HOW TO ATTRACT TOURISTS IN THE EUROPEAN UNION?

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Abstract
The objectives of this paper are to identify some determinants of tourism arrivals in the European Union (EU-28) countries and propose other constructs based on these factors. The determinants of tourism arrivals in the European Union (EU-28) countries as destination were analyzed using two econometric techniques: panel data models and Bayesian models in the stochastic search variable selection. According to panel data approach, number of employed persons in tourism, net occupancy rate in hotels and in the same type of accommodation and number of establishments had a positive influence on total tourist arrivals and on non-resident tourist arrivals over 2017-2019. For resident tourists, the number of establishments was not relevant in explaining their arrivals in European Union countries. According to Bayesian approach, in 2017, 2018 and 2019 the inflation affected the tourist decisions of arrival in European Union, even if they are resident or non-resident in a certain EU-28 country. In 2017 and 2019 for resident people and in 2018 for non-resident people, the tourists preferred less safe zones, probably because they appreciated more the touristic potential. It is clear that more establishments will ensure more tourism arrivals in European Union. The principal component analysis indicated that the European Union could attract more tourists if more establishments and more people are employed in touristic sector. The results have important implications for the EU policies in tourism, but differences between countries are not the subject of this research. The value added of this research will improve the tourist policies at the EU level.

Key Words: *tourism arrivals, establishments, panel data, Bayesian model, principal component analysis*

JEL Classification: *C51, C53*

I. INTRODUCTION

Tourism is still the largest engine of employment and wealth at global level. Tourism contributes to rural development and to the recovery of less-developed zones. In the context of sustainable development and regional policy, the need for reliable statistics on tourism has grown in the last years. However, a minimum interest is assigned to tourism at social and economic level. In EU, great difficulties were encountered in ensuring the legal political recognition, even if there is a real growth perspective of growth for tourism sector (Rita, 2000).

The EU enlargement has among purposes the creation of political stability and existence of a market and trade to compete the United States (Coles and Halls, 2005; Kostynets et al., 2020). In this vision, EU has to attract more tourists as possible from the entire world. Therefore, by studying the determinants of tourism arrivals in the EU through advanced econometric tools, we will get a picture of the tourism situation in EU as destination and we could provide recommendation for policy in order to develop the tourism sector.

The aim of this paper is to identify the factors that influence the tourism arrivals in the EU-28. The objectives of this paper are to explain tourism arrivals in this region based on a panel data approach and to propose new constructs that describe touristic arrivals based on an initial set of factors. In this study, more types of econometric models were estimated to extract the determinants of tourism arrivals in the EU-28. Moreover, the principal component analysis was applied to identify the variables that best explain the variation in tourism arrivals.

The novelty of this research comes from several directions: the estimation of panel data models to identify the determinants of EU-28's tourism arrivals (none of the studies before used panel data analysis for EU-28) and the use of a Bayesian technique to model tourism demand and to discover the relevant determinants for tourism arrivals (stochastic search variable selection procedure).

The paper is organized as it follows. After this short introduction, the literature review is discussed by insisting on the panel data models used to detect the tourism arrivals determinants in various studies. The next section is dedicated to a short description of tourism arrivals and other tourism aspects related to European Union. The empirical application determines the factors that influenced the tourism arrivals in EU-28 by using traditional and Bayesian econometric models and principal component analysis. The last section concludes.

II. LITERATURE REVIEW

International tourist arrivals by destination states are considered by United Nations World Tourism Organisation (UNWTO) the key variable for tourism demand. For this indicator, consistent and long data series have been registered in contrast to variables like nights, domestic arrivals. In the causal model used in *UNWTO Tourism Towards 2030* to forecast international tourist arrivals, output growth rate, transport's cost and proxies for business travel potential and travel affluence were used as predictors.

The modeling of tourism demand is a priority for tourism research since the last 10 years (Zhang et al., 2020). The models are based on second level data and the empirical research of tourism from economic perspective covers five principal domains:

- Economic impact of domestic or international tourism on the origin country (Saayman *et al.*, 2000; Saayman *et al.*, 2001; Pratt, 2015; Vaughan *et al.*, 2010);
- Tourism as engine of economic growth (Saayman *et al.*, 2001; Aslan et al., 2020; Cárdenas-García *et al.*, 2015);

One main research hypothesis in the literature is that tourism enhances economic growth. This assumption was checked for a sample of 144 countries by Cárdenas-García et al. (2015) who showed that the impact of tourism on economic growth is higher in developed countries compared to developing countries. The same conclusion was obtained by Pratt (2015) in the case of Small Islands Developing States.

In South-Africa, domestic and international tourism have a positive impact on sustainable development in the short-run, but investment in transport and infrastructure is necessary to achieve a long-run impact of tourism on regional development (Saayman et al., 2000). In North West Province of South Africa, tourism creates more employment which supports the economic development (Saayman et al., 2001). The local economy is stimulated by the spending of the visitors in the host region (Vaughan et al., 2010). In a recent study of Aslan et al. (2020), tourism generates economic growth only in the short-run in 17 Mediterranean countries in the period 1995–2014.

- Economic impact of various events (Gelan, 2003) and facilities (Chen and Hsu, 2001);

According to Gelan (2003), the 1999 British Open injected of $20.1m of "new money" in the local economy. The opinions of the residents related to the effects of riverboat gaming are validated using five factors: no crimes, public services, social image, societal activities and economic impact (Chen and Hsu, 2001).

- Modeling tourism demand and international flows (Divisekera, 2003; Tang and Tan, 2015; Eilat and Einav, 2003; Nikšić et al., 2018, Farzanegan et al., 2020);

Divisekera (2003) developed a demand model for international tourism using choice theory in the case of four countries: UK, Japan, US, and New Zealand. Another model based on panel data is proposed by Eilat and Einav (2003) who showed that political risk and exchange rate are essential determinants of tourism in developed countries. Similar findings were obtained for Malaysia by Tang and Tan (2015) using panel data. The authors showed that quality of environment, security and health factors condition the touristic flows in this country. Nikšić et al. (2018) also showed that terrorist attacks that violate security restrict tourists' arrivals in the UK, Germany and Turkey. Farzanegan et al. (2020) made a cross-country analysis of the effects of COVID-19 pandemic on tourism showing that those countries that used to receive more tourists than others are more sensitive to deaths caused by epidemic.

- Tourism demand forecasting (Frechtling, 2014, Akin, 2015; Polyzos et al., 2020; Cankurt and Subasi, 2015).

Frechtling (2014) presented a large variety of methods used in tourism demand forecasting, but a novel approach belongs to Akin (2015) that predicted touristic arrivals in Turkey using Neural Network models, Support Vector Regression and Seasonal ARIMA models. Similar models for Turkey were used by Cankurt and Subasi (2015) that showed the superiority of machine learning techniques in forecasting tourism demand compared to neural networks. In the actual context of COVID-19 pandemic, Polyzos et al. (2020) forecasted the arrivals of Chinese tourists in Australia and US using Long Short Term Memory and showed that 6 to 12 months are necessary after the pandemic to arrive to pre-crisis levels.

There are two types of methods used to model the tourism demand: quantitative and qualitative methods. The quantitative methods are the most utilized ones in modeling tourism demand (Song and Turner, 2006). Econometric modeling is still the most powerful approach for analyzing tourist demand, a large number of papers being dedicated to this topic after 2000 (Song and Li, 2008, Wierzbicka, 2020).

Determinants of tourism demand from England, United States, West Germany, Japan and France to Canada were identified using a log-linear function. Variables like exchange rate, GDP per capita, travel price index, crime rate, time trend, immigration and special events explained the tourism demand from the mentioned countries to Canada (Qiu and Zhang, 1995).

Panel data models were applied in some studies to model tourism demand. Panel data approach diminishes the multicollinearity by ensuring a higher number of degrees of freedom during the estimation process. When only short time series exist, panel data models are very useful in modeling the tourism demand. Panel data models were used to study the demand for tourism in 43 African countries (Naudé and Saayman, 2005). The same approach is used to analyze rural tourism demand in the zone of Galicia (Roget and González, 2006).

The factors affecting Italian domestic tourism approximated by regional bilateral tourism flows were identified by using the panel data approach (Massidda and

Etzo, 2014). This study confirmed that traditional economic variables are factors that explain bilateral tourism flows in Italian regions.

The tourism demand determinants in Tunisia were identified utilizing a dynamic panel model over the period 1994-2017 (Gasmi and Sassi, 2015). The estimation results indicated that client loyalty is the main factor that explains the foreign demand in tourism in Tunisia. The tourism in this country could be promoted by improving are the air supply and accommodation availability.

The panel data models were also estimated for tourism demand in Portugal (Leitão, 2015). The principal determinants of Portugal's tourism demand are represented by: income, bilateral trade, spatial distance between Portugal and the region of residence for tourists. The dynamic panel is a better tool for explaining the tourism demand than the other statistic methods.

The determinants of tourist arrivals were identified also for Egypt during 1990-2008 using a fixed effects model. Tourism arrivals to Egypt in that period were influenced by the following variables: output per capita in the origin country, living cost of a competitive destination country, living cost for tourists coming in Egypt, population in the destination, trade volume between origin country and Egypt (Ibrahim, 2015).

Unlike these studies that focused on a certain country or a small group of countries, we are not interested in covering the national level. We conducted the analysis on all the EU-28 countries until 2019 in order to formulate recommendations specific to entire European Union that will support the common tourism policy in this region.

III. TOURISM ARRIVALS IN THE EUROPEAN UNION

Tourism is an important sector for EU, because of the economic and social implications. On the other hand, the employment and economic potential of tourism make the European Commission to discuss many issues regarding the construction of a sustainable tourism in EU. Tourism generates economic revenue and employment, but on the cost of negative environmental impacts.

EU countries are among the most important touristic destinations in the entire world. Aspects like travelling safety and injuries of tourists during travelling are important problem for tourists that choose EU as destination. There is a higher risk of death among foreign tourists compared to resident population, up to 30% fatal problems of health appearing during their vacation (Bauer *et al.*, 2005).

The EU economy has robust tourism industry, but there are high differences in growth rates between regions. After EU's enlargement, these discrepancies grew, but there is a high competition between states in order to develop the infrastructure and the tourism.

EU had in 2017 five countries that were placed in the first 10 touristic destinations from the entire world as United Nations World Tourism Organisation (UNWTO) showed in its report. For European regions' development, the tourism could play an important role. The infrastructure made for touristic reasons ensures local development, avoiding rural decline and the industrial difficulties. A sustainable tourism is required to conserve the natural and cultural resources (Jupowicz-Ginalska and Paták, 2018).

In a communication from 2006 (*A renewed EU tourism policy: towards a stronger partnership for European tourism*), the European Commission analyzed the issues that affect the future development of tourism in EU. Among these problems, we can remember consumer demand for specific type of tourism, external concurrence, population ageing, the development of sustainable tourism. EU can consolidate it is position in tourism top if a more competitive supply is ensured and a sustainable tourism is promoted. Actions for the integration of sustainability priority by business and the sustainable management for touristic destinations were proposed in the European Commission communication from 2007 (Agenda for a sustainable and competitive European tourism). The tourism essential role is also recognized by Lisbon Treaty that took into account the necessity of competitive tourism sector in each member of EU. In 2010, the communication that sustained that Europe should be the first tourist destination in the world asked for actions to create a competitive tourism and a sustainable growth.

Tourism statistics in the EU are paced in two groups: statistics regarding occupancy and capacity of collective tourist accommodation and statistics regarding tourism demand. The first group of statistics is collected by survey in the touristic establishments, while the second group is taken by traveler survey.

In 2017, one European company out of 10 companies from non-financial sector activated in tourism sector. 9% of the people from non-financial business worked in a company engaged in touristic industries, while 21.9% of EU residents were employed in the sector of services,

In 2017, EU-28 residents made 1.2 billion trips for business and personal purposes. More than half of these trips were short trips. 61.1% of the EU' population with 15 years and more made at least a trip for personal purposes, but there are consistent differences between countries. For example, only 25.1% of the Romanian population made at least one trip in 2018, while the participation rate for Finland is 88.5% of the population aged 15 or more.

In 2017, Spain was the leader as tourism destination in the EU for people that live outside this country. Spain was followed by Italy, France and England. On the other hand, small countries as size like Latvia and Luxembourg and Latvia were less preferred by tourists living outside the EU in 2017. Germany had in 2017 the highest expenditure level on international travel, being followed by England and France.

The EU-28 losses in international arrivals from 2008-2009 (period of great recession) have been compensated in the next years, when annual growths were observed. As expected, in this period of recovery the arrivals grew more quickly than receipts. This situation is explained by the fact that exchange rate is strong and the economic environment is quite weak. The receipts grew faster than Gross Domestic Product, because tourism is resilient and it recovered rapidly in the net year after the economic shocks.

In 2011, most of the international arrivals to EU-28 countries originated from EU-28, the largest shares of these arrivals being registered by Belgium, Luxembourg, Spain, Portugal, Austria, Malta and Estonia. On the other hand, Sweden, Finland, Latvia and Lithuania were the countries with the lowest intra EU-28 arrivals in 2011. States like England, Germany, Italy, France and Netherlands attracted the most non-European tourists, mostly from Asia and North America.

In 2018, EU-28 Member States accounted for 40% of the total number of international tourist arrivals worldwide. In the first 8 months of 2018, EU-28's international arrivals increased with 6% compared to previous year. The summer season attracted many foreign tourists in the EU-28 countries. An increase in international arrivals was observed in the entire Europe (with 5% in the same period compared to the first 8 months of 2017). Even euro area attracted more tourists, because of the economic recovery and weaker currency.

According to UNWTO predictions, international tourist arrivals to EU-28 countries are expected to increase in average by 2.1% a year till 2025, but the average growth over 1995-2010 was of 2.4%. In the emerging economy states from EU-28 (Bulgaria, Romania, Croatia, Poland, Hungary, Lithuania and Latvia), tourism arrivals are expected to grow faster in average than in the rest of the countries (3.7% a year compared to 1.9% a year for the advance economy countries of destination).

IV. DATA AND METHODOLOGY

Tourism arrivals consider as destination hotels, camping grounds, holiday houses and various types of short-stay accommodation, trailer and recreational vehicle parks. The variable is registered in three variants: total number of tourism arrivals from the entire world to EU-28 countries, tourism arrivals from the entire world of residents in each EU country that choose EU-28 as destination, and tourism arrivals from the entire world of non-residents in EU that choose EU-28 as destination.

The variables used in this study to explain the tourist arrivals are represented by:

- number of establishments (with all types of accommodations described above);
- employed persons in tourism (Thousand people);
- net occupancy rate related to bedrooms inside of the hotels, bed-places and appropriate accommodation by volume class (available only from 2017 onward) as percentage;
- crime, violence or vandalism in the zone as percentage of total population;
- harmonized index of consumer price used to compute the inflation rate.

Expenditure on accommodation in EU-28 countries in thousand euro is used to check if the number of tourism arrivals influences the tourism arrivals.

All the data for these variables are provided by Eurostat and the considered period is 2017-2019.

Panel data approach was used in analyzing the tourist arrivals in European Union countries seen as destinations, because of the lack of data for some variables like expenditure and net occupancy rate in accommodation (available data only from 2017). For this short set of data panel data models are indicated. Moreover, a good alternative for small data series is the Bayesian approach. In this case, Bayesian models are constructed for each year including all the 28 countries of the EU.

Let us begin with a regression model based on country data and time series which is known as pooled ordinary least squares that neglects any type of effects:

$y_{it} = \beta_0 + \sum_j \beta_j X_{jit} + e_{it}$

i=1,2,...,N

t=1,2,...,T

y_{it}- endogenous variable for country i and year t

X_{jit}- the j-th predictor for country i and year t

e_{it}- innovation

β_j- j-th coefficient

β_0- intercept

This initial eqation is transformed to make estimations using panel data models where the fixed effects check for individual effects. Considering the hypothesis of a constant country effect, we modeled the unobserved factors using fixed effects that are represented as constant varying over countries (β_0i). In this case, the unobserved heterogenity is ensured by the fact that does not vary over time and might be linked to predictors. The one-way fixed effects model is represented as:

$y_{it} = \beta_{0i} + \sum_j \beta_j X_{jit} + e_{it}$

i=1,2,...,N

t=1,2,...,T

y_{it}- endogenous variable for country i and year t

X_{jit}- the j-th predictor for country i and year t

e_{it}- innovation

β_j- j-th coefficient

β_0- intercept

β_{0i}- unobserved individual effect for country i and year t

On the other hand, the random effects model treats the intercept a random variable with mean β_0. In this case, the country differences are cmputed as random gaps from the unchanged mean.

$\beta_{0i} = \beta_0 + \varepsilon_i$

ε_i is the innovation of zero mean and constant dispersion (σ_ε^2).

The composite representation is:

$$u_{it} = \varepsilon_i + e_{it}$$

ε_i- innovation that is country specific

e_{it} - random error term

The random effects model is described as:

$$y_{it} = \beta_0 + \sum_j \beta_j X_{jit} + u_{it}$$

i=1,2,...,N

t=1,2,...,T

Hausman test is applied to choose the best model between the fixed effects and the random effects one.

Let's start from a multi-factorial regression to explain the stochastic search variable selection. The main target is to find a solution for the canonical issue of choosing a certain variable. In this case, Y is the regresand while X1, X2, …,Xp are p regressors. We have to select the best model that has as regressors only a subset X1*, X2*,…,Xq* from the initial larger set of explanatory variables. The model is written in this form:

$$Y_t = X_{1t}^* \beta_1^* + X_{2t}^* \beta_2^* + \cdots + X_{qt}^* \beta_q^* + e_t$$

$\beta_1^*, \beta_2^*, \ldots \beta_q^* -$ parameters of the model

e_t- error term

The model is rewritten in this form:

$Y_i = X_i \cdot \beta_i + u_i$, where $u_i \sim N(0, s^2)$

$\beta_i | \gamma_i \sim \gamma_i \cdot N(0, V1) + (1 - \gamma_i) \cdot N(0, V2), V1 > V2$

$\gamma_i = 1$ indicates that the explanatory variable is chosen

$\gamma_i = 0$ =0 indicates that β_i is almost zero and the corresponding regressor is not chosen in the model

Gibbs sampler based on hierarchical proper priors presents few levels:

-the first level:

$s^2 \sim IG(a, b)$

$\beta_i | \gamma_i \sim \gamma_i \cdot N(0, V1) + (1 - \gamma_i) \cdot N(0, V2)$

-the second level: $\gamma_i \mid \omega_i \sim$ Bernoulli (ω_i)

-the last level: $\omega_i \sim$ Beta (a', b')

Bayes formula is utilized in order to update the conditional posterior of γ_i. The conditional posteriors β_i, ω_i and s^2 for 2 have conjugate forms.

V. ESTIMATIONS AND RESULTS

The panel data estimations were made in Stata 15, while the Bayesian model was built in Matlab. The presence of unit root in panel data is checked before the estimation process. For dynamic panels, in general, the unit roots do not create problems, but for fixed and random effects model the data should be stationary.

According to Fisher-type unit root test, for arrivals1, arrivals2, arrivals3, employed, establishment and occupation at least one panel is stationary at the 0.05 significance level (see Table 1).

Table 1. **Fisher-type unit root tests**

Variable	Statistic	p-value
Arivals1	-0.099	0.000
Arrivals2	-0.099	0.000
Arrivals3	-0.099	0.000
Employed	-0.2915	0.000
Establishment	-0.099	0.000
Occupation	-0.099	0.000

Source: own calculations

According to Harris-Tzavalis unit-root test, crime and logarithm of harmonized index of consumer prices (log_hicp) are stationary at 5% level of significance (because p-values is under 0.05), while the data series for hicp is not stationary at the same significance level. In this case, the logarithm was applied to get a stationary data set for the price index (see Table 2).

Table 2. **Harris-Tzavalis unit-root test**

Variable	Statistic	p-value
Crime	-3.8819	0.0001
Hicp	0.2253	0.5891
log_hicp	-6.0713	0.000

Source: own calculations

According to estimated fixed effects and random effects models, crimes, violence and vandalism and logarithm of harmonized index of prices have no impact of total tourist arrivals, resident and no-resident tourist arrivals. According to Hausman test, some random effects models were selected to explain various types of tourist arrivals. The Breusch-Pagan Lagrangean multiplier test indicated in all cases that a random effects model is better than an OLS regression model, the p-value of chi-squared statistic being less than 0.00 at the 0.05 significance level.

The economic interpretation for these types of models shows a stability of tourist arrivals in EU-28 countries over 2017-2019, the individual effects not being correlated with the explanatory variables.

According to estimation results, number of employed persons in tourism, net occupancy rate in various types of accommodation and number of

establishments have a positive influence on total tourist arrivals and on non-resident tourist arrivals. For resident tourists, the number of establishments is not relevant in explaining their arrivals in European Union countries (see Table 3).

Table 3. **Random effects models to explain various types of tourist arrivals**

arrivals1	Coefficient	Standard error	P>|z|	Rho	Breusch-Pagan Lagrangean multiplier test statistic (p-value in brackets)
Employed	3749.546	333.9539	0.00	0.9927	72.33 (0.00)
Establishment	182.0185	89.57208	0.042		
occupation	444090	127651.7	0.001		
Constant	$-1.97 \cdot 10^7$	6309192	0.002		
arrivals2					
employed	3043.168	164.1101	0.000	0.9947	78.91(0.00)
occupation	219471.9	65179.16	0.001		
constant	$-1.27 \cdot 10^7$	3391083	0.000		
arrivals3					
Employed	659.3596	190.1346	0.001	0.9917472	63.76 (0.000)
Establishment	202.7447	51.52859	0.000		
occupation	213573.4	76110.02	0.005		
Constant	-6604929	3699445	0.074		

Source: own calculations

These results make us to conclude the following:

- Countries with high tourist potential have more people working in this sector and attract more tourists (residents or non-residents);
- The residents are not interested too much in the number of establishments, because they can have other alternatives to get accommodation by appealing to their relatives, friends, acquaintances;
- Herd spirit seems to be present here, because the hotels and other establishments with a high net occupation rate attract more tourists. In general, the zones with a high net occupation rate in hotels and other accommodations have a high touristic potential and attract more tourists.

For all random effects models, the intra-class correlation is very high. 99.27% of the variance in total arrivals is due to differences across EU countries. 99.47% of the variance in resident tourist arrivals is due to differences across EU countries, while 99.17% of the variance in non-resident arrivals is due to differences across panels.

For non-resident tourists, a dynamic panel was built with Arrelano-Bover/Blundell-Bond estimators. The number of establishments in the current period and the number of non-resident tourist arrivals in the previous period have a significant and positive impact on current non-resident tourist arrivals in EU-28 as destination zone (see Table 4).

Table 4. **Results of system dynamic panel estimation for non-resident tourist arrivals**

arrivals3(t)	Coefficient	Standard error	P>|z|
arrivals(t-1)	0.9386	0.05094	0.000
establishment(t)	66.46235	33.41649	0.047

Source: own calculations

The number of establishments has a higher impact than the previous number of non-residents arrivals. Each new establishment put into operation attracts, in average, around 67 non-resident tourists.

We are particularly interested in the relationship between tourist expenditure in the destination country and the tourist arrivals in order to figure the tourists behaviour as consumers. Random effects model were estimated only for total tourism arrivals and residents' arrivals (see Table 5).

Table 5. **Random effects models for expenditure**

Variable	Coefficient	Standard error	P>|z|	Rho	Breusch-Pagan Lagrangean multiplier test statistic (p-value in brackets)
arrivals1	0.1334	0.027296	0.000	0.9885	74.31
Constant	642987.5	152861	0.674		
arrivals2	0.2515066	0.03182	0.000	0.9814	72.88
Constant	74262.38	1157697	0.949		

Source: own calculations

It seems that the total and the residents' tourist arrivals have a positive impact on touristic expenditure. The non-residents arrivals did not significantly increased the destination countries expenditure.

The Stochastic Search Variable Selection (SSVS) is the Bayesian algorithm that is applied in this case to select the most relevant explanatory variables that influence the tourist arrivals in all variants for each year in the interval 2017-2019. The algorithm is implemented in MATLAB and the posterior means of the coefficients in the refined regressions are presented in the following table. The acceptance probability for a variable is set to 0.5. This is an empirical value chosen by researcher. Indeed, when a lower value like 0.3 as selected, all the variables were chosen in the final model. When a higher value was set, like 0.7, none of the variables were chosen. Therefore, from practical reasons a value of 0.5 for acceptance probability was preferred in this case (see Table 6).

Table 6. **Explanatory variables selected by SSVS procedure to explain tourist arrivals in EU-28**

Dependent variable	Year	Selected variables	Corresponding posterior means of coefficients from refined regression
arrivals1	2017	Establishments	0.182
		hicp	-0.013
		constant	0.009
	2018	Crime	-0.001
		hicp	-0.017
		Constant	-0.009
	2019	hicp	-0.007
		Constant	-0.001
arrivals2	2017	Establishments	0.244
		Crime	0.006
		Constant	0.000
	2018	Employed	-0.009
		Establishments	0.010
		occupancy	-0.023
		Crime	-0.005
		hicp	-0.019
	2019	occupancy	0.011
		Crime	0.027
		hicp	-0.02
arrivals3	2017	Employed	0.187
		occupancy	0.566
		Hicp	-0.041
		Constant	0.003
	2018	Employed	-0.024
		Establishments	-0.008
		Crime	0.005
		Hicp	-0.029
		Constant	0.013
	2019	Hicp	-0.005
		Constant	-0.0003

Source: own calculations

In 2017, the establishments presented a direct effect on total tourist arrivals, while the inflation slowly and negatively affected the total number of tourist arrivals in the European Union. In 2017, crime, violence and vandalism had a very slow and negative influence on total tourist arrivals. The inflation had also a negative impact, but more intense than crimes. In 2019, only the inflation slowly and negatively affected the total number of tourist arrivals in the European Union.

In 2018, the establishments had a direct and statistically significant impact on resident tourist arrivals, while the crime, violence and vandalism slowly and positively affected the residents' number of tourist arrivals in the European Union. This result is contrary to expectations, but it could be explained by the fact that people with low revenues prefer even less safe locations in own countries. In 2018, as expected, the establishments positively influenced the residents' arrivals. The other variables (occupancy rate, employed people, harmonized index of prices, crime, violence and vandalism) had a negative influence on residents' tourism arrivals. Crime, violence and vandalism had the lowest impact on arrivals. On the other hand, the net occupancy rate was the most factor that were followed by residents in choosing a certain destination in own country. In 2017, the incidents of violence did not negatively influence the residents in choosing a less safe location in own country. On the other hand, a higher net occupancy rate in accommodation encouraged residents to choose that destination. The areas with higher inflation were more avoided by residents.

For non-residents, in 2019, the occupancy rate in hotels and other types of accommodation had a strong and significant impact in choosing a certain destination in EU-28. The number of employed people in tourism was positively correlated with non-residents arrivals. Inflation negatively influenced the decision of selecting a touristic location in EU-28, but its influence is very low.

In 2018, excepting the incidences of crime, vandalism and violence, the other variables (employed people, harmonized index of prices, establishments) had a negative influence on residents' tourism arrivals. It seems that touristic potential of the zone was more appreciated even if the area was not too safe. Even if the number of establishments grew, the number of non-residents arrivals diminished. In 2019, only inflation was taken into account in choosing a destination in EU-28.

The results of principal component analysis indicated, according to Kaiser criterion, that there are only two principal components that explained the total tourism arrivals. The results are shown in Table 7 and Table 8.

Table 7. **The selection of principal components**

Component	Eigenvalue	Proportion
1	3.39568	0.4851
2	1.33424	0.1906
3	0.990107	0.1257
4	0.661366	0.0945
5	0.561772	0.0803
6	0.141953	0.0203
7	0.0249917	0.0036

Source: own calculations

According to Table 7 and Table 8, the first principal component explained 48.51% of the variation in tourism arrivals and it included the resident and non-resident arrivals, employed people in the tourism and number of establishments. So, this component reflects the services quality (existence of establishments and personnel). The second principal component explained only 19.06% of the variation in total tourism arrivals and it is related to external factors, including occupancy rate in accommodation, incidents of crime, violence and vandalism and inflation (see Table 8).

Table 8. **The principal components that explain total tourist arrivals**

Variable	Component 1	Component 2
arrivals2	0.4973	0.0746
arrivals3	0.5086	0.0404
Employed	0.4910	0.1593
Establishments	0.4095	0.0305
Occupancy	0.1141	-0.6069
Crime	0.1068	0.5396
Hicp	-0.2468	0.5541

Source: own calculations

So, the European Union could attract more tourists if more establishments and more people are employed in touristic sector. A part of our results are reflected in previous studies. For example, Martins (2017) showed that external factors like relative prices determine the world tourism demand in the period 1995-2012. Other external factors like exchange rate are mentioned in the studies of martins (2017) and Tavares and Leitão (2017) for Brasil.

The importance of tourism establishments in attracting more tourists was previously described by Jesus and Franco (2016) for urban and rural regions in Portugal showing regional differences. For the region of Valencia, Perles Ribes et al. (2020) indicated that registered and non-registered establishments contribute to tourists' attraction, but there are not significant differences in tourists' preferences for these two categories of establishments. Attila (2016) showed that accommodations in Hungary are essential for a competitive tourism. Polukhina et al. (2016) showed that the qualification of personnel in tourism is important in attracting tourists in Volga Federal District.

VI. CONCLUSION

The EU countries are among the most important tourism destinations in the world. However, efforts are made to increase tourism demand in EU countries, because it is an engine of economic growth and employment. In this paper, determinants of tourism arrivals in European Union (EU-28) as destination were studied by using two econometric techniques: panel data models and Bayesian models in the stochastic search variable selection. According to panel data approach, number of employed persons in tourism, net occupancy rate in hotels and similar accommodation and number of establishments had a positive influence on total tourist arrivals and on non-resident tourist arrivals over 2017-2019. For resident tourists, the number of establishments was not relevant in explaining their arrivals in European Union countries. According to Bayesian approach, in 2017, 2018 and 2019 the inflation affected the tourist decisions of arrival in European Union, even if they are resident or non-resident in a certain EU-28 country. In 2017 and 2019 for resident people and in 2018 for non-resident people, the tourists preferred less safe zones, probably because they appreciated more the touristic potential. The principal component analysis indicated that the European Union could attract more tourists if more establishments and more people are employed in touristic sector.

This research brings an important contribution in terms of applied methods and also in terms of economic significance of tourism determinants for EU-28 countries. The panel data models were proposed because of the short series that are available for all EU-28 countries. On the other hand, methods of Bayesian Econometrics were applied to obtain a more price picture of tourism demand determinants in EU-28. It is clear that more establishments will ensure more tourism arrivals in European Union. The inflation influences the tourists' decision to select a certain European destination. The incidence of crimes, violence and vandalism had a low impact on tourism arrivals during 2017-2019, but in the context of terrorism it is possible to have a higher influence of this variable in the next years.

In a future study, it is necessary to make tourism arrivals forecasts for the next years using the proposed econometric models. Another interesting aspect is a comparison of the own predictions with UNWTO expectations for the next 5 years.

The aim of this research is not to highlight differences between countries. Our analysis was focused on the statistical indicators related to tourism arrivals in the case of EU-28 countries. We are interested in drawing some general conclusions that could be extended to other regions in the world. In a future research, we will conduct a separate analysis for developed and developing countries in the EU and a comparison will be made between those two groups of countries.

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