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The Evolution of the Number of Tourists accommodated in Arad

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Abstract
The paper analyses the evolution of the number of tourists accommodated in Arad between January 2006 and September 2009. For this purpose we have used the statistics data from the official sites. As variables we chose: X – independent variable - Total tourist arrival and accommodated in Arad, Y - dependent variable - Tourists staying in hotels.
Keywords: tourism, accommodation

Introduction

Tourism is the fastest growing industry in Europe and contributed greatly to the emergence and development of services economy (Rusu, Cureteanu and Isac, 2013).

Tourism is always evolving under the changes in the contemporary civilization, being an activity involving a complex mixture of material and psychological elements.

In 1936, The Committee of Statistical Experts of the League of Nations defined foreign tourist as “one who visits a country other than that in which he habitually lives for a period of at least twenty-four hours”. Its successor, the United Nations, amended this definition in 1945, by including a maximum stay of six months (Theobald, 2005).

Data are taken from the Monthly Statistical Bulletins - Arad County in the period January 2006 - September 2009.

The analyzed variables

As variables we chose: X – independent variable - Total tourist arrival and accommodated in Arad, Y - dependent variable - Tourists staying in hotels.

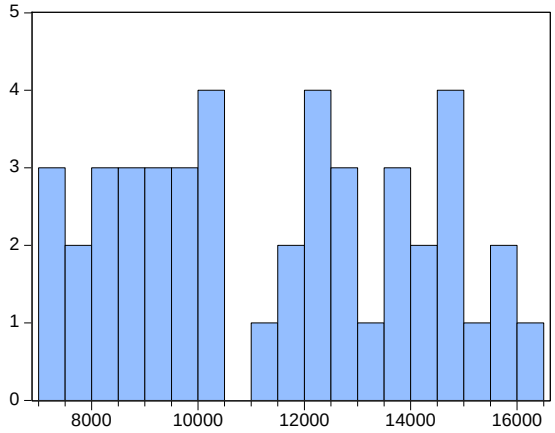
No.	Month	X – independent variable	Y - dependent variable
1.	January **2006**	11219	8733
2.	February	10113	7455
3.	March	10306	7499
4.	April	11177	8224
5.	May	13043	9508
6.	June	14120	10253
7.	July	17798	13905
8.	August	18861	14801
9.	September	19320	15611
10.	October	17898	13943
11.	November	15566	12373
12.	December	12120	9212
13.	January **2007**	10166	7635
14.	February	12666	10042
15.	March	13126	9984
16.	April	14571	11388
17.	May	15437	12161
18.	June	16468	12755
19.	July	19277	14845

20.	August	20562	15798
21.	September	17201	13768
22.	October	15775	12710
23.	November	12675	9478
24.	December	13357	10270
25.	January **2008**	11997	8769
26.	February	11881	8885
27.	March	13453	10285
28.	April	12373	9191
29.	May	15659	12164
30.	June	16636	13101
31.	July	18562	14698
32.	August	19157	15169
33.	September	17202	14182
34.	October	18501	14774
35.	November	15518	11705
36.	December	12922	9918

37.	January **2009**	11275	8187
38.	February	10248	7321
39.	March	11236	7833
40.	April	11330	8289
41.	May	15281	11592
42.	June	17179	12846
43.	July	18899	14460
44.	August	21790	16410
45.	September	16545	12174

The Calculations

For the size of Y will be calculated using the software Eviews the following:



Series: Y
Sample 2006M01 2009M09
Observations 45

Mean	11428.98
Median	11592.00
Maximum	16410.00
Minimum	7321.000
Std. Dev.	2698.713
Skewness	0.108099
Kurtosis	1.733593
Jarque-Bera	3.094741
Probability	0.212807

a. Mean - arithmetic average is determined by dividing the sum of the individual values of the variable to the total number of units in the population and is calculated with:

$$\overline{Y} = \frac{\sum_{i=1}^{k} Y_i \cdot N_i}{\sum_{i=1}^{k} N_i}$$, k=45

The value obtained using Eviews software is 11,428 tourists. The average monthly number of tourists accommodated in hotels in Arad is 11,428.

b. Median - The median is the numerical value separating the higher half of a population from the lower half, or that recorded level variable where for the number of units between the minimum and median variable equals the number of units between the median and its maximum value.

The median is calculated (Szenteşi, Lile, Rusu, Csorba and Bălan, 2011):

$$Me = Y_{\left\lfloor \frac{N}{2} \right\rfloor + 1}$$, if the whole population, N is odd,

$$Me = \frac{Y_{\left\lfloor \frac{N}{2} \right\rfloor} + Y_{\left\lfloor \frac{N}{2} \right\rfloor + 1}}{2}$$, if the whole population is an even number.

Using Eviews we obtained 11592 tourists. The median is the value of 11592 tourists staying in hotels in Arad County.

c. Coefficient of variation - is calculated using the ratio of standard deviation and the mean

$$V_Y = \frac{\sigma_Y}{\overline{Y}} \cdot 100(\%) = \frac{2698}{11428} \cdot 100 = 23{,}6\%$$

d. Skewness:

$$\alpha = \frac{\overline{Y} - Mo}{\sigma_Y}$$

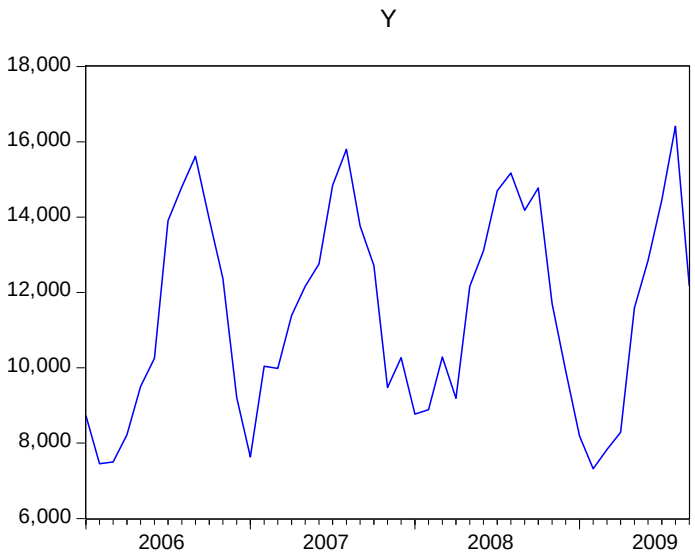
Using Eviews we obtain the value of 0,108099, thus since the skewness has a positive value, results that the series presents an asymmetry to the left

e. Kurtosis is calculated with the following formula:

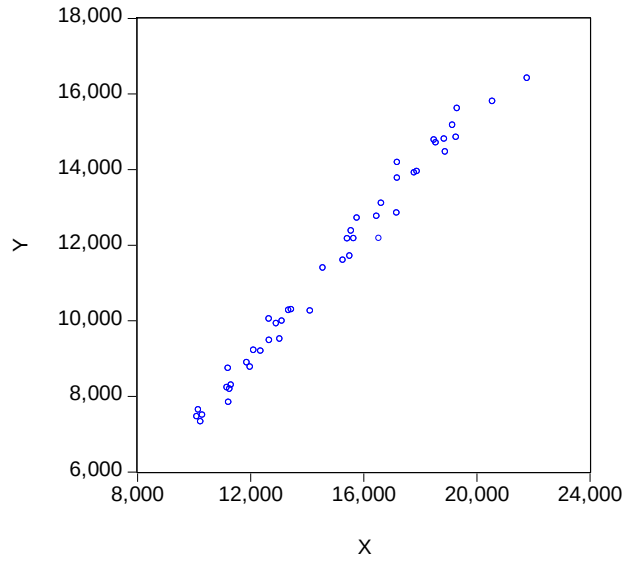
$$\beta_4 = \frac{M\left(Y - \overline{Y}\right)^4}{\sigma_Y^4} - 3$$

With Eviews software we get the following value: 1.733593. If β4> 0, the series graph is sharper and higher than normal curve chart, thus the series is leptokurtic. Thus in this case series Y is leptokurtic.

Independent variable Y chronogram



Point cloud representation



Following the mathematical form of the links they may be linear or non-linear. In this case the links are linear, so the connection is made after the equation.

It can be seen that the points are grouped diagonally so that we can confirm that between X and Y there is a link. Most points are located on the main diagonal so that the link is direct. The presence of a linear strip suggests a linear relation of the first degree.

The intensity is given by the width of the connection strip - the width of the strip is inversely proportional to the intensity of the points of the link – thus a narrow band indicates a strong intensity.

Dependent Variable: Y
Method: Least Squares
Date: 01/08/10 Time: 09:55
Sample: 2006M01 2009M09
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	0.836959	0.015929	52.54171	0
C	-1041.082	242.6284	-4.290848	0.0001

R-squared	0.984663	Mean dependent var	11428.98
Adjusted R-squared	0.984306	S.D. dependent var	2698.713
S.E. of regression	338.0825	Akaike info criterion	14.52788
Sum squared resid	4914889	Schwarz criterion	14.60818
Log likelihood	-324.8774	Hannan-Quinn criter.	14.55782
F-statistic	2760.632	Durbin-Watson stat	1.00967
Prob(F-statistic)	0		

Sample correlation value ratio is R-squared: 0.984663 in this case.

- if Ry/x < 0,5 connection between X and Y is reduced;
- if 0,5 ≤ Ry/x < 0,75 connection between X and Y is moderate;
- if 0,75 ≤ Ry/x ≤1 connection between X and Y is strong.

In conclusion there is a strong link between the two variables.

To generalize these values the Fisher test will be used – its calculated value is *F-statistic* FCALC = 2760.632. Fisher statistics table value for the probability of 95% and a total of 45 observations is Ftab = 4.085.

Presentation of two forms of plausible links between the two variables

It will identify two plausible forms of the relationship between two variables, based on the appearance of the cloud of points. In this particular case, it makes assumptions:

A - between the two variables is a linear relation: $Y = c(1)+c(2)\times X+\varepsilon t$

B - between the two variables is an exponential relation: $Y=c(1).c(2)X+\varepsilon$

Dependent Variable: Y
Method: Least Squares
Date: 01/08/10 Time: 10:02
Sample: 2006M01 2009M09
Included observations: 45
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1041.082	242.6284	-4.290848	0.0001
C(2)	0.836959	0.015929	52.54171	0
R-squared	0.984663	Mean dependent var		11428.98
Adjusted R-squared	0.984306	S.D. dependent var		2698.713
S.E. of regression	338.0825	Akaike info criterion		14.52788
Sum squared resid	4914889	Schwarz criterion		14.60818
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F-statistic	2760.632	Durbin-Watson stat		1.00967
Prob(F-statistic)	0			

The values of the estimated coefficients in the used sample are:

c(1) = -1041,082
c(2) = 0,836959

To generalize and expand the results related to the two arguments we need to apply the Student test.

For the parameter c(1) the value is *t-Statistic*: t_{calc} = -4,290848. For 95% probability, value is t_{tab} = 1,96. Thus the parameter c(1) significantly differs from 0 to the total population.

We apply Student *t-Statistic* for parameter as well: c(2): t_{calc} = 52,54171, t_{tab} = 1,96. Parameter c(2) significantly differs from 0 to the total population.

Conclusions

Tourism is extremely important for Arad County, being a significant opportunity in economic and social development. The problems arising are related to the number of tourists accommodated during the entire year (season on no season), Arad county having mostly business and transit tourism.

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