DYNAMIC ACTIVITY OF FOREIGN TOURISTS NATIONWIDE

Cristina BURGHELEA
Hyperion University,
crystachy@yahoo.com

Abstract:
Study of the dynamics of tourism activity aims to identify prospects for growth in the number of overnight stays by foreign tourists in Romania by applying a methodology based on the rigors of the econometric models requirements that ensure the formulation of relevant conclusions on the extent of foreign tourists flow trends. On this basis there can be established a basis of economic sustainability that can lead to a sustained development of the national economy as required by the international community. The study is structured towards an analytical treatment of dynamics, trend and seasonality of the number of overnight stays with a clear objective that is the knowledge and assessment of the predicted levels for future time segments. The analysis identifies the relative sizes in which the tourism phenomenon is explained by the general trend, seasonable and residual variables respectively. The study shows the importance and the dominant role of seasonal behavior in the dynamics of overnight stays of foreign tourists in 2007-2013.

Keywords: analysis of variance; regression equations; dummy variables; foreign tourist dynamics.

JEL classification: E24; F43.

1. Introduction

The importance of sustainable tourism development is shown in terms of understanding the concept of sustainable development in the evolution of the knowledge society and the existing connection between tourism and sustainable development [1]. Sustainable tourism springs from sustainable development, expressing the need for a balance between territorial growth, human development, resource conservation, customer demand

harmonization with development of territories [2]. Sustainable development is a normative concept that involves trade-offs between the objectives of social, environmental and economic nature, and is necessary to sustain the integrity of the overall system [3].

Tourism can play a significant role in the development of European regions. The existing connection between tourism and sustainable development that can be evidenced by the presence of the infrastructure created for tourism purposes, which contributes to local development, and jobs created or maintained can help to offset the decline in industrial or rural activities. Today tourism has become an activity of outstanding economic and socio-cultural importance, and in many cases it is an essential factor in the balance of income of countries, thus ensuring a healthy environment for future economic development [4].

Sustainable tourism involves protecting and developing cultural and natural heritage, from art to cuisine and biodiversity conservation, being always a major consumer of natural resources and human space and a generator of change in the environment and the economy, involving a wide range of effects.

2. Methodology used

The study of the evolution and seasonality of the number of overnight stays of foreign tourists in Romania [5] is based on a series of quarterly data recorded over a period of seven years, 2007-2013.

For the application of analytical methods for analysis of the development, trend and seasonality [6] the number of overnight stays registered in Romania established a dynamic series of quarterly levels for a period of seven years - 2007-2013. It is believed that the total number of observations (n = 28) provides statistical support required to define the statistical lawfulness of the tourism phenomenon.

For methodological reasons, a necessary prerequisite is to check the significance of indicators presented in Table 1 using analysis of variance.

The analysis is based on the ratio of dispersions and provides the opportunity to express viable appreciation on: significance and role proportion of components that explain the evolution and the trend of the number of overnight stays in the period under review [7].

Econometric modeling of dynamic series of the number of recorded nights spent by foreign tourists in the quarters for 2007-2013 envisages development of a general trend equation adjusted with quarterly seasonality dummy variables. The transaction is subject to certification of sustainability that has the following restrictions: the parameters of the model are statistically significant based on the "Criterion t"; the residual variable is distributed according to the normal distribution based on the "Jarque-Bera

criterion" and is not affected by an autocorrelation phenomenon based on the "Durbin-Watson statistic criterion"; the series under analysis is stationary based on the "White Heteroskedasticity Test" and the statistical test "Augmented Dickey-Fuller" and also presents safety to develop a forecast scenario by considering "Theil's irregularity coefficient" [8].

3. Analysis of the number of overnight stays based on dispersion ratio

The analysis based on dispersions ratio is a viable methodological solution to substantiate, in statistical terms, assessments on [9]: the significance and role of each variable proportion explains the structure of real indicators - the general trend; the significance and role proportion of the seasonal variable – and the significance and role proportion of the residual variable (error term).

Analysis of dynamics, seasonality and trend of tourism activity through the number of recorded nights spent by foreign tourists is supported the information given in the table. (See table no. 1)

Table 1

Overnight stays in the main structures of tourist reception with functions of tourist accommodation (foreign tourists)

Year	Q1	Q2	Q3	Q4	Total	Quarterly average in each year of the 2007-2013 period $\overline{x}_i$
2007	**587126**	**991414**	**1305824**	**700003**	**3584367**	896,091.75
2008	**639861**	**957825**	**1124625**	**636933**	**3359244**	839,811.00
2009	**488521**	**734765**	**868499**	**575881**	**2667666**	666,916.50
2010	**456805**	**760562**	**947319**	**590397**	**2755083**	688,770.75
2011	**506249**	**833337**	**1058018**	**665364**	**3062968**	765,742.00
2012	**534137**	**924144**	**1120072**	**713151**	**3291504**	822,876.00
2013	**567708**	**940243**	**1208026**	**755175**	**3471152**	867,788.00
Total	**3780407**	**6142290**	**7632383**	**4636904**	**22191984**	
$\overline{x}_j$ Quarterly average value between 2007-2013	540058.143	877470.0	1090340.429	662414.85		$\overline{x}_0$ = 792,570.9 Average value calculated for the entire period analyzed

Note: i = 1, 2, 3, 4, 5, 6, 7 (n= 7) = years; j = 1, 2, 3, 4 (m= 4) = quarters

Statistical formation of the dynamics of the number of overnight stays (trend, seasonality and residuals) and the proportion of each variable in

total variance of each variable are studied by analysis of variance, systematized in table 2, Fisher distribution complies with the law.

Table 2

Methodological Information Table for the analysis of variance

Type of variation	Sum of square deviations	Number of degrees of freedom	Estimate dispersion
1. Change in the number of overnight stays explained component – **trend,** as a result of action of essential factors	$m \cdot \sum_{i=1}^{7} (\bar{x}_i - \bar{x}_0)^2 =$ $= 4 \cdot 46807.5 = 187230.0$	$f = n - 1 =$ $= 7 - 1 = 6$	$s_1^2 = \frac{1872300}{6} =$ $= 31205.0$
2. Change in the number of overnight stays explained component – **seasonality**, as a result of seasonal factors action	$n \cdot \sum_{j=1}^{4} (\bar{x}_j - \bar{x}_0)^2 =$ $= 7 \cdot 176577.8 = 1236044.6$	$f = m - 1 =$ $= 4 - 1 = 3$	$s_2^2 = \frac{1236044.6}{3} =$ $= 412014.9$
3. Change in the number of overnight stays explained component – **residual**, as a result of random factors action	$\sum_{i=1}^{7}\sum_{j=1}^{4} (x_{ij} - \bar{x}_i - \bar{x}_j + \bar{x}_0)^2 =$ $= 56995.4$	$f = (n-1)\cdot(m-1) =$ $= 6 \cdot 3 = 18$	$s_3^2 = \frac{56995.4}{18} =$ $= 3166.4$
4. Change in the total number of overnight stays (PT.4 = Pt.1 Pt.2 + = + pt.3)	$\sum_{i=1}^{7}\sum_{j=1}^{4} (x_{ij} - \bar{x}_0)^2 =$ $= 1480270.0$	$f = n \cdot m - 1 =$ $= 7 \cdot 4 - 1 = 27$	

Source: Personal processing

Note: *The sum of squared deviations for trend and seasonality respectively may be presented, in terms of mathematical formalization, as follows:*

$$\sum_{j=1}^{4}\sum_{i=1}^{7} (\bar{x}_i - \bar{x}_0)^2 = m \cdot \sum_{i=1}^{7} (\bar{x}_i - \bar{x}_0)^2 \; ; \; \sum_{i=1}^{7}\sum_{j=1}^{4} (\bar{x}_j - \bar{x}_0)^2 = n \cdot \sum_{j=1}^{4} (\bar{x}_j - \bar{x}_0)^2$$

Checking the null hypothesis on the significance of the trend component:

$$F_{\text{statistic}} = \frac{s_1^2}{s_3^2} = \frac{31205.0}{3166.4} = 9.855 > F_{table} = F\,q = 0{,}05\,;\, f_1 = 6\,;\, f_2 = 18 = 2{,}66$$

Checking the null hypothesis significance seasonality component:

$$F_{statistic} = \frac{s_2^2}{s_3^2} = \frac{412014.9}{3166.4} = 130.121 > F_{table} = F_{q=0,05;\, f_1=3;\, f_2=18} = 3,16$$

Note: *F_{table} is extracted from the table of Fisher distribution function values for a probability 95% (5% significance level) and number of degrees of freedom f_1 and f_2 .*

The significance of the indicator system, which refers to the dynamics of the number of overnight stays (foreign tourists) using **"Criterion *F*"** (Analysis of variance) provides the following information [10]:

- Trend in the number of overnight stays is a real component of the development or it is statistically significant because $F_{statistic}$ is greater than F_{table}. *Trend* holds a 12.648% share of the total variation in the number of overnight stays of foreign tourists;
- Based on the same statistical criterion, quarterly seasonality is also existing and statistically confirmed. *Seasonal component* owns 83.501% of the total variance in the number of overnight stays and is the main characteristic of the evolution of the number of overnight stays;
- *The residual component,* as an expression of the action of random or nonessential factors, has a rate of 3.851% of the total variance in the number of overnight stays;

Based on the results obtained by applying **"Criterion *F*"** (Analysis of variance) and the conclusions drawn, guaranteed with a probability of 95% (significance level equal to 5%) the development of a model identified by a general tendency equation corrected for seasonality variable represented by average coefficients calculated for each quarter seasonality is justified.

As revealed by applying analysis of variance [11], 83.501% of the total variance in the number of overnight stays variable is explained by seasonality and in these conditions the dynamic series of the number of overnight stays will be subject to adjustment methodology which will use an econometric model that simultaneously highlights the general trend and seasonality using quarterly seasonality dummy variables.

The econometric model related to this data system uses successively separate dummy variables for each of the four quarters of each year in the seven years studied, as shown in Table. 3.

Table 3 *System of variables analyzed by the trend and seasonality of the number of foreign tourists by introducing dummy variables for quarterly seasonality*

Period	Actual number of overnights (Thousand day-tourists) x_i	Dummy Q1 D_1	Dummy Q2 D_2	Dummy Q3 D_3	Dummy Q4 D_4	Time variable t	t^2
2007: 1	587126	1.000000	0.000000	0.000000	0.000000	1.000000	1.000000
2007: 2	991414	0.000000	1.000000	0.000000	0.000000	2.000000	4.000000
2007: 3	1305.824	0.000000	0.000000	1.000000	0.000000	3.000000	9.000000
2007: 4	700003	0.000000	0.000000	0.000000	1.000000	4.000000	16.00000
2008: 1	639861	1.000000	0.000000	0.000000	0.000000	5.000000	25.00000
2008: 2	957825	0.000000	1.000000	0.000000	0.000000	6.000000	36.00000
2008: 3	1124.625	0.000000	0.000000	1.000000	0.000000	7.000000	49.00000
2008: 4	636933	0.000000	0.000000	0.000000	1.000000	8.000000	64.00000
2009: 1	488521	1.000000	0.000000	0.000000	0.000000	9.000000	81.00000
2009: 2	734765	0.000000	1.000000	0.000000	0.000000	10.00000	100.0000
2009: 3	868499	0.000000	0.000000	1.000000	0.000000	11.00000	121.0000
2009: 4	575881	0.000000	0.000000	0.000000	1.000000	12.00000	144.0000
2010: 1	456805	1.000000	0.000000	0.000000	0.000000	13.00000	169.0000
2010: 2	760562	0.000000	1.000000	0.000000	0.000000	14.00000	196.0000
2010: 3	947319	0.000000	0.000000	1.000000	0.000000	15.00000	225.0000
2010: 4	590397	0.000000	0.000000	0.000000	1.000000	16.00000	256.0000
2011: 1	506249	1.000000	0.000000	0.000000	0.000000	17.00000	289.0000
2011: 2	833337	0.000000	1.000000	0.000000	0.000000	18.00000	324.0000
2011: 3	1058.018	0.000000	0.000000	1.000000	0.000000	19.00000	361.0000
2011: 4	665364	0.000000	0.000000	0.000000	1.000000	20.00000	400.0000
2012: 1	534137	1.000000	0.000000	0.000000	0.000000	21.00000	441.0000
2012: 2	924144	0.000000	1.000000	0.000000	0.000000	22.00000	484.0000
2012: 3	1120.072	0.000000	0.000000	1.000000	0.000000	23.00000	529.0000
2012: 4	713151	0.000000	0.000000	0.000000	1.000000	24.00000	576.0000
2013: 1	567708	1.000000	0.000000	0.000000	0.000000	25.00000	625.0000
2013: 2	940243	0.000000	1.000000	0.000000	0.000000	26.00000	676.0000
2013: 3	1208.026	0.000000	0.000000	1.000000	0.000000	27.00000	729.0000
2013: 4	755175	0.000000	0.000000	0.000000	1.000000	28.00000	784.0000
Total	22191.984						

Data source: www.insse.ro

Defining the econometric model

Graphical representation of the number of overnight stays (Fig. no. 1.) illustrates a development that may be deemed to have a general tendency

to change assimilated to a parabolic shape, marked by cyclical fluctuations of quarterly seasonal nature.

Analytical form of the econometric model can be synthetically expressed by an equation that captures both the general trend and quarterly seasonality by introducing the system of dummy variables:

- The general trend parabolic quarterly seasonality with dummy variables: $\boxed{y = (a_1 D_1 + a_2 D_2 + a_3 D_3 + a_4 D_4) + bt + ct^2}$

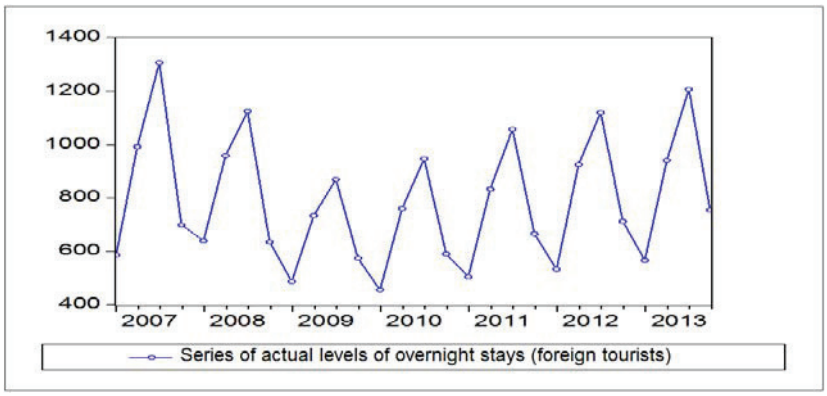

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Fig.no.1. *Graphical representation of the number of overnight stays (foreign tourists)*

In the case of the general parabolic tendency represented by quarterly seasonality dummy variables, the digital dimension of the parameters of the agreed tendency equation is estimated by the method of least squares, and the resulting values are presented in a synoptic table of econometric representation indicators (see Table no. 4).

The system of equations is used for this purpose:

$$\begin{cases} \Sigma D_1 x = a_1 \Sigma D_1^2 + a_2 \Sigma D_1 D_2 + a_3 \Sigma D_1 D_3 + a_4 \Sigma D_1 D_4 + b\Sigma D_1 t + c\Sigma D_1 t^2 \\ \Sigma D_2 x = a_1 \Sigma D_1 D_2 + a_2 \Sigma D_2^2 + a_3 \Sigma D_2 D_3 + a_4 \Sigma D_2 D_4 + b\Sigma D_2 t + c\Sigma D_2 t^2 \\ \Sigma D_3 x = a_1 \Sigma D_1 D_3 + a_2 \Sigma D_2 D_3 + a_3 \Sigma D_3^2 + a_4 \Sigma D_3 D_4 + b\Sigma D_3 t + c\Sigma D_3 t^2 \\ \Sigma D_4 x = a_1 \Sigma D_1 D_4 + a_2 \Sigma D_2 D_4 + a_3 \Sigma D_3 D_4 + a_4 \Sigma D_4^2 + b\Sigma D_4 t + c\Sigma D_4 t^2 \\ \Sigma t x = a_1 \Sigma t D_1 + a_2 \Sigma t D_2 + a_3 \Sigma t D_3 + a_4 \Sigma t D_4 + b\Sigma t^2 + c\Sigma t^3 \\ \Sigma t^2 x = a_1 \Sigma t^2 D_1 + a_2 \Sigma t^2 D_2 + a_3 \Sigma t^2 D_3 + a_4 \Sigma t^2 D_4 + b\Sigma t^3 + c\Sigma t^4 \end{cases}$$

Thus, the analytical form of the statistical lawfulness of the development of the number of recorded nights spent by foreign tourists by quarters, between 2007-2013, the parabolic general trend variant with quarterly seasonality dummy variables is:

$$y = (725.8252014\,D_1 + 1065.963162\,D_2 + 1279.011767\,D_3 + 848.7164447\,D_4) -$$
$$- 37.1231223\,t + 1.273963654\,t^2$$

Table 4. Synoptic panel representing econometric indicators
(Model series econometric statistical representation of the number of overnight stays by using dummy variables on a quarterly seasonality parabolic general trend)

Dependent Variable: Number of overnight stays				
Method: Least Squares				
Sample: 2007: 1-2013: 4				
Included Observations: 28				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D_1 Q1 „a_1”	725.8252	43.17258	16.81218	0.0000
D_2 Q2 „a_2”	1065.963	44.16463	24.13613	0.0000
D_3 Q3 „a_3”	1279.012	44.90808	28.48066	0.0000
D_4 Q4 „a_4”	848.7164	45.41513	18.68797	0.0000
„b”	-37.12312	6.206239	-5.981581	0.0000
„c”	1.273964	0.207568	6.137581	0.0000
R-squared	0.939184	Mean dependent var		792.5709
Adjusted R-squared	0.925363	S.D. var dependent		234.1470
S.E. of regression	63.96858	Akaike info criterion		11.34207
Sum squared resid	90023.54	Schwarz criterion		11.62754
Log likelihood	-152.7890	Durbin-Watson stat		1.214825

Source: Personal processing

The synoptic panel of econometric representation indicators exposes the estimate average error of the parabolic trend equation corrected by applying quarterly seasonality dummy variables, in absolute, which is calculated as follows:

$$\hat{\sigma}_{x;y} = \sqrt{\frac{\Sigma(x_i - y_i)^2}{n-k}} = \sqrt{\frac{90023.54}{28-6}} = \sqrt{4091.97909\ 1} = \pm 63.96858$$

thousand days - tourists

in which "*n*" is the number of observations = 28, and the constant "*k*" is the number of parameters in the parabolic trend equation corrected by applying quarterly seasonality dummy variables = 6.

To assess the viability of the econometric model based on the estimated average error of the trend equation corrected by applying of dummy variables, the mean estimate error *in relative expression* will be calculated as follows:

$$\hat{V}_{x \cdot y} = \frac{\hat{\sigma}_{x;y}}{\bar{x}} \cdot 100 = \frac{63.96858}{792.5709} \cdot 100 = 8.07\%$$

This indicator expresses therefore the "power" of the econometric model, when used in extrapolating or forecasting calculations. In principle, it is considered an estimate of the average relative error of a very good size when positioning within a maximum of 10%.

A similar significance indicator is the "coefficient of irregularity / inequality of Theil" which sustain the viability of the model because it has a value (*Th* = 3.4395% - see Fig. no. 4) not exceeding the 5% threshold considered sufficiently restrictive to justify the use of the calculation model estimations of the number of overnight stays related segments next time.

Table 5. Residual term interval, series of actual levels – foreign tourists and levels estimated the number of overnight stays (thousand day-tourists) - General parabolic trend with quarterly seasonality dummy variables

Quarter	Actual number of overnight stays (Thousand day-tourists) x_i	Parabolic trend with dummy variables seasonally adjusted y_i	Residual levels	Residual interval $\hat{\sigma}_{x;y} = \pm 63{,}96858$ $-\hat{\sigma}_{x;y}$ 0 $+\hat{\sigma}_{x;y}$
2007: 1	587126	689976	-102 850	| *. |. |
2007: 2	991414	996813	-5.39877	|. *. |
2007: 3	1305.82	1179.11	126716	|. |. * |
2007: 4	700003	720607	-20.6044	|. * |. |
2008: 1	639861	572059	67.8023	|. | * |
2008: 2	957825	889087	68.7379	|. | * |
2008: 3	1124.62	1081.57	43.0509	|. | *. |
2008: 4	636933	633265	3.66786	|. *. |
2009: 1	488521	494908	-6.38716	|. *. |
2009: 2	734765	822128	-87.3633	| *. |. |
2009: 3	868499	1024.81	-156 308	| *. |. |
2009: 4	575881	586690	-10.8087	|. * |. |
2010: 1	456805	458524	-1.71947	|. *. |
2010: 2	760562	795936	-35.3743	|. * |. |

2010: 3	947319	1008.81	-61.4878	|. * |. |
2010: 4	590397	580881	9.51582	|. | *. |
2011: 1	506249	462908	43.3414	|. | *. |
2011: 2	833337	810511	22.8258	|. | *. |
2011: 3	1058.02	1033.57	24.4447	|. | *. |
2011: 4	665364	615839	49.5245	|. | *. |
2012: 1	534137	508058	26.0794	|. | *. |
2012 2	924144	865853	58.2911	|. | *. |
2012: 3	1120.07	1099.11	20.9653	|. | *. |
2012 4	713151	691565	21.5864	|. | *. |
2013: 1	567708	593974	-26.2664	|. * |. |
2013: 2	940243	961961	-21.7184	|. * |. |
2013: 3	1208.03	1205.41	2.61903	|. *. |
2013: 4	755175	808057	-52.8815	|. * |. |

Source: Personal processing

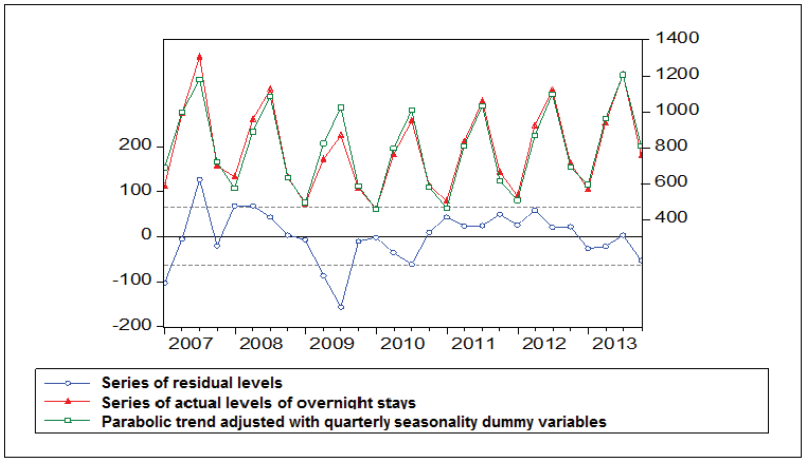

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Fig. no. 2. *Graphical representation of the number of foreign tourists overnight stays (Actual data and estimated data based on parabolic model with dummy variables for quarterly seasonality residual term values)*

Useful information points to the graphical representation in Fig. 2. where the actual levels chronogram of the number of overnight stays and that of the estimated levels on the basis of parabolic model with quarterly seasonality dummy variables have overlapping forms about which induce viability of the econometric model assessment. The graph is displayed waveforms and values of the term of error (residual) waste which reproduce beach Table 5. Residues are disposed compared with the limits marked by

an estimate of the average error equation parabolic trend corrected by applying quarterly seasonality dummy variables,

$\hat{\sigma}_{x;y} = \pm 63.96858$ thousand days - tourists

The analysis highlights six points marking the residuals (see table no. 5) that emerge out of bounds represented by a mean estimate of error, but not positioned outside the limits defined by error or maximum permissible limit set under the law Student distribution by considering the critical value (probability factor) $\pm t = \pm 2{,}074$ relating to a significance threshold of 5% and 22 bilaterally distributed degrees of freedom. The error limit is therefore defined as:

$$\pm t_{q=0.05;\, f=n-k=28-6=22} \cdot \hat{\sigma}_{x;y} = \pm 2{,}074 \cdot 63.96858 \ .$$

Graphical representation, in fig. no. 3, of the histogram exposed residues and where next chart presents the statistical indicators that describe the series of the term residual values: mean, median, maximum and minimum value, standard deviation estimate coefficients of asymmetry statistics (Skewness) and vaulting / flattening (kurtosis) and Jarque-Bera statistic coefficient which is associated probability of normal form attesting the compliance of the distribution of residues of normal distribution law.

"Jarque-Bera criterion" provides information that residuals series of the parabolic model with quarterly seasonality dummy variables are not distributed normally because the statistical probability Jarque-Bera associated coefficient (JB = 2.300101) is 0.316621, based on distribution law χ^2 with two degrees of freedom.

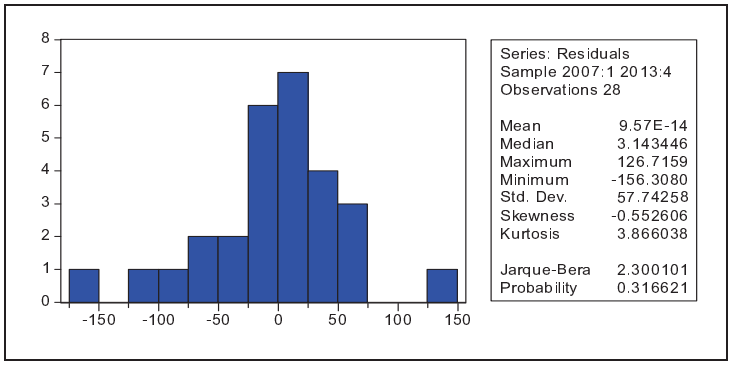

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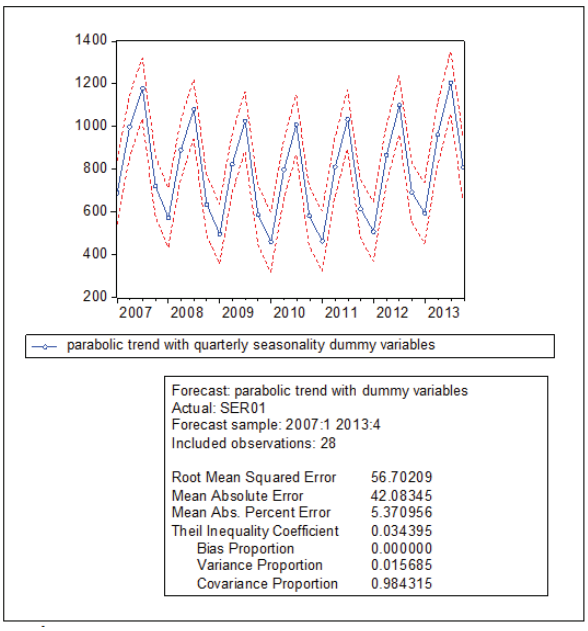
Fig. no. 3. *Statistical description and test for normality of the distribution of the residual variable*
(Parabolic model with dummy variables for quarterly seasonality)

The econometric model developed to formalize the trend fined quarterly seasonality dummy coefficients shown in FIG. no. 4 graphics

illustrating its viability by the arrangement of attaching points overnight stays of foreign tourists. It also presents a statistical confirmation for the digital dimension size of Theil's coefficient of inequality / irregularity.



Source: Personal processing

Fig. no. 4. *Graphical representation of estimated levels of the number of overnight stays and of the limits that fall within the terms of* ± 2.074 *estimates of the mean error of the foreign tourists trend equation (under the Student distribution law with bilateral arrangement significance) for a significance threshold of 5% and 22 degrees of freedom*

$$(\pm t_{q=0.05;\ f=n-k=28-6=22} \cdot \hat{\sigma}_{x;y} = \pm 2.074 \cdot 63.96858 \quad)$$

To test the state of heteroscedasticity / homoscedasticity test of residuals the White Test was used. Results entered in *the Synoptic panel of "White Heteroskedasticity Test"* (See Table 6) were obtained using the **Eviews** software and certifies that the residual variable is heteroscedastic (rejecting hypothesis of heteroscedasticity) and therefore the residual variable is homoscedastic. In these conditions the residual variable dispersion is constant. The conclusion made is validated both under ***"Criterion F"*** as well as ***"Criterion*** χ^2 **,** significance thresholds of 37.9465% and 32.9978% justify the rejection of the hypothesis of heteroscedasticity as exceeding the maximum permissible limit of 5%.

Table 6. Synoptic table of "White Heteroskedasticity Test"
(Parabolic model with dummy variables for quarterly seasonality)

White Heteroskedasticity Test:				
F-statistic	1.181095	Probability (significance)		0.379465
Obs * R-squared	14.64588	Probability (significance)		0.329978
Dependent Variable: RESID ^ 2				
Method: Least Squares				
Sample: 2007: 1- 2013: 4				
Included Observations: 28				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1191.376	12050.72	0.098863	.9226
D_1	10728.56	11029.28	0.972735	.3472
D_1* t	-2333.263	3143.340	-0.742288	.4702
D_1* t ^2	218.5065	438.5176	0.498284	.6260
D_2	1254.560	10888.02	0.115224	.9099
D_2*t	-557.8679	3407.479	-0.163719	.8723
D_2* t ^2	160.0509	445.1740	0.359524	.7246
D_3	15701.84	11130.90	1.410653	.1802
D_3*t	-1426.741	3578.629	-0.398684	.6961
D_3* t ^2	169.5426	447.5087	0.378859	.7105
D_4*t	-931.7651	3652.896	-0.255076	.8024
D_4* t ^2	177.2343	445.5897	0.397752	.6968
t* t ^2	-10.72191	22.58022	-0.474836	.6422
t-4	0.203295	0.386253	0.526327	.6069
R-squared	0.523067	Mean dependent var		3215.126
Adjusted R-squared	0.080201	S.D. var dependent		5542.889
S.E. of regression	5315.972	Akaike info criterion		20.30167
Sum squared resid	3.96 + 08	Schwarz criterion		20.96777
Log likelihood	-270.2234	F-statistic		1.181095
Durbin-Watson stat	1.869933	Prob (F-statistic)		0.379465

3. Interpretation of representation indicators and econometric conclusions on the model viability assessment

Calculations allow us to appreciate that the model built on a parabolic general trend equation corrected with quarterly seasonality dummy variables is statistically convincing.

Therefore the model considered as reasonable analytical expression of the evolution in the number of overnight stays in the period 2007-2013 is:

$$y = (725.8252014\,D_1 + 1065.963162\,D_2 + 1279.011767\,D_3 + 848.7164447\,D_4) -$$
$$- 37.1231223\,t + 1.273963654\,t^2$$

In support of that assessment there are the following results:

1.- Based on **"Criterion *t*"**, the parabolic shape general trend equation parameters seasonally adjusted with quarterly dummy variables were significantly different from zero values. Checking the null hypothesis of each parameter is assessed by significance thresholds lower than 5% and is therefore invalidated.

Thus, we conclude that the model was correctly specified and the trend equation parameters show good efficiency when used for the calculation of forecasts. However there is a certain reserve on the correctness of that conclusion since the error distribution is not confirmed statistically of formal similarity with normal distribution, the Jarque-Bera statistical criterion (see fig. no. 6).

2.- In the context of the analysis of the dynamic of the number of overnight stays, the "Durbin-Watson statistic coefficient " is irrelevant because the econometric model has no distinct parameter (coefficient) marking the ordinate at origin.

3.- The relative expression standard error of the estimate equation parabolic trend adjusted with quarterly seasonality dummy variables in relation to the average number of overnight stays is 8.61%, a convenient size, positioned below the 10% limit required to consider the model viable.

4.- "Theil's irregularity (inequality) coefficient" reconfirms by its value, $Th = 3.4667\%$, the conclusion offered in the form of relative standard error of the estimate equation parabolic trend with dummy variables seasonally adjusted quarterly econometric model is viable, properly formalize evolution and trend of the number of overnight stays.

5.- The White test confirms the stationary of the dynamic series and thus the viability of the model is sustained, the residual variable is homoscedastic, which will ensure efficient estimate calculation of the number of overnights levels which will be recorded in future time segments.

6. – The "Augmented Dickey-Fuller" statistical test also indicates that the error associated with rejecting the hypothesis that the overnights series has a root unit, is 0.01%, lower than the standard threshold of 5%. In these circumstances it supports the hypothesis that the series is stationary.

7.- The statistical test that propagates a particular vulnerability to the parabolic correction model with dummy variables is the test for normality of distribution of the residual variable, "Jarque-Bera criterion". This test provides information that the residuals series is not normally distributed which alters the viability of the model [12]

4. Conclusions

The main reason for creating a comprehensive methodology which focuses on improving prospects for perpetuating sustainable tourism in developing countries stems from the growing importance of tourism activity

in these countries. Tourism is one of the most important socio-economic sectors in the world that has been continuously expanding at an average yearly rate of 4-5% in the second half of the 20th century. The evolutionary process of the tourism market must be constantly supervised and measured using appropriate indicators, to be in line with environmental trends and changes caused by the preferences and requirements of potential tourists, who have a considerable effect on the implementation and development of the eco - sustainable tourism process.

Analysis conducted allows us to state that the flow of foreign tourists is positioned on an overall upward trend at the end of 2013 with growth prospects in the coming years. The flow of tourists shows the ability of the economy to ensure competition with neighboring tourist areas.

The study undertaken gives reliable information for decision-makers within the meaning of the mobilization effort for the development of material and human factor competitiveness.

Regardless of models used, the need to estimate and forecast touristic activity is and will continue to be a vital asset in implementing strategic decisions for the existence of sustainable tourism development.

ACKNOWLEDGMENT

This paper has been financially supported within the project entitled „SOCERT. Knowledge society, dynamism through research", contract number POSDRU/159/ 1.5/S/132406. This project is co-financed by European Social Fund through Sectoral Operational Programme for Human Resources Development 2007-2013. Investing in people!"

Bibliography

[1] Zaman, G., Zenovic, G., (2007), Criterii si principii ale dezvoltarii durabile din punctual de vedere al resurselor acesteia, Buletinul AGIR, nr. 1, pp. 136-142

[2] Aceleanu M. I., Serban A. (2009), *Relation Between Sustainable Innovation And Competitive Advantage: Romanian Perspective,* The 11th International Conference Innovation and Knowledge Management in Twin Track Economies, International Business Information Management Association (IBIMA), 4-6 January 2009, Cairo, vol.8, nr.7, paper 44, ISBN 978-0-9821489-0-7

[3] Kiper, T., (2013), Role of Ecotourism in Sustainable Development, Advances in Landscape Arhitecture, Kiper, licensee InTech

[4] Vasile, V., Stanescu, S., Balan, M., (2013), Promoting the Quality of Life: Challenges of Innovative Models versus

Payment Policies", in „The European Culture for Human Rights the Right to Happiness", Cambridge Scholars Publishing,UK

[5] Bacescu-Carbunaru, A., (2002), Analiza macroeconomica, Economic Publishing House, Bucharest.

[6] Balan, M., Balan, Gh., (2013) "Social Vulnerability: A Multidimensional Analysis of the Development Regions of Romania", publicata in Volumul: Applied Social Sciences: Economics and Politics, Editura Cambridge Scholars Publishing (CSP), editori: Georgeta Rata si Patricia Runcan, 3-11 pp., 165 pg., ISBN(10): 1-4438-4334-2, ISBN(13): 1-4438-4334-8

[7] Popescu, G., H., Ciurlau, C., F., (2013). Macroeconomie, Economic Publishing House, Bucharest.

[8] Baron, T., Biji, E., Tövissi, L., Wagner, P., Isaic-Maniu, Al., Korka, M., Porojan, D., (1996), Statistica teoretica si economica, Didactic and Pedagogic Publishing House, Bucharest

[9] Andrei, T., (2003), Statistica si econometrie, Economic Publishing House, Bucharest

[10] Galam, S. (2002), Minority Opinion Spreading in Random Geometry, European Physical Journal B 25, pp. 403-406

[11] Isaic-Maniu, Al., Mitrut, C., Voineagu, V., (1995), *Statistica pentru managementul afacerilor*, Economic Publishing House, Bucharest.

[12] Mihailescu, N., (2012), *Statistica si bazele statistice ale econometriei*, Bren Publishing House, Bucharest.