, the RER and the GDP are positive correlated.

Comparing results

Table 3 shows the results of previous empirical papers investigating the TLGI for other Latin-American regions. The papers included in the table have been selected for the econometric approach. We focus here in a comparison with Latin American regions, excluding European regions. The reason of this choice is because our interest is to compare destinations with similar structural characteristics. The Latin American regions have common aspects between them while not have too many similarities with the European regions.

The table shows the elasticity of per capita GDP with respect to tourism. Even when there are differences, the values of that elasticity in our study are in line with the results summarized in Table 5. Notice that the elasticity of San Andrés and Providencia is by far the largest among the sample. It remarks the notable impact of tourist on the economic growth of the islands in the last three decades.

Table 5. Previous empirical results for the TLGI in Latin American countries

Country	Period	Periodicity	β_1	Paper
Mexico	1980-2007	quarterly	0.69	Brida et al. (2008a)
MERCOSUR and Chile	1990-2000	Annual	0.74	Gardella and Aguayo (2002)
Colombia	1907-2007	quarterly	0.51	Brida et al. (2009a)
High and medium income Latin American Countries	1985-1998	Annual	-	Eugenio-Martin et al. (2004)
Low income Latin American Countries	1985-1998	Annual	-	Eugenio-Martin et al. (2004)
Chile	1988-2008	Annual	0.81	Brida et al. (2009b)
Uruguay	1987-2006	quarterly	0.42	Brida et al. (2008b)

Source: Author's calculations.

The comparison of the regional elasticity with Colombia as a whole shows that three of the regions presents similar elasticities to the national, while Bolivar presents a low elasticity and San Andrés and Providencia a high elasticity in relation with the elasticity of the country. This shows the importance of the regional analyses, considering the high dispersion between different regions of a country. The impact of tourism on per capita GDP depends on the characteristics of each region.

Conclusions

Tourism is considered as an important source of foreign exchange earnings, employment of domestic labor and a source of growth for a country. Many governments these days recognize the important role of tourism in both economic growth and social progress, and this is why they try to exploit their tourism potential. The purpose of this paper is to analyze the impact of the tourism sector on the economic growth of five tourism destinations of Colombia. Tourism is a key aspect of the Colombian economy for its importance in creating value-added, employment and income. This is particularly true at a regional level.

The cointegration analyses confirm the hypothesis of a positive relationship linking real per capita GDP, real tourism expenditure and the real exchange rate for the five Colombian regions considered. The tourism real expenditure is weakly exogenous and allow us to establish log run relation between these variables. The elasticity of the GDP per capita with respect to e real expenditure varies from 0.20 to 1.79. Antioquia, Bogotá and Magdalena presents similar elasticity to Colombia as a whole –about 0.60-, while Bolivar presents a relative low elasticity –about 0.20-. The case of San Andrés and Providencia is really remarkable, presenting an elasticity of 1.79, which means that a 1% increase in the real expenditure produces, in the long-run, an increase of 1.79% in GDP per capita. This results show us the importance of regional analysis of the effects of expenditure in GDP per capita, taking in consideration the local characteristics of each region.

From this analysis is possible to elaborate interesting political recommendations. The concept of elasticity shows us the effect in the per capita GDP of an increase in the tourism expenditure. In that sense, regions with high value of this parameter can see that politics for increase the tourism expenditure will have a big effect in the population welfare and from this point, they can accentuate that kind of politics.

As future line of research, those methodologies could be extended to other regions of developing countries that would allow us to make new comparisons

and elaborate new political recommendations. The big limitation for that is the absence of disaggregated data available in main of the developing countries.

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