ISSN (PRINT): 1994 - 7658 ISSN (ONLINE): 1314 - 0817

VARNA UNIVERSITY OF MANAGEMENT

European Journal of Tourism Research

http://ejtr.vumk.eu

Asymmetries in European inbound and outbound tourism: Normal, luxury or inferior good? Fresh evidence from a quantile regression

Angeliki, N. Menegaki [1], Aviral Kumar Tiwari [2] and George, M. Agiomirgianakis[3]

[1] Department of Tourism Economics & Management (DOEPTM), Agricultural University of Athens, Amfissa Campus, 33100, Email: amenegaki@aua.gr, Open University of Cyprus, Nicosia, Cyprus. School of Social Sciences, Hellenic Open University, Patras, 26335, Greece. Laboratory of Economic Analysis & Policy, Hellenic Open University, Patras, Greece.

[2] Rajagiri Business School, Rajagiri Valley Campus, Kochi, India. Laboratoire d'Economie d'Orléans (LEO - CNRS) Research Fellows, University of Orleans, France, Email: aviral.eco@gmail.com

[3] School of Social Sciences, Hellenic Open University, Patras, 26335, Greece. Laboratory of Economic Analysis & Policy, Hellenic Open University, Patras, Greece. Email: gmagios@otenet.gr

* Corresponding author

Abstract

This paper studies aggregate inbound and outbound tourist demand in Europe for 1995-2015 with a new panel quantile regression approach. It employs tourist arrivals, tourist receipts and tourist expenditure. Besides real domestic income and real exchange rate, the demand is instrumented with environmental degradation and trade openness. Results show that tourism behaves like a normal good when tourist arrivals are used as a predictor of demand and a luxury good when tourism revenue is used instead. Conversely, tourism behaves like an inferior good when tourist expenditure is used. The results suggest that for inbound tourism in Europe to remain competitive, prices should be low to attract inbound tourism while tourism expenditure subsidization programmes should take place for European residents to be able to afford outbound tourism.

Keywords: Asymmetries; Panel quantile approach; tourism demand; inbound; instrument; outbound

Citation: Menegaki, A., Tiwari, A. K. and Agiomirgianakis, G. (2020). Asymmetries in European inbound and outbound tourism: Normal, luxury or inferior good? Fresh evidence from a quantile regression. *European Journal of Tourism Research* 25, 2508.

Introduction

Tourism demand in Europe is a topic worthy of investigation, because Europe is a popular tourist destination, with six of its member states among the world's top ten destinations (Trip Advisor, 2018). Eighty percent of international tourists in Europe, show a preference for France, Italy, Spain and the UK where more than half (55.7 %) of the total nights spent by non-residents in the EU-28 were spent in those countries (European Commission, 2018). Moreover, Europe is the main destination for US tourists with a market share of at least 40% of US tourists traveling abroad (Han *et al*., 2006). The growth in tourism demand has been higher for European emerging economies reaching a 6% compared to the average corresponding to the rest of the European countries which is equal to 4% (UNWTO-United Nations World Tourism Organization, 2017) Chinese tourists in Europe are only 3 million from the 86 million Chinese tourists travelling around the world (Skivalou & Filippidi, 2015). Given that currently only 5% of Chinese people have travelling documents from a population of 1.3 billion (Menegaki & Agiomirgianakis, 2019), it is reasonable for European tourist makers to aspire to a larger share of this market and one way to achieve that is through low prices. A more detailed presentation of inbound tourism demand in Europe is depicted in Table 1. This shows that Southern Europeans and Asians are the highest percentage of inbound tourism travelers in Europe followed by Western Europeans and Americans.

Table 1. *Inbound tourism in Europe by regions*

Region	**Share%**				
	1995	**2000**	**2005**	**2010**	**2017**
Northern Europe	6.9	6.6	6.8	5.9	5.9
Western Europe	21.1	20.5	17.5	16.3	14.6
Central/Eastern Europe	11.1	10.2	11.8	10.4	10.1
Southern/Mediterranean Europe	19.0	20.4	19.9	18.8	20.2
Asia and the Pacific	15.5	16.2	19.1	21.9	24.5
Americas	20.5	18.9	16.5	15.9	15.6
Africa	3.5	3.9	4.3	5.3	4.7
Middle East	2.4	3.3	4.1	5.8	4.4

Source: UNWTO, World Tourism Organization (2018)

Besides being a popular destination, Europe is also a tourist tank which fuels outbound tourism and consists of European residents who travel outside their country, either remaining within European territory or going outside that. Europeans appear to prefer Europe itself as an outbound tourist destination. Thus, on average, only 15% of tourism nights are spent by EU residents in non-EU countries such as USA and Turkey. Also, according to Eurostat (2018), most tourism trips are short, up to three overnight stays, more than one in nine trips is for professional purposes, over half of all overnight stays take place in rented accommodation, air travel is the main means of transport for over half of all outbound trips. Last, half of Europeans do not go on holiday at all because of financial reasons, albeit the quality of life tourism contributes to (Bronner & de Hoog, 2016).

After the presentation of the most important characteristics of inbound and outbound tourism in Europe, it is worth reporting the significance of the tourist industry and its benefits to European economies. Tourism has favored employment and the advancement of economic growth, particularly after the economic crisis which has afflicted the European region. Overall, Europe has experienced small fluctuations in tourist arrivals ranging from 1%-3% in the years from 2009 and onwards, namely when the economic crisis started heavily, till up to date. Very few industries in Europe have remained

equally vibrant to contribute to the afflicted countries' moving out of the crisis or reducing the effects of the crisis on themselves.

Tourism in Europe has also been important for other reasons; For example, the infrastructure developed for tourism has been significant not only for tourism purposes, but also because it has contributed to local development and particularly the development of rural regions in Europe with a focus on sustainability (European Commission, 2018). The European Union (EU) has also focused much on improving the sustainable high-quality image of its tourist destinations through e.g. certification schemes, eco-management and audit schemes (Cismaru & Ispas, 2015), which constitute only some examples of environmental friendly and sustainable management of tourism in Europe.

This paper explores the determinants of international tourism demand in Europe (both the inbound and the outbound). The analysis we have performed is of a macroeconomic nature and hence we do not investigate tourists' preferences and the substitution e.g. between tourist's working time with leisure, tourist products and other consumer goods which are often examined under a micro-economic framework. As known, tourism demand is influenced both by numerous price and non-price factors. The former usually include the cost of transport to travel to and from the holiday destination and the price of the accommodation, food, touring and entertainment. The non-price factors usually include the socio-economic characteristics, the demographics and the qualitative factors that form or affect one's destination choice. Therefore, in the macroeconomic set-up of the models we employ in this paper, we use real income in the destination country and real exchange rate (to represent the relative prices between Europe and the outer world) as price factors instrumented by two non-price factors, i.e. environmental quality and trade openness.

Our paper falls in the category of tourism demand identification without using bilateral data. Tourism economics literature is relatively recent and its conceptualization is still under formation (Stabler *et al.*, 2010). The specific contribution of this paper consists in five major points:

- ✓ First it applies the Canay's (2011) fixed effect quantile panel data approach method in tourism modeling, also juxtaposing inbound and outbound tourist demand for the first time within this framework.
- ✓ Second, it uses a group of 32 European countries rather than a single country approach as it has been typically done in modeling tourist demand up-to-date. Thus, it is essentially the largest European country sample study so far.
- ✓ Third, it uses real domestic income in a dual way; One way is as a proxy for quality of life and the level of development and the other is real income reflecting on buying capability. Knowing the contribution of domestic income to inbound tourist demand enables an informed pricing of the tourist product, easier forecasting and planning in sectors such as infrastructure, accommodation, aviation etc.
- ✓ Fourth, it compares the results produced from international tourist arrivals and international receipts in the inbound tourism demand model and thus contributes to the literature that deals with the choice of the most appropriate tourist activity variables.
- ✓ Fifth, it accommodates new variables in the tourist demand equation such as environmental degradation and trade openness.

The rest of this paper has five additional parts; Part 2 contains the literature review, Part 3 explains the model theory, Part 4 comprises the data, Part 5 contains the results and Part 6 offers the conclusion with policy recommendations.

Literature Review

Tourism demand refers to the willingness to pay as well as the ability to pay for a tourist good in a given period. Following standard consumer demand theory, demand is affected by price and non-price factors. The former are income and prices and the latter encompass a large variety of qualitative and quantitative factors such as the size of the market, the marketing and promotion strategies (Han *et al*., 2018), the prevalent weather conditions (Wilkins *et al*., 2018), the political conditions (Adeola *et al*., 2018); (Lv & Xu, 2017) pertaining in the destination country, the immigration stock (Balli *et al*., 2016) and many other parameters. Up-to date most tourist demand studies have employed the level of relevant prices between the origin and the destination country (Khoshnevis Yazdi & Khanalizadeh, 2017), as well as income (Habibi, 2017); (Wang *et al*., 2018). Empirical literature is being continually enriched with additional variables; For example, travel cost has been included by Habibi (2017); Athanasopoulos & Hyndman (2008), violent situations and disease infection have been included in Chu (2008) and Smeral (2010) respectively, substitute prices have been used in Li *et al*. (2005), foreign direct investment has been used in Peng *et al*. (2015) while the strength and persistence of travel preferences have been employed in Peng *et al*. (2015) too. Silva *et al*. (2017) have used a variable of country relations across Europe and they support that it can improve the predictive accuracy of tourism demand. Tourism demand is affected by numerous non-economic factors and certainly there is plenty of scope for empirical research. For example, cultural and nationalistic backgrounds can also affect tourism demand, because tourists from different origins have different interpretations of visual imagery and experiences (Cho, 2010). Furthermore, Pham *et al*. (2017) include three main groups of variables: *income factor* (proxied by GDP per capita), *price factor* (proxied by the weighted price), and *other factors* representing changes in the operating environment of tourism as well as migration flows from China to Australia, since their study is focusing on a particular flow of tourist arrivals from Australia to and from China. Last, Agiomirgianakis *et al*. (2017), besides the disposable income, they also employ exchange rate and its volatility and the temperature (as a proxy for the weather). The exchange rate and its volatility has also previously been employed in Agiomirgianakis *et al*. (2014, 2015). A depreciation in the exchange rate increases the competitiveness of the tourist destination. The increase in its volatility has a negative effect on tourism demand.

Besides the variety of price and non-price factors affecting demand, noteworthy is the fact that there is not a universally acceptable measure of tourism activity in demand modeling. Tourism demand may be expressed as the number of foreign visitors crossing the borders (inbound tourists) (Ongan & Gozgor, 2018) or the number of nights spent (Damm *et al*., 2017) by inbound tourists or the receipts generated from tourists (Pham *et al*., 2018), while they stay in the destination country, their length of stay (Pham *et al*., 2018) etc. Noteworthy is the fact that, the magnitude of tourist arrivals does not reveal anything about the intensity of spending when tourists are in the destination country, since receipts are generally acknowledged to be higher, the longer one stays in a destination. The usage of the aforementioned measures is mixed and ambiguous in literature. For example, we have identified studies employing tourist arrivals such as in Agiomirgianakis *et al*. (2017), Petrevska (2017); Silva *et al*. (2017) and Pham *et al*. (2017) and others employing expenditures such as in (Dumičić *et al*., 2017) and Garcia *et al*. (2013) and each study supports that it uses the right dependent variable, given its aims and objectives. Martins *et al*. (2017) derive a global relationship for tourism demand and they state that GDP per capita is more important when tourism demand is expressed in TA, and relative prices are more important when tourism demand is expressed in TE. Also, Song *et al*. (2010) find that when tourist demand is proxied by TA is more influenced by income, while when it is proxied by expenditures it is more influenced by the real exchange rate. Therefore, researchers should be wary of their selection if variable which they express tourism demand.

While most of the aforementioned factors (both in the dependent and the independent variables) are relying on micro-economic foundations, the current paper uses a macro-economic framework such as is done for example, in Adeola *et al.* (2018); Chaisumpunsal & Pholphirul (2017); Martins *et al.* (2017); Zaman *et al.* (2016). Moreover, there is not a consensus in tourism economics theory as to whether we should use aggregate or per capita models. According to Song *et al.* (2007) the aggregate tourism demand models outperform the per capita models, with aggregate expenditure models being the most accurate. Their empirical study focuses on demand for Hong Kong tourism by residents of Australia, the UK and the USA and they claim that the choice of the demand measure for forecasting models should depend on whether the objective of the decision maker is to maximize tourist arrivals or expenditure (receipts), and also that the models should be specified in aggregate form.

As far as the European countries are concerned, which form the base of our current research, tourism demand has been studied only in very few cases on a multiple country base. Otherwise, there is a lot of geographical fragmentation in research and most European studies are single country ones or are about special sides of tourist demand within a single European country. With respect to the former category, namely that of groups of European countries, Silva *et al.* (2017) and Dumičić *et al.* (2017), for example, have carried out two studies. The first is on ten European countries and uses monthly time series data from 2000-2013. They apply an optimized multivariate singular spectrum analysis (MSS) and they end up producing causality analysis about which country causes tourist demand in the other. Dumičić *et al.* (2017) on the other hand, uses quarterly time-series data from 1996-2014 to model tourism expenditure with GDP per capita and transport costs. They use heterogeneous panel data analysis and identify short-run and long-run elasticities together with the speed of adjustment.

Other studies that employ European samples are either single country studies or focus on the demand of a particular tourist product within a specific country. For instance, Cerdeira Bento (2014) use European students to study their demand for Erasmus tourism or Vilchez (2013) uses a sample of European municipalities on the Mediterranean coast to study the valuation of the location and the seasonality implicit in the price of accommodation. Gunter & Smeral (2017) in their study for European outbound tourism find that income elasticities were greater is slow economic growth periods than in high economic growth.

With respect to the employed method, this is the first paper employing the Chernozhukov & Hansen (2008) developed the instrumental variable quantile regression method to model tourist demand for 32 European countries. Most studies have used typical time-series or panel data approaches. Vilchez (2013) had also used the simple quantile regression but not its instrumental counterpart. Santeramo & Morelli (2016) use the quantile approach in a gravity model. In our approach, we use panel data which constitute a large dataset combining the qualities of cross sectional with time-series data. The quantile method examines the tourist demand at different quantiles, otherwise we would investigate the whole distribution of the tourist demand variable.

Furthermore, our strategy of employing the destination country income with a dual meaning, namely both as income but also as a proxy for the level of economic development and quality of life in the destination country, is principally instigated by the need to examine tourism demand within various framework set-ups and methods, a fact also underlined in Jennings (2007); Matias *et al.* (2007) and Shaw and Williams (2004) who also support the enrichment of independent variables with political economy considerations. The quality of life connected with tourism is also acknowledged in Croes *et al.* (2018). Next, Figure 1 depicts the numerous forms which tourist activity (demand) modeling can assume. Modeling can be differentiated either through the choice of the dependent variable, namely

the variable that is selected as the most appropriate to represent the demand for tourism or through the sample of countries participating in each study. Figure 1 reports for the former the tourist arrivals, the expenditure (or revenue), the binary choices of the tourist (one's acceptance or non-acceptance for a tourist choice) and other variables which are quite numerous. Figure 1 places these numerous variables in one group entitled as "Other variables". Modeling can also be differentiated by means of a geographic factor. Figure 1 separates these studies as "single country" (Dryglas & Różycki, 2017), "multiple countries" (Dumičić *et al.*, 2017) or "a place within a single country", such as is done in Garcia *et al.* (2013).

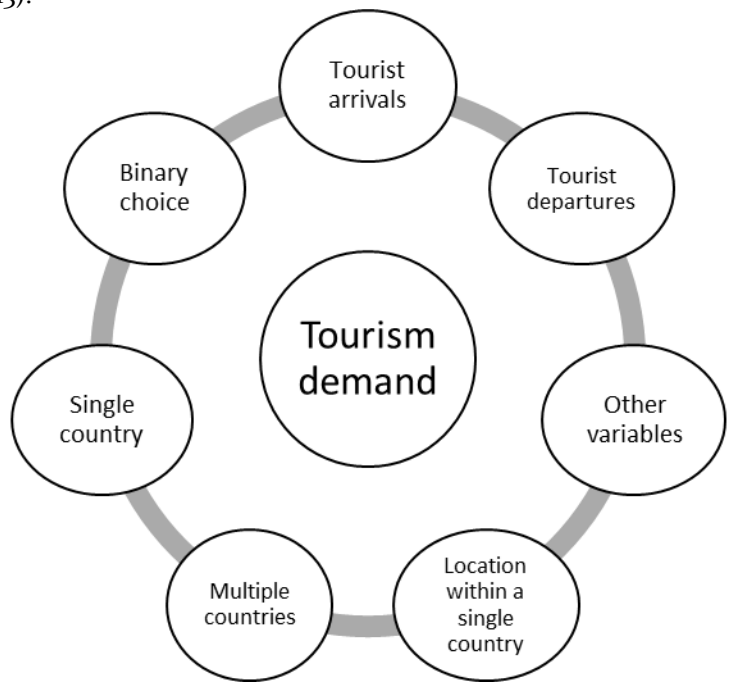

Figure 1. *Tourism activity demand literature segmentation based both on the employed dependent variable and the country of sampling*

Data

We have selected a panel for 32 European countries from 1995 to 2015. The countries are Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, LXB, Hungary, Malta, NRL, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, UK, Iceland, Norway, Switzerland and FYROM. To obtain elasticities, all variables are used in logarithm form and have been obtained from the World Development Indicators (Worldbank, 2017). The choice of independent variables has relied on a combination of issues such as the existent tourist demand theory and data availability.

The variables that will be used in the models of this paper are displayed in Table 2. We also provide a thorough theoretical explanation and support of their choice. The current study employs two measures of inbound tourism demand and a single measure for outbound tourist demand. Because tourist economics literature is ambiguous about which of the two variables (Martins *et al.*, 2017; Song *et al.*, 2010), namely tourist arrivals and tourist receipts, is the best to use, we saw appropriate, for reasons of robustness proof, to use both of them in our model of inbound tourist demand.

Table 2. *Variables and nomenclature*

Variable	Meaning
TA_{it}	Tourist arrivals
TR_{jt}	Tourist receipts
TE_{jt}	Tourist expenditure
GDP_{it}	Real GDP per capita
ER_{ijt}	Real exchange rate
$CO2_{it}$	Carbon dioxide emissions
Tr_{it}	Trade openness

Note: *i*, *j* stand for origin and destination countries respectively, *t* stands for time

According to the Worldbank Development Indicators (2017), international tourist arrivals are defined as overnight visitors, namely the number of tourists who travel to a foreign country for a period not exceeding 12 months and whose main purpose of visit is other than work. Furthermore, international tourism receipts (% of total exports) are expenditures earned by the destination country from inbound tourism, while international tourism expenditures (% of total imports) are expenditures of international outbound visitors in other countries (residents of the destination country who travel abroad). Both these magnitudes include payments to national carriers for international transport and any other prepayment made for goods or services. Their measurement as percentage of imports and exports respectively broadly shows the contribution of tourist activity in the balance of payments. The higher the percentage of tourism receipts, the more heavily an economy relies on the tourism industry. The higher the percentage of tourism expenditures, the more the country's residents travel and spend on tourism activity outside their countries.

As a measure of income we use real GDP per capita in the destination country in constant prices. This variable is also considered as a proxy for the quality of life and the development level. According to Lim (2006) and Garín-Muñoz (2009), most tourism demand macroeconomic econometric studies use GDP per capita or aggregate as a proxy for income in the origin country and they find that tourism demand is significantly affected by that magnitude. Our paper complies with that with an additional caveat and novelty; it tests the relationship of the GDP of the destination country with tourist demand. Since GDP can be considered as a proxy for economic development, it is worthwhile to empirically investigate this relationship for the first time in this literature.

The real exchange rate is the bilateral nominal exchange rate between European countries (€) and the outer world ($) multiplied by the ratio of European countries price level and the tourist's origin country price level. This represents Europe's competitiveness. The real effective exchange rate of the destination country (€) with respect to the $, stands for a proxy representation of relative prices and exchange rates between the destination country and the outer world. A devaluation of the exchange rate increases competitiveness and tourism demand.

Among the additional explanatory variables, we use, are the carbon dioxide emissions (metric tons per capita) as a measure of environmental degradation and trade openness expressed as trade in % GDP terms. Therefore, trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

The model

The Quantile instrumental regression model

Canay (2011) building upon Koenker (2004) specified the quantile regression with fixed effects and Chernozhukov & Hansen (2008) developed the instrumental variable quantile regression. It is a generalization to the standard quantile regression and investigates the effects of the quantiles of a dependent variable to the conditional quantiles of another variable. The quantile regression method investigates the effects of the explanatory variables not only at the centre but also at the tails of the distribution of the dependent variable. The quantile method is particularly useful for modeling tourist demand since tourism economics is an area that suffers from a shortage of a concrete economic theory. Under the proposed framework, the effect of income can be investigated in any level of tourist demand. The quantile regression is superior in that is shows how destination countries with different real income per capita and different real exchange rates affect tourism demand for themselves as destinations (inbound tourism) and for countries other than themselves (outbound tourism) differently by using information from all countries through the weighted sum of absolute deviations.

The baseline model in this paper is an instrumental variable quantile with fixed effects as shown in Harding & Lamarche (2009), because we assume that tourist activity is affected by a number of exogenous variables which are correlated with the country effects, namely there are unique unobserved parameters in the countries that contribute their effect on the dependent variable, i.e. tourist activity demand (expressed as tourist arrivals, tourist receipts or tourism expenditure). The model is developed in Equations (1)-(3).

$$y_{it} = a_i + X_{it}^{'}\beta + C_{it}^{'} + \varepsilon_{it} \qquad i=1, \ldots,N, \quad t=1, \ldots T \qquad (1)$$

$$C_{it} = f(X_{it}, D_{it}, e_{it}) \qquad (2)$$

$$a_i = g(X_{it}, \ldots, X_{iT}, G_{i1}, \ldots G_{iT}, v_i) \qquad (3)$$

With y_{it} being tourism activity as represented by three variables: tourist arrivals, tourist receipts and tourist expenditure, X_{it} is a vector of the exogenous variables such as the real GDP per capita and the real exchange rate and ε_{it} is the disturbance term.

While C_{it} represents endogenous variables such as carbon dioxide emissions and trade openness that are related both to a set of instruments D_{it} and the exogenous variables X_{it}. a_i is the country effect, *i* and *t* denote the country and time respectively.

The structural model is further depicted as shown in Equations (4) and (5):

$$y_{it} = H_{it}^{'}a(\varepsilon_{it}) + X_{it}^{'}\beta(\varepsilon_{it}) + C_{it}^{'}\gamma(\varepsilon_{it}) \qquad (4)$$

$$Q_y^S(\tau|\, H, X, C) = H_{it}^{'}a(\tau) + X_{it}^{'}\beta(\tau) + C_{it}^{'}\gamma(\tau) \quad \text{structural quantile function} \qquad (5)$$

With H_{it} being the indicator variable for the country specific effects, τ stands for the τ-th quantile, Q_y^S is the structural quantile function, ε_{it} follows a uniform distribution.

$$\{\hat{\alpha}(\tau,\gamma), \hat{\beta}(\tau,\gamma), \hat{\eta}(\tau,\gamma)\} = \arg\min_{\alpha,\beta,\eta} \sum_{t=1}^{T}\sum_{i=1}^{N} \rho_\tau \left(y_{it} - H_{it}^{'}a - X_{it}^{'}\beta - C_{it}^{'}\gamma - \widehat{D}_{it}^{'}\eta\right) \qquad (6)$$

ρ stands for the quantile response function, $\hat{Z}$ is a least squares estimator (Equation 6). To find an estimate for γ(τ), we look for a value of γ that makes the coefficient on the instrumental variable $\eta\ (\tau, \gamma)$ as close to zero as possible. The minimization of the following objective function (Equation 7) allows identification of α, β, η as a function of τ and γ.

$$\hat{\gamma}\ (\tau) = \arg \min_{\gamma}\ \hat{\eta}(\tau,\gamma)' * A * \hat{\eta}\ (\tau,\gamma) \tag{7}$$

The reader can briefly review the principle underlying the instrumental variable quantile regression in Chernozhukov & Hansen (2008). Our quantile regressions have been estimated at eleven distinct points of the tourist arrivals, tourist receipts and tourist expenditure distributions, namely at 0.05, 0.15, 0.25, 0.35, 0.45, 0.5, 0.55, 0.65, 0.75, 0.85, 0.95 quantiles. In essence, we estimate three models, two for the inbound tourist demand and one for the outbound tourist demand as shown in Equations 8-10:

The model set-up

$$TA_{it} = f\left(GDP_{it}, ER_{ijt}, CO2_{it}, Tr_{it}\right) \tag{8}$$

$$TR_{jt} = f\left(GDP_{it}, ER_{ijt}, CO2_{it}, Tr_{it}\right) \tag{9}$$

$TE_{jt} = f\left(GDP_{it}, ER_{ijt}, CO2_{it}, Tr_{it}\right)$, the outbound model (10)

i, *j* stand for origin and destination countries respectively, *t* stands for time, GDP stands for real GDP per capita, ER stands for the real exchange rate, CO_2 stands for carbon dioxide emissions and *Tr* stands for trade openness. TA, TR and TE have been defined previously.

Results

The summary results of the three models that are developed in this section are presented in Table 6 at the end of this section. Detailed results are presented in separate tables (2-4) in the following sub-sections.

The inbound tourist demand model for Europe

International Tourist Arrivals (TA)

As far as TA are concerned (Table 3), we observe first that the effect of domestic real GDP per capita on international TA is positive and smaller than one and this effect decreases slightly from the lowest to higher quantiles of international TA. The interpretation for the 1st quantile of TA is that 1% increase in GDP per capita increases TA by 0.86%. The interpretation is similar for the rest of the quantiles. Thus, it is 0.8629 in the 1st quantile, 0.8717 in the 2nd quantile and there is a smooth decay from 0.8485 to 0.8064, namely from the 3rd to 11th quantile. This shows that when domestic income increases, this causes an increase in tourist arrivals, but this increase is less intense for higher international TA. This number stands for the income elasticity and the fact that this is lower than unity, means that tourism in Europe is a normal good. The positive relationship between real domestic income per capita and international TA should not be a surprise since real domestic income reflects not only the general welfare, the quality of life and development of the destination country, but is also reflects the level of prices and the consequent destination competitiveness. The second interpretation cannot be supported due to the positive sign of income. Therefore, the first explanation remains prevalent. Naude & Saayman (2005) have also found a positive relationship between TA and the level of

development of the destination country. The positive but decreasing rate in the relationship between domestic income and TA may reflect the lower rates of income growth and tourist growth, particularly at the end of the studied period, due the economic crisis afflicting Europe. Since a large part of inbound tourism are European residents, they too are afflicted by the negative economic environment in Europe. At this point, we must report two relevant findings in literature which can possibly boost the explanation we provide here: One study is by Gunter and Smeral (2017) and can partly explain the asymmetry evidenced in the quantiles of TA. Gunter and Smeral (2017) investigate European outbound tourism and find that income elasticities were greater is slow economic growth periods than in high economic growth. They also find that small income improvements in the fast growth periods were used for pent up demand for necessary consumption goods or precautionary savings than traveling abroad. Of course on our case, demand is expressed in arrivals and not revenue, but the insights from this piece of literature are rich. The second study is by Dumicic *et al.* (2017) who study the effect of income on tourist expenditure for European countries and they find that the rise in transportation costs prevents a rise in tourist expenditure despite a rise in income. They attribute this to the decision of tourists not to travel away from their domiciles as a result of high transportation costs. Analogous explanations can be allotted in our TA model. Income rises but not at s sufficient level to cause more arrivals.

Furthermore, higher European income (in the destination countries) entails a higher demand and an increase for imports. Higher destination country income might also entail higher infrastructure investment and some of that investment may contribute to an international TA increase too. Also, European countries with higher income can afford the provision of higher quality tourism which also causes the increase in international TA. Second, regarding the real exchange rate (ER), we observe there is a negative relationship between the ER and the size of international TA. This finding is in accordance with past literature, e.g. Agiomirgianakis *et al.* (2014, 2015, 2017). This means that as the ER increases, TA will decrease and vice-versa. An increase in the real exchange rate means that domestic goods are becoming more expensive relative to the imported goods and European consumers (destination country consumers) can get more foreign goods for an equivalent amount of domestic goods. The relative expensiveness of local products with respect to foreign ones deters some of the possible inbound tourists from visiting Europe. This situation will in turn increase net imports and can contribute to an increase in the current account deficit. The decrease in TA is asymmetric across the quantiles: It is high in the 1st quantile, then it decreases in the 2nd-4th quantiles and again it increases up to the 10th quantile. It decreases abruptly to 0.62 in the 11th quantile. The interpretation for the 1st quantile is that 1% increase in the real exchange rate decreases TA by 0.93%. The interpretation is similar for the rest of the quantiles.

Third, other instrumental variables such as the environmental degradation which is proxied by carbon dioxide emissions reveal a negative relationship between environmental quality in the destination country and the number of international TA at that country. The effect of the environmental degradation on tourist arrivals is higher at the 1st quantile and it is asymmetric throughout the quantile range. On the other hand, there is a positive relationship between the square of carbon dioxide emissions and the number of tourist arrivals which supports the existence of positive U shaped curve relationship between TA and environmental degradation. This means that as TA increase in number, environmental degradation decreases and this continues up to a point. When that point is exceeded, environmental degradation increases. Overcoming that critical point in TA refers us to a situation where economies of scale in pollution abatement are exhausted and new measures must be taken to address the larger sizes of TA. With respect to CO_2 emissions themselves (not their square), the interpretation for the 1st quantile is that 1% increase in carbon dioxide emissions,

decreases tourist arrivals by 1.06%. The interpretation albeit similar reveals the asymmetry for the rest of the quantiles; The coefficient decreases in higher quantiles showing that higher numbers of arrivals cause relatively less environmental harm than lower numbers of arrivals. In conjunction with the above finding, this constitutes evidence of returns to scale in pollution abatement, but still needs further research.

Fourth, trade openness has a positive relationship with TA in European countries. Apparently, this effect is also asymmetric and higher for higher quantiles. It reveals that higher trade openness causes larger numbers of inbound tourism, because the country has an open trade orientation, most likely will have a simpler legislation and bureaucratic regime on the mobility of people, goods and services with less barriers which also favor tourist mobility. Bearing in mind that European countries themselves have a free mobility regime and many of them a common currency which reduces transaction costs, this result is realistic. Besides, other studies have found the same result, e.g. Chaisumpunsakul & Pholphirul (2017) find a positive correlation between trade and international tourist demand (TA) in Thailand. In our study, the interpretation for the 1st quantile is that 1% increase in trade openness, increases tourist arrivals by 0.30%. The interpretation is similar for the rest of the quantiles.

Last the constant is asymmetric; It is higher in the 1st than in the 11th quantile with many fluctuations within that interval. Overall, the fact that most of these effects become smaller in the higher quantiles, means that most of the effects are reduced in the occurrence of higher TA, again noting the occurrence of economies of scale.

International Tourism Receipts (TR)

We should pinpoint, in this section, that while the variable of international TA reveals the occurrence of the tourist phenomenon in a single dimension, namely it indicates whether one had at least one overnight stay abroad, the variable of international tourism receipts (TR) additionally provides information on the duration of the tourist stay and spending activity, because the longer stays entail higher receipts. Juxtaposing the results from the TR model with the ones from the TA model, we observe (Table 4) that the TR model contains one additional variable which is the squared GDP per capita to capture evidence of a Kuznets' curve (inverse U curve). The interested reader could also consult Zaman *et al.* (2016) for the various forms of the Kuznets' curve. GDP per capita has a positive sign in all quantiles. This means that domestic income per capita has a positive effect on tourist receipts. In this variable, the coefficient size is larger for the TR model that the TA counterpart.

As regards income, the explanation applicable in the international TA model apparently applies in this case too. Namely, that higher income in the destination country reflects a prosperous economic reality in the destination country and a higher quality of life which not only lures international tourists to visit the destination, but also contributes to increased domestic investment which attracts increased tourist spending. The interpretation for the 1st quantile is that 1% increase in income, also increases tourism receipts by 1.36%. With an income elasticity being higher than unity, this means that tourism to European countries is a luxury good. A large part of inbound tourists in Europe is Americans for whom visiting Europe is a dream of life, because of the history and the old civilization Europe offers. Another significant part of inbound tourists are wealthy Europeans who travel from one country to the other within European territory. Thus, the traditional European destinations such as Italy, France, Spain and UK are regarded as expensive destinations which require that the tourist is able to spend.

Table 3. *International tourist arrivals (TA)- Model 1*

Quantiles	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	0.05	0.15	0.25	0.35	0.45	0.5	0.55	0.65	0.75	0.85	0.95
GDP_{it}	0.8629***	0.8717***	0.8485***	0.8423***	0.8319***	0.8333***	0.8331***	0.8388***	0.8370***	0.8367***	0.8064***
	(0.0342)	(0.0173)	(0.0115)	(0.0106)	(0.0114)	(0.0114)	(0.0111)	(0.0105)	(0.0095)	(0.0130)	(0.0526)
ER_{ijt}	-0.9368***	-0.7230***	-0.7304***	-0.7713***	-0.8088***	-0.8045***	-0.8281***	-0.8356***	-0.8080***	-0.8586***	-0.6226**
	(0.2118)	(0.0827)	(0.0731)	(0.0638)	(0.0624)	(0.0647)	(0.0563)	(0.0559)	(0.0553)	(0.0668)	(0.2980)
$CO2_{it}$	-1.0606***	-0.8206***	-0.7885***	-0.8087***	-0.7934***	-0.7693***	-0.7661***	-0.7999***	-0.7603***	-0.7716***	-0.6797**
	(0.2177)	(0.0731)	(0.0593)	(0.0544)	(0.0529)	(0.0568)	(0.0558)	(0.0626)	(0.0533)	(0.0719)	(0.2838)
$CO2_{it}$ Squared	0.0393***	0.0316***	0.0299***	0.0303***	0.0297***	0.0287***	0.0284***	0.0300***	0.0287***	0.0291***	0.0255*
	(0.0098)	(0.0030)	(0.0024)	(0.0023)	(0.0023)	(0.0024)	(0.0024)	(0.0027)	(0.0023)	(0.0031)	(0.0145)
Tr_{it}	0.3028***	0.3560***	0.3556***	0.3493***	0.3504***	0.3529***	0.3518***	0.3571***	0.3659***	0.3623***	0.3765***
	(0.0377)	(0.0177)	(0.0103)	(0.0102)	(0.0111)	(0.0106)	(0.0105)	(0.0070)	(0.0088)	(0.0136)	(0.0586)
Constant	24.3629***	22.8182***	22.9738***	23.3033***	23.5325***	23.4145***	23.5240***	23.8180***	23.6388***	23.9110***	22.9361***
	(1.5414)	(0.5841)	(0.5073)	(0.4693)	(0.4576)	(0.4621)	(0.4329)	(0.4608)	(0.4133)	(0.5194)	(2.1261)
Observations	507	507	507	507	507	507	507	507	507	507	507

Robust standard errors in parentheses
All variables are in log form
*** p<0.01, ** p<0.05, * p<0.1

On the other hand, there is a negative relationship between the square of GDP per capita and tourism receipts. This is evidence for the existence of an inverse U curve, according to which TP increases with income, but this occurs up to a critical threshold point, beyond which TP starts decreasing, even if income increases further. This is widely attributed to holiday packages which exploit economies of scale and drop tourist product prices at a very low level. There are fluctuations of the size of the coefficient of GDP per capita squared but the size of the 1st quantile is larger than that at the 11th quantile. This asymmetry reveals that TR starts decreasing at a much higher point than it does in other quantiles and this is consistent with economies of scale. The same applies for GDP per capita (non-squared). Second, there is a negative relationship between the real exchange rate and TR. The same reasoning applies as the one we have reported in the previous section for the case of TA. Namely, an increase in the real exchange rate means that domestic goods are becoming more expensive relative to the imported goods and European consumers or international tourists in Europe can buy more foreign goods for an equivalent amount of domestic goods. This will increase net imports and can contribute to an increase in the current account deficit. The size of the coefficient, however, is smaller, almost half, in the TR model than the TA model. This shows that TR is less sensitive than the TA when it comes to a marginal increase in the real exchange rate. Our findings are consistent with results by Song *et al*. (2010) who also find that when tourist demand is proxied by TA is more influenced by income, while when it is proxied by expenditures it is more influenced by the real exchange rate.

Third, the sign of the carbon dioxide emissions is negative, while the sign of the square carbon dioxide emissions is positive. The size of the coefficient in this variable is almost equal in the TA and TR models. The explanation applicable here is the same as the one provided in the previous section for the TA model, namely that there is an inverse U relationship between tourism demand and environmental degradation. This is attributed to economies of scale in pollution abatement which are exhausted beyond a threshold point.

Fourth, the sign of the trade openness is negative showing a negative relationship between trade openness and TR. An increase in trade openness by 1% will decrease TR by 0.69%. We would expect TR to increase and not to decrease with respect to trade openness. This finding can be attributed to the substitutability of tourist activities with other trade activities in some countries. Given that: i) a significant part of European country nationals, also count as inbound tourists, ii) European states are afflicted hard by the economic crisis, iii) Europeans substitute tourism consumption with basic goods consumption, either by quitting any holiday ideas completely or by substituting the more expensive and independent holidays with cheaper holiday packages which reduce TR. According to European Commission (European Commission 2018), about half of Europeans (after the economic crisis) prefer staying in their home countries and postpone holiday plans (domestic or international) in order to cover basic needs. However, even the Europeans with higher incomes who can still afford holidays, have been affected by the economic crisis and look for cheaper or shorter holidays mostly within Europe and this is accomplished through the holiday packages which leave little revenue to the destination country.

The outbound tourist demand model for Europe

International Tourism Expenditure (TE)

International TE is used to model an outbound tourist demand in this paper. As far as the results from Table 5 are concerned, the coefficient of income is negative, which means that as domestic income increases, the TE decreases. This is an odd finding, since as real domestic income increases, we would expect a higher ability of outbound tourist spending. Of course this is not the case if the prices in

Table 4. *International tourism receipts (TR)- Model 2*

Quantiles	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	**0.05**	**0.15**	**0.25**	**0.35**	**0.45**	**0.5**	**0.55**	**0.65**	**0.75**	**0.85**	**0.95**
GDP_{it}	1.3622***	1.0565***	1.2130***	0.9991***	1.0666***	0.9942***	1.0305***	1.0334***	0.9380***	0.7909***	1.1589
	(0.2718)	(0.3177)	(0.4128)	(0.2657)	(0.2261)	(0.1875)	(0.2040)	(0.2396)	(0.2260)	(0.0972)	(0.7651)
$GDP_{it}{}^2$	-0.1130***	-0.0952***	-0.1038***	-0.0942***	-0.0990***	-0.0956***	-0.0974***	-0.0980***	-0.0941***	-0.0871***	-0.1094***
	(0.0138)	(0.0162)	(0.0204)	(0.0130)	(0.0111)	(0.0092)	(0.0101)	(0.0118)	(0.0114)	(0.0050)	(0.0381)
ER_{ijt}	-0.3969***	-0.3696**	-0.5303***	-0.6449***	-0.5195***	-0.5362***	-0.5173***	-0.6072***	-0.5925***	-0.4586***	-0.1626
	(0.1294)	(0.1511)	(0.1398)	(0.1323)	(0.1033)	(0.0913)	(0.0921)	(0.0965)	(0.0922)	(0.0816)	(0.2512)
$CO2_{it}$	-1.1082***	-0.9870***	-0.9724***	-1.0769***	-1.0862***	-1.0868***	-1.0707***	-1.0924***	-1.0508***	-0.9935***	-0.6572***
	(0.1039)	(0.1472)	(0.1276)	(0.1204)	(0.0935)	(0.0787)	(0.0782)	(0.0830)	(0.0847)	(0.0778)	(0.1356)
$CO2_{it}$ Squared	0.0458***	0.0405***	0.0412***	0.0445***	0.0450***	0.0449***	0.0449***	0.0461***	0.0443***	0.0420***	0.0263***
	(0.0049)	(0.0058)	(0.0054)	(0.0050)	(0.0039)	(0.0033)	(0.0032)	(0.0036)	(0.0036)	(0.0033)	(0.0057)
Tr_{it}	-0.6964***	-0.6903***	-0.6441***	-0.6621***	-0.6575***	-0.6633***	-0.6520***	-0.6419***	-0.6364***	-0.6309***	-0.6480***
	(0.0273)	(0.0372)	(0.0196)	(0.0159)	(0.0140)	(0.0144)	(0.0153)	(0.0064)	(0.0155)	(0.0139)	(0.0293)
Constant	-7.0589***	-6.3455***	-5.4780**	-3.3611**	-3.9383***	-3.5651***	-3.7537***	-2.9558**	-2.5427**	-2.5809***	-7.3559*
	(1.5009)	(1.8562)	(2.2195)	(1.3969)	(1.2163)	(1.0604)	(1.1332)	(1.3229)	(1.2402)	(0.8451)	(4.0013)
Observations	475	475	475	475	475	475	475	475	475	475	475

Robust standard errors in parentheses
All variables are in log form
*** p<0.01, ** p<0.05, * p<0.1

outbound tourism destinations increase at a much higher level than the domestic ones and the domestic income does not increase inasmuch as to compensate for them. This is an explanation for this finding, particularly after the economic crisis started in Europe. There are several findings in literature which support our argument. One is by Gunter and Smeral (2017) in their study for European outbound tourism who find that income elasticities were greater is slow economic growth periods than in high economic growth. They also find that small income improvements in the fast growth periods were used for pent up demand for necessary consumption goods or precautionary savings than traveling abroad. The other is by Dumicic *et al.* (2017) who study the effect of income on tourist expenditure for European countries and they find that the rise in transportation costs prevents a rise in tourist expenditure despite a rise in income. They attribute this to the decision of tourists not to travel away from their domiciles as a result of high transportation costs. These two research findings together with executive summary results from the European Commission outline the new reality in tourism by European residents, e.g. Half of them do not go on holidays, those who go on holidays, their holidays are shorter and cheaper. Also, according to Vanhove (2018), there is significant substitution of outbound tourism with domestic tourism in Europe, due to the economic crisis.

This is the only model where the income coefficient has a steady upward trend from the 1st to 11th quantile. This entails that in higher quantiles, as income increases, the TE will decrease more in analogy. Based on the result for the 1st coefficient, 1% increase in domestic GDP, results in 1.01 % decrease in TE. This elasticity size reveals that the outbound tourism in Europe as an inferior good and thus confirms European Commission (2017) stated stylized facts that Europeans prefer to go on holidays in Europe or stay in their country without going on holidays, because of the economic insecurity they feel and it is caused from the economic crisis.

Second, the coefficient in the real exchange rate is positive. This was not the case for the previous two models, namely the TA or the TR. An increase in the real exchange rate causes an increase in TE. If domestic goods become more expensive, this favors outbound tourism spending. The size of this coefficient is of the same level as in the TR model, but with a different sign than that in the TA model. There is a clear asymmetry and a gradual decay of the size of the coefficient across quantiles. Thus, it starts from 0.3454 in the 1st quantile and becomes 0.1885 with a negative sign in the 11th quantile though.

Third, environmental degradation is inversely related to tourist expenditure. This translates into that European outbound tourists' spending decreases as domestic environmental degradation increases. In this model, the square of CO_2 emissions was not confirmed. Wang *et al.* (2018) in their study about the effect of air quality in the place of origin of outbound tourism demand, they find a push effect in demand caused by pollution.

Last, trade openness appears as negatively related to TE. If trade openness is inversely related to TE, that means that when a country is open from a trade point of view, TE should reduce. If the trade volume is dominated by exports, the country fosters more the inbound tourism and not the opposite, because inbound tourism is an equivalent of export while outbound tourism is an equivalent of import. Chaisumpunsakul & Pholphirul (2017) find a positive correlation between trade and international tourist demand (TA) in Thailand. We find the same positive correlation when TA is used, but in this case TE or the TR, there is a negative relationship between the magnitudes. A possible explanation could be attributed again to the reduced buying power of Europeans or the economic insecurity they experience which drives them to spend less when in holiday. Also, the

Table 5. *International tourism expenditure (TE) -Model 3*

Quantiles	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	**0.05**	**0.15**	**0.25**	**0.35**	**0.45**	**0.5**	**0.55**	**0.65**	**0.75**	**0.85**	**0.95**
GDP_{it}	-1.0145***	-1.0377***	-1.0492***	-1.0461***	-1.0533***	-1.0593***	-1.0552***	-1.0734***	-1.0695***	-1.0775***	-1.0993***
	(0.0433)	(0.0166)	(0.0159)	(0.0160)	(0.0166)	(0.0160)	(0.0160)	(0.0152)	(0.0160)	(0.0189)	(0.0239)
ER_{ijt}	0.3454**	0.2810***	0.1880**	0.1522*	0.0538	0.0482	0.0724	0.0606	0.0599	0.0484	-0.1885
	(0.1733)	(0.0883)	(0.0774)	(0.0776)	(0.0685)	(0.0589)	(0.0762)	(0.0781)	(0.0793)	(0.1051)	(0.1927)
$CO2_{it}$	-0.0628	-0.0504**	-0.0559***	-0.0528***	-0.0510**	-0.0432**	-0.0221	-0.0242	-0.0228	-0.0069	-0.0421
	(0.0511)	(0.0195)	(0.0196)	(0.0168)	(0.0205)	(0.0191)	(0.0205)	(0.0172)	(0.0174)	(0.0243)	(0.0364)
Tr_{it}	-0.8750***	-0.8668***	-0.8692***	-0.8639***	-0.8593***	-0.8538***	-0.8354***	-0.8362***	-0.8304***	-0.8115***	-0.8332***
	(0.0393)	(0.0153)	(0.0160)	(0.0137)	(0.0167)	(0.0156)	(0.0165)	(0.0138)	(0.0141)	(0.0189)	(0.0245)
Constant	-7.9379***	-7.2864***	-6.6908***	-6.4371***	-5.8016***	-5.6634***	-5.6436***	-5.3618***	-5.2540***	-4.8379***	-3.5007***
	(0.6154)	(0.3565)	(0.3311)	(0.3286)	(0.3165)	(0.2959)	(0.3310)	(0.3168)	(0.3245)	(0.4522)	(0.8044)
Observations	475	475	475	475	475	475	475	475	475	475	475

Robust standard errors in parentheses,
All variables are in log form
*** p<0.01, ** p<0.05, * p<0.1

vertical expansion pursued by tour operators, suppresses prices to the lowest possible level and this is reflected to some degree, to these expenditures.

To corroborate the stability and robustness of the Chernozhukov & Hansen (2008) developed the instrumental variable quantile regression results in this paper, we have additionally employed the Canay's (2011) fixed effect quantile panel data approach. However, since results are not much different than the already reported for Chernozhukov & Hansen (2008) approach results and to save space, we do not report them but they are available upon request.

Table 6. *Summary of results from all models*

	Inbound TA	**TR**	**Outbound TE**
Domestic real GDP	+ normal	+ luxury	- inferior
Domestic real GDP squared		-	
Real exchange rate	-	-	+
Emissions	-	-	-
Emissions squared	+	+	
Trade	+	-	-

Note: The signs + or – signify the direction of the effect on the variable, be that positive or negative.

Source: The Authors' compilation

Conclusions

This paper applies the Canay (2011) fixed effect quantile panel data approach and Chernozhukov & Hansen (2008) developed the instrumental variable quantile regression for the first time in modeling the tourism demand for Europe. The demand is modeled in two ways. First, it is modeled as inbound tourism demand, namely the demand originating from international tourists who travel towards European countries. These may be both from European countries and overseas. Second, it is modeled as outbound tourism demand, namely the demand for tourism originating from European residents towards European and non-European destinations. The first type of demand is modeled with two dependent variables: international tourism arrivals and international tourism receipts. The second type of demand is modeled through international tourism expenditures. As independent variables, both models have used the same variables, namely real GDP per capita, the real exchange rate, environmental degradation (proxied by CO_2 emissions) and trade openness. In both the inbound and outbound models, the income is perceived to denote both the level of income (which through the level of prices reflects on destination competitiveness) and the level of development in the destination countries. A higher level of development and lifestyle attract inbound tourists and also induces local residents to assume tourist activities, enjoy leisure and broaden their outlook. This is the first study in tourist demand modeling which uses the income of the destination country as an explanatory variable.

The results of this study are quite rich and innovative. Both the inbound and the outbound models provide useful insights for inbound and outbound tourism demand in Europe, at a macroeconomic level of analysis. The asymmetry evidenced in the elasticity of income with respect to tourist demand, reveals that tourism is a normal good when tourism is modeled as inbound tourist arrivals, is a luxury good when it is modeled as inbound tourism revenue and an inferior good when it is modeled as outbound tourism expenditure. Results are considered as ground-breaking because they are also in accordance and complementarity with major statements and observations produced by the European Commission and can lead to the generation of important policy conclusions.

Thus the income of the destination country is significant in explaining inbound tourist demand (both as tourist arrivals and tourist revenue). There are possible explanations for this, which of course will need further research for their corroboration. Such explanations connect the income with the concept of development. With respect to the outbound model, tourism appears as an inferior good for Europeans. Normally, if income increases, residents of a country will assume more outbound tourism activity. However, according to European Commission, the economic crisis has created a feeling of insecurity and European residents prefer substituting their holiday with the consumption of more vital good for everyday life or for saving the money for possible future needs. Also, according to European Commission, half of the Europeans do not go on holiday at all because they cannot afford it. The other half, who go on holidays, have changed their tourism pattern. They prefer staying within Europe and they consume less (cheap tourist packages make that easier). Policy makers need to boost tourist demand for the 50% of European who choose not to go on holidays for financial reasons, by widening the base for social tourist through subsidization of more income groups. Also, competition authorities need to address more attention to tour operators' vertical integration in Europe and through appropriate measures to enable the revival of tourist revenue. Foremost, sophisticated marketing to new markets such as the Chinese, will contribute to a significant boost of tourist demand in Europe.

The real exchange rate has a negative sign in the inbound tourism demand model. If policy makers were to adopt lessons from this model, then they should try to keep prices in Europe as low as possible because both TA and TR are very sensitive to price increases. A similar situation is revealed in the outbound tourism model, whereby European residents appear as sensitive in the domestic price increases and they tend to increase their tourist expenditure when the relevant domestic prices increase.

The only variable which has the same effect on tourism demand, whether tourism is inbound or outbound, is the environmental degradation. Environmental degradation, as proxied by carbon dioxide emissions, is negatively related to tourism demand. Since, the perused variable in the inbound model proxies the environmental degradation in the destination country, in the outbound model it proxies the environmental degradation in the domestic country. The latter makes sense because the outbound tourism in Europe is to a large extent, directed mostly to other European countries. Thus, if the environmental situation worsens in European countries, outbound tourists will travel less in these countries or they will go overseas in order to enjoy a cleaner natural environment than that prevalent in Europe. Foremost, the existent literature has found a so called push effect caused by environmental degradation and drives residents of polluted countries to select holiday destinations that are less or not polluted. To increase or to maintain tourist demand in Europe, policy makers need to improve the environment.

Last but not least, trade openness is another factor that affects tourism demand. There is a positive relationship between trade openness and TA, while there is a negative relationship between trade openness and tourist receipts or tourist expenditure. Since the variables TA, TR and TE describe tourism activity in a different way, the first describes the occurrence of tourism, while the last two also encompass the element of duration and other parameters such as spending behavior. Thus, we advise caution on this last finding. If the TA finding is adopted for the inbound tourist demand, the positive sign of trade reveals that there is a positive relationship between the two magnitudes. TA will increase if trade openness increases and this shows that these magnitudes move in a parallel and complementary way. On the other hand, TR and TE will decrease if trade openness increases which reveals their moving in a competitive way. The reason for this is the substitutability between tourism

activities and other trade activities, but this finding definitely demands further research. Further research is also required with testing more variables that affect tourism demand and new dependent variables which will represent the amalgam concept that tourism consists of as well as other proxies for environment degradation. Last, by no means do we suggest that our study is free of limitations. For example, the data-span is neither short nor long, but it is worth investigating the robustness of the estimated relationships with longer series when they become available.

References

Adeola, O., Boso, N., & Evans, O. (2018). Drivers of international tourism demand in Africa. *Business Economics*, 53, 25-36.

Agiomirgianakis, G., Serenis, D., & Tsounis, N. (2014). Exchange rate volatility and tourist flows into Turkey. *Journal of Economic Integration,* 29, 700-725.

Agiomirgianakis, G., Serenis, D., & Tsounis, N. (2015). The effects of exchange rate volatility on tourist flows: Evidence from the UK and Sweden. *International Journal of Tourism Policy*, 6, 1-16.

Agiomirgianakis, G., Serenis, D., & Tsounis, N. (2017). Effective timing of tourism policy: The case of Singapore. *Economic Modelling,* 60, 29-38.

Balli, F., Balli, H.O., & Jean Louis, R. (2016). The impacts of immigrants and institutions on bilateral tourism flows. *Tourism Management,* 52, 221-229.

Bronner, F. & de Hoog, R. (2016). Crisis Resistance of Tourist Demand: The Importance of Quality of Life. *Journal of Travel Research*, 55, 190-204.

Cerdeira Bento, J.P. (2014). The determinants of international academic tourism demand in Europe. *Tourism Economics*, 20, 611-628.

Chaisumpunsakul, W., & Pholphirul, P. (2018). Does international trade promote international tourism demand? Evidence from Thailand's trading partners. *Kasetsart Journal of Social Sciences*, 39, 393-400.

Chernozhukov, V., & Hansen, C. (2008). Instrumental variable quantile regression: A robust inference approach. *Journal of Econometrics*, 142, 379-398.

Cho, V. (2010). A Study of the non-economic determinants in tourism demand. *International Journal of Tourism Research*, 12, 307-320.

Cismaru, L. & Ispas, A. (2015). Improving the profile of the European tourist destinations through the European to tourism indicators system, *Bulletin of the Transilvania University of Braşov Series V: Economic Sciences*, 8 (57), 1.

Croes, R., Ridderstaat, J., & van Niekerk, M. (2018). Connecting quality of life, tourism specialization, and economic growth in small island destinations: The case of Malta. *Tourism Management*, 65, 212-223.

Damm, A., Greuell, W., Landgren, O., & Prettenthaler, F. (2017). Impacts of +2 °C global warming on winter tourism demand in Europe. *Climate Services*, 7, 31-46.

Dryglas, D., & Różycki, P. (2017). Profile of tourists visiting European spa resorts: a case study of Poland. Journal of Policy Research in Tourism, *Leisure and Events*, 9, 298-317.

Dumičić, K., Mikulić, J., &Časni, A.C. (2017). Tourism spending behaviour before and after the 2008 financial crisis: A dynamic panel investigation. *Tourism Economics*, 23, 223-228.

European Commission (2018). Tourism statistics, available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics (Accessed on 22.02.2018).

García-Sánchez, A., Fernández-Rubio, E., & Collado, M.D. (2013). Daily expenses of foreign tourists, length of stay and activities: Evidence from Spain. *Tourism Economics*, 19, 613-630.

Garín-Muñoz, T. (2009). Tourism in Galicia: Domestic and foreign demand. *Tourism Economics*, 15, 753-769.

Gunter, U., & Smeral, E. (2017). European outbound tourism in times of economic stagnation. *International Journal of Tourism Research*, 19, 269-277.

Han, J.S., Lee, T.J., & Ryu, K. (2018). The promotion of health tourism products for domestic tourists. *International Journal of Tourism Research*, 20, 137-146.

Han, Z., Durbarry, R., & Sinclair, M.T. (2006). Modelling US tourism demand for European destinations. *Tourism Management*, 27, 1-10.

Harding, M., & Lamarche, C. (2009). A quantile regression approach for estimating panel data models using instrumental variables. *Economics Letters*, 104, 133-135.

Jennings, G. R. (2007). Advances in tourism research: Theoretical paradigms and accountability. *Advances in Modern Tourism Research: Economic Perspectives*, 9-35.

Khoshnevis Yazdi, S., & Khanalizadeh, B. (2017). Tourism demand: a panel data approach. *Current Issues in Tourism*, 20, 787-800.

Koenker, R. (2004). Quantile regression for longitudinal data. *Journal of Multivariate Analysis*, 91(1), 74-89.

Lv, Z. & Xu, T. (2017). A panel data quantile regression analysis of the impact of corruption on tourism. *Current Issues in Tourism*, 20(6), 603-616.

Martins, L.F., Gan, Y., &Ferreira-Lopes, A. (2017). An empirical analysis of the influence of macroeconomic determinants on World tourism demand. *Tourism Management*, 61, 248-260.

Matias, Á., Nijkamp, P., & Neto, P. (2007). *Advances in modern tourism research: Economic perspectives.* New York: Physica-Verlag.

Naudé, W. A. & Saayman, A. (2005). Determinants of tourist arrivals in Africa: A panel data regression analysis. *Tourism Economics*, 11(3), 365-391.

Ongan, S. & Gozgor, G. (2018). Tourism demand analysis: The impact of the economic policy uncertainty on the arrival of Japanese tourists to the USA. *International Journal of Tourism Research*, 20(3), 308-316.

Peng, B., Song, H., Crouch, G.I., & Witt, S.F. (2015). A Meta-Analysis of International Tourism Demand Elasticities. *Journal of Travel Research*, 54, 611-633.

Petrevska, B. (2017). Predicting tourism demand by A.R.I.M.A. models. *Economic Research-Ekonomska Istrazivanja*, 30(1): 939-950.

Pham, T.D., Nghiem, S., & Dwyer, L. (2017). The determinants of Chinese visitors to Australia: A dynamic demand analysis. *Tourism Management*, 63, 268-276.

Pham, T.D., Nghiem, S., & Dwyer, L. (2018). The economic impacts of a changing visa fee for Chinese tourists to Australia. *Tourism Economics*, 24, 109-126.

Santeramo, F. G. & Morelli, M. (2016). Modelling tourism flows through gravity models: A quantile regression approach. *Current Issues in Tourism*, 19(11), 1077-1083.

Silva, E.S., Ghodsi, Z., Ghodsi, M., Heravi, S., & Hassani, H. (2017). Cross country relations in European tourist arrivals. *Annals of Tourism Research*, 63, 151-168.

Smeral, E. (2010). Impacts of the world recession and economic crisis on tourism: Forecasts and potential risks. *Journal of Travel Research*, 49(1), 31-38.

Song, H., Li, G., Witt, S.F., & Fei, B. (2010). Tourism demand modelling and forecasting: How should demand be measured? *Tourism Economics*, 16, 63-81.

Stabler, M. J., Papatheodorou, A., & Sinclair, T.M. (2010). *The economics of tourism*, 2nd edition, Routledge, pp. 506.

Trip Advisor, (2018). Top 25 Destinations- World. Retrieved from: https://www.tripadvisor.com/TravelersChoice-Destinations-cTop-g1, (Accessed on 09.03.2018).

UNWTO-United Nations World Tourism Organization, (2017). European Union Short-Term Tourism Trends Volume 1. Retrieved from: https://www.e-unwto.org/doi/pdf/10.18111/9789284418596 (Accessed on 02.03.2018).

Vanhove, N. (2018). *The economics of tourist destinations*, 3rd edition, Routledge.
Vilchez, J. R. (2013). Destination and seasonality valuations: A quantile approach. *Tourism Economics*, 19(4): 835-853.
Wang, L., Fang, B., & Law, R. (2018). Effect of air quality in the place of origin on outbound tourism demand: Disposable income as a moderator. *Tourism Management*, 68, 152-161.
Wilkins, E., de Urioste-Stone, S., Weiskittel, A., & Gabe, T. (2018). Weather sensitivity and climate change perceptions of tourists: a segmentation analysis. *Tourism Geographies*, 20, 273-289.
Zaman, K., Shahbaz, M., Loganathan, N., & Raza, S.A. (2016). Tourism development, energy consumption and Environmental Kuznets Curve: Trivariate analysis in the panel of developed and developing countries. *Tourism Management*, 54, 275-283.

Received: 16/07/2019
Accepted: 29/11/2019
Coordinating editor: Stanislav Ivanov