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Econometric modeling of demand for tourism in Albania

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ABSTRACT

The demand for tourism in Albania has increased substantially in the recent few years and this has caused a positive affect in the economic grouth of the country. This papers focus is on the mos appropriate ARIMA model for the tourism demand in Albania. To detect the behavior of this variable it's used the unit root test. Firstly it is analysed the seasonal behavior of this variable and then it is created a full modeling of the series in the SARIMA form. The estimated model will be used to forecast the tourism demand in the future periods.

Keywords: Tourism, ARIMA, seasonality, Unit root, forecast.

1. INTRODUCTION

If we analyze the history of the Albanian tourism industry we will see that we have very little tradition. Taking into consideration the 40-year history of a regime that was fighting the concept of a consumer society, where the provision of recreation and entertainment services were considered foreing and bourgeois, where culinary art did not develop out of poverty, where in the sphere of services existed only popular restaurants or social food places, and where the construction of hotels in the major cities became only in 1970 because of the need for foreing currency.

Tourism, before the 90' was only a very small percentage of GDP, which included only domestic tourism. After the 90', Albania has reached high level of toursim compared to the past years, including domestic and foreing tourism. In the recent years, Albanians have invested a lot of money in tourism, but this investment was followed by building a lot of buildings with or without permission that consumed the beauty of our country. Tourism brings not only good things like great profits, historic,cultural and knowledge exchange, but also environmental pollution, destruction of rare beauties, destruction due to abuse and exploitation to the maximum**.**

The issue of tourism is increasingly taking place in the debates in the media these past two years, as a consequence of the increasingly number of tourists from Kosovo and it's increasingly impact on the Albanian economy. "New York Times" has published a list of 52 countries to visit in 2014 and the Albanian coast shores ranked the fourth. Likewise the Turkish magazine "Skylife" described Albania as a very interesting destination to be visited by tourists from all over the world.

So far the public discussions are more involved in what is called the hardware or the visible part of tourism: infrastructure and construction of accommodation units. While little attention has been paid to what constitutes software which is intangible: service, the people, the behavior of host community, or hospitality in conditions of market economy and the problems associated with this. Albania is a beautiful country that offers coastal, mountain and historical tourism. The coastal tourism dominates even though the other should be.

The 2014 tourism summer season has been pretty positive for Albania compared to 2013. This is because the increased number of the tourist by 20% to 25% and the increased time of their stay in Albania. The level of income that tourism gave to Albanian economy was 30% more compared to 2013 (for the first six months according to the Institute of Statistic). All those who have visited once Albania, do not hesitate to come back a second time. Many natural beauties of our country have captivated everyone, filling the pages and the covers of many prestigious magazines and newspapers around the world. Tourism in Albania is becoming the engine of the economic development of this country and employment of people.

2. LITERATURE REVIEW

Many researchers have conducted different studies for tourism demand. A large majority of them have in focus the modeling of it by different political and ecomomic factors. Whereas the other part uses tourism as a tool to demonstrate the economic and social level of a country. Below is a list of studies which analyse and model only the time series of the demand for toursim and use evaluated models for predictions.In 2010 Loganathan and Yahaya modeled the tourism demand in Malaysia on the basis of ARIMA models and in modeling they use the

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logarithm of the variable which is in quarterly frequencies. With the help of models the authors predict the upcoming periods [1]. Bigovic in 2012 builds a SARIMA$(1,0,2)(0,0,1)_{12}$ for the tourism demand in Montenegro and uses it for predictions[2].

Chang & Chen & Lee in 2011 modeled the demand for tourism in Taiwan using ARIMA models and then used the neural technique for adapting the splins regression[4]. Sinaj in 2014 analyzes the relationship on the demand for tourism in the Albanian economy using Granger Casuality Test[3].

3. EMPIRICAL ANALYSIS

The data

Information regarding variable number of tourists are taken from the database of INSTAT with quarterly frequency in Albania for a period of 2001 to the third quarter of 2014. The number of observations is sufficient to derive reliable results then for predictions.

3.1 Trend of demand for tourism

Below is the chart to see the progress of tourism demand over the years in Albania.

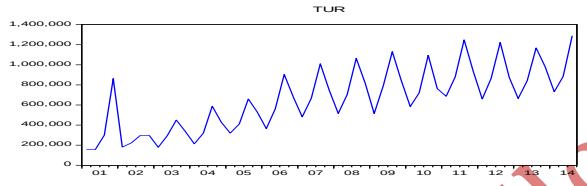

Figure 1 Chart the progress of the demand for tourism

We notice form the graphic a positive trend, especially in the recent years. Likewise it is noticeable that the demand for tourism has seasonal influences which is expected because Albania continues to offer as primary tourism the coastal by exploiting only its geographical position. This is very clear in the graphic of the average of each quarter of the year, where it is very clear that in the third quarter so in the summer we have the highest demand for tourism.

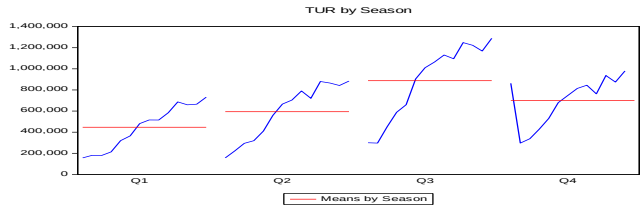

Figure 2 The impact of seasonal in demand for tourism

These effects clearly proven by the following indices. If the value of the index is greater than 1 then survey x is on the trend line . If the index value is less than 1, then the following observation is under the trend line.

Scaling Factors:	
1	0.696292
2	0.928581
3	1.349714
4	1.145900

Table 1. Quarterly indices of demand for tourism. Author's calculations

During the modeling of variable demand for tourism in use models SARIMA$(p,d,q)(P,D,Q)_{12}$

3.2 The study of Stationarity

Variables which are time series are generally variables which have a certain trend towards they are not stationary and must be returned in such using differences. A time series is stationary if the mathematical expectation, variance and covariance to be constant (not to depend on the time). Analytically, we can write:

$$E(DTR_t) = \mu$$
$$Var(DTRt) = \sigma^2$$
$$cov(DTR_{t+k}, DTR_t) = \gamma_k$$

A useful way of determining the order of differentiations is the use of criteria for the existence of unitary root for the series under study, the number of demand for tourism. The order of differentiations will be determined by the number of the unitary roots.

We will use the DF test assuming that the remains were not correlated between them. If such a thing happens we use the generalized Dickey-Fuller test ADF(g), which is an asymptotic test to show us the existence of unitary roots.

Referring to the model:

$$\Delta DTR_t = \beta_1 + \beta_2 t + \delta DTR_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta DTR_{t-i} + u_t$$

Construct hypotheses:

$H_0 : \delta = 0$ (variable has a unit root or the time series is not stationary)

H_1: $\delta<0$(the time series is stationary)

If the student statistics values are greater than the critical value, then the basic hypothesis not reject.

ADF test results for the series DTR and for series difference (d(DTR)) given in the table below:

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Null Hypothesis	t-Statistic	Prob.*
DTR has a unit root d(DTR) has a unit root	-0.0805 -18.338	0.9458 0.0000
Test critical values:	1% level	-3.565430
	5% level	-2.919952
	10% level	-2.597905

Table 2. Results of Unit root test Author's calculations

So the DTR series is not stationary because the value of student statistics is -0.0805, greater than the critic value of the unilateral hypothesis. As for the difference series of DTR the value is -18.338 which is less than the critical value of the basic hypothesis as a result the hypothesis stays. So the DTR series is not stationary and a difference is not sufficient to return it to stationary and therefore it is called as first order integral series I(1).

3.3 Estimation of the model

Referring to the criteria mentioned above, time series of the tourism demand is a non-stationary first order variable, ARIMA(p, 1 , q). In the previous paragraphs we showed that this series has seasonal effects and therefore the generalized form of tourism demand model is SARIMA(p,1,q)(P,D,Q)$_{12}$. The general form of this model in the language of the backwards operator is:

$$(1-\Phi_1 B^{12}-\Phi_2 B^{24}-....-\Phi_P B^{12P})(1-B^{12})^D(1-B)\cdot$$
$$\cdot(1-\varphi_1 B-\varphi_2 B^2-...-\varphi_p B^p)DTR_t=$$
$$=(1+\Theta_1 B^{12}+\Theta_2 B^{24}+..\Theta_Q B^{12Q})(1+\theta_1 B+.....+\theta_q B^q)u_t$$

When ut is white noise, ut~WN(0,σ^2).

For the selection of the model will use selection criteria models: AIC, BIC and SBQ

Akaike Info Criterion (AIC) is an honor the most important criteria used for selection of models. This criterion was published for the first time by Hirotsugu Akaike in 1974. This criterion provides a relative measure of lost information of a model that attempts to describe reality

In the general case AIC criterion computes the following formula: AIC = 2k - 2ln (L)

Where k is the number of independent variables of the model, and L is the maximum value of the function of likelihood of that model.

BIC criterion was developed by Gideon E. Schwarz, who used a Bayesian argument for its adoption. BIC criterion is an asymptotic result that is derived under the assumption that the distribution of the data found in the exponential family. The formula for BIC criterion is:

BIC = - 2 ln L + k ln (n).

The model selected based on the criteria of selection of models AIC, BIC and SBQ is:

MODEL FINALLY CHOSEN:

SARIMA(0,1,1)(0,1,1)

WITHOUT MEAN

The estimated model is given in the table below:

METHOD OF ESTIMATION: EXACT MAXIMUM LIKELIHOOD

PARAMETER	ESTIMATE	STD ERROR	T RATIO	LAG
MA1	1	-.58485	0.12975	-4.51
1				
MA2	1	-.58049	0.14620	-3.97
4				

Table 3 The Estimated Model SARIMA
Author's calculations

Since a model to be good for predictions that his errors should be white noise, for this quantitatively analyze it. The results for the errors of the model are:

TEST-STATISTICS ON RESIDUALS

MEAN= -0.0184495
ST.DEV.= 0.0140996
OF MEAN
T-VALUE= -1.3085
NORMALITY TEST= 2.551 (CHI-SQUARED(2))
SKEWNESS= 0.5197 (SE = 0.3499)
KURTOSIS= 3.4110 (SE = 0.6999)
SUM OF SQUARES= 0.4939969
DURBIN-WATSON= 2.0620
STANDARD ERROR= 0.1025211
OF RESID.
MSE OF RESID.= 0.1051057E-01

Table 4. Statistics of errors. Author's calculations

Skewness and kurtosis results for almost are near zero and 3, one thing is also supported by Statistics Jarque-Bera.

The Statistics Jarque-Bera is:

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$$JB = \frac{n}{6}\left[S^2 + \frac{(k-3)^2}{4}\right] \sim \chi_2^2$$

IF the value of JB is greater than the critical value of Hi-square distribution then the basic hypothesis reject. The statistics is JB = 2551 which indicates that the model Residual have normal distribution. So the remains of the model are white noise so it can be used projections.

If we use the model for predictions for two years following predictions:

2014-4	1582407.687
2015-1	932714.4
2015-2	1264797.6
2015-3	1903398.53
2015-4	1587231.926
2016-1	935626.2
2016-2	1268670.8
2016-3	1909091.31

The chart below forecasts given for the request for tourism in Albania obtained from the estimated model.

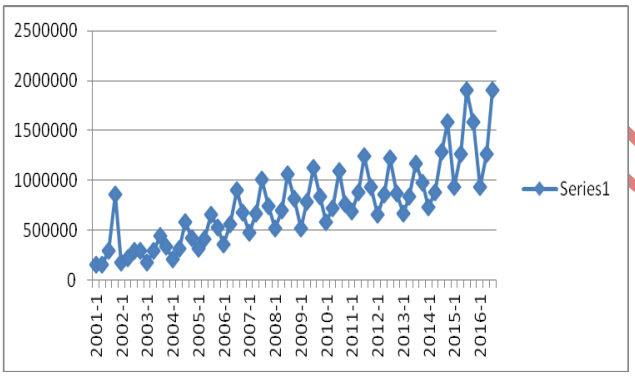

Figure 3 Forecast of demand for tourism

4. CONCLUSIONS

After analyzing the data on quarterly basis, the demand for tourism in Albania, was discovered that the series was non-stationary, unitary root test resulted in a series I (1). After analyzing some of SARIMA models and comparing them based on three criteria, it returns that the most appropriate model for the demand for tourism in Albania is SARIMA(0,1,1)(0,1,1) with quarterly seasonally. The model confirms that in Albania continues to dominate coastal tourism even though this country has many beautiful mountainous places and with a rich history. An obstacle for tourism is the infrastructure which still remains far from a true standard.

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