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Contribution of tourism to economic convergence in the European Union member states

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Abstract

The main objective of this paper is to determine whether tourism contributes to the economic convergence in the EU member states. The starting point of the analysis is the theoretical concepts of σ-convergence and (conditional) β-convergence. For the purpose of examining the relationship between tourism and σ-convergence in the long and short term, the cointegration test is used. Additionally, panel analysis is used for testing the model of conditional convergence. In this model, tourism as a conditional factor is operationalised by monetary indicators (consumption components and capital investments) as well as by a non-monetary one (direct employment) based on the tourism satellite account methodological framework. The model also tests a range of economic, social and ecological impacts on tourism and the economic convergence. The results proved that, although there is a long-term and short-term relationship between tourism and the economic growth convergence, tourism does not contribute to the economic convergence in the European Union member states, at least not to the extent that was expected.

Keywords: economic convergence, tourism as conditioning convergence factor, European Union, panel analysis

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Introduction

Over the past 60 years, development in the European Union (EU) been fostered by three kinds of processes: deepening (referring to policies, common regulation and economic liberalization), widening (of economic and other competences) and enlargement (growth in the number of member states) (Pelkmans, 2001). Although levels of economic development among member states have always differed, the fifth and the sixth enlargement rounds have significantly increased the differences in the economic, social, legal, environmental and other areas of development. With each wave of the EU enlargement, poorer and less developed countries were entering and needed to be integrated into the common market to participate in economic and political affairs. To support the efficiency of their integration, the EU set up economic and social cohesion goal in the Treaty of Rome (EC, 2002). In this regard, more balanced economic development and social welfare ought to be provided, consequently creating preconditions for the faster progress of less developed member states to catch up with the more developed ones. This "catching-up" process known as the concept of the economic (growth) convergence, is introduced by the neoclassical theory of economic growth (Sala-i-Martin, 1996).

For the purpose of analysing the economic convergence among EU member states, it is necessary to identify both the key variables used as the economic growth determinants on one hand, and those variables that can stimulate the process of economic convergence on the other hand. Among a number of potential variables affecting economic convergence, tourism seems to be very suitable due to its contribution to the overall EU economy.

Tourism is one of the most important economic and social phenomena of modern times and definitely one of the core economic activities not just in European countries but globally. Hence, global economic impact of tourism in 2019 accounted for 10.3% of global GDP and it produced 330 million jobs, or 9.9% of total employment (UNWTO, 2019). As for the impact of tourism to the European Union economy, in 2019 it generated 9.5% of the total GDP and 11.2% of total employment (WTTC, 2019). Europe generated more than half of the world's international tourist arrivals in 2018, and took almost 40% of the total receipts from international tourism (UNWTO, 2019) thus proving it being the most visited tourist region in the world. Within Europe, the European Union recorded 562,9 million international tourist arrivals in 2018, with a growth rate of 4.4%, led by well-known destinations in Southern and Mediterranean Europe. Worth mentioning is that in recent years, before COVID pandemic crisis, apart from traditional tourism champions, all European countries, traditional as well as emerging ones experienced significant tourism demand growth rates (UNWTO & EC, 2018; UNWTO; 219; WTTC, 2019). The same trend can be observed with regard to international tourism receipts. In 2018, Europe generated international tourism revenue of 570,5 billion euros, representing 39.3% of total revenue in the world. Out of this, 480,7 billion euro have been earned in the European Union, representing 33,1% of the total revenue generated by tourism.

Apart from being an important inbound tourism destination, Europe is also the most significant outbound market worldwide. Thus in 2018, Europeans made almost half of the international tourism expenditure realized at the global level (UNWTO, 2019). Since Europeans travel most frequently to destinations in their own region, outbound demand from EU markets seems to be an important driver of inbound growth in Europe. From the aforesaid it can be concluded that despite variation of tourism results across EU countries, it has a huge potential to affect their economic growth, and consequently to enhance their residents' standard of living and quality of life.

Bearing in mind the foregoing, this paper aims to help extending current body of knowledge related to the contribution of tourism to economic convergence across the European Union. With this regard, it

first researched if tourism by contributing to economic growth can foster its convergence. Additionally, it explores if tourism enhances the economic growth convergence in the EU member states.

To fulfil the above goals, we performed a thorough literature review. On this basis, a methodological framework was developed using two approaches of convergence (σ- and β-convergence), to analyse the role of tourism in achieving economic convergence. Further, we evaluated tourism contribution to the economic convergence in the EU member states. Finally, based on the results, the research limitations were identified, and the future research directions highlighted. A few recommendations deriving from the research results were also given, potentially useful to the economic and tourism policymakers.

The paper is structured as follows: after *introductory* text, the second chapter, dealing with the *literature review* elaborates on the economic convergence theoretical background and potential role of tourism in that process. Third chapter is dedicated to the *variables, model specification*, and *research model elaboration*. Empirical validation of the theoretical assumptions is carried out in fourth chapter. In the last chapter, conclusive remarks, research gaps and recommendation for the future research are pointed out.

Literature review

Economic convergence - theoretical background

The classical approach to convergence analysis distinguishes two basic concepts of convergence, i.e. the σ-convergence and the absolute (β-) convergence concept. Both convergence concepts assume that reduction of the per capita output gap results from the tendency that economies with lower per capita outputs grow faster than those with the higher per capita outputs (Blanchard, 2005). Despite the same starting point, there is a controversy regarding the application of the two convergence concepts, arising from different focuses on the convergence processes' aspects. Hence, Vojinović & Oplotnik (2008) point out that the concept of β-convergence has been more frequently used by macroeconomists, while σ-convergence has been more popular in literature on economic geography and regional science. It is most usually applied to evaluate dispersion of per capita income in time, across different economies and assumes that economies are converging if the dispersion of their real per capita income has the decreasing tendency. (Barro & Sala-i-Martin, 1990).

To test the σ-convergence hypothesis, the coefficient of variation of GDP per capita is used. This is equal to the ratio between standard deviation and the average value (Sala-i-Martin, 1995). The lower the value of the coefficient is, the lower are the disparities among economies (proving the existence of convergence) and vice versa (the higher the value of the coefficient, the higher the disparities among economies, proving the existence of divergence in terms of per capita income.

If less developed economies tend to grow faster than developed ones, the absolute β-convergence exists (Barro & Sala-i-Martin, 1990), as proved by the Solow's (1956) growth model. The situation of absolute β-convergence occurs, as assumed by the neoclassical Solow-Swan model, when countries with a lower level of initial capital per person are poorer than those with higher levels of capital per capita, but have higher growth rates of capital per capita, which ultimately results in higher GDP per capita growth rates (Barro & Sala-i-Martin, 2003).

Absolute convergence is usually empirically tested by the regression equation comparing each economy's income per capita growth rate and its initial income level:

$$\Delta \ln y_{i,t} = \gamma + b \ln y_{i,t-1} + u_{i,t} \qquad (1)$$

where *y* denotes per capita income, *i* refers to each individual economy, *t* is the time period, *γ* represents a common steady state, *b* is the coefficient of convergence and *u* is the stochastic error. The existence of absolute convergence may be proven if b<0.

Convergence is unconditional (or absolute) towards a common steady state for all economies, whereas divergence is a transient, short term phenomenon reflecting adjustment towards a long run equilibrium level of per capita income (Soukiazis & Proença, 2008). Absolute convergence occurs if per capita income growth and its initial level are inversely related. This is more likely to happen in countries with comparable economic and institutional characteristics (Proença & Soukiazis, 2008). According to Sala-i-Martin (1996), two basic concepts of convergence analyse two phenomena of economic growth that are conceptually completely different: σ-convergence analyses how the distribution of income changes over time while absolute β-convergence inspects the income mobility inside the same distribution.

Several research studies by Barro & Sala-i-Martin (1990), empirically investigated both aspects of convergence on different samples in the US federal states, and in 90 regions in 5 European countries (1990, 1992, 1995), while Sala-i-Martin (1995) did the same investigation for OECD economies, all of them proving different results with regard to both, σ and β-convergence presence and speed.

It is important to stress that neoclassical model assumption of the initial capital level being the only difference between economies does not work in the contemporary global environment where economies differ in many aspects, from institutional framework to macroeconomic and financial indicators, all of which can affect their stability (Borys *et al*, 2008). Convergence is conditioned upon structural factors characterized by increasing economy of scale, such as innovation, technological progress and human and physical capital accumulation. In such circumstances economies are subject to divergent steady states. However, if convergence exists despite the differences among structural factors causing divergent steady states, then, as pointed out by Soukiazis & Proença (2008), the conditional β-convergence is proved. In this case, the conditional convergence is empirically tested by the following regression equation:

$$\Delta \ln y_{i,t} = \gamma + b \ln y_{i,t-1} + c_j \, ln \, X_{i,t}^{j} + u_{i,t} \qquad (2)$$

with *X* being a vector of *j* factors used for controlling dissimilarities across economies. In case when b<0 and $c_j \neq 0$, economies demonstrate conditional convergence. In contrast, if *b*<0 and c_j=0, convergence is absolute.

For the purpose of testing the conditional convergence hypothesis, it is necessary to maintain the steady state constant. Sala-i-Martin (1995) points out that there are two possible approaches to holding the steady state constant. The first is focused on restricting the convergence study to a sample of economies assumed to have similar steady states. In the second approach, variables that can maintain the steady states constant are introduced. In different empirical studies, depending on the research objectives and the characteristics of the economies in the sample, the authors have used different variables attempting to maintain a stable steady state. Hence, in the analysis of economic convergence in Latin American countries, Eugénio-Martín *et al*. (2004) used gross domestic investment, general government consumption, public spending on education, the quality of the political system in the country and index of political stability as conditional convergence factors. On a sample of 42 African countries Fayissa *et al.* (2007) investigated the contribution of tourism (receipts) to economic growth and development over a period from 1995 to 2004, proving that index of economic freedom, number of enrolled students in

secondary schools, foreign direct investment, household consumption per capita and terms of trade, help maintaining steady state stability. Analysing the real convergence of economic growth in the potential candidate and candidate countries for EU membership, Borys *et al.* (2008) considered the influence of inflation, the initial level of foreign direct investment, openness of the economy, terms of trade and the index of economic freedom as variables determining the differences in the steady state among countries. Savelin & Žuk (2018) analysed real income convergence in Central, Eastern and Southeastern Europe (CESEE) Europe to the most effective EU economies in the period from 2000 to 2016. The results showed that the best CESEE economies in terms of the speed of convergence exhibit common characteristics such as, among other things, a significant improvement in human and institutional capital, favourable demographic trends and fast transition of labour from primary into other sectors of economy.

The contribution of tourism to economic convergence

Due to its ever growing importance in the world's economy, tourism has recently become one of the major topics in the literature on economic growth and development (to name some of the authors: Cortés-Jiménez, 2006; Nowak *et al.*, 2007; Lee & Chang, 2008; Proença & Soukiazis, 2008; Katircioglu, 2009; Adamou & Clerides, 2010; Figini & Vici, 2010; Dritsakis, 2012; Paci & Marrocu, 2012; Tugcu, 2014; Brida *et al.*, 2016; Etokakpan *et al.*, 2019; Sacco & Cassar, 2019). In a review of literature dealing with this issue, Gwenhure & Odhiambo (2017) delineated four main approaches to looking at the causal relation between economic growth and tourism. The first explains a unidirectional causal impact of tourism on economic growth (so called tourism-led growth hypothesis); the second refers to a unidirectional causal impact of economic growth on tourism (the growth-led tourism hypothesis). The third explains a bidirectional causal link between economic growth and tourism, also known as the feedback hypothesis while the fourth posits a neutrality hypothesis, where neither of the variables influences the other. As stressed by the same authors (Gwenhure & Odhiambo, 2017), results on the interrelation between economic growth and tourism differ from country to country and in accordance with the methodology applied.

Although the contribution of tourism to economic growth has been researched theoretically and empirically in detail, discussions on the contribution of tourism to economic convergence are deficient. The reasoning behind this relationship may be associated with Kaldor's economic growth model (1966). According to this model, countries achieve different economic growth rates depending on structural differences within their economies. Following that, more productive export sectors that lead to greater competitiveness due to increased output, knowledge and technology, make countries grow faster. With this regard, inbound tourism as an (invisible) export sector can stimulate economic growth in the countries where tourism has a large share in their overall economic structure (Mihalič, 2014), though sometimes at the expense of other sectors that may be crowded out (Holzner, 2005; 2010; Inchausti-Sintes, 2015). On the other side, it has to be borne in mind that the satellite account approach defines tourism as a demand-driven activity that consists of several industries that place their outputs to visitor consumption (European Commission *et al.*, 2009, as cited in Ivandić & Šutalo, 2018). Owing to multiplier effects, visitor consumption of goods and services from those industries generates further growth (Frechtling & Horvath, 1999). Moreover, tourism benefits from public goods in supporting its competitiveness (Zhang, 2015; Liua & Wub, 2019), which further enhances cross-sectoral linkages with and the spillover effects between other sectors.

In line with the previously mentioned, we may conclude that tourism consumption can stimulate faster economic growth in less developed countries eventually affecting their convergence with the more developed ones.

Literature review on the impact of tourism on convergence reveals that most of the previously conducted studies are either focused on small samples of economies, or are concentrated on measuring the impact of tourism on the convergence of regional growth. Thus, Proença & Soukiazis (2008) indicate that a number of studies on the impacts of tourism on growth and convergence at a regional level show it can have a rapid and almost instantaneous impact on the regional economy with even a moderate level of investment. Cortés-Jiménez (2006) explores the relevance of tourism for regional economic growth in Spain and Italy between 1990 and 2000, using international and domestic tourist arrivals, both having significant and positive roles in regional economic development, with domestic tourism being more significant for the Spanish regions, and international tourism for the Italian regions. However, this research has not shown that any of them had an impact on the regional convergence process in either Italy or in Spain. Soukiazis & Proença (2008) investigated the impact of tourism on both, regional growth of 30 NUTS III and 7 NUTS II regions in Portugal, and the convergence process at regional level by applying the hypothesis of the conditional β-convergence. An analysis of the concept of σ-convergence has proved that there is no evidence of a dynamic convergence of income per capita among Portuguese regions during the observed period. On the other hand, a positive impact of tourism on per capita income growth affecting the increase of the convergence rate has been proven. Given this, tourism was considered an alternative means for encouraging higher regional growth in Portugal under the assumption of accommodation capacity improvement. There are several recent researches applying the concept of convergence to the analysis of the regional level impacts of tourism. Thus, Li *et al*. (2016) proved tourism contributing significantly to the decrease of regional disparity, with domestic tourism having a greater impact than international. Butnaru & Haller (2017) applied the concept of tourism gross domestic product (GDPT) σ- and β-convergence for the period 2005–2014, to investigate sustainability of rural tourism in 12 UK rural regions. The results proved that GDPT per inhabitant in the UK rural regions slightly stimulates the convergence process and the economic development of the country. Primayesa *et al*. (2019) researched the impact of tourism activities on regional economic growth in Indonesia in the period 2010-2016. Tourism accommodation capacities were used as a proxy variable for tourism, based on the arguments given by Soukiazis & Proença (2008). The results have proved tourism encourages economic growth, but showed no indication of convergence among regions in Indonesia.

As for the studies dealing with the impacts of tourism on the convergence at a country level, Williams & Shaw (1991) proved, based on a sample of 15 western European countries, that tourism, tending to generate a more even distribution of wealth between north and south, richer and poorer economies, contributes to the process of economic convergence. Proenca & Soukiazis (2008) undertook research on the contribution of tourism (operationalized by the international tourism revenue as a conditional growth factor), on economic convergence on a sample of four countries, established tourist destinations, i.e. Portugal, Spain, Italy and Greece. The results showed that a convergence process (in the sense of σ-convergence) existed, since the disparities in per capita income were declining over a period of time. Concerning the disparities in international tourism revenues, the convergence process was unstable, with differences in tourism revenues tending to increase at the beginning of the period, declining in the middle and increasing again at the end of the observed period. By applying the concept of conditional β-convergence, the authors estimate that per capita income converges at an annual rate of approximately 13.9%, which means that a period of approximately 5 years is needed to reduce the differences in per capita income by 50% among the above mentioned countries. By excluding tourism from the convergence equation, the annual per capita convergence rate falls to 8.7%, which means that the period in which per capita income is reduced by 50% is extended to 8 years. These results confirm that tourism may be viewed as a factor of convergence that helps to reduce the asymmetries among countries, which is especially important from the European cohesion policy perspective. Butnaru & Haller (2018) applied the convergence approach in analysing the reaction of tourism gross domestic

product (GDPT) to the crises resulting from the acts of terrorism and the waves of refugees in the EU member states, between 2000 and 2015. Thus, β convergence with a relatively slow speed is confirmed in 26 countries. The σ convergence analysis in the same period among EU countries showed slight oscillation, with both, convergence and divergence being recorded.

Given the aforementioned, it can be stressed that there is a constant need for further investigation on the contribution of tourism on economic convergence, on the basis of not only a larger sample of economies but also by using methods and indicators that can provide useful empirical analysis. This research may also be seen as a humble contribution in filling this aim.

Variables and model specification

In order to investigate the contribution of tourism on economic convergence, this paper empirically tests the link between tourism and the economic convergence in the European Union member states, analysing both concepts of economic convergence, i.e. σ-convergence and conditional β-convergence. The reason for choosing the EU member states as a survey sample is threefold. Firstly, the European Union is the most significant world tourist region, in terms of inbound and outbound tourism. Secondly, one of the EU's most important goals is to achieve economic and social cohesion among member states and thirdly, tourism plays an important role in economies of many European Union countries.

Empirical validation of the previously explained theoretical assumptions is carried out in two stages. The first stage examines the relationship of tourism and economic convergence in the EU member states in the long and short term, applying the concept of σ-convergence. In the second stage the potential of tourism as a conditional convergence factor contributing to the diminishment of development disparities among EU member states is analysed.

Variables

Per capita income growth rate is chosen as the dependent variable in the model. (Barro & Sala-i-Martin, 1990, 2003; Sala-i Martin, 1995). In most of the earlier studies on economic convergence, GDP per capita annual growth rate was used, expressed in purchasing power parity (PPP) (Borys *et al.*, 2008; Vojinovic & Oplotnik, 2008). Annual growth rate of GDP per capita expressed in PPP is used as a dependent variable in this research as well, and data sets are obtained from the World Bank's database (WB-WDI, 2015).

Unlike in previous researches, where tourism variables were presented by either non-monetary demand indicators, such as the number of overnight stays (Cortés-Jiménez, 2006; Paci & Marrocu, 2012), or non-monetary supply indicators such as the number of available accommodation capacities (beds) (Soukiazis & Proença, 2008; Primayesa *et al.*, 2019), or inbound tourism receipts (Cortés-Jiménez, 2006; Fayissa *et al.*, 2008; Proença & Soukiazis, 2008;), this model is based on a wider range of tourism indicators, including consumption components and capital investments as monetary indicators as well as direct employment as a non-monetary one (based on the Tourism Satellite Account methodological framework).

As Tourism Satellite Accounts are not available for all EU countries, a time series used in this research is obtained from the World Travel and Tourism (WTTC) Economic Data Search Tool as 'simulated tourism satellite accounts' database. Despite the conceptual and methodological differences between the Tourism Satellite Accounts (TSA: RMF 2008) and the WTTC approach, due to which some authors have even called into question the validity of the latter (Frechtling, 2010), WTTC data-base has been used in this research since it provides a methodologically consistent time series of relevant data which

has a source in a developed and harmonized European Statistical System. On this basis, the used variables are outlined in Table 1.

Table 1. *Variables description and sources*

Variable name	Variable Symbol	Variable description	Source
Domestic T&T spending	DOMSP	Spending by the residents for trips (leisure and business) within a country	WTTC
Visitor exports	VEXP	Spending by international tourists for trips (leisure and business) within the country.	WTTC
Government individual T&T spending	GINEXP	Spending by government on non-commercial services for which recipients can be individually recognised.	WTTC
Capital investment	CAPINV	Capital investment of all sectors directly related to the T&T industry.	WTTC
T&T direct contribution to employment	DEMPL	The number of jobs directly related to the T&T industries.	WTTC

*T&T – Travel and tourism
**All variables are compatible with the TSA methodology

Keeping in mind that the convergence of the GDP does not necessarily imply the standard of living convergence (Cracolici *et al*., 2010), it seems logical to include not just economic but also some social and environmental dimensions into this analysis. Hence, the control and dummy variables included in the analysis are described in Table 2.

The independent variables have separately been introduced into the model and no fluctuation in the estimated coefficients was proved, thus indicating that no multicollinearity exists.

Model specification

For the purpose of examining the interrelation between tourism and σ-convergence in the short and long term the cointegration test is used. According to the concept of σ-convergence, the convergence of economic growth among the observed countries is measured by the standard deviation of the logarithmic values of GDP per capita, eventually resulting in a single "sigma" value for each observed year. If convergence exists, the "sigma" indicator will decline over the years. Eventually, the value of the "sigma" approaches zero. Figure 1 shows the standard deviation of the logarithmic values of GDP per capita in the EU member states, during the period 1998 to 2016. It can be seen that per capita income disparities are declining over time proving the existence of the economic convergence in the EU member states for the observed period. However, the convergence process is not stable because of the fluctuations at the beginning and the end of the observed period as well as during the global economic crisis. The concept of cointegration can be defined as a systematic co-movement between two or more variables in the long term.

Table 2. *Control and dummy variables description and sources*

Variable name	**Variable Symbol**	**Indicator**	**Indicator description**	**Indicator used in previous research**	**Source**
Economic environment	REER	Real effective exchange rate	REER is used as a measure of the external competitiveness of tourism.	Bandula Jayathilake, 2013; Lee & Chang, 2008; Pavlić *et al.*, 2015,	Eurostat
Social environment	LEXP	Life expectancy at birth	Life expectancy is used as a proxy of human capital variables.	Adamou & Clerides, 2009; Sequeira & Nunes, 2008;	Eurostat
Ecological environment	ENV	Environmental preservation expenditure	Environmental preservation expenditure is used as a proxy for spending on all activities intended for elimination or reduction of pollution, resulting from the goods' and services' production processes.	Akis *et al.*, 1996; Tovar & Lockwood, 2008	Eurostat
Dummy variable 1	DV 1	Accession to the European Union	Increase in tourist spending after accession to the EU as well as the integration process deepening, eventually causing positive impact on the economic convergence.	Hall *et al.*, 2006; Kaitila, 2005	
Dummy variable 1	DV 2	Global economic crisis in 2007	The impact of the global economic crisis in 2007, which (with a year or two's delay) negatively affected tourism demand and consumption and consequently led to a fall of tourism revenues, eventually negatively affecting the process of economic convergence.		

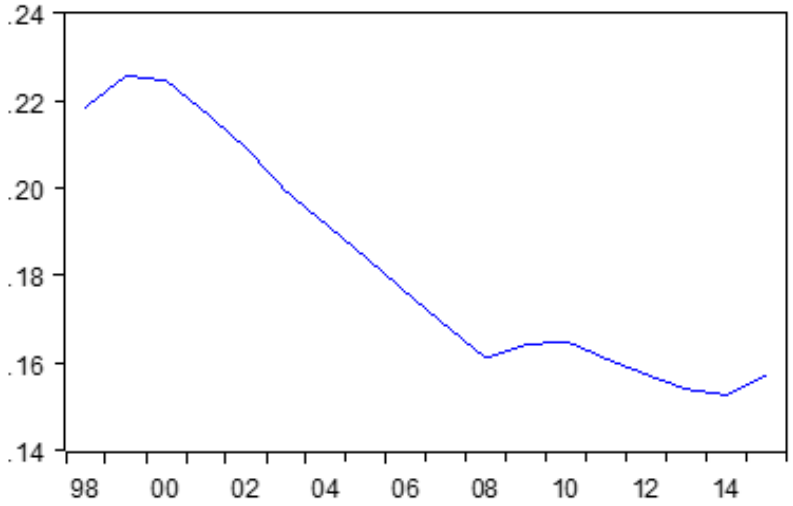

Figure 1. *The σ-convergence in European Union (1998-2016)*

In order to analyse the impact of tourism on the economic convergence, in the second phase of this research, tourism is taken as a conditional convergence factor.

Because of the need to deal with the cross-sectional and time-series data sets, a panel analysis is used for testing the model of conditional convergence, and exploring tourism as conditional factor affecting economic convergence in the EU member states. Conditional convergence is analysed in two phases. In the first phase, the isolated impact of tourism on economic convergence is estimated, using this expression:

$$\Delta \ln GDPpc_{i,t} = \gamma + b \ln GDPpc_{i,t-1} + \beta_1 ln\ DEMPL_{i,t} + \beta_2\ ln\ DOMSP_{i,t} + \beta_3\ ln\ VEXP_{i,t} + \beta_4\ ln\ GINEXP_{i,t} + \beta_5 ln\ CAPINV_{i,t} + \varepsilon_{i,t} \quad (3)$$

In the second phase, the impact of the variables from the economic, social and ecological environment (control and dummy variables) is tested and the following dynamic panel model is formed:

$$\Delta \ln GDPpc_{i,t} = y + b \ln GDPpc_{i,t-1} + \beta_1 DEMPL_{i,t} + \beta_2\ DOMSP_{i,t} + \beta_3\ VEXP_{i,t} + \beta_4\ GINEXP_{i,t} + \beta_5\ CAPINV_{i,t} + \beta_6\ REER_{i,t} + \beta_7\ ENV_{i,t} + \beta_8\ LEXP_{i,t} + \beta_9\ DV1 + \beta_{10}\ DV2 + \varepsilon_{i,t} \quad (4)$$

For the panel analyses are used the usual estimation methods: OLS with pooled data, GLS which supposes that the particular individual effects are random and LSDV, which assumes that the particular individual effects are covered by particular country dummies.

Results and discussion

Interrelation between tourism and σ-convergence

In this study, the cointegration test is used to model the short-run and long-run relationship between σ-convergence of economic growth and tourism (operationalized by a non-monetary and 4 monetary indicators). Since the analysis considers the time period of 18 years, the number of observations is relatively low, so it is justified to analyze a cointegration test based on a single equation, the so called Engle & Granger technique (1987). This technique assumes that one variable is endogenous (economic

convergence expressed by the concept of σ-convergence) and another one is exogenous (tourism, which is operationalized by monetary and non-monetary indicators). Before the analysis of cointegration, we test order of integration of the series. The results of the ADF test are depicted in the Table 3.

Table 3. *Augmented Dickey-Fuller Unit Root Test*

	ADF test Level		**ADF test 1st Difference**	
	t - statistic	**t – statistic linear trend**	**t - statistic**	**t – statistic linear trend**
σ-convergence	-1.007269	-0.467364	-2.448397**	-3.071416*
DEMPL	-1.213444	-1.394517	-2.958319**	-2.922680*
DOMSP	-2.538621	0.329485	-1.402499	-2.985386*
GINEXP	-3.781403**	-2.798247*	-3.667389**	-7.923122***
CAPINV	-2.501485	-3.561244*	-4.934689***	-4.702817**
VEXP	-1.052347	-2.347380	-5.522912***	-5.860837***

Note: ***, ** and * denote rejection of the unit root hypothesis at 1%, 5% and 10% respectively.

The results of the ADF test point to all variables except GINEXP are cointegrated in the same order I (1), i.e. they are non-stationary in levels and become stationary by differentiation. After confirming that the variables are cointegrated in the same order I (1), the estimation of a long-run relationship of the variables continues.

Table 4. *OLS estimates of the long-run models*

	(1)	**(2)**	**(3)**	**(4)**
Constant	0.005589	0.095928***	0.185738***	0.039278
Trend	-0.003349***	-0.002520***	-0.005021***	-0.001612*
DEMPL	0.041250***			
DOMSP		0.017859***		
CAPINV			0.008529	
VEXP				0.024075***
R-square	0.9672	0.9754	0.9179	0.9527
F	221.69***	297.48***	83.92***	151.24***

Note: ***, ** and * indicate that estimates are significant at 1%, 5% and 10% levels respectively.

From the data presented in Table 4 it is evident that the linear trend is negative and statistically significant in all models, thus confirming σ-convergence, and the variables that significantly affect the reduction of σ-convergence over time are all tourism variables but CAPINV. Having estimated the long-run model, a test for cointegration is done, using the residuals based method of Engle & Granger (1987). The results are presented in Table 5.

Table 5. *Engle and Granger Cointegration Test*

Residual	**t - statistic**
DEMPL	-2.838214***
DOMSP	-2.780989***
CAPINV	-1.242114
VEXP	-2.477597***

Note: *** indicates significance at 1%.

The data in Table 5 show that the residuals (except for the CAPINV variable) are stationary, i.e. integrated in order (I), which means that between σ-convergence and DEMPL, DOMSP, VEXP there is cointegration (the long and short-term systematic comovement). On the other hand, there is no cointegration between σ-convergence and CAPINV, although they are non-stationary; it is concluded that they are related only in the short term. Therefore, the estimated regression in the first differences is:

$$\Delta SIGMA_t = -0.003631 + 0.01169\Delta CAPINV_t \qquad (5)$$

However, in the above equation the coefficient is not statistically significant so the conclusion is that σ-convergence and CAPINV are related only in the short term but the short-term effect is not statistically significant. Furthermore, for variables for which the presence of a cointegrating relationship has been evidenced, an error-correction mechanism (ECM) is also tested, describing the short-run dynamics consistent with the long-run relationship. Therefore, three ECM models are estimated:

$$\Delta SIGMA_t = -0.003367 + 0.026197\Delta DEMPL_t - 0.348981\hat{\varepsilon}_{t-1} \qquad (6)$$
$$\Delta SIGMA_t = -0.002401 + 0.012737\Delta DOMSP_t - 0.701990\hat{\varepsilon}_{t-1} \qquad (7)$$
$$\Delta SIGMA_t = -0.002773 + 0.009534\Delta VEXP_t - 0.453312\hat{\varepsilon}_{t-1} \qquad (8)$$

All estimated coefficients are positive and statistically significant at the significance level α = 0.05, which confirms the significant influence of three tourist variables on σ-convergence in the short term. As pointed out earlier, the long-term effects of the regression coefficients in Table 3 have also proved to be significant at the significance level of less than 1%, thus proving that there is a long-term and short-term statistically significant comovement between economic convergence (expressed in the concept of σ-convergence) and the three tourism variables (T&T direct contribution to employment; domestic T&T spending; visitor export) in EU member states, while the relationship between economic convergence (expressed as the concept of σ-convergence) and Capital investment in tourism exists only in the short term and is not statistically significant.

Tourism as the conditional factor of economic convergence

In order to test whether European Union member states converge or diverge in the sense of per capita income, a simple panel model of β-convergence of economic growth has been estimated:

$$\Delta lnGDPpc_{i,t} = 0{,}15192 - 0{,}01315\, ln\, GDPpc_{i,t-1} + u_{i,t} \qquad (9)$$

The coefficient of the lagged GDPpc variable is negative, as assumed by the theory, and statistically significant, which confirms the existence of economic convergence in the EU member states. However, the very low value of the estimated coefficient suggests that this is a slow economic convergence process since the estimated convergence rate is about 1% per annum. This indicates that 53 years are needed to reduce the 50% difference in GDP per capita in the observed sample.

In order to investigate whether tourism can stimulate (faster) economic convergence in the EU member states, a panel analysis of conditional β-convergence with tourism as a conditional convergence factor has been conducted.

The results of the descriptive statistics of different panel models analysing the isolated impact of tourism on the economic convergence in the EU member states are shown in Table 6.

Table 6. *Descriptive statistics of different panel models - the isolated impact of tourism on the economic convergence in the EU*

COMPARISON OF MODEL STATISTICS					
STATISTIC	BE BtwGdps*	POOL Pooled	FIX FixOne	RAN RanOne	FIX-two FixTwo
DFE	21	497	470	497	453
Root MSE	0.004281	0.0159	0.0153	0.0155	0.0118
R-Square	0.5922	0.0953	0.2074	0.0646	0.5423
F			2.4613		10.0570
Pr > F			0.0000824		0
Hausman m				35.2183	
Hausman Pr>m				3.9095E-6	

Note: * between regression (regression on group means)

The comparison of model parameter estimates is presented in Table 7.

Table 7. *The results of model parameter estimates - the isolated impact of tourism on the economic convergence in the EU*

COMPARISON OF MODEL PARAMETER ESTIMATES						
VARIABLE		BE BtwGdps*	POOL Pooled	FIX FixOne	RAN RanOne	FIX-two FixTwo
Intercept	Estimate	0.119926	0.142560	0.296972	0.170163	0.080979
	Pr > |t|	<.0001	<.0001	0.0011	<.0001	0.3242
LAG	Estimate	-0.024223	-0.02951	-0.068193	-0.036136	-0.016805
	Pr > |t|	0.0001	<.0001	0.0005	<.0001	0.3437
DEMPL	Estimate	-0.000159	0.000197	0.004726	0.000623	0.001471
	Pr > |t|	0.7390	0.6078	0.0003	0.2759	0.1474
DOMSP	Estimate	-0.000440	-0.00024	-0.000309	-0.000009	-0.000432
	Pr > |t|	0.3967	0.4721	0.7373	0.9844	0.5300
VEXP	Estimate	-0.000402	-0.00033	-0.000389	-0.000300	0.000243
	Pr > |t|	0.0203	0.0038	0.4026	0.0723	0.4765
GINEXP	Estimate	-0.000221	-0.00035	0.001807	-0.000533	0.001024
	Pr > |t|	0.5806	0.3446	0.0762	0.3332	0.1799
CAPINV	Estimate	0.000678	0.000351	-0.000114	0.000183	0.000116
	Pr > |t|	0.1317	0.2562	0.7496	0.5941	0.7172

Note: * between regression (regression on group means)

On the basis of the values obtained by parametric tests (F-test and Hausman test), it can be concluded that the panel model with random effects is the most adequate for this analysis. Model results with negative and statistically significant, at the level of 5%, coefficient of the lagged GDPpc variable, as presumed by theory. The value of the convergence coefficient suggests that convergence is faster when the model incorporates tourism as a conditional convergence factor. In this case, the GDP per capita in the EU member states converges at a rate of 3.6% per annum, indicating that time needed for a 50% reduction in the gap between GDPpc in the EU member states is reduced for more than 30 years (more precisely at a period of 19.2 years).

However, only the VEXP independent variable, statistically significant at the level of significance of 10%, contributes to the economic convergence, with, nevertheless, a negative impact. This means that reducing the share of visitor exports in the total export of goods and services of each member state stimulates the economic convergence in the European Union member states.

Furthermore, the analysis also contains control and dummy variables capturing the impact of the environment on tourism and the economic convergence, as well as on the relationship between them. The results of different panel models' descriptive statistics, analysing the impact of tourism on the economic convergence in the EU member states with the social and environmental variables taken into account, are shown in Table 8.

Table 8. *Descriptive statistics of different panel models - the impact of tourism on the economic convergence with the impact of the environment in the EU*

COMPARISON OF MODEL STATISTICS					
STATISTIC	BE BtwGdps*	POOL Pooled	FIX FixOne	RAN RanOne	FIX-two FixTwo
DFE	16	492	465	492	448
Root MSE	0.004604	0.0140	0.0136	0.0136	0.0116
R-Square	0.6406	0.3067	0.3852	0.2926	0.5633
F			2.1983		5.9807
Pr > F			0.000582		0
Hausman m				18.0262	
Hausman Pr>m				0.0810	

Note: * between regression (regression on group means)

With regard to the value of the parametric tests, the two-way fixed effect model seems to be adequate for further analysis. The comparison of model parameter estimates is presented in Table 9.

The selected estimator gives a negative coefficient of the lagged GDPpc variable, as assumed by the theory, but it is not statistically significant at the level of 5%. This implies that by taking into account the impact of the environment on the relationship of tourism and economic convergence in the EU member states during the observed period, a statistically significant economic convergence cannot be proven, leading to the conclusion that tourism cannot be considered a conditional convergence factor under the conditions explained above.

Concluding remarks

Discussion and policy implications

This research started from the premise that since tourism is a significant contributor to the economic growth (as proved by many studies), it may also contribute to disparities reduction between the EU less and more developed member states, thus affecting the economic convergence among them. However, the results that we obtained on the basis of methodology, variables and available data sets, proved that tourism does not bring about economic convergence in the EU member states, at least not to the extent that was expected. Hence, the analysis of the interrelation between tourism and σ-convergence indicated the presence of a long and short-term relationship between σ-convergence and following variables: directly employed in tourism; domestic tourist spending; visitor exports. On the other hand, the link between capital investment in tourism and the reduction of real per capita income differences exists only in the short term but is statistically insignificant.

Table 9. *The results of model parameter estimates - the impact of tourism on the economic convergence with the impact of the environment in EU*

COMPARISON OF MODEL PARAMETER ESTIMATES

VARIABLE		BE BtwGdps*	POOL Pooled	FIX FixOne	RAN RanOne	FIX-two FixTwo
Intercept	Estimate	0.096960	0.162419	0.222206	0.179861	0.292772
	Pr > |t|	0.0646	<.0001	0.0321	<.0001	0.0742
lag	Estimate	-0.012435	-0.00559	-0.006213	-0.002851	-0.011292
	Pr > |t|	0.3243	0.3931	0.7985	0.7379	0.6219
DEMPL	Estimate	-0.00005425	0.000284	0.003468	0.000576	0.001862
	Pr > |t|	0.9299	0.4649	0.0031	0.2939	0.0750
DOMSP	Estimate	-0.000321	-0.00026	-0.000796	-0.000291	-0.000689
	Pr > |t|	0.6279	0.4461	0.3431	0.5458	0.3428
VEXP	Estimate	-0.000477	-0.00024	-0.000404	-0.000157	0.000168
	Pr > |t|	0.0463	0.0380	0.3945	0.3329	0.6696
GINEXP	Estimate	-0.000316	-0.00019	0.002261	-0.000149	0.001160
	Pr > |t|	0.4860	0.5561	0.0198	0.7471	0.1475
CAPINV	Estimate	0.000937	0.000455	-0.000033	0.000288	0.000264
	Pr > |t|	0.1358	0.0732	0.9261	0.3098	0.4199
REER	Estimate	0.000144	-0.00013	-0.000216	-0.000178	-0.000202
	Pr > |t|	0.4169	0.0822	0.0699	0.0449	0.0607
ENV	Estimate	-0.000223	-0.00050	-0.001235	-0.000721	-0.000879
	Pr > |t|	0.7875	0.1977	0.1852	0.1937	0.3154
LEXP	Estimate	-0.000517	-0.00140	-0.002153	-0.001751	-0.002688
	Pr > |t|	0.4701	0.0007	0.0035	0.0008	0.0974
DV1	Estimate	-0.002984	0.000831	0.005521	0.002835	0.006397
	Pr > |t|	0.5738	0.7061	0.0512	0.2441	0.0139
DV2	Estimate	-0.018971	-0.02427	-0.023970	-0.024318	-0.004032
	Pr > |t|	0.5415	<.0001	<.0001	<.0001	0.1950

Note: * between regression (regression on group means)

Yet, regardless of the results, one should be careful with the conclusions. Although long-term comovement has been proven, the analysis does not provide enough information on its causes. In fact, it is not known whether tourism influences convergence, or convergence influences tourism, or whether there is a two-way causal influence between tourism and economic convergence. Responses to these questions might be obtained by employing a causality analysis, which unfortunately could not be carried out here due to data constraints. Specifically, the precondition for conducting Granger's causality test is the stationarity of the variables. Since the time series are not stationary, it is not recommended this test be conducted.

On the other hand, it has been confirmed that the less developed countries in the EU have been growing faster than the developed ones. However, based on data for the observed period it was concluded that 53 years are needed to reduce the 50% difference in gross domestic product per capita, which is considerably slower than suggested by the results of all earlier studies.

Although the economic convergence in EU member states has accelerated when tourism was included as a conditional factor into the analysis, after the addition of some social and environmental (control

and dummy) variables, economic convergence has shown not to be statistically significant. At the same time visitor export is the only statistically significant factor of the economic convergence in the EU member states, but its impact on the economic convergence was proven to be negative. However, any indication that a decrease in the share of inbound tourism expenditure in the total export stimulates the economic convergence must be carefully interpreted. Namely, as stressed by Inchausti-Sintes (2015), an increase in revenues from international tourism may cause a reallocation of resources, including labour, towards tourism as a booming sector, pulling them away from other economic sectors, especially in underdeveloped countries, where the contribution of tourism to the economy is relatively large, eventually leading to deindustrialization (and in some occasions to tourism becoming a monoculture). In this way, development of other activities, not directly related to tourism, is slowed down. Thus, tourism becomes increasingly dependent on imports, consequently reducing its contribution in the economy. Although the "crowding out" mechanism was for the first time empirically tested in the case of the Netherland's natural gas supply shocks in the 1960s, a number of studies (Chao *et al*, 2006; Holzner, 2005, 2010; Nowak *et al*, 2007; Inchausti-Sintes, 2015), have investigated demand side shocks such as an inbound tourism growth, as a cause of deindustrialisation processes. Not less important to mention is that the rentier nature of the supply of tourism accommodation contributes significantly to the crowding-out effect (especially in the small economies such as Croatia with more than 60% of the accommodation facilities being in the hands of the households (MINT, 2018)), by reducing the young generation's willingness to get higher education and find employment elsewhere. In order to avoid these risks and minimize any negative consequence that may result, a reduction of the visitor exports share in total exports could be a starting point for stimulating the economic convergence. The decline in the share of visitor exports in total exports can be achieved by a faster increase in the international revenue of other sectors in relation to the increase in the international revenue of tourism. Thus, by a strengthening of the international competitiveness of "other sectors", the economic convergence among EU member states may be achieved. Furthermore, the fact that the inclusion of some socio-environmental variables into the analysis has not contributed to the achievement of statistically significant economic convergence in EU member states additionally confirms the complex nature of the issue of economic convergence and proves that each country is specific, for which reason the same variables may affect them differently.

In this respect, it should be kept in mind that there is a constant debate between the northern member states, dominantly tourist-generating and the southern states, mostly receptive, on the appropriateness of common policy measures. Given this, we first suggest a more coherent tourism policy should be implemented and better coordinated with other economic sectors at an individual country level. Parallel to this, the EU policy-makers should redirect their efforts from tourism marketing to a set of economic policies (related to taxation of tourism activities, import-substitution, innovation, tourism assets' productivity enhancement, etc.), taking into account country specificities. In this way, tourism in less developed countries would not just be more effective but will more significantly contribute to economic convergence with other EU member states.

Limitations and future research direction

This research has certain limitations that may have significantly affected final results, and accordingly provide a challenge for future researches. Hence, although the variable of tourism is for the first time operationalized on the basis of the TSA methodology framework, due to the unavailability of the original time series the authors have used model data published by the WTTC in collaboration with Oxford Economic Forecasting. Despite the importance of the tourism leakage (import dependence) indicator, it has not been taken into account due to the unavailability of data. Furthermore, the choice of research timeframe leaves open the question as to how the choice of a longer or shorter period of

analysis would affect the results of the research. It should be noted that longer periods of time leave countries in the sample "more time" to achieve convergence but also increase the possibility of significant "shocks" in individual countries that can slow down convergence.

Although it was intended, after proof of the long and short-term relationship between tourism and the σ-convergence of economic growth, the causality analysis (for the purpose of testing the direction of impacts) could not be carried out due to data constraints. In addition, even though the testing of selected indicators' robustness has confirmed the significant impact of the chosen environmental indicators on the relationship between tourism and the economic convergence, the choice of different indicators and /or approach might have shown different results. Since the contribution of the chosen variables on economic convergence was researched separately, an aggregate level analysis may be one of the challenges for the future research.

Another approach to the EU member states grouping, based on the dominant model of tourism development may be employed in the future research too. In such a grouping, countries may be divided into those basing their supply largely on the assumption of favourable climate factors (seasonally-oriented tourism) and countries that are oriented at developing more forms of special types tourism (not so heavily dependent on either the summer or the winter season). This approach may be useful in creating policy measures more precisely, with a special stress on those more focused on the specific types of tourism and tourism products with the added value (such as health tourism, agro-tourism, cultural tourism and the like). Apart from grouping countries with regard to the dominant model of tourism, another possible approach is to group them according to whether they are dominantly generating or receptive tourist markets, in which case a different policy approach to each one of these groups should be employed by the EU.

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