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textul lucrării:

THE RELATIONSHIP BETWEEN TOURIST ARRIVALS AND ACCOMODATION IN ROMANIAN REGIONS.
 A PANEL DATA APPROACH Abstract This research is a novelty for the literature regarding tourism demand modeling in Romania.

16 **Panel data approach has been applied to** analyze the

relationship between

5 **tourist arrivals and the establishments of tourists' reception with functions of tourists' accommodation in**

the eight Romanian regions (Nord

4-**West region, Central region, Nord -East region, South-East region, South-Muntenia region, Bucharest-Ifov region, South- West Oltenia and West**

regions). According to panel VAR Granger causality test,

5 **the establishments of tourists' reception with functions of tourists' accommodation**

are a cause for tourist arrivals, but the relationship is not reciprocal. A valid fixed effects model was built and an increase in the number of

8 **establishments of tourists' reception with functions of tourists' accommodation**

with one establishment

37 **increased in average the number of tourist arrivals with**

around 293 people in Romanian regions over the period 1990-2015. According to panel vector-autoregressive model, the tourist arrivals in the current period were positively influenced by

20 **the establishments of tourists' reception with functions of tourists' accommodation and tourist arrivals in**

the previous period. Key words: tourist arrivals, accommodation, panel data, Granger causality JEL Classification: C23, C51. I. INTRODUCTION Tourism

51 **demand modelling is one of the most important domains in tourism research,**

a considerable attention being given by practitioners and academic in the last ten years. The research in tourism demand modelling is based on secondary data concerning the estimation process. The empirical research in tourism from economic point of view is related to five main areas: › Economic influence of international tourism or/and domestic tourism on the national economy (Saayman, Saayman et al., 2000; Vaughan, Farr et al., 2000, Pratt, 2015); › Tourism as factor of economic development (Saayman, Saayman et al., 2001, Cárdenas- García, Sánchez-Rivero et al., 2015); › Economic influence of certain known events

9 **(Gelan, 2003) and facilities (Chen and Hsu, 2001); › Modeling and**

incorporate the international touristic flows or tourism demand (Eilat and Einav, 2003; Divisekera, 2003, Tang and Tan, 2015); › Predicting tourism demand (Frechtling, 2012, Akin, 2015, Cankurt and Subasi,

2015). In this study, the main aim

26 **is to identify the relationship between tourism demand and**

touristic accommodation using panel data approach. The cross- sections are represented by the eight regions from Romania (Nord

4-**West region, Central region, Nord- East region, South-East region, South-Muntenia region, Bucharest-Ilfov region, South-West Oltenia and West**

regions). The analysis is conducted in the period 1990-2015. The main results showed that touristic arrivals at

67 **regional level in Romania are** determined by **the**

touristic structures that provide attractive offers to lure customers. It seems that more arrivals in the previous year do not encourage entrepreneurs to immediately offer more buildings for accommodation. On the other hand, the construction of these buildings and the obtaining the attestation take enough time which can be more than a year. The panel vector-autoregressive approach put into evidence the positive impact of tourist arrivals and of

8 **establishments of tourists' reception with functions of tourists' accommodation**

31 **in the previous year to the** tourist arrivals **in the current year.** After this introduction, **the**

paper presents a theoretical background from literature regarding tourist demand modeling. The empirical application uses data for the eight Romanian regions and the relationship between tourist arrivals and accommodation is studies from panel data perspective. The last part of the articles concludes.

II.MODELLING TOURIST DEMAND IN LITERATURE Methods for tourism demand modelling are placed

39 **into two major categories: qualitative and quantitative** methods. Most of **the** studies used **quantitative methods**

39 **to analyze and predict the** tourist **demand**

(Song and Turner, 2006).

44 **Song and Li (2008)** made a consistent **review of** papers on **tourist demand modeling and forecasting** after **2000.**

Time series approach and econometric modeling remain the most powerful quantitative tools for analyzing tourist demand. Recent issues in this field are related to the evaluation of crisis effect on tourist demand

and seasonality and tourist cycles analysis. Naudé and Saayman (2005) identified two groups of methods for estimating the tourist arrivals: ▶ Models

58 **based on non-causal** relationship, mostly **time series models**; ▶ **Econometric**

methods based on causal relationship. According to Chu (2004), causal models are designed to detect

9 **and measure** the **economic and noneconomic** factors that determine **other variables** like **price and quantity**.

On the other hand, time series models detect the presence of stochastic components (like moving average component or autoregressive element) in any time series. Box–Jenkins approach and exponential smoothing are examples of non-causal techniques used by Lim and McAleer (2001) and Chu (1998). These non-causal models are suitable for

26 **tourism demand forecasting**. The **major** disadvantage **is that** they are **not based on** an **economic theory**

and cannot be employed in policy framework. Therefore, more researchers prefer the causal models that allow the evaluation of changes in tourism arrivals when one or more factors modify. For estimating tourist demand

61 **various types of** non-causal **models have been** proposed: multivariate regression **in the**

context of price-independent generalized log-linear utility function (Divisekera, 2003), cointegration techniques like error correction models (Kulendran and Witt, 2001), autoregressive distributed lag model (ARDL) for capturing dynamics in economic sectors (Song, Witt et al, 2003). The regional determinants of tourism arrivals were identified by Eilat and Einav (2003) by using panel data techniques like pooled logit models.

48 **Naudé and Saayman (2005)** identified **the determinants of** tourism **arrivals** during 1996-2000 **in** 43 countries from **Africa**:

destination's development level, political stability, infrastructure and marketing.

54 **The most used measure of tourism demand** is represented **by tourist**

arrivals which are evaluated as total number of

1 **tourist arrivals from origin** place **to a** certain **destination**. The variable can **be decomposed into**

more components like business

45tourist arrivals, holiday tourist arrivals and arrivals for visiting relatives and friends (Kulendran and Wong, 2005).

Other proxy variables for tourism demand are: tourism revenues, tourist expenditure in the destination place, tourism export, tourism import, and tourism employment.

64Generalised Autoregressive Conditional Heteroskedastic (GARCH) model

was utilized for modeling tourism demand using

1time series. Chan, Lim et al (2005) used three multivariate GARCH models to study the

1tourism demand volatility and the consequences of different shocks in the tourism demand. The results showed that tourism demand was influenced by the model conditional variances

where

1demand for Australian tourism is linked by four leading tourism source markets.

By using causal econometric models policy recommendations might be provided and the effectiveness of current tourism policies might be assessed. The inter-correlated relationships between

1tourism demand and various factors represent major concerns of governments and

businesses. An important

1development of the structural modelling in the tourism context is shown in Li et al (2006), who combined the

time varying parameters model (TVP) with error correction model (ECM model) to obtain TVP-ECM model. Wong, Song

1et al (2006) proposed three Bayesian VAR (BVAR) models by choosing various priors. The

forecasts based on these Bayesian models have improved the accuracy of traditional econometric models. Almost ideal demand system (AIDS) was recently applied in tourism demand analysis in certain neighbouring destinations. AIDS method is better than

66single-equation approach in terms of elasticity

for studying complementary and substitution effects. De Mello and Fortuna (2005) and Mangion, Durbarry

11 **et al (2005)** mixed an **ECM with a linear AIDS model**. **Li, Wong et al (2006)** combined a **TVP** model along with a **long-run LAIDS** and with **EC- LAIDS** to obtain **TVP-LR-AIDS and TVP-EC-LAIDS** processes. Panel data **models**

were successfully

62 **applied in the context of tourism demand.**

This type of model diminishes the disadvantage

1 **of multicollinearity and** it ensures **more degrees of freedom in the estimation**

process. For small time series, it is useful for

65 **modeling and forecasting the tourism demand.**

16 **Naudé and Saayman (2005)** used the **panel data** models to analyze the demand for **tourism in**

a number of

41 **43 African countries** and **Roget and González (2006)** studied the rural tourism demand in **Galicia.**

16 **The main determinants of tourism demand in Tunisia**

were identified by Gasmi and Sassi (2015) using a dynamic panel model in the period 1994-2012. The results showed that client loyalty is the main determinant of foreign demand in tourism in this country. The tourism in Tunisia could be promoted if improvements are made in air supply and capacity of accommodation. The panel data approach was also employed by Leitão (2015) who modeled the tourism demand in Portugal.

60 **The main determinants of tourism demand in Portugal are:**

income, bilateral trade,

63 **geographical distance between Portugal and origin** country and border. **The**

dynamic panel is most suitable for modeling tourism demand than statistic approaches.

1Hernández-López and Cáceres-Hernández, (2007) showed that genetic algorithms (GA) are useful in explaining changes observed in the tourism demand. Support vector machine (SVM)

might be used in nonlinear regression estimation and classification. A genetic algorithm in SVM approach was described by Pai, Hong et al (2006) for modeling and predicting the tourism demand in Barbados. III.MODELLING TOURIST ARRIVALS IN ROMANIAN REGIONS The variables used in this analysis are represented by tourist arrivals and

50establishments of tourists' reception with functions of tourists' accommodation. The

tourist arrivals are the proxy for tourism demand. The

8establishments of tourists' reception with functions of tourists' accommodation are represented by

any building that seasonally or permanent provides accommodation and other types of services for tourists. If the capacity is less than 5 places, the statistical research excludes this from this category of establishments. The variables are registered for the eight regions of Romania over the period 1990-2015: Nord-

4West region, Central region, Nord -East region, South- East region, South-Muntenia region, Bucharest-Ilfov region, South-West Oltenia and West

regions. The source of data is represented by the Statistical Research regarding the capacity of tourist accommodation of individuals and companies. The panel data approach is applied in this case to study the

55relationship between the two variables. The presence of unit root

is checked using Im- Pesaran-Shin test at a significance level of 5%.

36The null hypothesis states that all panels contain unit roots.

The test statistic for tourist arrivals is -4.2447 and the associated probability is 0.00, fact that suggests

53the rejection of the null hypothesis. For the establishments of tourists' reception, the

test statistic for tourist arrivals is -4.045 and the associated probability is 0.00, fact that shows the rejection of the null hypothesis. So, some

49panels are stationary for both variables at a significance level of 5%

(see results in Appendix A). The panel VAR- Granger causality test is applied to identify the causality between variables.

33 Table 1. The panel VAR Granger causality Wald test

Hypothesis Chi-squared Degrees of freedom Prob.>chi- squared Tourist arrivals does not Granger cause establishments 0.572 1 0.449 establishments does not Granger cause Tourist arrivals 24.68 1 0.000

57 The results of Granger test indicated that the establishments of

tourists' reception are a cause for tourist arrivals, but the relationship is not bi- directional. The increase in tourist arrivals does not determine an increase in the supply of tourist establishments. A fixed effects and a random effects model are estimated to explain the tourist arrivals using establishments as explanatory variable. Table 2. A fixed effects model for explaining tourist arrivals in Romanian regions Variable Coefficient t- calculated Prob.>|t| establishments 293.274 3.24 0.001 constant 705050.7 14.26 0.000 For fixed effects model, 67.66% of the overall variation is explained by the differences between regions. The model is valid, the coefficients being statistically significant. For this model, the errors are homoskedastic.

46 Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

was applied. For this test, the null hypothesis states the constant variance. The value of chi-squared statistic is 15 and the associated probability is 0.0592, which is greater than 0.05. Therefore,

47 we do not have evidence to reject the null hypothesis. An increase in the

number of

8 establishments of tourists' reception with functions of tourists' accommodation

with one establishment

37 increased in average the number of tourist arrivals with

around 293 people in Romanian regions over the period 1990- 2015. Table 3. A random effects model for explaining tourist arrivals in Romanian regions Variable Coefficient t- calculated Prob.>|t| establishments 363.006 4.46 0.000 constant 669379.1 9.13 0.000 A random effects model was also estimated, but the Hausmann test indicated that the fixed effects model is better. A panel vector- autoregressive model was also estimated to check if the values in the previous periods of these variables affect the current values. Table 4. A panel vector- autoregressive Variable Coefficient z- calculated Prob.>|z| establishments (t)= dependent variable establishments (t-1) 0.9403 2.40 0.017 arrivals (t-1) 0.00010 0.76 0.449 arrivals (t)= dependent variable establishments (t-1) 273.903 4.97 0.000 arrivals (t-1) 0.2840 5.01 0.000 The panel

43 VAR model satisfies the stability condition. All the eigenvalues lie inside the unit circle. Table

5. Eigenvalue

33 **stability condition** Eigenvalue **Real Imaginary Modulus 0.9814647 0 0.**
 9814647 **0.2429451 0**

0.2429451 1 .5

35 **Imaginary 0 -.5 -1 Roots of the companion matrix -1 -.5 Real 0 .5 1** Figure 1:
Eigenvalue stability condition

The first equation of panel VAR model indicated that the number of establishments is not fixed according to

68 **tourist arrivals** evolution **in the** previous **period.** On **the**

other hand, the tourist

52 **arrivals in current period** depends **on** the **arrivals in the previous**

period and on

5 **the establishments of tourists' reception with functions of** tourists'
accommodation in

the previous period. The relationships between these variables are positive. If the number of tourist arrivals increased with ten people

31 **in the previous year, the** number of arrivals **in the** next **year**

will increase, in average, with almost 3 arrivals. If the number of

5 **establishments of tourists' reception with functions of** tourists'
accommodation increased **in**

the previous year with one unit, the tourist arrivals will increase, in average, in the next year with almost 274 arrivals. So, the number of establishments plays a more important role in attracting tourists

56 **than the number of arrivals in the previous**

year. advantages for tourism demand modeling, there are few studies

59 **in this** domain. **A panel data analysis was** made **for**

Romanian regions over the period 1990-2015. The results indicated that touristic arrivals at regional level in Romania are determined by the touristic structures that provide attractive offers to lure customers. It seems that more arrivals in the previous year do not encourage entrepreneurs to immediately offer more buildings for accommodation. The number of tourist arrivals from previous year and

5the establishments of tourists' reception with functions of tourists' accommodation in

the previous year influence the current tourist arrivals in Romania. The fixed effects model showed that there are specific latent factors in each region that are correlated with

20the establishments of tourists' reception with functions of tourists' accommodation. This type of

research is a novelty from Romanian literature regarding tourism demand modeling. However, it would be interesting to make analysis at national level by taking the total levels of the variables. V. APPENDIX A . xtunitroot ips structure

3Im-Pesaran-Shin unit-root test for structure Ho: All panels contain unit roots
Ha: Some panels are stationary Number of panels = 26 Number of periods = 8
AR parameter: Panel-specific Panel means: Included Time trend: Not included
Asymptotics: T,N -> Infinity sequentially ADF regressions: No lags included
Statistic p-value Fixed-N exact critical values

1% 5% 10% IV. CONCLUSIONS There are many studies regarding tourism demand modeling, which has a major importance in decision-making, planning and the monitoring of tourism control. Even if panel data approach has many . xtunitroot ips arrivals

3Im-Pesaran-Shin unit-root test for arrivals Ho: All panels contain unit roots
Ha: Some panels are stationary Number of panels = 26 Number of periods = 8
AR parameter: Panel-specific Panel means: Included Time trend: Not included
Asymptotics: T,N -> Infinity sequentially ADF regressions: No lags included
Statistic p-value Fixed-N exact critical values

361% 5% 10% -1. 850 -1. 750 -1. 700 0.0000

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