Mariana C. JUGANARU
Kamer Ainur M. AIVAZ
Ion Danut I. JUGANARU
Ovidius University of Constanta

SIGNIFICANT MOMENTS IN THE HISTORY AND EVOLUTION OF THE TOURISTIC CITY OF CONSTANTA AND ANTICIPATION OF THE NUMBER OF ARRIVED TOURISTS USING THE ARIMA MODELS

Empirical study

Keywords
Tourists' arrivals,
Autoregressive models,
Previsions

JEL Classification
C10, C21, C53, M21, J63, Y32, Z33

Abstract

For the Romanian economy, Constanța is appreciated mainly because it is the biggest port town in the country, and for many generations it has been the city where they spend many of their summer holidays. But how many of us know that the bathroom resort – Constanța has an officially attested existence of 140 years? In this study, the aim is, on one side, to present the significant moments in the history and evolution of this historic city, in order to bring to the foreground and sustain the position that the city has at the present moment in the system of touristic spots on the Romanian seaside, and on the other side, our concern is to know the future evolution of the touristic activity, to make some previsions using the ARIMA models, for one of the most used indicators in the analysis of touristic circulation, respectively: the number of arrivals of tourists, structurally and totally: Romanian and foreigners. We think that the obtained results, applying these models, may be considered a solid base for different debates regarding the choice of an efficient strategy, that should allow reaching an equilibrium between the effort of attracting a number of tourists as big as possible (Romanian and foreigners), of growing their degree of satisfaction towards the touristic offer and the concern of not generating disruptions in the economic, social and cultural life of the city.

INTRODUCTION

Within our concerns of analyzing the touristic activity, we selected and tested different econometric models that should allow us to make a quantitative research of the touristic market, but at the same time, also offer us a base of information for different qualitative interpretations. In a previous study, made by the same group of authors, it has been noticed that, in 2015, the bigger values of the indicators " tourists' arrivals (total number, Romanian and foreigners) and "overnight staying (total number, Romanian and foreigners)" were registered in 3 cities/touristic spots: Mamaia, Constanța and Eforie Nord. The mentioned study aimed to highlight some differences or/and resemblances between the 17 cities and touristic spots of the Romanian seaside (Năvodari, Mamaia Sat, Mamaia, Constanța, Eforie Nord, Techirghiol, Eforie Sud, Costineşti, Neptun, Olimp, Cap Aurora, Jupiter, Venus, Saturn, Mangalia, 2 Mai şi Vama Veche). In the mentioned study, we used a database referring to the main indicators of the touristic circulation in 2015 (tourists' arrivals, overnight staying and the duration of the stay in average, in each of the 17 cities/touristic spots), that we analyzed using the ACP method – analysis of main components. (Juganaru.M., Aivaz.K., Juganaru.D., 2016). Our next aim in our activity of research is to test, for these frst three cities/touristic spots, the ARIMA models, in order to anticipate the evolution of the indicator „number of tourists" and, at the same time, to evaluate the possible consequences that may appear after this evolution, as well as their impact on the economic and social life of the city. We started the series of studies concerning the anticipation of the evolution of the number of tourists with Mamaia, the reason of choosing it is because Mamaia is situated on the first place in the mentioned ranking, but also because Mamaia celebrated on the 28th of July 2016, 110 years of existence. The present study analyzes the touristic city of Constanța, which was situated on the second place, in 2015, regarding the values of the indicators of touristic circulation registered by the 17 cities and touristic spots of the Romanian seaside.

SIGNIFICANT MOMENTS IN THE HISTORY OF 140 YEARS OF THE TOURISTIC CITY OF CONSTANȚA

In order to understand the history of the touristic activity in Constanța, we think it is necessary to discuss several aspects in the history of this city. On their way, the Greek shippers were attracted by the shelter offered by a peninsula (shaped as trapeze, with the small base towards the sea, being surrounded from three parts by water) and the golf that formed a natural port on the Western shore of the Black Sea and formed a Greek colony, Tomis, beginning with the 6th century before Christ.(Păuleanu, 2006). The citatel of Tomis (as Histria and Callatis) was organized after the model of the urban civilization in the Antic Greece. The trades of goods started early. Part of the local agricultural production (expecially wheat) starts slowly to leave the port of Tomis towards the overpopulated citadels from the entire basin of the Aegean Sea. Then, the trade backwards develops as well (wine, oil and ceramic pots). (Păuleanu, 2006). As the trade intensified, the first changes in the port emmerged, in the 4th-3rd century before Christ. The maritime trade gets, step by step, to connect Tomis with important centers, as: Bizant, Apollonia, Athens, Rhodos, Thasos, Cos. The role of commercial ways, drawn in Antiquity, meant not only changing products, but also changing influences, knowledge, mentalities and cultures. Also, these exchanges maintained in all the history of the city, giving Constanța the image of „mix of cultures and civilizations, with a portual and edilitary structure – Greek, Roman, Byzantine, Ottomane, and finally, Romanian. The city has shown, across time, a true „vocation of survival".(Păuleanu, 2006)

After the year 46 after Christ, Dobrogea and the Greek citadels entered the military surveillance of the Ottoman Empire, a domination of 7 centuries, which, for Tomis, meant a period of development and modernization. Being raised to the rank of metropolis of the Left Pont, Tomis had a particular shining, as a city and as a port. Its development continues after conquering of Dacia (101-102 and 105-106) by the Romans. The invasions of the 3rd century follow in history, which affected Tomis, the pontic regions becoming a passing hall for strings of migrating peoples. In certain periods, in the chronics of the time, Tomis is not even mentioned, which shows that the city was nearly destroyed. Then, in the 13th and 14th centuries, the Genovese and Italians make incursions with a trading aim on the pontic shore. Being attracted by the economic potential of Tomis, they contributed to its development. Tomis gets to be considered the biggest port in the Black Sea and Oriental Europe. A long period of Ottoman ocupation followed (1417-1877), when the Danubian and pontic ports closed for European trade. Tomis decades to a small fair, destroyed also by the war with the Russians, in 1828 (Păuleanu, 2006).

The economic deveopment triggered the touristic development

The geographic position, as well as the economic and social flourishment in older times, made Tomis known in the world, becoming attractive and tempting for international trade. The

economic development, in the modern period of Constanța (and the region of Dobrogea), started approximatively around 1860, after the Ottoman administration charged an English company with the exploitation of the port and buiding a railway line between Constanța-Cernavodă (Duployen, 1933; Păuleanu, 2006). Constanța was seen as a point of economic connection (and not only) between the East and the West. The idea of linking Cernavodă with Constanța had aroused the interest of different business men and foreign institutions, a long time before. Beginning with 1837, the English man Wilson proposed that the city of Cernavodă should be connected with the Black Sea through a channel. The project, almost ready to be applied, was abandoned in 1855 because of the war. (Păuleanu, 2006). Ion Ionescu de la Brad makes, in 1850, the first Romanian project for the channel towards the sea. (Ionescu de la Brad,1855; Păuleanu, 2006). In 1855, the French government sends dr. Camille Allard, ing. Leon Lalanne şi Jules Michel, to establish a way of comunication between Danube and the Black Sea. (Mircea,1906; Păuleanu, 2006). In the construction of the railway station there were involved, besides English specialists, also business men and financiers from London, Manchester, Newcastle, Nottingham. The same English company got involved later on in the development projects of the port, but also in linking it to the railway station, in order to prove its efficiency. (Păuleanu, 2006). The construction of the railway station started in 1858, and the work was inaugurated on 22nd of September/ the 4th of October 1964. Truly important for the economic development was also the construction of the bridge over the Danube river. The first studies were made in 1879, the construction began in 1890, after the projet of the engineer Anghel Saligny, and the inauguration of the bridge took place in September 1895. (Păuleanu, 2006). These investitions meant the fast development of the activity from various sectors of the national and local economy, implicitly of the touristic activity, through investitions and the development of new touristic points on the seaside, the growth of the number of tourists, the growth of the incomes from the touristic activity and also the improvement of the social and cultural life. Works involved the coming in the city of a great number of specialists: English engineers, German mechanics, Italian bricklayers, Armenian workers, Greeks, Turkish people, Bulgarian, Russian people but also Italian doctors, Greek and Armenian traders. In this context, besides the mentioned investitions, the process of building new houses began(for the workers arrived in Constanța, but also for the locals), new hotels (by the Greeks), of new commercial centers (administrated by Armenians), founding exportation companies, different companies that, through their activity, intended to satisfy the needs related to a new dimention of the economic and social life. (Duployen, 1933; Păuleanu, 2006). Changing the geo-political conjuncture, after the half of the 19th century (the union of Moldavia with the Romanian Country in 1859 after Dobrogea became part again of the Romanian state in 1878, after almost 500 years of Ottoman ocupation, and later, the Great Union from 1918, with Transilvania) had positive consequences for the development, from any perspective, of Dobrogea and Constanța (Păuleanu, 2006). Concerning the perception and description of Constanța,we can remark that, obviously, in the modern history of the city, there has always been made the association between the activity of the port and the touristic activity. Therefore, in 1896, we find the information according to which the city hall decides the founding of an embelishment comission of the city, „because Constanța had important balneary and portuary functions" (Constanța,1897; Păuleanu.2006). The city is peceived, in 1899, as a „very important balneary station", and in a report sent to the King Carol I, in 1903, by the Interior Minister, Constanța is considered a „first maritim port of the country and the most important balneary station" (Păuleanu,2006).

Natural resources - the main factor in the formation of the touristic offer and demand for the balneary station Constanța

With the aid of a short enumeration (forced by the dimension of the study), of appreciations made along time by personalities from different scientific and cultural areas, our aim is to draw the attention upon the role of natural resources on the formation of the touristic offer when Constanța began to be considered a balneary station. So, in 1876, the English company, who was in Constanța to make the railway Constanța-Cernavodă and the modernization works of the port, brought Doctor Colin, a specialist fond of helio-marine cures, who was thrilled after analysing the chemical composition of the water. (Dobrogea Jună,1922; Păuleanu, 2006). The journals of the moment mention that in the summer of 1894, „ a great and distinguished number of people came from different parts of the country to visit our city, to breath the fresh air, refreshing and giver of health and life, but also the take maritim baths". ". (Aurora, 1894; Păuleanu, 2006). Later, in 1928, Constanța becomes a station known also in Europe, due to its natural resources (Dobrogea Jună, 1928; Păuleanu. 2006). Morfi Papastavru, an importat character, organizer of the cure establishment, said, in 1934, that the „**Modern Baths" (Modern Beach, n.n) were founded in 1876"** (Păuleanu, 2006). In a few years, the touristic offer diversifies depending on the resources of the area, but also on the differents

requests of the tourists. The journals of the moment inform (but also promote at the same time) about the variety of material endowments and services offered by the „Modern Baths", that could be used by the patients according to the doctors' prescription. Even from 1916, instalations with steam baths, medicinal ones, with mud from Techirghiol were functioning, and from 1924 the special instalation with hidro-theraphy is introduced (Păuleanu, 2006).

It can be said that in the development strategy of the station, the combination of the natural resources with the anthropical one was followed, and in a short period of time, the natural resourrces get to be better and better exploited, through founding real bases of treatment. At the same time, we can notice changes in the tourists' behaviour, regarding the tendency of spending the summer holiday at the seaside, which can be framed as the „fashionable" thing to do in those times. On the 14th of August 1887, Delavrance wrote for the newspaper „The Romanian", that a lot of people from Bucharest, from upper socio-professional categories, preferred to go to Constanța „...to spend there the last days of their holiday. After the air of the mountains, the salted air of the sea." (Ștefănescu Delavrancea, 1972; Păuleanu, 2006).

The balneo climateric station of Constanța

We didn't find, in our research, any information regarding the moment when the touristic activity began in Constanța and when the city was recognized as a „balneo-climateric" station, but only the mention that, beginning with the Turkish administration in Constanța, baths in the sea were an usual thing on the coast, under the clear sky and in the huts, on the South-Eastern coast .(Dacia, 1924; Păuleanu, 2006). But in 1892, the existence of the „regulations of the balneo-climateric station of Constanța" is mentioned, made by the city hall and approved by the Internal Ministry. (Păuleanu, 2006). The oficial status of the city is offered by the Minister of Health and Social Protection, who said, in December 1927,that „the city of Constanța, with the beach at Mamaia, the Constanța county, is declared a balneo-climaterc station and enjoys the rights and duties that come with the status." (DJAN. 1939; Păuleanu, 2006). The activity of the station in appreciated in 1928, when the city hall receives the gold medal at the Balneo-Climateric Exposition, and, also in 1928, Constanța hosts the 5th International Congress of thalassotheraphy, where many foreign scientists participated. (DJAN. 1928, în Păuleanu. 2006). In order to understamd the quote „Constanța having the beach at Mamaia", we mention that after the works of modernization of the port began, the beach „At the vineyards" (in the South of the city) was abolished and a new one was founded, in the North of Constanța (beach that will later become the Mamaia station). In 1904, the engineer Anghel Saligny forms the development strategy:" In order to be successful as a balneary station, Constanța should have a beach nearby, where the visitors of the baths may spend the whole day and even live in the summer houses, near the sea, thing necessary primarily for the children and, as it is the case of foreign famous beaches, as Ostende, Scheveningen and others more" (http://Constanța-imagini-vechi.blogspot.ro).

But even in these conditions, it seems that the problems of the beach in Constanța weren't solved entirely..."the beach of Mamaia can only be considered a luxury beach and its status will remain this and, therefore, another solution must be found." (Dacia. 1928, în Păuleanu. 2006). It can be understood that, through the development of the beach in Mamaia (and later on, of the entire station), the problem of restraining the touristic activity in Constanța was never considered and implicitly, the improvement of the beaches in the city was never renounced at.

Appreciations of the evolution of the touristic market in Constanța

The analysis of the touristic market requires the use of specific indicators, which, most of the times, are expressed physically, in order to reflect a quantitative dimension of the market. A particular aspect of our study is that we used a series of information of a qualitative nature, from different publications, referring at the modern history of the city of Constanța, in order to conclude or support quantitative aspects regarding the touristic activity. In the research that we made, we found only few valoric mentions about the touristic circulation/demand in that period. So, if in 1881, it is mentioned that at „the baths", at Constanța, 250 families came and „every day brings new guests" (L"Independance Roumaine. 1881, p.2, în Păuleanu. 2006), in 1909, the following information is registered:" during the season or per month, approximatily 730 families are established, around 2500 people, and the population that takes the train for pleasure (that was the name of the train on the route Bucuresti-Constanța) for a short time is 5000 people". (DJAN.1911, f.3 în Păuleanu. 2006) The growth of the number of tourists (as it can be unserstood from the mentioned presentations) intensified the concern of building new hosting places. For the indicator „hosting capacity" (which expresses the touristic offer), the documents from the end of the 19th century and the beginning of the 20th century are more generoues, because there are both qualitative and quantitative information. In 1880, at Constanța, there were 3 hotels built and together

with the 2 already existent ones, they meant a hosting capacity of 100 rooms. At the end of 1881, another hotel was to be finished, with 75 rooms". (L"Independance Roumaine. 1881, în Păuleanu. 2006). Moreover, besides the hotels, we can mention the existence of the hans (some of them were functioning even in the time of Turkish administration). If the entire hosting capacity was in 190, of 13 hotels (Viitorul Dobrogei. 1910, în Păuleanu. 2006), in 1926 we are reminded of the existence of a number of 26 hotels, in the next structure: luxury – 3 units; 1st class – 3 units; 2nd class – 7 units; 3rd class – 13 units. (DJAN. 1926, în Păuleanu. 2006). Based on this information, about the capacity and the structure of the hosting units, we can appreciate more or less the evolution of the touristic market. Until the 1st World War, it registered a continuous growth, quantitatively and qualitatively and the process of segmentation of this market becomes more and more obvious (we can say that there were different segments of tourists formed after several criteria: social class, the type of income, the aim and duration of the trip etc). (Jugănaru.1998) During the interwar period, Constanța continued to be a touristic attraction for foreign and Romanian tourists. Once the 2nd World War started, the social and political conjuncture of the country changed radically, and we cannot talk anymore about the touristic activity at the seaside. The move to the socialist economic system, triggered, especially after the 60s, a great development process of the existent stations, but also a process of building new ones in the South of the Romanian seaside. When the economic and political systems changed, in 1990, there were 3 known hotels in Constanța, with permanent activity, and shortly after, one of them was demolished. Hotels in Mamaia were used also for satisfying the hosting request existent in the touristic city of Constanța. Together with the development of the economic activity, and through moving to a new way of approaching and development of business, the construction of new hotels begins so that, in 2015, 59 hosting units are available, with a capacity of 3997 places, that assure adequate conditions for the demands of the development of several types of tourism: business, cultural-educational, holiday and sporting one.

THE METHODOLOGY OF INVESTIGATION

It has been noticed that, in the economic practice, the economic variables (as the number of tourists' arrivals), besides the important influences that they suffer because of some factorial variables (as, for instance: the level of the prices, the level of the incomes, the rate of inflation, rate of exchange), they also suffer because of their autoregressive characters, based of the memoration of their previous behaviour. Mainly, the autoregressive effect is emphasized, more or less, by the way the actual level of the analyzed variable is influenced by its previous levels, the gap in time of the influences having different values. The interested economic subjects in the formulation of some predictions with a high degree of acuracy, in other words, those interested in the quantitative aspect of the modifications emmerged in the studies variable, follow sistematically this evolution, orienting themselves for the estimation of the anticipated level of the variable having its level in the previous periods. This sort of relationship can be studied with the aid of autoregressive models by several orders. An autoregressive model requires a connection between the current level of the studied variable and its previous behaviour.

In econometry, in order to modelate the series of time, we use several types of stochastical models: autoregressive models (AR), medium mobile type models (MA) and models composed based on these (ARIMA). The variables have a strong innertial character, the actual values of the variable being influenced by the past evolution of the phenomena (the autoregressive component), and the shocks produced on them are quantified by the medium mobile type variable. (Gujarati, D.,2003).

Bob and Jenkins (1976) elaborated a general methodology, in order to make forecasts for the univariated series of time. These specialists figured out that the majority of the series of time are unstationary, but they can be modelled using integrated models and medium mobile ones (ARIMA).

By applying the methodology Box-Jenkins, in our study, we will estimate a model for every analyzed series of time (for each variable) and we will make forecasts for two consecutive years (2016,2017).The steps necessary for an estimation of an ARIMA process(p,d,q), using the Box-Kenkins models are the following: testing the stationarity of the series; identification of the type of model; estimation of the parameters of the model; validation of the model; making forecasts based on the chosen model (Asteriou, D., Hall, S., 2011).

DATA, RESULTS AND DISCUSSIONS

The database used is taken from the National Institute of Statistics – INS, Center of Statistics in the county of Constanța and contains indicators of the touristic circulation from 2006-2015 for the touristic city (the county) of Constanța. (See table 4.1). We mention that the indicators: „**total number of tourists' arrivals/Romanian/foreign", „total number of overnight staying/Romanian/foreigners" and the „total medium stay/Romanian/foreigners"** are considered specific indicators of the touristic

circulation both for internal and international tourism. (Minciu, 2005; Jugănaru,2007). It must be mentioned that these are physical indicators and they express only the quantitative dimension of the touristic demand. Because we cannot make in just one study (because of the restrictions related to the dimension of its publication) the forecast of all the mentioned indicators (which would require the elaborations of nine econometric modelations), we chose that, in the present study, we should make only the forecast of the indicator "tourist arrivals" in the three forms of statistical registration, respectively: total number of tourist arrivals, arrivals of Romanian tourists and arrivals of foreign tourists.

The processing of data was made with the aid of E-views. Because the used series were un-stationary, we used several statistic tests, in order to transform them into stationary series. After applying those tests, the series have become stationary and integrated in the first order; therefore, in order to determine ARIMA, we used the Box-Jenkins procedure; afterwards, the performances of the chosen model ARIMA were verified based on the classic statistic tests. The last step of the study regarded the making of forecasts for 2016 and 2017.

1.1. Modelation of the variable „total number of tourists"

a. Testing the stationarity of the series of time

In order to test the stationarity of the series of time, we apply the tests Augmented Dickey-Fuller and Phillips-Perron. The results obtained and presented in the tables 4.2 and 4.3 indicate the fact that the series of time is unstationary (the probability afferent to the t-Student test is bigger than the signification threshold of 5%), but, by applying the operator „-„ the null hypothesis is validated, the series of time becoming stationary after the first differentiation (d=1), for a relevance level of 10%. (Dickey, D., Fuller, W.,1979).

b. Identification of the type of model

From the table 4.4, we can determine the p and q parameters from the graphic of autocorrelation and partial correlation functions of the stationary series, keeping in mind that:
-the autocorrelation function decreses suddenly towards 0, after the first term, anticipating a MA(1) type process.
- the value of partial autocorrelation function decreases towards 0 starting with the second term, so it is recommended an AR(1) process type.
Concluding, the order of the autoregressive component is p=1 and the order of the medium mobile component is q=1. (Engle, R.,1982).

c. Criteria of choosing the best model

Based on the results obtained in the previous step, we analyzed several autoregressive models, integrated and medium mobile, according to the values of the indicators p and q. The parameters of the model are estimated through the method of the smallest squares. According to the values of the informational criteria that are emphasized by the values of the determination report (column R^2 ***from*** table 4.5) and keeping in mind the differentiation of the series from the previous step, in order to modelate the initial series of time, the ARIMA (1,1,1) specification is chosen.
The ecuation of the ARIMA (1,1,1) model is the following:

$$\Delta \mathbf{Y_t = 11.34 + 1.546\ \Delta\ Y_{t-1} + 0.837\ \varepsilon_{t-1}}$$

where Y_t = logarithm of the analyzed variable

d. Testing the validity of the ARIMA model (1,1,1)

In order to appreciate the quality of the econometric process, which means the validity model, we analyzed a series of aspects related to: testing the parameters of the models (table 4.6), testing the hypothesis according to which the average of errors is null (table 4.7), testing the hypothesis of homoscedasticity (table 4.8), testing the hypothesis of normality of the models (tabel 4.9), testing the hypothesis of un-correlation of the errors (table 4.10).
The results obtained after the tests were made indicate the following:
-Because the value of the probability of the test t is bigger than the chosen significance threshold of 0.05%, we accept the hypothesis according to which the average of the errors is null.
-Because the value of the probability associated to the Chi-square test is bigger than 0.05%, we accept the homoscedasticity hypothesis, with a probability of 95%.
-because the probability associated with the Jarque Bera test is bigger than 0.05%, we accept the null hypothesis according to which the series is normally distributed.
-According to the correlogram of the errors, we notice that there isn't a serial autocorrelation of the errors until lag 8, because the probability associated to the test for each gap is bigger than the value of the significance threshold.

e. The forecat of the analyzed series of time

In our study, in order to test the capacity of the estimated model of forecasting the evolution of the variable „total number of tourists" based on the real recorded data, we used the dynamic forecast variant (*out-of-sample*). (Brooks, C., 2008)
We made a forecast that comprises the annual values of the variable for the period 2016-2017.

In table 4.11, there are emphasized the forecasted values of the variable „total number of tourists" in the city of Constanța, for the period 2016-2017.

The forecasted growth of the total number of tourists, in the touristic city of Constanța, should be of 217024 tourists, in comparison with 2015, year when the biggest level of this indicator was registered in the analyzed period, 2006-2015, respectively 188347 tourists. The forecasted value indicates a growth of 15.22% of this indicator. A new aspect for Constanța is that in the season 2016, after the rehabilitation works, the tourists enjoyed larger areas, generous from the point of view of the beaches. For 2017, the forecasted value is 337852 tourists, which represents a growth in comparison with the values of the indicator in 2006 and 2015.

1.2. Modelation of the variable „number of Romanian tourists"

a. Testing the stationarity of the series of time

The results obtained and presented in the tables 4.12 and 4.13 indicate the fact that the series of time is unstationary (the probability afferent to the t-Student test is bigger than the signification threshold of 5%), but, by applying the operator „-„ the null hypothesis is validated, the series of time becoming stationary after the first differentiation (d=1), for a relevance level of 5%.

b. Identification of the type of model

With the aid of the data from the graphic of autocorrelation and partial correlation functions of the stationary series (table 4.14) , we can determine the p and q parameters from the graphic of autocorrelation and partial correlation functions of the stationary series, keeping in mind that:
-the autocorrelation function decreses suddenly towards 0, after the first term, anticipating a MA(1) type process.
- the value of partial autocorrelation function decreases towards 0 starting with the second term, so it is recommended an AR(1) process type.
Concluding, the order of the autoregressive component is p=1 and the order of the medium mobile component is q=1.

c. Criteria of choosing the best model

According to the values of the informational criteria that are emphasized by the values of the determination report (column R^2 ***from*** table 4.15) and keeping in mind the differentiation of the series from the previous step, in order to modelate the initial series of time, the ARIMA (1,1,0) specification is chosen. The values of the informational criteria ***(Akaike, Schwarz, Hannan-Quinn)*** for the analyzed period are indicated in table 4.14.
The ecuation of the ARIMA (1,1,1) model is the following:

$$\Delta Y_t = 11.21 + 1.794\ \Delta Y_{t-1}$$

where Y_t = logarithm of the analyzed variable

d. Testing the validity of the ARIMA model (1,1,0)

The results obtained after the tests were made (tables 4.16, 4.17., 4.18, 4.19, 4.20) indicate the following:
-Because the value of the probability of the test t is bigger than the chosen significance threshold of 0.05%, we accept the hypothesis according to which the average of the errors is null.
-Because the value of the probability associated to the Chi-square test is bigger than 0.05%, we accept the homoscedasticity hypothesis, with a probability of 95%.
-because the probability associated with the Jarque Bera test is bigger than 0.05%, we accept the null hypothesis according to which the series is normally distributed.
-According to the correlogram of the errors, we notice that there isn't a serial autocorrelation of the errors until lag 8, because the probability associated to the test for each gap is bigger than the value of the significance threshold.

e. The forecat of the analyzed series of time

In our study, in order to test the capacity of the estimated model of forecasting the evolution of the variable „number of Romanian tourists" based on the real recorded data, we used the dynamic forecat variant (*out-of-sample*). We made a forecast that comprises the annual values of the variable for the period 2016-2017.
In table 4.21, there are emphasized the values forecasted of the variable „number of Romanian tourists" in the city of Constanța, for the period 2016-2017.
The forecasted value of the number of Romanian tourists in 2016 in Constanța is of 198763 tourists. In comparison with season 2015, when a number of 159937 toursits was registered, we remark a growth of 24.27%. The forecasted value for 2017 shows that the number of Romanian tourists will grow, breaking the levels from 2016 and 2015.

1.3. Modelation of the variable „number of foreign tourists"

a. Testing the stationarity of the series of time

The results in the tables 4.12 and 4.13 indicate the fact that the series of time is unstationary (the probability afferent to the t-Student test is bigger than the signification threshold of 5%), but, by applying the operator „-„ the null hypothesis is

validated, the series of time becoming stationary after the first differentiation (d=1), for a relevance level of 10%.

b. Identification of the type of model

With the aid of the data from the graphic of autocorrelation and partial correlation fuctions of the stationary series (table 4.24) , we can determine the p and q parameters from the graphic of autocorrelation and partial correlation functions of the stationary series, keeping in mind that:

-the autocorrelation function decreses suddenly towards 0, after the first term, anticipating a MA(1) type process.

- the value of partial autocorrelation function decreases towards 0 starting with the second term, so it is recommended an AR(1) process type.

Concluding, the order of the autoregressive component is p=1 and the order of the medium mobile component is q=1.

c. Criteria of choosing the best model

The values of the informational criteria ***(Akaike, Schwarz, Hannan-Quinn)*** for the analyzed models are indicated in the table 4.25. According to the values of the informational criteria that are emphasized by the values of the determination report (column R^2 ***from*** table 4.25) and keeping in mind the differentiation of the series from the previous step, in order to modelate the initial series of time, the ARIMA (1,1,1) specification is chosen.

The ecuation of the ARIMA (1,1,1) model is the following:

$$\Delta Y_t = 10.05 + 0.240\ \Delta Y_{t-1} + 4.848\ \varepsilon_{t-1}$$

where Y_t = logarithm of the analyzed variable

d. Testing the validity of the ARIMA model (1,1,1)

The results obtained after the tests were made (tables 4.26, 4.27., 4.28, 4.29, 4.30) indicate the following:

-Because the value of the probability of the test t is bigger than the chosen significance threshold of 0.05%, we accept the hypothesis according to which the average of the errors is null.

-Because the value of the probability associated to the Chi-square test is bigger than 0.05%, we accept the homoscedasticity hypothesis, with a probability of 95%.

-because the probability associated with the Jarque Bera test is bigger than 0.05%, we accept the null hypothesis according to which the series is normally distributed.

-According to the correlogram of the errors, we notice that there isn't a serial autocorrelation of the errors until lag 8, because the probability associated to the test for each gap is bigger than the value of the significance threshold.

e. The forecat of the analyzed series of time

In our study, in order to test the capacity of the estimated model of forecasting the evolution of the variable „number of foreign tourists" based on the real recorded data, we used the dynamic forecat variant (*out-of-sample*). We made a forecast that comprises the annual values of the variable for the period 2016-2017.

In table 4.31, there are emphasized the values forecasted of the variable „number of foreign tourists" in the city of Constanța, for the period 2016-2017.

The value obtained from the econometric modelation is of 24000 foreign tourists for 2016. In comparison with 2015, when a number of 28410 foreign tourists was registered, it should be registered in 2016 a decrease of 14.57% of the number of foreign tourists in Constanța. The forecasted value for 2017 indicates a growth, in comparison with the value from 2016, but it remains smaller than the value registered in 2015 year when this indicator had the biggest value in the entire analyzed period: 2006-2015. An explanation for this particular situation is the fact that in 2015, representants from a publicity agency from abroad came several times in order to make a commercial movie, and the shootings , where a great number of foreign tourists hosted in Constanța were involved, took place at the Casino in Constanța.

CONCLUSIONS

Regarding our research of analysis of the touristic activity, we think that the ARIMA model is adequate, from a methodological point of view, to process the series of data (for the interval 2006-2015), using it leading to the elaboration of pertinent forecasts for the evolution of the indicator „number of tourists", in 2016 and 2017. The database, elaborated with the help of the ARIMA model, was taken from the National Institute of Statistics (INS) and represents the oficial data regarding the quantitative dimension of a part of the touristic demand. In these conditions, we must underline the fact that our study has some limitations. Firstly, we mention that in the analysis of the touristic market we should discuss its two main components, respectively: demand and touristic offer. (Jugănaru.2000). The oficial quantitative dimension of the touristic offer is expressed physically through the „hosting capacity", indicator that was not included in our study. Secondly, regarding the touristic demand, in the present study, we elaborated only the physical indicator „tourists arrivals" (total number/Romanian/foreign). Because of the

conditions relating to dimensions of the study, we did not include the other indicators too: „overnight staying"(total number/ Romanian/ foreign) and the „average stay" (total number/Romanian/ foreign). This is the reason why, in this study, we can not afford to make evaluations over some aspects regarding the future evolutions of the report between offer and demand, respectively to establish if there will be a touristic demand unsatisfied by the offer specific to every moment or if it will remain touristic offer uncovered in the interval 2016-2017, in Constanța. (Jugănaru,1998)

Moreover, we also mention that in this study, we elaborated the oficial values of this indicator referring only to the tourists hosted in the structures of touristic receival having clasiffied hosting functions. In reality, the value of the indicator „tourists' arrivals" is bigger, because, besides the tourists hosted in the clasiffied hosting structures, there are other tourists who are not registered, that are hosted by relatives, friends or even own a summer residence in Constanța. At the moment, there isn't a registration system of the number of tourists hosted in other spaces than the clasiffied ones. We can accept the idea that there are two different dimensions of the touristic market in Constanța: an official dimension (emphasized by the values from the statistical registrations of the indicators of the touristic circultion) and a real dimension, bigger than the official one, but which is not (at least, at the moment) registered.

We think that when we talk about the consequences, economically and socially, of the growth of the number of tourists, we should keep in mind that the forecasted values (obtained by applyig the ARIMA model) are smaller than the real ones. This aspect requires a clarification. On one side, we mentioned the two dimensions of the touristic market in Constanța and, on the other side, regarding the forecasting of the analyzed indicators, in the interval 2016-2017, we underline that the ARIMA model elaborated only the official values registered in the interval 2006-2015. In reality, in the evolution of the indicators of touristic circulation (at least for 2016), factors from the category of the random ones intervened. Juganaru, 2000), of a different nature: political and security factors (we mention here the emmergence of some political tensions between different European states, the emphasis of the immigration phenomena, the growth of insecurity in some areas/countries of Europe, as a consequence of the attacks from different European cities) and natural factors (natural disatsers: floods, earthquakes etc.)The ARIMA model did take into consideration when the forecasts were made, this action of the random factors. But in 2016, the action of the random factors was obvious and trigerred important changes in the touristic activity, in the flux of tourists. There were registered changes in the behaviour of the tourists regarding the criteria that influenced the choice of the holiday destination, for the Romanian tourists as well as for the foreign ones. Constanța and, actually, the entire Romanian seaside, represented a holiday destination that offered the tourists safe conditions. At these aspects, we should add the fact that the meteo conditions from the summer of 2016 were extremely favorable for spending the different forms of tourism, and the extended and modernized beaches from Constanța represented attraction factors for tourists. After the official data are published of the touristic circulation from 2016, we want to make a comparative analysis, in another study, between the forecasted aspects and the registered ones.

Even if we mentioned that our study must be interpretated with some limitations, we think that the forecasted tendency of growth of the total number of tourists, in 2016-2017, must be taken into consideration by the local administration, economic agents, cultural organizations, institutions of market economy, investors etc in establishing a general strategy of development in Constanța, with its traditions of a city with „portuary and touristic functions". In this strategy, it is necessary for all the mentioned entities to realize that, on one side, Constanța is a residence city for about 310.000 citizens, and on the other side, it is the place where a large range of economic activities takes place, the most developed portuary activity from the country and the 4th in Europe is manifested, it is un important universitary center, but at the same time, it is also the oldest touristic station from the Romanian seaside. We think that an approach based on the correlation of all the functions of Constanța would be helpful for its balanced development, under economic and social aspect. The growth of the total number of tourists in 2016-2017, but also for a longer period of time, is reflected quantitatively in the growth of the results of all the economic and uneconomic agents, but firstly of the ones that perform activities in tourism and activities correlated with tourism; opportunities for investors and antreprenours; the growth of incomes for the local budget; possibilities for new investments; the growth of work places, of the degree of occupation of the working force and the increase of incomes. It must be taken into consideration that the inaproppriate handling of the tendency of growth of the number of tourists, through the lack of a strategy of integration, can lead to the emmergence of different complaints from the tourists under different forms (over-crowding in the hosting units, in transportation means, in all kinds of commercial spaces, in parking spots, the decrease of the quality of touristic services etc). In this context, it would be possible that, at a certain moment, paradoxically, the number of tourists decreases.

Also, there can interfere disruptions of the social life of the rezident citizens. We consider that the quantitative development must be carefully analyzed and sustained by the development under qualitative aspect, that would require preocupations/activities that realize the growth of the degree of satisfaction of the specific desires of every segment of tourists. At the same time, knowing the forecasted values for 2016-2017, referring to the number of arrivals of Romanian and foreign tourists can be useful in the elaboration of the promoting strategies corresponding and differentiated for each of the 2 categories of tourists and the growth of the brand Constanța.

REFERENCE LIST

[1] AURORA, *Cronica locală* I, nr 1, Constanţa, 1sept.1894, p.4" în Păuleanu, D.
[2] Asteriou, D., Hall, S.,2011, Applied econometrics. Palgrave Macmillan
[3] Brooks, C., 2008, Introductory econometrics for finance. Cambridge University Press, New York
[4] Constanţa, V, nr.225, 12 oct.1897, p.3; în Păuleanu, D.
[5] Dacia, XV, nr.119 si 152, 1928, p.1; în Păuleanu, D.
[6] Dacia. - *Vizita Regală la bordul vasului "Sinaia*", XI, nr. 239-230, 1924, p.1-2; în Păuleanu, D.
[7] Dickey, D., Fuller, W.,1979, Distribution of the estimators for autoregressive time series with a unit root. Journal of
[8] Direcţia Judeţeană a Arhivelor Naţionale Constanţa, Dosar nr. 60/1939 f.22; în Păuleanu, D.
[9] Direcţia Judeţeană a Arhivelor Naţionale Constanţa, Dosar nr. 58/1928, f.113; în Păuleanu, D.
[10] Direcţia Judeţeană a Arhivelor Naţionale Constanţa, Dosar nr. 17/1911, f.3; în Păuleanu, D.
[11] Direcţia Judeţeană a Arhivelor Naţionale Constanţa, Dosar nr. 41/1926, f.79 şi Dosar nr. 9/1926,f.3 ; în Păuleanu, D.
[12] Dobrogea Jună, XVI, nr 216, 19 sept. 1922, p.1; în Păuleanu, D.
[13] Duployen, I. N. - *Constanța acum 100 de ani*, Dimineața,12 noiemb. 1933, p.100**,** în Păuleanu, D.
[14] Engle, R. 1982, Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica, Vol50, Nr.4, pp.987-1007
[15] Gujarati, D.,2003, Basic econometrics (fourth edition). McGraw-Hill Higher Education, New York
[16] Ionescu de la Brad, I.-*Românii din Dobrogea*, România Literară,nr.2, 8 ian.1855,p.2; în Păuleanu, D.
[17] Jugănaru, M.1998. *Teorie şi practica în cercetarea de marketing*. Bucureşti: Editura Expert
[18] Jugănaru, M. 2000. M*arketing*. Bucureşti: Editura Expert
[19] Jugănaru, I. D., 2007. *Politici şi strategii în turismul mondial*. Bucureşti: Editura Expert.
[20] Juganăru Mariana, Juganăru Ion Danuţ, Aivaz Kamer Ainur - *Quantitative Aspects Regarding The Tourist Trafic Indicators In The Human Settlements Located On The Blak Sea Coast*, The 9 Edition of the Internationsl Conferences Series of SEA (Share. Empower. Awareness.) - Cross-Cultural Diferences in Tourism, Sport and Leisure, Constanța, 8th to 9th July 2016, http://seaopenreserch.eu & Cross-Cultural Management Journal, Volume XVIII, Issue1(9) / 2016, pg. 65-75
[21] L"Independance Roumaine,V,nr 1171, Edition A, Bucarest,2/14 aout 1881, p.2; în Păuleanu, D.
[22] Mircea, A. - *Din geografia istorică a României*, Ovidiu,VI, nr 75-76, Constanţa, iulie-aug. 1906, în Păuleanu, D.
[23] Minciu,R.,2005.*Economia turismului*. Bucureşti :Editura URANUS
[24] Ștefanescu Delavrancea,B. - *Şapte zile la Constanţa*. Note constanţene, Memoriu"Pro Nasone" în B S D , Opere, VI, Bucureşti: Editura Minerva, 1972, p.113-121; în Păuleanu, D.
[25] Viitorul Dobrogei, II, nr.52, 31 ian. 1910, p.3; în Păuleanu, D.
[26] Păuleanu, D. 2006-*Constanţa 1878-1928. Spectacolul modernităţii târzii*, Vol I, Bucureşti: Editura ARCADE.
[27] http://constanţa-imagini-vechi.blogspot.ro/2012/07/mamaia-numele-unei-legende-partea-i.html

ANNEXES

Table 4.1 Evolution of the number of tourists in Constanța

Number	Year	Total number of tourists	Number of Romanian tourists	Number of foreign tourists
1	2006	93866	75608	18258
2	2007	98109	76405	21704
3	2008	105962	85293	20669
4	2009	92040	74201	17839
5	2010	88838	73073	15765
6	2011	95405	79286	16119
7	2012	104381	86690	17691
8	2013	108647	92069	16578
9	2014	124886	105883	19003
10	2015	188347	159937	28410

Source:INS

Table 4.2 Values of the test Augmented Dickey-Fuller

Logarithmed Variable	**t-statistic**	**Prob.**	**t-statistic (differentiated series)**	**Prob.**
Total number of tourists	-2.041	0.999	-1.703	0.0835

*critical value of the test ADF for a signifficance level of 5% is -3.25
*critical value of the test ADF for a signifficance level of 10% is -2.77

Source: own edit through E-views

Table 4.3 Values of the test Phillips-Perron

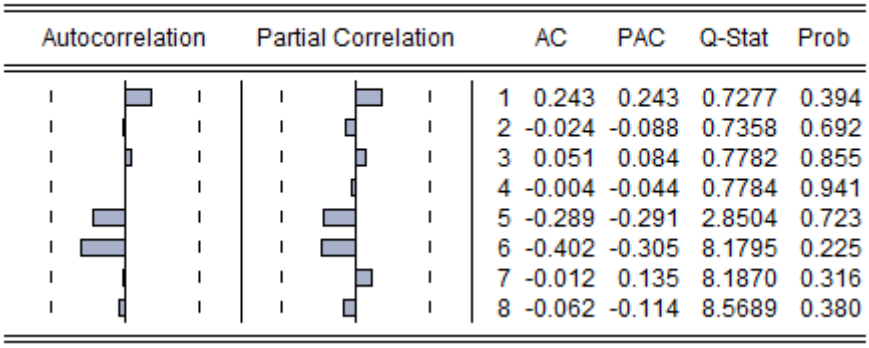
Logarithmed Variable	**t-statistic**	**Prob.**	**t-statistic (differentiated series)**	**Prob.**
Total number of tourists	5.338	1000	-1.618	0.0967

*critical value of the test ADF for a signifficance level of 5% is -3.25
*critical value of the test ADF for a signifficance level of 10% is -2.77

Source: own edit through E-views

Table 4.4 Autocorrelation and partial autocorrelation functions

Sample: 2006 2015
Included observations: 9



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.243	0.243	0.7277	0.394
		2	-0.024	-0.088	0.7358	0.692
		3	0.051	0.084	0.7782	0.855
		4	-0.004	-0.044	0.7784	0.941
		5	-0.289	-0.291	2.8504	0.723
		6	-0.402	-0.305	8.1795	0.225
		7	-0.012	0.135	8.1870	0.316
		8	-0.062	-0.114	8.5689	0.380

Source: own edit through E-views

Table 4.5 Values of the informational criteria

	R^2	AIC	Schwarz	Hannan-Quinn
ARIMA(1,1,1)	0.74	-0.94	-0.87	-1.08
ARIMA(1,1,0)	0.73	-1.10	-1.06	-1.20
ARIMA(0,1,1)	0.44	-0.47	-0.41	-0.54

Source: own edit through E-views

Table 4.6 Testing the coefficients of the model

Variable	Coefficient	t-Statistic	Prob.
C	11.34	41.78	0.0000
AR(1)	1.546	2.38	0.0500
MA(1)	0.837	3.081	0.0216

Source: own edit through E-views

Table 4.7 Testing the hypothesis according to which the average of errors is null

Test of Hypothesis: Mean = 0.000000

Sample Mean = -2.92e-13
Sample Std. Dev. = 0.118132

Method	Value	Probability
t-statistic	-7.41E-12	1.0000

Source: own edit through E-views

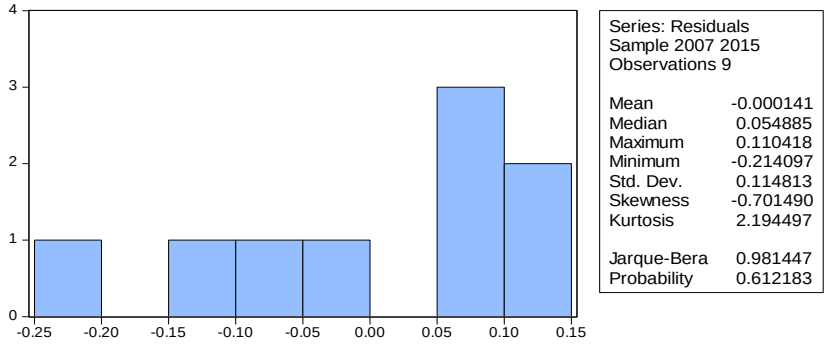
Table 4.8 Test ARCH

Heteroskedasticity Test: ARCH

F-statistic	0.129668	Prob. F(1,6)	0.7311
Obs*R-squared	0.169234	Prob. Chi-Square(1)	0.6808

Source: own edit through E-views

Table 4.9 Historiogram of distributions



Source: own edit through E-views

Table 4.10 Corelogram of errors

Included observations: 9
Q-statistic probabilities adjusted for 2 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.241	-0.241	0.7193	
		2	-0.094	-0.161	0.8440	
		3	-0.120	-0.202	1.0817	0.298
		4	0.248	0.160	2.2968	0.317
		5	-0.005	0.079	2.2973	0.513
		6	-0.360	-0.352	6.5795	0.160
		7	0.002	-0.161	6.5798	0.254
		8	0.070	-0.102	7.0614	0.315

Source: own edit through E-views

Table 4.11 The nominal forecasted values

Year	Total number of tourists forecasted by the ARIMA (1,1,0) model
2016	217024
2017	337852

Source: own edit

Table 4.12 Values of the test Augmented Dickey-Fuller

Logarithmed Variable	t-statistic	Prob.	t-statistic (differentiated series)	Prob.
Number of Romanian tourists	1.7023	0.966	-2.404	0.0248

* critical value of the test ADF for a signifficance level of 5% is -3.25
* critical value of the test ADF for a signifficance level of 10% is -2.77

Source: own edit through E-views

Table 4.13 Values of the test Phillips-Perron

Logarithmed Variable	t- statistic	Prob.	t-statistic (differentiated series)	Prob.
Number of Romanian tourists	1.5674	0.9582	-2.395	0.0252

* critical value of the test ADF for a signifficance level of 5% is -3.25
* critical value of the test ADF for a signifficance level of 10% is -2.77

Source: own edit through E-views

Table 4.14 Autocorrelation and partial autocorrelation functions

Sample: 2006 2017
Included observations: 9

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.177	0.177	0.3864	0.534
		2	0.034	0.003	0.4032	0.817
		3	0.056	0.051	0.4551	0.929
		4	-0.004	-0.023	0.4555	0.978
		5	-0.260	-0.266	2.1261	0.831
		6	-0.395	-0.343	7.2751	0.296
		7	0.027	0.163	7.3099	0.397
		8	-0.135	-0.137	9.1147	0.333

Source: own edit through E-views

Table 4.15 Values of informational critetia

	R^2	AIC	Schwarz	Hannan-Quinn
ARIMA(1,1,1)	0.73	-0.74	-0.68	-0.89
ARIMA(1,1,0)	0.78	**-1.19**	**-1.15**	**-1.28**
ARIMA(0,1,1)	0.44	-0.32	-0.26	-0.39

Source: own edit through E-views

Table 4.16 Testing the coefficients of the model

Variable	Coefficient	t-Statistic	Prob.
C	11.217	163.52	0.0000
AR(1)	1.794	5.11	0.0014

Source: own edit through E-views

Table 4.17 Testing the hypothesis according to which the average of erros is null

Test of Hypothesis: Mean = 0.000000

Sample Mean = -2.18e-13
Sample Std. Dev. = 0.113078

Method	Value	Probability
t-statistic	-5.79E-12	1.0000

Source: own edit through E-views

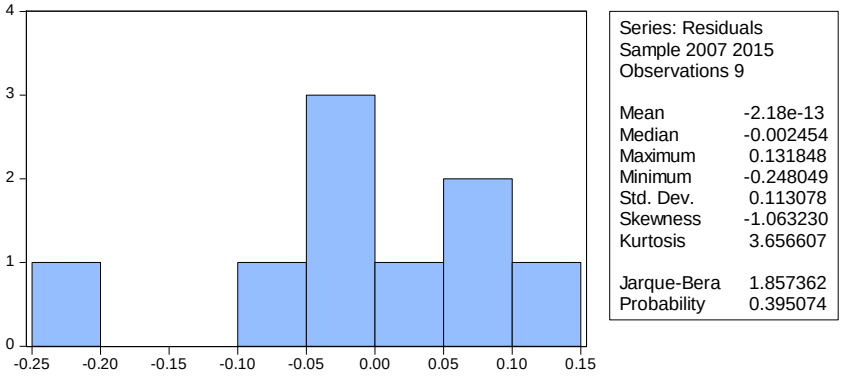
Table 4.18 ARCH test

Heteroskedasticity Test: ARCH

F-statistic	0.209555	Prob. F(1,6)	0.6632
Obs*R-squared	0.269977	Prob. Chi-Square(1)	0.6033

Source: own edit through E-views

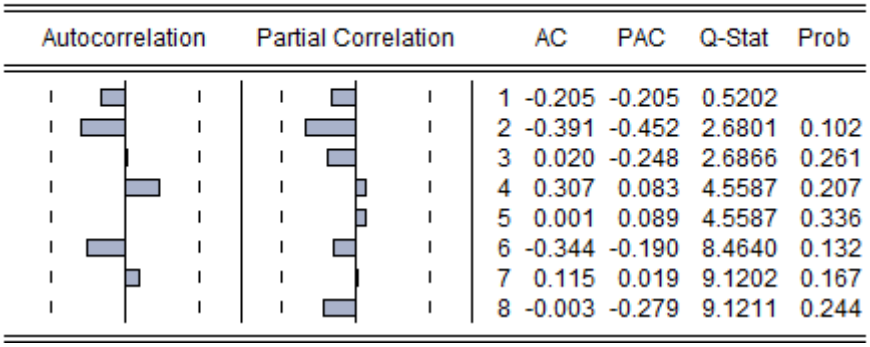
Table 4.19 Testing the hypothesis of normality of the errors



Source: own edit through E-views

Table 4.20 Correlogram of erros

Sample: 2007 2015
Included observations: 9
Q-statistic probabilities adjusted for 1 ARMA term(s)



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.205	-0.205	0.5202	
		2	-0.391	-0.452	2.6801	0.102
		3	0.020	-0.248	2.6866	0.261
		4	0.307	0.083	4.5587	0.207
		5	0.001	0.089	4.5587	0.336
		6	-0.344	-0.190	8.4640	0.132
		7	0.115	0.019	9.1202	0.167
		8	-0.003	-0.279	9.1211	0.244

Source: own edit through E-views

Table 4.21 Forecasted nominal values

Year	Number of Romanian tourists in Constanța forecasted by ARIMA (1,1,0) model
2016	198763
2017	296906

Source: own edit

Table 4.22 Values of the test Augmented Dickey-Fuller

Logarithmed Variable	t-statistic	Prob.	t-statistic (differentiated series)	Prob.
Number of foreign tourists	0.842	0.874	-1.692	0.085

* critical value of the test ADF for a signifficance level of 5% is -3.25
* critical value of the test ADF for a signifficance level of 10% is -2.77

Source: own edit through E-views

Table 4.23 Values of the test Phillips-Perron

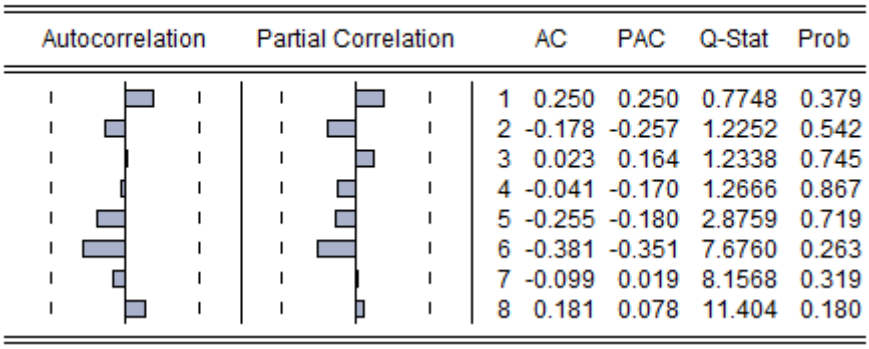
Logarithmed Variable	t-statistic	Prob.	t-statistic (differentiated series)	Prob.
Number of foreign tourists	0.842	0.874	-1.666	0.0890

* critical value of the test ADF for a signifficance level of 5% is -3.25
* critical value of the test ADF for a signifficance level of 10% is -2.77

Source: own edit through E-views

Table 2.24 Autocorrelation and partial autocorrelation functions

Sample: 2006 2017
Included observations: 9



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.250	0.250	0.7748	0.379
		2	-0.178	-0.257	1.2252	0.542
		3	0.023	0.164	1.2338	0.745
		4	-0.041	-0.170	1.2666	0.867
		5	-0.255	-0.180	2.8759	0.719
		6	-0.381	-0.351	7.6760	0.263
		7	-0.099	0.019	8.1568	0.319
		8	0.181	0.078	11.404	0.180

Source: own edit through E-views

Table 4.25 Values of informational criteria

	R^2	AIC	Schwarz	Hannan-Quinn
ARIMA(1,1,1)	0.94	**-2.92**	**-2.86**	**-3.07**
ARIMA(1,1,0)	0.16	-0.37	-0.33	-0.47
ARIMA(0,1,1)	0.44	-0.92	-0.86	-0.99

Sursa: prelucrare proprie prin E-Views

Table 4.26 Testing the coefficients of the models

Variable	Coefficient	Prob.
C	10.058	0.0000
AR(1)	0.240	0.0000
MA(1)	4.848	0.0010

Source: own edit through E-views

Table 4.27 Testing the hypothesis according to which the average of errors is null

Test of Hypothesis: Mean = 0.000000

Sample Mean = -0.023724
Sample Std. Dev. = 0.034274

Method	Value	Probability
t-statistic	-2.076552	0.0715

Source: own edit through E-views

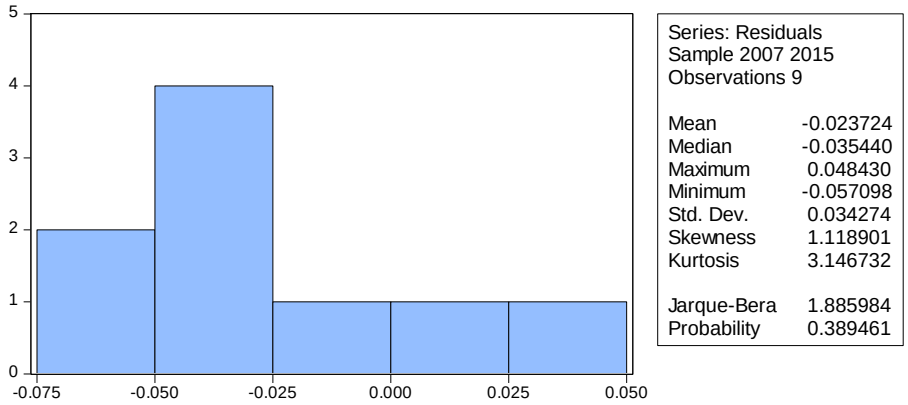
Table 4.28 ARCH test

Heteroskedasticity Test: ARCH

F-statistic	0.342168	Prob. F(1,6)	0.5799
Obs*R-squared	0.431610	Prob. Chi-Square(1)	0.5112

Source: own edit through E-views

Table 4.29 Testing the hypothesis of normality of errors



Source: own edit through E-views

Table 4.30 Correlogram of errors

Sample: 2007 2015
Included observations: 9
Q-statistic probabilities adjusted for 2 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.369	0.369	1.6817	
		2	-0.138	-0.317	1.9522	
		3	-0.029	0.199	1.9662	0.161
		4	-0.153	-0.359	2.4289	0.297
		5	-0.367	-0.157	5.7702	0.123
		6	-0.243	-0.129	7.7205	0.102
		7	0.025	0.065	7.7519	0.170
		8	0.037	-0.115	7.8879	0.246

Source: own edit through E-views

Table 4.31 Forecasted nominal values

Year	Number of foreign tourists in Constanța forecasted by ARIMA (1,1,1) model
2016	24000
2017	26226

Source: own edit