TOURISM – ECONOMIC GROWTH NEXUS.
THE CASE OF ROMANIA

Alina BADULESCU[1], Daniel BADULESCU[2*],
Ramona SIMUT[3], Simona DZITAC[4]

[1, 2, 3]*Department of Economics and Business, Faculty of Economic Sciences,
University of Oradea, Oradea, Romania*
[4]*Department of Energy Engineering, Faculty of Energy Engineering and Industrial Management,
University of Oradea, Oradea, Romania*

Abstract. The development of tourism is usually associated, in positive terms, with economic development, foreign currency inflows, employment opportunities, infrastructure improvements, sustainable development and poverty alleviation. However, the nature of the tourism-growth relationship is still a matter of academic debate, and, perhaps, an expression of the inconsistencies and contradictions of public policies designed to support this industry. Researchers and practitioners have not yet come to an agreement on a number of fundamental questions: does tourism stimulate economic growth or the converse, and whether the causality, if it does exist, is uni or bidirectional, is constant or can change its direction in the medium - or long run. The present paper investigates the relationship between Gross Domestic Product (GDP) per capita and international tourism in Romania, over the 1995–2016 period. Our results show that the causal effect of the GDP on the international tourist arrivals and on the international tourism receipts is significant in the long run in Romania. In the short-run, we find a unidirectional causal relationship from the international tourism receipts to GDP, and a bidirectional causal relationship between GDP and the number of international tourist arrivals.

Keywords: international tourism, economic growth, TLGH, GTLH Romania, Johansen cointegration test, Granger causality.

JEL Classification: Z32; F43; L83; R11.

Introduction

According to the World Tourism Organization (2018), the growth of international exchanges, the promotion of new destinations and the massive investments in tourism in the last decades contributed to the transformation of this industry into a key factor of development, job creation and business enhancer, infrastructure developments and an increase in export

incomes. The share of tourism in the global economic activity is estimated at ca. 10% of the world's GDP, 7% of global trade and almost 10% of total jobs (World Tourism Organization [WTO], 2019). In the last decade, the growth rate of worldwide international tourist arrivals (overnight visitors) is almost double that of the global economy. These figures could be even greater if we also consider the indirect effects of tourism development to other economic sectors. Thus, according to the World Travel & Tourism Council [WTTC], travel and tourism is one of the largest sectors, covering 10.4% of world GDP (WTTC, 2019), and the benefits are particularly significant in developing countries. International tourism generates income growth, increases competition and efficiency among local firms, by connecting them to the international network of tour-operators, and, not least, by creating economies of scale in small firms (Balaguer & Cantavella-Jorda, 2002).

The development of tourism industry has become a significant issue in numerous countries, both theoretically and practically, by designing and adopting various policies and stimuli. Thus, tourism has been positively associated to economic development, monetary gains, generation of employment opportunities, infrastructure improvements, sustainable development and the reduction of poverty, but also associated to more sensitive and ambivalent topics, such as social and environmental impact, cultural values etc. International tourism incomes can be assimilated to an alternative form of export, both through the direct revenues of tourism services, as well as by stimulating the consumption of local products (in other words, stimulating the *export* of said products). Tourism improves the development opportunities of small, local businesses (Watkins et al., 2018). In other words, tourism is a source of revenue based on *in situ* consumption (Cortés-Jiménez et al., 2009). Implicitly, this type of consumption isn't limited through a development of tourism in a given (social, geographical) context, but to other sectors of the national or local economy, through spill-overs and externalities (Balaguer & Cantavella-Jorda, 2002). Finally, tourism contributes to generating investments flows and financial resources for local and central public administrations, and thus contributes to solving social issues by improving employment opportunities and the standard of living, as well as by harmonising the rate of local and regional growth (Sehleanu, 2019). The interest in analysing tourism with respect to economic growth and government policies also stems from the fact that tourism (as an export supplier) can be a complementary channel consolidating economic growth (Lanza & Pigliaru, 2000), being taken into account in policies, strategies and promotional actions by governments (Cortés-Jiménez et al., 2009). However, there are researchers considering that the role of tourism as a substitute of imports and a source of monetary gains should not be exaggerated, due to its extreme sensitivity to external competition, high prices' elasticity, unforeseen external events (disasters, epidemics, and terrorism), fashion and seasonal changes (Mathieson & Wall, 1982; Bac & Aksoz, 2017).

All in all, investigating the direction of the complex relationship between tourism and economic growth is essential in providing evidence to be employed in shaping economic policies regarding the development of tourism industry.

This study focuses on the case of Romania, an emerging Eastern European economy with a particular situation of tourism ressources versus tourism industry contribution to GDP. The expectations of transitional and emerging countries regarding tourism as a driver of economic growth, but also as beneficiary of reforms and political and economic trans-

formation (especially in Central and Eastern Europe) are considerable and have a history of over 20 years. Romania is an epitome of this situation: endowed with a significant touristic heritage, it experienced a decline of internal tourism in the first decades after 1990, and an increased dynamism of outbound flows. Slowly, these tendencies were counterbalanced by the growth and continuous adaptation of accommodation capacity, a revival of inbound flow, a balancing of touristic inflows and outflows, and a slow but steady growth of the share of tourism in the GDP. This begs the question, to what extent is this rebound of tourism due to Romania's economic growth in the last decade and to what extent has tourism contributed to said growth. We consider that the answers are relevant not only to this specific case, but also in regional (and wider) terms, considering the necessity of intelligent and efficient policies aiming to exploit touristic potential and harmonize the evolution of the tourism sector to the overall development of the world's regions and states.

Therefore, this study investigates the nexus between international tourism (expressed by both international tourist arrivals and international tourism receipts) and economic growth (measured by GDP per capita) for the case of Romania. We examine all the directions of this nexus, i.e. the tourism-led economic growth hypothesis (TLGH) and the economy-driven tourism growth hypothesis (EDTGH), by using the Johansen cointegration test and Granger causality for the 1995–2016 period of time. The (remaining part of the) paper is organized as follows. In Section 1 we present a literature review on the hypotheses of the tourism-economic growth relationship on an international and Romanian level. In Section 2 we present the data and methodology, in Section 3 the calculations and in Section 4 we discuss the results. In the last section we present a brief conclusion of the results obtained in this study, policy recommendations and the limitations of the study.

1. Literature review

1.1. Hypotheses on tourism – economic growth nexus: international overview

While the existence of a tourism-growth relationship is accepted and empirically proven in numerous cases and regional contexts, there is yet no consensus on its fundamental aspects, e.g. its direction, strength and time-dependence. In other words, does tourism stimulate economic growth or is the converse true? Is there a causality relationship between the two, and, provided that it exists, is it uni- or bidirectional, and can it change its direction on the medium or long-term? Empirical literature on the causal relationship between tourism and economic growth groups these hypotheses in four main categories.

The first is the tourism-led growth hypothesis – TLGH (or TLEG), which states that tourism is a major driver for economic growth. The second is the growth-led tourism hypothesis – GLTH (or *economic driven tourism growth hypothesis* – EDTG), which considers that economic growth contributes to the development of the tourism sector. The third considers a bidirectional relationship between them (*bidirectional causality hypothesis* – BC). Finally, the last view (the fourth) is that of neutrality (*no causality hypothesis* – NC).

TLGH is by far the most supported model (as shown by a varied and significant body of economic literature), a model which is based on variate model and techniques (cross section and panel data, VAR or VECM, ARDL, ARCH, GARCH, input-output analysis).

The TLGH hypothesis is demonstrated by Balaguer and Cantavella-Jorda (2002) in the case of Spain between 1975–1997, who include in the model the evolution of real GDP, international tourism receipts, and the effective real exchange rate; Durbarry (2004) in the case of Mauritius for the relationship between real exports and real GDP between 1952 and 1999; Hye and Khan (2013) in the case of Pakistan, who identify the relationship as most significant in the long run; Kibara et al. (2012) for Kenya, both long and short term. Arslanturk and Atan (2012) for Turkey, Tang and Tan (2015) for Malaysia, and Mishra et al. (2011) for India, support a long-term one-way causality between tourism activities and economic growth, while Akinboade and Braimoh (2010) for South Africa additionally support a short-term causality. Jalil et al. (2013) for Pakistan between 1972–2011, and Brida et al. (2008) for Chile, also found out that economic development in the above-mentioned nations was supported by the development of international tourism. Sanchez Carrera et al. (2008) for 1980–2007 in Mexico, and Bento (2016) for 1995–2015 in Portugal, confirm the TLGH hypothesis, i.e. that tourism development precedes economic growth. In the case of Greece, both Eeckels (2012) for 1976–2004, and Bayramoğlu and Arı (2015) for 1980–2013, found unidirectional causality, i.e. from the spending of foreign tourists to economic growth. Other studies confirm TLGH for groups of countries, such as Schubert et al. (2011) on small island economies dependent on tourism between 1970 to 2008, Caglayan et al. (2012) who found a unidirectional causality from tourism to economic growth in the case of 135 East and South Asian economies, and a unidirectional causality but this time from economic growth to tourism in the case of Latin America and Caribbean economies (Gwenhure & Odhiambo, 2017), or Fahimi et al. (2018) on several small states over the period 1995–2015. Lee and Chang (2008), analysing OECD and non-OECD countries for the interval 1990–2002, state that TLGH holds only for OECD economies. Sequeira and Nunes (2008), analysing a few groups of countries (including small and developing countries), from 1980 to 2002, discover a unidirectional tourism-to-growth relationship, but weaker in small and developing countries. Cárdenas-García et al. (2015) classify 144 countries into 2 groups, based on unequal socioeconomic development, and discover that tourism foster economic growth mostly in developed economies. In economies with a lower level of economic development, while tourism did positively influence economic growth, it did not ensure the countries' or local economies' prosperity.

A second perspective, the GLTH claims that economic growth determines the development of tourism. By various methods and tests (bivariate model, VAR and Granger causality tests, Toda-Yamamoto causality or ARDL bounds testing), the relationship is confirmed by Oh (2005) for 1975–2001 in South Korea, by Katircioglu (2009a) for Cyprus, and by Payne and Mervar (2010) in the case of Croatia (2000–2008).

The third perspective is grounded on a series of studies which highlight, at least for a certain number of countries and time-frames, a bidirectional influence of tourism and economic growth. Thus, analysing international tourism in Greece for 1960–2000, Dritsakis (2004), by Johansen cointegration and error correction, supports a bidirectional influence between international tourism and growth. By similar methods and tests, the same relationships are identified in Turkey for 1980–2004 (Demiroz & Ongan, 2005), Taiwan between 1959 and 2003 (Lee & Chien, 2008) and 1956 to 2002 (Kim et al., 2006), Ecuador (Rivera, 2017), Italy

and Spain from 1954 to 2000 (Cortés-Jiménez et al., 2009). In addition to these studies, which refer to a single or at most two countries, a number of studies identify a bidirectional relationship between tourism and growth for groups of countries or regions, such as Tugcu (2014) for Mediterranean countries between 1988 and 2011, Apergis and Payne (2012) for nine Caribbean countries, Dogru and Bulut (2018), for seven European countries, Chou (2013) for 10 European emerging economies between 1988–2011, or Lee and Chang (2008) for several non-OECD economies.

The last hypothesis, that of neutrality, claims the non-existence of causality between tourism and growth, as encountered in the works of Brida et al. (2011) for Latin America, Katircioglu (2009b) (insignificant or unconvincing causal relation) and Ozturk and Acaravci (2009) both for Turkey, Kasimati (2011) for Greece, or Tang and Jang (2009) for US.

1.2. The relationship tourism – economic growth in Romania

While Romanian tourism is of substantial interest to Romanian (and occasionally international) researchers, systematic analyses of the relationship between tourism and economic growth are relatively few. In the following paragraphs we will summarise the most important contributions to the topic.

Surugiu et al. (2009) analysed tourism's importance and contribution to the Romanian economy between 1990 and 2008, a period characterised by a decline in tourism activity. Using Input – Output analysis, the authors found a relatively low potential for economic operators in tourism to increase the supplies for sectors using the tourism product in their production (Surugiu et al., 2009).

In another study, C. Surugiu and M.-R. Surugiu (2013) found that TLGH holds for Romania (C. Surugiu & M.-R. Surugiu, 2013). In other words, the authors highlight the fact that tourism exerts a significant impact on growth and, thus, the demand for internal tourism should be encouraged, while also monitoring the noticeable increase in the outbound Romanian tourism. Promoting national tourism destinations, improving the infrastructure and diversifying recreational facilities must take place concurrent with increasing awareness of the general benefits resulting from supporting internal tourism.

Finally, C. Surugiu and M.-R. Surugiu (2015), reinterpret the results of Zaman et al. (2010), by applying and developing the Generation of Regional Input – Output Model on a specific region of Romania. The authors insist on the significance of the obtained results, which need to be extended to the other regions of Romania, in order to provide theoretical arguments for policies supporting tourism, as well as to better value the natural and cultural heritage of tourism (Zaman et al., 2010).

Without supporting or explicitly mentioning any of the above-mentioned theories (TLGH, GTLH), other studies and articles highlight the potential and good growth rates of tourism in Romania, while also mentioning the precarious state of the infrastructure, the lack of vision of sectorial or macroeconomic policies, and the overall state of economic development as hindrances in fully capitalising the potential of this sector (Mazilu et al., 2018), as well as the imperative of Romania not being considered an interesting, yet *peripheral* destination of international tourism (Postelnicu & Dabija, 2018).

Other figures and opinions on the tourism contribution to the national economy are provided by Romanian country reports issued by WTTC, the most recent being *Travel & Tourism Economic Impact 2018. Romania* (WTTC, 2018). While not explicitly stated, WTTC supports (through promoted indicators – direct and indirect contribution to GDP, employment, visitors, exports and investments) the TLGH hypothesis, i.e. travel and tourism are a significant economic activity in most countries, with direct, indirect and induced economic effects (WTTC, 2012). According to these studies, in 2017, in Romania, the tourism direct contribution to GDP was USD 3,024.1 million (1.4% of total GDP), with prognosis to rise by 4.6% in 2018, and to 2.1% per annum, from 2018–2028, to 1.5% of total GDP in 2028. The total contribution of travel & tourism to GDP was USD11, 185.7 million (5.3% of GDP in 2017), and is forecast to rise by 5.5% in 2018–2028. Regarding the relative importance of the overall contribution of travel & tourism sector to GDP, out of 185 countries, Romania (2017) is ranked the 59th (in absolute terms), and the 150th (in relative size), which could improve in the next decade to the 44th place (WTTC, 2018).

Moreover, the tourism-growth relationship for Romania is encountered in other panel analysis studies, alongside other countries (grouped by various criteria: regional, level of development etc.). The framing of Romanian tourism into one of the four theories according to each paper is presented in Table 1.

In conclusion, based on empirical studies listed above, different results have been obtained for Romania, such as: a majority of studies which describe a unidirectional causality support the TLGH hypothesis rather than the EGTH. However, a few studies show a bidirectional causality, but only in the short term.

Table 1. Empirical studies on the tourism-growth causal relationship in Romania (source: own elaboration)

Author/s and publication's year	Method	Conclusion	Obs
C. Surugiu and M.-S. Surugiu (2013)	Vector error correction model (VECM)	Tourism-led growth hypothesis was confirmed for domestic tourism	Romania 1988–2009 Variables: GDP growth, exchange rate and tourism consumption (domestic and international tourism)
C. Surugiu, Frent, and M. Surugiu (2009)	Input-Output model (IO model)	Very low output, income, value added, and employment multipliers	Romania, 1990–2008 Variables: tourism demand, output, income, employment and value added
Zaman, Vasile, M.-R. Surugiu, and C. Surugiu (2010)	Input-Output model (IO model)	Decreasing share of tourism in overall national output. Tourism registers small multipliers	Romania, 2000–2008 Variables: tourism arrivals, output, wage earnings, employees and value added
C. Surugiu and M. R. Surugiu (2015)	A regional Input-Output analysis	Lower backward or forward regional multipliers for tourism compared to other sectors	Romania, 2008, Variables: tourism demand, output, gross value added

Author/s and publication's year	Method	Conclusion	Obs
WTTC (Country Report Romania) (2018)	Sum of (1) direct, (2) indirect (inter-industry linkages), and (3) induced (incomes earned directly and indirectly in the local economy) impacts	Contribution of Travel & Tourism sectors to Romanian economy (2017) was: – 5.3% in total GDP; – 6.3% in total employment; – 8.1% in total investment	Romania, 2017–2018
Biji, Lilea, Vătui, and Roșca (2015)	Multi-criteria analysis by the method of ranks and the method of relative distance; The linear trend function; The second-degree parabola.	For the market share of tourist demand time series (number of nights spent in the main tourism region/ total country), it is observed that both functions indicate increasing trends for five regions, decreasing trends for 11 regions, and opposite tendencies, with increasing linear function in 8 regions and with increasing second degree parabola in 3 regions	EU Members State (countries and regions), including Romania, 1998–2011
Badulescu, Simut, and Badulescu (2018)	Autoregressive Distributed Lag (ARDL) model	Between tourism (international arrivals, and, respectively, international receipts) and GDP, exist: – a short-run bidirectional relationship; – a long-run unidirectional relationship	Central and Eastern European economies, including Romania, 1995–2015 Variables: GDP per capita and international tourism
Cárdenas-García, Sánchez-Rivero, and Pulido-Fernández (2015)	Structural Equation Model (SEM)	TLGH validated for Romania	144 countries, including Romania, 1991–2010 Variables: multiple
Škrabić Perić and Vidović (2017)	Heterogeneous Panel Granger causality test	Bidirectional Granger causality GDP – tourism for 5 European emerging economies	11 economies, including Romania, 1995–2013 Variables: GDP and international tourism receipts
Chou (2013)	Panel causality analysis	Tourism–growth relationship significant, but no significant relationship between the per capita real GDP and domestic tourism spending (neutral relationships) in Romania, Bulgaria and Slovenia	10 transition countries, including Romania, 1988–2011 Variables: GDP per capita and domestic tourism spending

Author/s and publication's year	Method	Conclusion	Obs
Martins, Gan, and Ferreira-Lopes (2017)	Panel data Poisson regression model and Standard methods for panel data with real valued dependent data	Real expenditures per arrivals has a quite lower effects on GDP	218 countries, including Romania, 1995–2012 Variables: World GDP per capita, nominal exchange rate, relative prices, and tourism demand (inbound number of visitors and tourism expenditures)
Sánchez-Rivero, Pulido-Fernández, and Cárdenas-García (2013)	Canonical correspondence analysis	Inconclusive results – Country with medium economic growth and medium to weak tourism growth	177 countries, including Romania, 1999–2008 Variables: the growth of tourism (6 indicators) and economic development (8 indicators)
Arezki, Cherif, and Piotrowski (2009)	Instrumental variables techniques (IV)	Positive relationship between tourism receipts and growth (however, the impact of tourism on economic growth should not be overestimated)	127 countries, including Romania, 1980–2002 Variables: GDP per capita and tourism receipts

2. Data and methodology

In order to investigate the presence of the relationship between the Romanian GDP per capita (constant 2010 US$) (GDP) and international tourism in Romania, measured by the number of arrivals (ARIV), and also the presence of a relationship between GDP per capita (in constant 2010 US$) (GDP) and international tourism measured by the international tourism receipts (expressed in current US$) (REC), this study employs the Johansen cointegration test and Granger causality. We used data provided by The World Bank database (2017). Given the limited availability and accessibility of the data, this study refers to the period 1995–2016. Table 2 presents the descriptive statistics for the dataset.

Table 2. Descriptive statistics (source: World Development Indicators (The World Bank, 2017))

	Variables		
	GDP	ARIV	REC
Minimum	4779.7	4794000	306000000
Maximum	10065.5	10223000	2630000000
Mean	7048.64	6733682	1290000000
Median	7121.6	6318500	1480000000
Std. Deviation	1816.72	1642634	789000000
Skewness	0.0377	0.4658	0.0571
Kurtosis	1.4823	2.0186	1.3872

According the descriptive statistics, all the variables are positively skewed and have a small kurtosis. Natural logarithms are used to transform the variables to ease the interpretation of the parameters and to avoid any problems of heteroscedasticity.

To test the long-run relationship between time-series variables, during the last two decades, a variety of econometric methods have been used. Although the econometric analysis of the time series starts from the assumption that the data in the observed time series have the stationary property, most economic time series do not satisfy the stationary conditions due to the many changes in the business environment. Thus, aspects regarding the importance, the consequences and the modalities of testing and realization of stationary assumptions become very important in the analysis of time series. Therefore, in order to test the relationship and the causality between the selected variables, firstly we examine the stationarity of all the variables. The next step is to test for cointegration in order to determine if the long-run equilibrium relationship between the selected variables exist or not, and the third step is to test the causality in order to find the type and the direction of the relationship.

Starting from these variables, i.e. GDP, ARIV and REC, we have stated and tested the following three hypotheses:

H1: For Romania, there is a long-run equilibrium that characterizes the relationship between tourism and economic growth.

H2: For Romania, there is a unidirectional relationship between international tourism and GDP: tourism-led economic growth hypothesis (TLGH) or the economy-driven tourism growth hypothesis (EDTGH).

H3: For Romania, there is a bidirectional relationship between economic growth and tourism.

3. Calculation

The analysis starts by investigating the stationarity or unit root test of the variables number of international tourist arrivals (ARIV), international tourism receipts (REC) and GDP per capita (GDP), see Table 3. We use the most common test, the Augmented Dickey Fuller test (see Dickey & Fuller, 1979).

The unit root test results (ADF test) indicates that the null hypothesis is rejected at the 5% significance level after the first difference for ARIV variable and REC variable, while for GDP the null hypothesis is rejected at the 10% significance level after the first difference. Thus, it can be concluded that all variables have a unit root. Because the series are stationary at the first difference, these are integrated of order one, I(1). If the series of data are non-stationary at the level, they can be cointegrated, i.e. there is at least one linear combination between them that is stationary. Because the variables have the same order of integration I(1), the condition to be cointegrated is respected.

Johansen (1988) and Johansen and Juselius (1990) derived a procedure, maximum likelihood, that overcame the limitation of univariate cointegration (Johansen & Juselius, 1990). In order to examine the existence of a cointegration between the selected variables, the methodology we use to estimate the model parameters is that proposed by Johansen (1991) and Johansen & Juselius (1990), according to which the null hypothesis of non-cointegration will be tested.

Table 3. Unit root test results (ADF test) (source: own calculations using Eviews 9)

H_0: the series has a unit root H_1: the series is stationary		Log values		
		LGDP	LARIV	LREC
ADF (level)	None	3.597958 (0.9996)	1.397137 (0.9542)	0.906403 (0.8959)
	Intercept	0.077361 (0.9559)	–0.105441 (0.9367)	–0.561286 (0.8596)
	Trend & intercept	–1.654713 (0.7350)	–2.805906 (0.2104)	–1.895031 (0.6213)
ADF (1st diff)	None	–2.088676 (0.0381)	–3.650701 (0.0010)	–3.262762 (0.0025)
	Intercept	–2.828529 (0.0721)	–3.950526 (0.0074)	–3.298809 (0.0288)
	Trend & intercept	–2.824689 (0.0812)	–3.967131 (0.0280)	–3.221693 (0.1084)
The order of integration		I(1)	I(1)	I(1)

Note: p-value are in () and the optimal lag length is determined based on Akaike, Schwarz and Hannan-Quinn info Criterion.

To determine the number of cointegration relationships we can use the following two types of LR (*likelihood ratio*) tests, namely the Trace test (LR_{max}) and the Maximum Eigenvalue test (Johansen & Juselius, 1990; MacKinnon et al., 1999; Enders, 2014; Andrei & Bourbonnais, 2017). In the case of the Trace test, the null hypothesis is that of the non-existence of a cointegration relationship between variables. This is accepted when the statistic value is less than the critical one (statistic < λ critical, for 1% and 5% significance level). The Trace statistic is:

$$\text{Trace} = -T \sum_{i=r+1}^{k} \log(1-\hat{\lambda}_{r+1}). \tag{1}$$

In the case of Maximum Eigenvalue test we have:

$$\lambda_{max}(r, r+1) = -T\log(1-\hat{\lambda}_{r+1}). \tag{2}$$

The null hypothesis is H_0: r cointegration relationship, while the alternative one is H_1: $r + 1$ cointegration relationship, for $r = 0, 1, ..., k - 1$.

The critical values are determined by several authors (Johansen & Juselius 1990; MacKinnon et al., 1999), and differ as the series have a deterministic constant and/or trend, respectively the cointegration equations contain a constant and/or a deterministic tendency.

Table 4. Cointegration test results (source: own calculations using Eviews 9)

Variables	Hypothesized No. of CE(s)		Trace statistic	Max-Eigen statistic	Critical Value (5%)	
					Trace	Max-Eigen
LGDP/LARIV	None	H_0: $r = 0$	21.05**	20.61**	15.49	14.26
	At most 1	H_0: $r \leq 1$	0.44	0.44	3.84	3.84
LGDP/LREC	None	H_0: $r = 0$	16.77**	12.80**	12.32	12.22
	At most 1	H_0: $r \leq 1$	4.97	4.97	4.12	4.12

Note: Lags interval (in first differences): 1 to 1. ** denotes significant at 5% significance level. r denote the number of cointegrated vectors.

Based on the Trace test statistic results and the Max-Eigen test statistic results (see Table 4), we notice that the null hypothesis of no cointegration relationship between the variables is rejected so the alternative hypothesis of at least 1 cointegration equation is accepted, at 5% significance level. As Granger (1981) and Engle and Granger (1987) state, if there is cointegration between two time series, there is a long-run effect that prevents the two time series from separating from each other.

In order to identify a possible long-run equilibrium between the variables number of ARIV, REC and GDP, we will apply the Johansen cointegration test. According to the results obtained from the Johansen-Juselius Cointegration Tests, we can decide the appropriateness of applying the vector error correction model (VECM). After normalizing the cointegrating vector to estimate the error correction model (ECM) of the dynamic structure we have (Andrei & Bourbonnais, 2017):

$$y_t = \alpha_1 + \beta_1 x_t + \varepsilon_t, \tag{3}$$

where: y_t – is the endogenous variable, x_t – is the exogenous variable, $\alpha_1,\ \beta_1$ – parameters, ε_t – the random variable.

The error correction term can be derived from the previous equation:

$$EC_t = y_t - \alpha_1 - \beta_1 x_t. \tag{4}$$

The equation becomes:

$$\Delta y_t = a_0 + \delta EC_{t-1} + \sum a_{1j}\Delta y_{t-j} + \sum a_{2j}\Delta x_{t-j} + u_t. \tag{5}$$

In order to accomplish the system to converge to equilibrium, the adjustment coefficient should be negative in sign. A positive sign would implicate that the system diverges from the long-run equilibrium path (Greene, 2011).

4. Results and discussion

The presence of cointegration between variables indicates a long run relationship between them. Therefore, the vector error correction model (VECM) can be applied. The long run relationship between the number of international tourist arrivals (ARIV) and GDP per capita, respectively between international tourism receipts (REC) and GDP per capita for one cointegrating vector, for the case of Romania, is presented in Table 5.

The results show that the causal effect of the GDP on the ARIV and on the REC variable is significant in the long run, the estimated adjusted coefficients are statistically significant and relevant, as p-values are less than 0.05. The negative sign of this coefficients indicate that a long-run equilibrium characterizes the relationship between the mention variables. Therefore, the results confirm the first hypothesis (H1) of this study. On the other hand, with respect to the long-term causal effect of the ARIV and the REC variable on the GDP, we observe positive values which presuppose that the system deviates from the long-term equilibrium path. So, the long-term causal results show their divergence in the direction ARIV on the GDP, respectively the REC variable on the GDP. The short-run coefficients indicate convergence and significant results from GDP to the ARIV, from the REC to GDP and also from the ARIV to GDP. Regarding the short-term causal results of GDP on the REC, the short-term causal results indicate divergence and non-significant coefficients.

Table 5. VECM and Granger causality tests (source: authors' estimates using Eviews 9)

Causality direction	Error correction term (ECT) [t-statistic] (p-value)	Short-run Coefficient [t-statistic] (p-value)	Lag coefficient [t-statistic] (p-value)	F-statistic (p-value)
LARIV → LGDP	0.377509*** [2.60] (0.01)	0.249224* [1.78] (0.09)	0.063983 [0.22] (0.82)	3.533034** (0.03)
LGDP → LARIV	−1.53275*** [−5.21] (0.00)	1.104846** [2.23] (0.04)	0.808672*** [3.37] (0.00)	9.441875*** (0.00)
LREC → LGDP	0.249019** [2.32] (0.03)	0.095192** [2.21] (0.04)	0.033991 [0.13] (0.89)	3.769604** (0.03)
LGDP → LREC	−0.713792*** [−3.10] (0.00)	0.606842 [0.39] (0.69)	0.341433 [1.34] (0.19)	4.573808*** (0.01)

Note: *,**,*** denotes significant at 10%, 5% and 1% significance level.

We check also the quality of the residue, namely: the normal distribution, the autocorrelation and the homoscedasticity. Thus, in the Table 6, below, we presented the probabilities of the tests associated with the three hypotheses on errors listed above.

Table 6. The p-values of residual tests (source: authors' estimates using Eviews 9)

Models based on causality direction	H_0 – the errors are homoscedastic (ARCH LM)	H_0 – the errors are independent (Breusch Godfrey LM)	H_0 – the errors are normally distributed (Jarque-Bera)
LARIV → LGDP	0.6947	0.4139	0.3279
LGDP → LARIV	0.8604	0.4157	0.9717
LREC → LGDP	0.1658	0.3485	0.1585
LGDP → LREC	0.7501	0.3769	0.9186

Given that the values of these probabilities are higher than the 5% threshold (p-value = 0.05), then the null hypothesis is accepted as valid, which validates the correct representation of the residue of the estimated models. According to the results presented in Table 6, we can affirm that the null hypothesis is accepted for all these three residual tests (ARCH LM, Breusch Godfrey LM Test and Jarque Bera), therefore, the correct representation of the residue of the estimated models is validated.

The results of the cointegration test show the existence of a long-run, stable equilibrium between Romania's international tourism and economic growth. The existence of long-run relationships between the development of international tourism in Romania and economic growth means that both variables, i.e. GDP and international tourism (ARIV and REC), are causally related at least in one direction. To find out the causality, we apply the Granger causality test. The long-run Granger causality from the independent variables to the dependent variable and the one-way short-term Granger causality are presented in the bellow Figure 1.
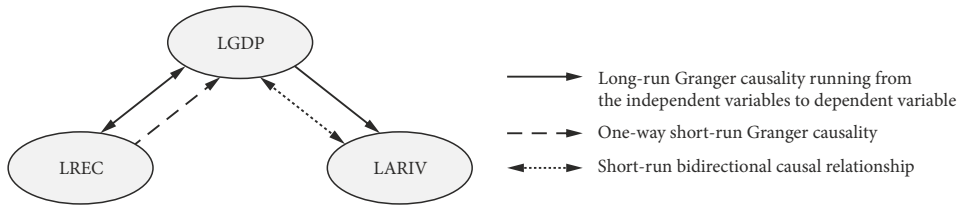
Figure 1. Granger causality relationship between GDP, ARIV and REC
(source: authors' contribution)

The results indicate the existence of a long-term unidirectional Granger causality between the development of tourism and economic growth. Thus, Romania's economic growth is the cause of Granger's development of Romanian tourism, i.e. national economic growth can promote the long-term development of international touristic flows and receipts. However, the existence of the converse (the long-run influence of tourism on economic growth) is doubtful. In the short-run, we identify a unidirectional causal relationship from REC to GDP. We also find evidence of a short-term bidirectional causal relationship between the GDP and the number of international tourist arrivals (ARIV). The results confirm the third hypothesis (H3) but only in case of the GDP and ARIV.

Conclusions

This paper aims at analysing the long-run and short-run relationship between GDP and international tourist arrivals (ARIV), respectively international tourism receipts (REC) over the period 1995–2016 in Romania, using the Johansen cointegration test and Granger causality. The results show that the causal effect of the GDP on the ARIV and on the REC variable is significant in the long run and the sign of this adjustment coefficients is negative. So, the long-term causal results show their convergence in the following direction: GDP to the ARIV and GDP to the REC. As regard to the long-term causal effect of the ARIV and the REC variable on the GDP, the sign of this adjustment coefficients is positive, which presuppose that the system deviates from the long-term equilibrium path. We also study the short-run relationship between the variables. The results show that in the short-run, the causal effect of the GDP to the ARIV, of the REC to GDP and also of the ARIV to GDP, is significant. The short-term causal results of GDP on the international tourism receipts indicate divergence and non-significant coefficients.

In other words, our study highlights that, in the case of Romania, the second (i.e. growth-led tourism – GLTH) hypothesis is confirmed on the long run (with respect to both international tourism receipt, and international tourism arrivals). On the other hand, on a short term, the tourism-led growth hypothesis (TLGH) is supported for the relationship between GDP and international tourism receipt, whereas the bidirectional causality hypothesis (BC) describes the relationship between GDP and international tourism arrivals. In terms of policy recommendations, Romania is a country wherein the ability of the tourism industry to attract tourists and international revenue (thus leading to the growth of this sector in particular, and of the economy in general) is potential rather than actual. Henceforth, on a

short term, it is recommended to support the tourism industry (in accordance with TLGH and BC), thus supporting GDP growth. This is followed by a consistent growth of GDP, leading to long-term returns for the tourism industry (according to GLTH). For as long as sustainability is taken into account in economic development, it is expected that, in the long run, sustainable practices and their benefits become commonplace in the tourism sector as well (Mester et al., 2016).

We consider that our paper only partly confirms similar studies, which determines us to continue our research on the subject in the future, by taking into account more economic variables and influences, as well as, if possible, longer analysis timeframes. Ultimately, the most important limitation of our study is the relative short length of the time series used (which is also encountered in other analyses), since the earliest available data for the tourism indicators in Romania stem from 1995.

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Author contributions

The paper is a result of a collaborative work. AB, DB and RS conceived the study, AB and DB reviewed the literature, DB, RS and SD did the data analysis. AB, DB and RS wrote the first draft. All authors revised the paper and prepared the final article.

Disclosure statement

Authors declare they have no competing financial, professional, or personal interests from other parties.

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