

ECONOMETRIC ANALYSIS OF THE FLOW OF TOURISTS IN ACCOMMODATION STRUCTURES IN ROMANIA

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Abstract:

The fluctuations of the tourism movement in Romania can be highlighted by the structural change of its principal indicators, the number of tourist arrivals as well as their development trends covering the period of 2000 to 2009.

Romania's international tourist flows give an overview of the Romanians outside departures and arrivals of foreigners in Romania. Of these, the paper approaches the tourism flows for Romania on two categories: Romanians and foreign. Also developments are analyzed regarding the foreign tourists arrived in Romania on the basis of geographical areas and countries of origin.

Keywords: tourist arrivals, regression, Fisher test, Student test, ANOVA

JEL clasification: C10, L83

1. METHODOLOGICAL CONSIDERATIONS

Information about time evolution to the phenomena of tourism and targeting tourist traffic are recorded systematically.

Evolution of tourist traffic is driven by the action of different categories of factors, measurable through the system of indicators.

Dynamic analysis of tourist movement attests that its evolution is recorded as qualitative changes in the tourist orientation for high comfort of services, for specific tourism products and as quantitative changes resulting from its size expressed by various indicators.

One of the most important indicators for assessing the tourist traffic is the number of tourist arrivals in tourist reception structures that are studied, both in terms of structural developments and the trend in the period 2000-2008.

Structural changes made, and the dynamics of tourist arrivals in tourist facilities are determined by applying various statistical, econometric methods: the indices method, regression method, etc. Regression method is based on measuring and predicting the influence of one or more factors may have on the evolution of a phenomenon or economic process.

The basic element in the regression is the regression function, which summarizes the outcome variable Y shape dependence, the factorial variables X . The main indicators used for summary regression analyses are R , R^2 , \bar{R}^2 and S_e (Table No. 1).

Table No.1 The indicator used for regression statistics R, R^2, \bar{R}^2, S_e

Multiple R	$R_{y, x} = \sqrt{\frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^n (y_i - \bar{y})^2}} = \sqrt{1 - \frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2}}$
R Square	$R^2 = \frac{\Delta_{y/x}^2}{\Delta_y^2} = 1 - \frac{\Delta_e^2}{\Delta_y^2} = \frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^n (y_i - \bar{y})^2}$
Adjusted R Square	$\bar{R}^2 = 1 - \frac{\Delta_e^2 / n - k - 1}{\Delta_y / n - 1}$
Standard Error	$s_e = \sqrt{\frac{\Delta_e^2}{n-2}} = \sqrt{\frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{n-2}}$
Observations	n

Regression function can be validated by F test (Fisher Snedecor) dispersion analysis (Table No.2). Regression model is statistically significant if calculated F is greater than critical F ($F_{calculated} > F_{\alpha; k; n-k-1}$). Also, the model is considered statistically significant if Significance F is less than α , where α represent threshold signified and $1-\alpha$ represents confidence level. Usually, $\alpha = 0.05$ or $\alpha = 0.01$, corresponding to 95% or 99% confidence level.

Table No 2. ANOVA table with F test

Source variation	df	SS	MS =SS/df	F	Significance F
Regression	k	$SSR = \Delta_{y/x}^2 = \sum_{i=1}^n (\hat{y}_i - \bar{y})^2$	$s_{y/x}^2 = \frac{\Delta_{y/x}^2}{k}$	F calculated $F = \frac{s_{y/x}^2}{s_e^2}$	
Residual	n-k-1	$SSE = \Delta_e^2 = \sum_{i=1}^n (y_i - \hat{y}_i)^2$	$s_e^2 = \frac{\Delta_e^2}{n-k-1}$		
Total	n-1	$SST = \Delta_y^2 = \sum_{i=1}^n (y_i - \bar{y})^2$ $SST = SSR + SSE$	$s_y^2 = \frac{\Delta_y^2}{n-1}$		

Finally, regression model parameters are tested by t test (Student test).

The methods used involve the determination of absolute indicators, relative and medium through which the image will shape the evolution of this indicator of tourist traffic.

1. STRUCTURAL FLUCTUATIONS OF TOURIST ARRIVALS IN ROMANIAN TOURIST RECEPTION STRUCTURES

Analysis of fluctuations in tourist arrivals, in tourist reception structures, is done from two viewpoints:

- at regional level, on the tourist destinations;
- by resident tourists, in the two categories: Romanian and foreign.

Romania has established six major tourist destinations (denoted by DT), for which the structural fluctuations in terms of tourist arrivals in tourist accommodation in Romania on these destinations, both in 2000 and 2008, which are presented within Figure 1.

Structural changes, recorded principally tourist destinations are:

- DT 1 - for spas situation is as follows: if in 2000 they were for 13.77% of their tourist arrivals in 2008 to return only 10.22% of the total, due to quality facilities and services
- DT 2 - resorts in sea side, excluding town only to return in 2008 11.68% 13.65% compared to the set of all tourist arrivals in 2000 due to significantly lower quality of services offered to the tourists;
- DT 3 - mountain area resorts host tourists in tourist reception so that the weights of 2000 (15.37%) and 2008 (14.01%) are fairly close to what explains the continuing attraction that offers the Romanian Carpathians;
- DT 4 - Danube Delta area, including town is the area that attracted quite a few tourist tourists in 2000 (the share is only 0.7% of their total arrivals), while over the years, promotion and attention particular rearrangement led to a change of holiday destination for tourists, many prefer this region, a fact noted by higher share down to 1.35% of Romanian tourists, the explanation lies in changing the tourists, now due to high stress limited time is often motivated to spend the weekend in the mountains as close to their residence;
- DT 5 - Bucharest and cities of the county, excluding become over the years most popular tourist destinations all, fluctuations were observed in weight and substantially amended in 2008 (47.20%) compared to the year 2000 down to 45.47% of total tourist arrivals in tourist reception in Romania, especially due to rising rates in the tourism business is conducted;
- DT 6 - Other places and tourist routes are also increasingly sought in recent years, all due to increasing tourism, business, cultural and religious one, the share of 11.04% of total arrivals in 2000 is substantially altering fixing the levels of 2008 to 15.54%.

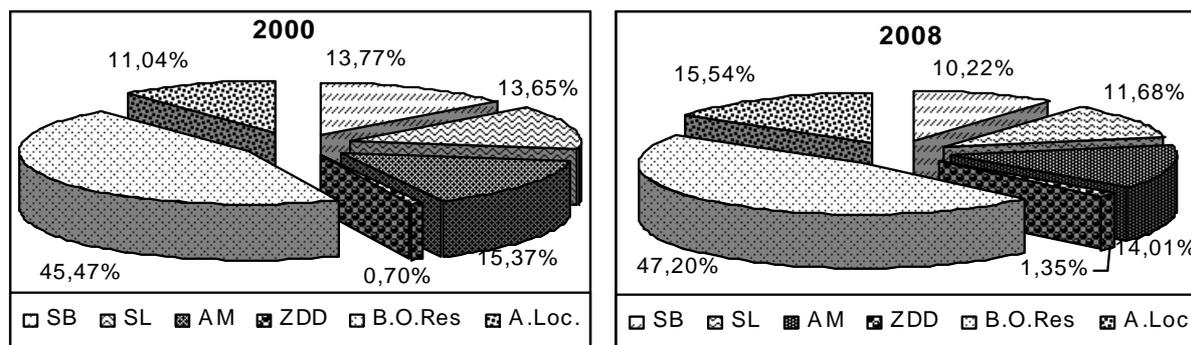


Figure.1 The tourist arrivals in tourist reception in Romania in 2000 and 2008 on tourist destination

Structural changes are recorded on tourist destinations due to the changes occurring throughout the analysis of 2000 by 2008, which includes either a deterioration of infrastructure in certain destinations or tourist preferences change in the type of tourism practiced focusing on the weekend, cultural, religious or business.

Study of structural changes on the number of tourist arrivals on the two categories, as their residence, followed Comparative Romanian tourist arrivals and foreign tourist establishments in Romania over the period 2000-2008.

Trend is well illustrated by the graphical representation within Figure. 2. As you can see the corresponding series are relatively different.

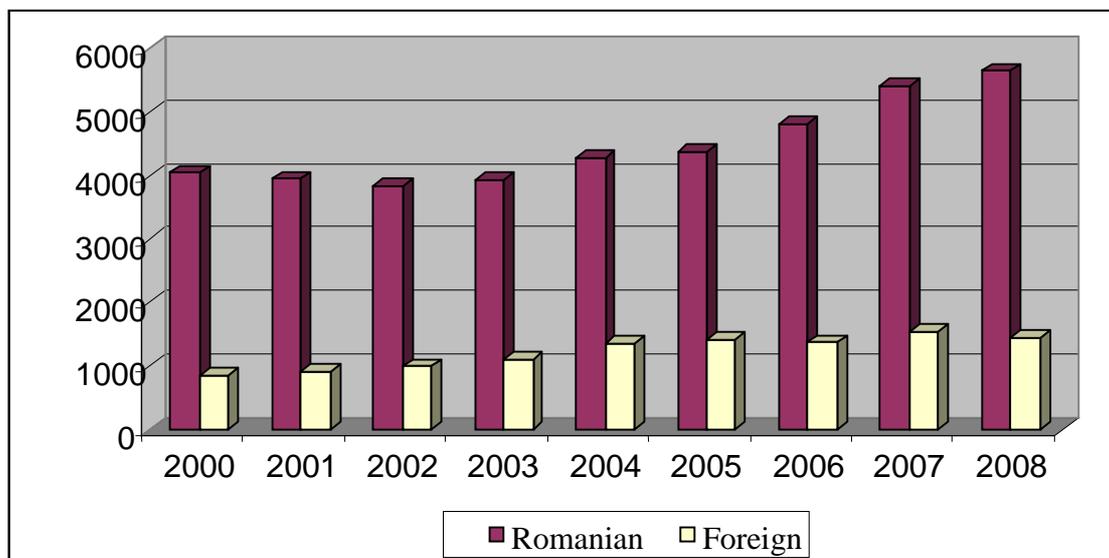


Figure.2 Comparative of the two categories of Romanian and foreign tourists arrivals in the tourist reception in Romania

The number of Romanian tourists who have done tourism between 2000 - 2008, through the share of representation in the composition of tourist arrivals between 75% and 83%, gave the outline of the evolution of the total number of tourists accommodated in this period.

Since 2000, there was a corresponding decrease in percentage of Romanian tourists, the overall decreasing by 7.01%, the value recorded in 2005, being 75.37%, with the maximum share of 82.38% in 2000.

After a sinusoidal trend with a minimum in 2000 (17.62%), foreign tourist arrivals in Romania have returned to the first year level, in 2005 falling to 24.63% from the base year.

The percentage reduction of 2.43% set in 2006 against 2005 for foreign tourist arrivals is reported as a structural change in the Romanian tourist arrivals.

Although in 2007 to 2006 the share of foreign tourists arrivals in the total of tourist in Romania has been a slight revival, from 22.20% to 22.25% in 2008 their share in total tourist arrivals was only 20.57%. How low is not given by the higher growth of the Romanian tourist arrivals of tourist in Romania but by reducing the absolute number of foreign tourists from 1.551 million in 2007 to 1466 thousand in 2008, this is an important warning to Romanian tourism.

An important factor that determined this evolution is the low purchasing power of the Romanian population, because small increases in revenue in relation to the price jump and the entry in the current economic crisis.

Structural Analysis of registered tourist arrivals of tourist reception structures in 2008 compared to 2000 shows a positive change in the share of foreign tourist's arrivals in tourist establishments. Thus, if in 2000 the total foreign tourist arrivals returned 17.62% in 2008 will determine that the arrivals in this category are 20.57% of the total. (Graph 2 and 3) as seen in Figure. 3.

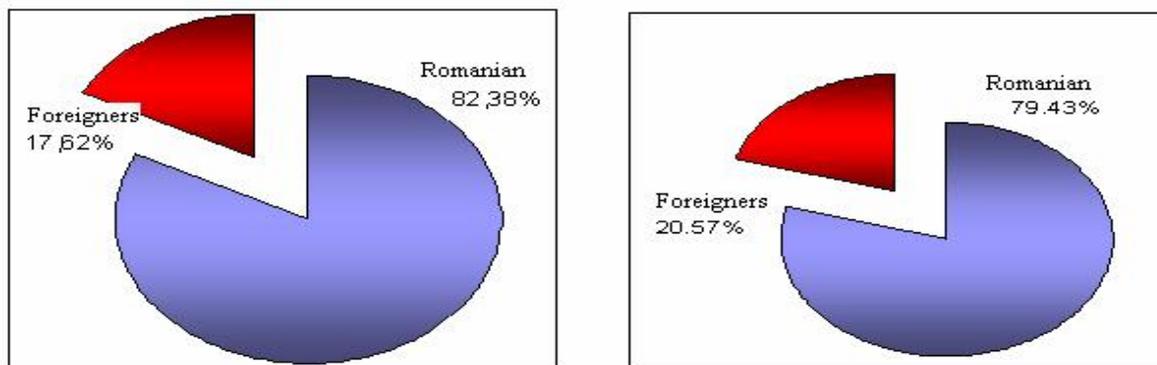


Figure.3 The tourist arrivals in tourist reception in Romania in 2000 and 2008, the Romanian and foreign categories

A structural overview of the two categories of tourist’s arrivals by country of residence, the main tourist destinations, is shown in Figure.4.

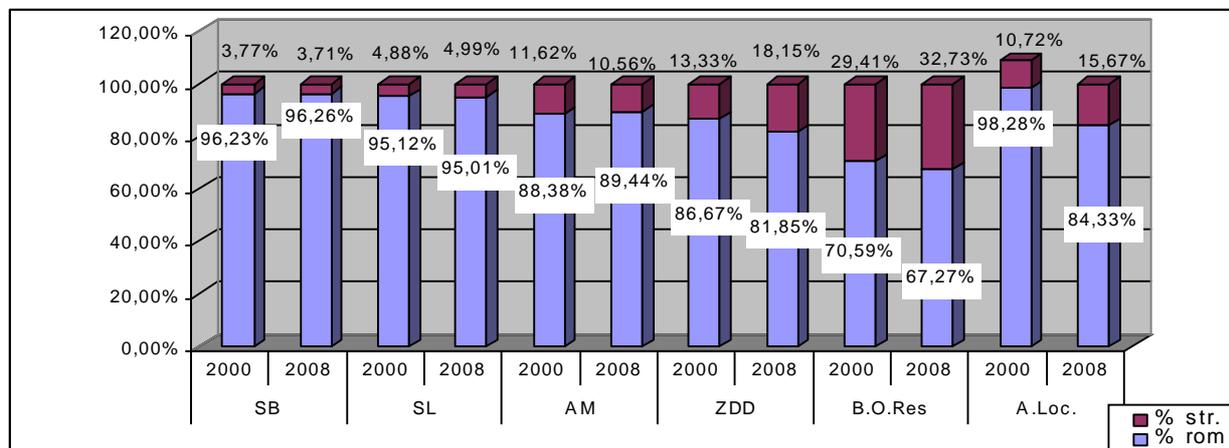


Figure.4 The tourist arrivals in tourist reception on Romania's tourist destinations and by category by country of residence in 2000 and 2008

The period 2000-2008 is outlined in the Romanian economy after the transitional period and conduct a fairly significant economic progress.

This context explains the oscillations recorded in terms of tourist arrivals on the two and on Romania's tourist destinations.

Percentage values of Romanian and foreign arrivals in 2008 compared to 2000, tourist destinations, have highlighted the significant fluctuations in arrivals at the destination called "other places". Here was reported a significant decrease in tourist arrivals for the Romanian foreign percent reflected by the 84.33% (2008) compared to 98.28% (2000). Claim is justified not only by arrivals recorded as a result of the practice of tourism activities by foreigners, and a more marked increase in collaboration with Romanian firms with foreign collaborators who sent the country resulting in an increase in overnight stays.

This argument explains the significant weights corresponding foreign tourists for destination Bucharest and cities of the county, excluding, where the share of foreign tourists arrivals in 2008 reached 32.72% from 29.41% down to the 2000.

Increased degradation and poor quality infrastructure, facilities and services resorts led to a loss from a departure of foreign tourists, a fact noted by insignificant percentages of 3.77% in 2000 respectively 3.74% in 2008, established the total tourist arrivals in tourist destination considered.

The phenomenon of slight increase in the number of arrivals of foreign tourists is reported and seaside resorts and the Danube Delta, the proportion of the total arrivals is changing from 4.88% (2000) to 4.99% (2008) for the first destination that from 13.33% in 2000 to 18.15% in 2008 for the second.

Resorts in the mountain area is a favorite destination for Romanian mainly, especially if we consider weekend tourism, increasingly practiced by them, a situation reflected by the proportion of 89.44% of total tourist arrivals in that destination in 2008 compared to the 88.38% in 2009.

Structural analysis was focused in particular to the situation of foreign tourist arrivals in view of prospects that would have created the conditions in which their number was a significant increase. Structural oscillations presented evidence that, for a few tourist destinations, arrivals of tourists were slightly signification in 2008 compared to 2000, reflecting the unfavorable situation of Romania in terms of tourism supply.

2. EVOLUTION OF THE NUMBER OF ARRIVALS IN TOURIST RECEPTION IN ROMANIA

Retrieving data from statistical publications have enabled a graphical representation showing evolution of the number of tourist arrivals in tourist reception in Romania.

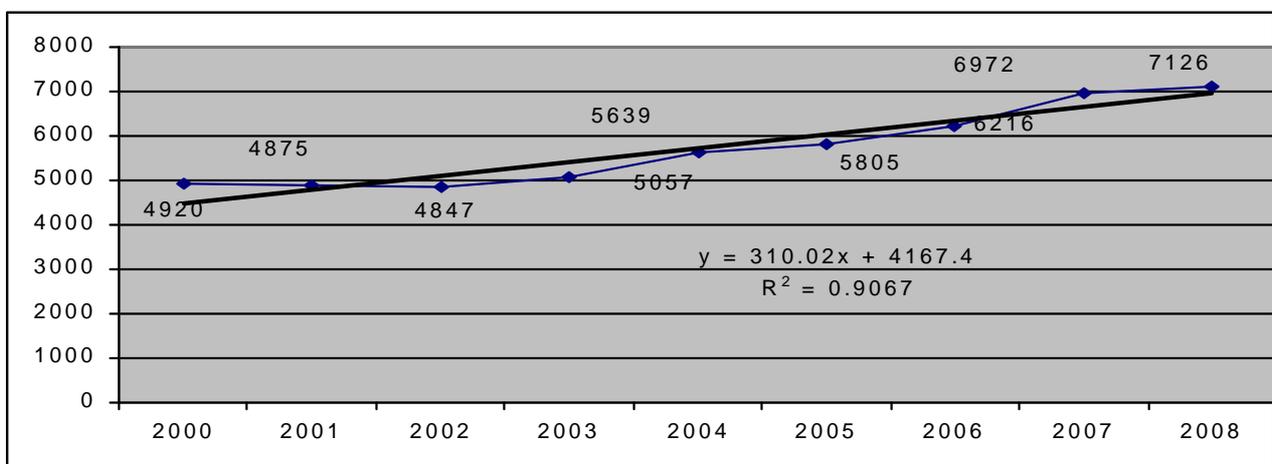


Figure.5 Evolution of the number of arrivals in tourist reception in Romania

Chronogram shows overall growth of the number of tourists during the period 2000 - 2008, from a minimum of 4920 visitors registered in 2000, corresponding to a maximum of 7126 tourists in 2008.

This increase is confirmed by calculation of average indicators which indicates an average increase of about 276 thousand tourists annually, i.e. an average increase of 1.0474 times with an average of 4.74%, according to the annual arrival of tourists in 5337 average year.

The graphic representation shows that the evolution of the number of tourist arrivals is as linear trend equation is:

$$\hat{y}_t = 4167.4 + 310.02 \cdot t_i \quad (1)$$

It follows that, after applying the method of adjusted linear, this equation allows us to note that the regression coefficient value indicates an average increase from one year to another, the number of tourists with around 310 tourists per year.

Representatives of travel agencies, estimated that the number of foreign tourists will increase until 2010, because 2009 was a year of stagnation caused by the current economic crisis.

Evolution of tourist arrivals is determined both in absolute and relative value of each year comparing with that of the first year or the year before.

For the first comparison to the number of tourist arrivals in 2000 may be added that, from 2002 to 2008, every year has increased. Phenomenon recorded the lowest increase in absolute terms in 2003 compared to 2000 (with 137 arrivals, so the actual 2.8%), while the year 2008 was before the sharp increase, they are accommodated in tourist establishments Romania with 2.206 million tourists more than in the reference year, representing a relative increase of 44.84%.

To those listed, there are exceptions only in the years 2001 to 2000, respectively in 2002 to 2000 so that the number of tourists arrivals decreased with 45 thousand, respectively 73 thousand people concerned.

Comparing the number of arrivals in each year from that previously seen the lowest increase in this indicator in 2008 than in 2007, when before it only a difference of 154 thousand persons, which represents a positive change by only 2.21% significance the trend was registered in 2007 compared to 2006 (an increase of arrivals is higher by 12.16% i.e. 756 thousand person actually accommodated).

Also refer to a small decrease in 2002 compared to 2001, with 28 thousand personae, which is a relative reduction of 0.58%.

Overall, the number of tourists has seen a very slight growth process, which may be interpreted as a situation favorable to Romania, while the future is aware that facing global economic crisis.

3. CORRELATION BETWEEN ROMANIAN TOURIST ARRIVALS AND REAL AVERAGE WAGE

In this chapter we turn to a brief analyze respect how the number of arrivals of tourists stay in tourist reception in Romania has been influenced by the evolution of their actual average salary in 2000-2008.

During the period analyzed, Romania, the real average wage had an upward trend (Figure.6) doubled during the analyzed period. The largest increase in average real wages occurred in 2007 2008 (123.03%) followed by 2006-2007 (115%).

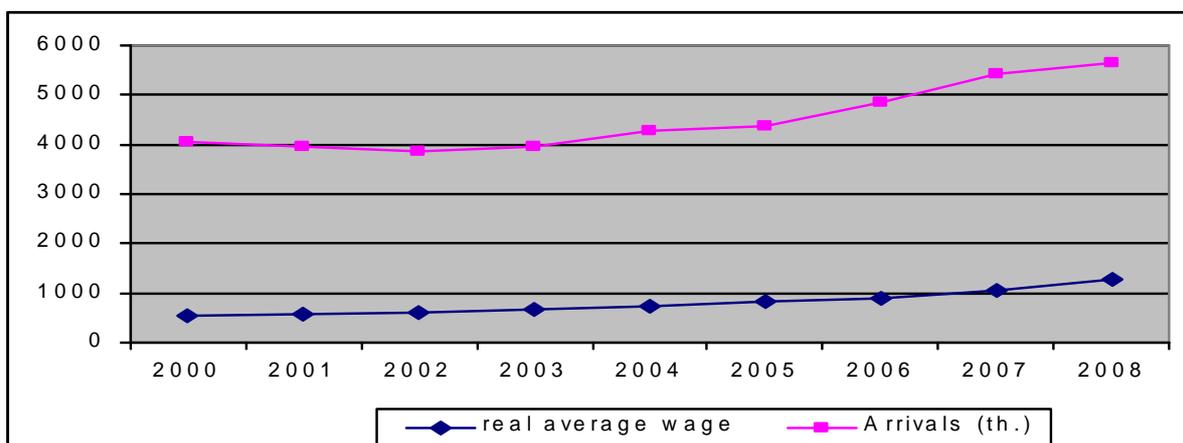


Figure.6. Average real wage developments and the number of tourist arrivals in tourist structures in Romania

Considering the developments of average real wage and the number of tourist arrivals in tourist structures in Romania between 2000-2008 it was examined how the number of Romanian tourist's arrivals is influenced by their real wage. The results obtained are presented in Table 3.

Table No.3 Determination and testing of regression model

SUMMARY OUTPUT						
<i>Regression Statistics</i>						
Multiple R	0.9677839					
R Square	0.9366057					
Adjusted R Square	0.9275494					
Standard Error	180.17931					
Observations	9					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	3357489.458	3357489	103.4201	1.91474E-05	
Residual	7	227252.0757	32464.58			
Total	8	3584741.533				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2375.5574	216.1482332	10.99041	1.14E-05	1864.448035	2886.667
real average wage	2.6460805	0.260196015	10.16957	1.91E-05	2.030814742	3.261346

Analyzing the data presented in Table 3 shows that between the number of tourist arrivals and their real wage is a strong connection (Multiple R = 0.977839). The percentage of actual average wage influence on the number of tourists arrivals is about 94% (R Square = 0.9366057). Since Significance F = .000,019 < 0.05 regression model is valid. The model was testing for $\alpha = 0.05$. The model is:

$$\hat{y} = 2375.55 + 2.646 \cdot x \quad (2)$$

In equation (2) \hat{y} represents the number of tourist arrivals Romans (expressed in thousands of tourists) and x represents the real average wage (expressed in lei). As $t_a = 10.99041$ and significant level (P-value) is $1.14E-05 < 0.05$ means the coefficient is statistically significant coefficient taking values between the lower (Lower 95%) and upper limit (Upper 95%) of 1864.448035 to 2886.667

The coefficient of real average wage (2.6460805) indicates that the average real wage increase of 1 lei, the number of Romanian tourists arrivals increased by about 2600 tourists. Since $t_b = 10.16957$ and P-value is $1.91E-05 < 0.05$, the coefficient is statistically significant. Confidence interval is the lower limit (Lower 95%) and upper limit (Upper 95%) of 2.030814742 to 3.261345.

CONCLUSIONS

Overall, in 2008 compared to 2000, structural changes on tourist arrivals in tourist reception are not significant. This situation is very favorable for Romanian tourism, given the advantages they had in economic Romania, under the significant increase in tourist arrivals in tourist reception stain in the country.

Today, as global tourism is characterized by strong competition between destinations, the necessity of a new model of a tourist policy is emerging based on a strategy to provide a new vision of production and marketing of tourism products.

This new approach could change the default so favorable tourist traffic tourist arrivals on condition that arises linking supply with pricing given the present crisis which is still evident in the Romanian economy.

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