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**ECONOMIC THEMES (2022) 60(1): 1-19**

DOI 10.2478/ethemes-2022-0001

# MEASURING THE IMPACT OF THE COVIID-19 CRISIS ON THE FOREIGN TOURIST RECEIPTS

**Aleksandar Trajkov**

*University "St. Kliment Ohridski" Bitola Faculty of Tourism and Hospitality Ohrid, North Macedonia*

✉ *aleksandar.trajkov@uklo.edu.mk*

**Cvetko Andreeski**

*University "St. Kliment Ohridski" Bitola Faculty of Tourism and Hospitality Ohrid, North Macedonia*

✉ *cvetko.andreeski@uklo.edu.mk*

**Jovanka Biljan**

*University "St. Kliment Ohridski" Bitola Faculty of Tourism and Hospitality Ohrid, North Macedonia*

✉ *jovanka.biljan@uklo.edu.mk*

UDC 616.98:578.834]:338.48

Original scientific paper

**Abstract:** Tourism is a significant economic activity for developing any national economy and the world economy as well. Revenues generated through tourism services affect GDP and directly stimulate economic growth. The revenues are important for the national economies, i.e. the foreign exchange inflow, generated through tourist services export. However, many factors directly impact on the volume of foreign tourist arrivals, and thus directly affect both foreign exchange inflows and GDP. Government measures taken for various reasons that have a straight impact on the movement of people significantly reduce tourist travels. It can cause numerous and robust adverse effects on the national economy. The health crisis caused by the pandemic COVID – 19 has led to restrictive governmental measures that had a negative impact on tourist travels, and thus on the revenues generated from the export of tourist services. The paper aims to measure the effect of the COVID - 19 crises on the income generated by the foreign tourists' arrivals in Ohrid, as a case study destination in North Macedonia. The research results will show the losses this economic sector has suffered from the "lockdown" caused by the pandemic.

Received: 16.09.2021
Accepted: 24.02.2022

**Keywords:** tourist income, receipts, foreign tourist overnights, COVID – 19, health crises, Ohrid, North Macedonia

**JEL classification:** Z30, C52, F19, L83

## 1. Introduction

Global health crises caused by the coronavirus COVID-19 pandemic is recognized as one of the utmost challenge humanity have faced recently. Since its appearance in Asia in 2019, the virus has spread on every continent aside from Antarctica. But the pandemic is a lot over and above a health crisis. Furthermore, it is an exceptional socio-economic crisis as the countries were forced to implement restrictive measures to deal with the COVID 19 spread. Having a consequence on each country, the health crises can generate overwhelming social, economic and political effects that will cause deep and longstanding concerns.

As for illustration, the global economy is estimated to have contracted 4.3 per cent in 2020 (World Bank Group, 2021). International labour organization (ILO) data confirm that labour markets around the world were disrupted in 2020 on a historical record level and 255 million full–time jobs were lost (ILO, 2021). Even in the countries that have implemented less rigorous measures, economic and other business-related activities have been affected because of physical distancing and globally extended effects, such as the drastic decrease in tourism and the persistent barriers to migration. (ILO, 2021).

A virus crisis has provoked an unprecedented change to the international tourism industry, among other economic sectors. Tourism in the pre-pandemic period was growing more rapidly than the world economy and was a key sector in many advanced, developing and emerging economies. The tourism industry generated millions of jobs with a high share of women (54% of workforce) and youth. International tourist arrivals in 2019 have reached 1.5 billion in the 10$^{th}$ consecutive year of sustained growth. According to World Tourism Organization (UNWTO), tourism export revenues touched 1.7 trillion USD (UNWTO, 2021). Tourism was considered as 3$^{rd}$ largest export category after fuels and chemicals and in 2019 accounted for 7% of global trade. For some countries, it can present over 20% of their GDP (UNWTO, 2020).

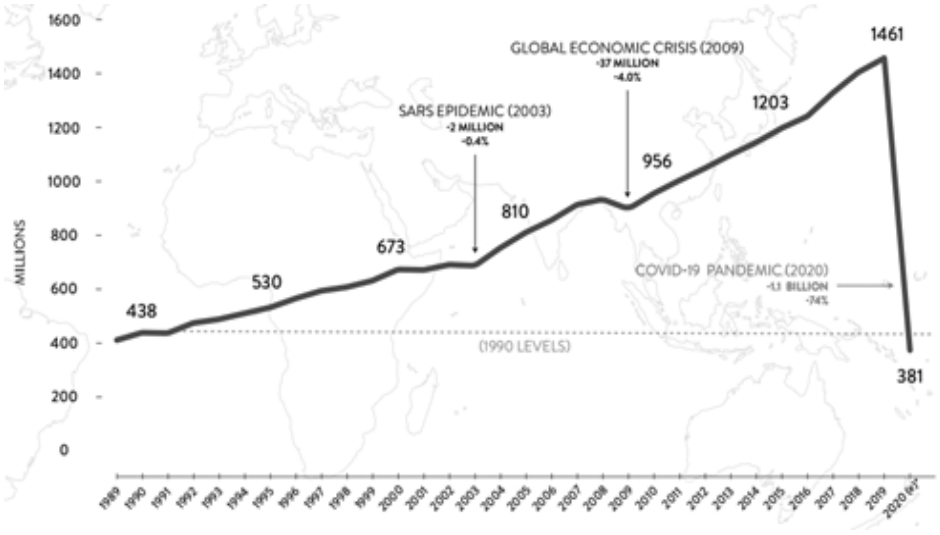
In the middle of March 2020, World Health Organization has declared the pandemic outbrak, and by the middle of April 2020, 100% of worldwide destinations have introduced lockdowns and travel restrictions. As of the 1$^{st}$ of November 2020, 27% of all destinations worldwide kept their borders completely closed for international tourism (UNWTO, 2021). The new challenge humanity has faced led to the rash drop in tourism, which on the other hand put an outsized impact on countries that rely on foreign travellers—with potentially large-scale effects on their economies' national accounts (Rebillard, 2020).

The health crisis has caused an unprecedented fall of international tourism with a record drop of international tourist arrivals of 74%, leading them to the levels of nearly 30 years ago. According to UNWTO, international tourist arrivals have reached a record of 1460 million in 2019 and dropped to 381 million in 2020. The

decrease of -1.1 billion arrivals in 2020 caused a 1.3 trillion USD loss in export revenues of international tourism, and the estimated loss in global GDP is over 2 trillion USD. The pandemic has also put about 100-120 million direct tourism jobs at risk (UNWTO, 2021).

International organizations as World Bank, International Monetary Fund, World Tourism Organization, World Tourism and Travel Council and many other official bodies recognise tourism as a directly measurable activity, which enables more accurate analysis that helps creating more effective policy in the sector. Formerly, the tourism industry trials generally relied on estimates from associated areas of measurement (e.g. Balance of Payments statistics). As for today, tourism holds a range of instruments that can help track and measure the productive activities of the sector and the activities of the tourists and travellers. (Index Mundi, 2019). Changes in tourism revenues in Macedonia have been an interest in certain research papers. (Trajkov & Biljan, 2019) The methodology for measuring changes in tourist arrivals and its impact on tourism export were also considered in this paper.

**Figure 1 International Tourist Arrivals (millions)**




*Source:* (UNWTO, 2021)

This research aims to calculate and measure the impact of the COVID-19 crisis on the income generated by the foreign tourists' arrivals in Ohrid as one of the most important tourist destinations in Macedonia. The basis for measurement is forecasting the series of foreign tourists for the pandemic period and the original data obtained in the analyzed period. The forecasting model is ARIMA, and the analysis is made based on all accompanying statistical indicators (Andreeski &

Mechkaroska, 2020) (Kulendran, & Wong., 2005) (Box & Jenkins, 1976).The research results will show the losses that this exceedingly important economic sector has suffered from the "lockdown" caused by the pandemic and that the country was not immune to the general governmental policies of restrictions in order to protect the health of the population and to provide the necessary capacities for medical healthcare. Data used for the research are taken from official sources and institutions UNWTO, International Monetary Fund (IMF), World Bank, National Bank of the Republic of N. Macedonia (NBRM), State Statistical Office (SSO) etc.

## 2. Measuring and structuring tourism consumption in the municipality of Ohrid and its impact on national GDP in the pre–COVID 19 period

The analysis of the total tourist consumption in the municipality of Ohrid is based on data from the State Statistical Office and the NBRM over realized tourists overnights instead of tourist arrivals as more suitable indicator for analysis. More accurate calculation for tourist consumption can be made by using the selected indicator, having in mind the methodology of recording tourists' arrivals and tourists' overnights given by the SSO.

At the national level, foreign tourists' consumption is taken from the national balance of payments published by the NBRM, given as export of travel services (tourism). It is converted into USD according to the average exchange rate in the respective year, published by the Central Bank. Then the total amount is divided by the total number of foreign tourists' overnights at the national level, which gives the average consumption of foreign tourists. The average consumption of foreign tourists per night at the national level is used to calculate the total income generated from the foreign tourists that visit the municipality of Ohrid.

The consumption of domestic tourists at the national level is taken from the data on the national GDP given by the SSO. The part where the final consumption of households is measured according to the durability and classification of individual consumption by purpose (national concept) identifies the total consumption of the domestic population, by years, in the sector hotels and restaurants, made in the domestic national economy, but also in foreign countries. Therefore, due to better accuracy in the calculations, this data is corrected and the import of travel services (tourism) given in the national balance of payment is deducted from the total consumption of the households in the sector hotel and restaurants. The result will be the total consumption of domestic tourists in the domestic national economy. The ratio between the total consumption of domestic tourists and the total number of nights spent by domestic tourists gives the average consumption per night of domestic tourists. This average consumption of domestic

tourists per night is used to calculate the total income generated from the visit of the domestic tourists in Ohrid.

Table 1 indicates that the share of foreign tourists' overnight stays in the total overnight stays in the municipality of Ohrid was continuously increasing in the period 2001 - 2019. Calculations from the data in Table 1, indicate that the lowest participation of foreigners in the total number of overnight stays in the municipality of Ohrid was in 2001, during the political crises and military conflict in the country, when it was only 5 %, while in 2019 the share of over 43% was reached. As can be seen from the data in the table, the share increase is not only due to the continuous growth of foreign overnight stays, but also to the decrease of domestic overnight stays in the analysed period.

**Table 1: Tourist Consumption in Municipality of Ohrid**

| | **Tourist overnights** | | **Average Overnight Consumption (USD)** | | **Total Overnight Consumptions (million USD)** | | **Share of foreign tourist income in total tourist income (%)** |
|---|---|---|---|---|---|---|---|
| | Domestic | Foreign | Domestic | Foreign | Domestic | Foreign | |
| **2000** | 989234 | 153762 | 45 | 77 | 44 | 12 | 21.1 |
| **2001** | 541483 | 27760 | 69 | 122 | 37 | 3 | 8.3 |
| **2002** | 863156 | 66195 | 52 | 142 | 45 | 9 | 17.4 |
| **2003** | 882848 | 98762 | 61 | 164 | 54 | 16 | 23.1 |
| **2004** | 714656 | 91461 | 75 | 199 | 53 | 18 | 25.4 |
| **2005** | 774670 | 129726 | 88 | 202 | 68 | 26 | 27.7 |
| **2006** | 767561 | 129099 | 115 | 292 | 88 | 38 | 30.0 |
| **2007** | 813716 | 147495 | 110 | 359 | 90 | 53 | 37.1 |
| **2008** | 858203 | 170792 | 81 | 389 | 69 | 66 | 48.9 |
| **2009** | 774424 | 176830 | 104 | 373 | 80 | 66 | 45.1 |
| **2010** | 644415 | 147576 | 106 | 353 | 68 | 52 | 43.3 |
| **2011** | 592886 | 217909 | 119 | 318 | 71 | 69 | 49.6 |
| **2012** | 575308 | 248358 | 101 | 288 | 58 | 71 | 55.2 |
| **2013** | 522718 | 273330 | 131 | 302 | 68 | 83 | 54.8 |
| **2014** | 468268 | 285780 | 167 | 319 | 78 | 91 | 53.9 |
| **2015** | 498517 | 319658 | 120 | 255 | 60 | 82 | 57.8 |
| **2016** | 533165 | 297168 | 124 | 265 | 66 | 79 | 54.5 |
| **2017** | 557569 | 379472 | 113 | 253 | 63 | 96 | 60.4 |
| **2018** | 585051 | 449807 | 119* | 256 | 70 | 115 | 62.3 |
| **2019** | 621390 | 480173 | 119* | 251 | 74 | 121 | 62.0 |
| **Total** | | | | | 1305 | 1167 | |

* Average of the period 2015-2017

*Source:* own calculation based on the data taken from (State Statistical Office, 2021) (NBRM, 2021)

The data in the table show that the average consumption of foreign tourists in the period 2000-2019 fluctuates more than the average consumption of domestic tourists. In recent years, the average overnight consumption of foreign tourists has decreased to about $ 250, compared to $ 380 in 2008, which negatively affects total

revenues. However, the reduced consumption results in greater competitiveness of the sector and provides an increase of the number of overnight stays of foreign tourists, which generates more revenue in total from the visit of foreign tourists in Ohrid. If we compare the total revenues from domestic and foreign consumption in Ohrid, we can see that in the period 2017-2019 the revenues from foreign overnight stays reached about 62% in the total share of realized tourist revenues in Ohrid, compared to only 8.3% share in 2001, during the crisis in Macedonia. The growth of tourist revenues in the municipality of Ohrid in the last decade led to a record result of nearly 200 million USD in 2019.

The average consumption per night of foreign tourists is as much as 165% higher than the consumption by domestic tourists per night in the period 2000 - 2017. In certain periods it was as much as 380% more (2008) to last the last few years 113% and 125%.

Calculations made with data from Table 1 show that the total tourist income in Ohrid in the period from 2000 to 2019 amounted to 2472 million USD, of which 1167 million USD were realized on the basis of foreign overnight stays, and 1305 million USD were realized on the basis of domestic overnight stays.

**Table 2: Share of tourist revenues generated in the Municipality of Ohrid in total GDP**

| Year | Tourist revenues in Municipality of Ohrid, million USD (A) | GDP, million USD | Tourist revenues share in total GDP A / GDP * 10 |
|---|---|---|---|
| 2000 | 56 | 3773 | 1.48 |
| 2001 | 41 | 3710 | 1.11 |
| 2002 | 54 | 4018 | 1.34 |
| 2003 | 70 | 4946 | 1.42 |
| 2004 | 72 | 5683 | 1.27 |
| 2005 | 94 | 6259 | 1.50 |
| 2006 | 126 | 6861 | 1.84 |
| 2007 | 142 | 8337 | 1.70 |
| 2008 | 136 | 9910 | 1.37 |
| 2009 | 146 | 9402 | 1.55 |
| 2010 | 120 | 9407 | 1.28 |
| 2011 | 140 | 10495 | 1.33 |
| 2012 | 130 | 9745 | 1.33 |
| 2013 | 151 | 10818 | 1.40 |
| 2014 | 169 | 11362 | 1.49 |
| 2015 | 141 | 10052 | 1.40 |
| 2016 | 145 | 10746 | 1.35 |
| 2017 | 159 | 11338 | 1.40 |
| 2018 | 186 | 12640 | 1.47 |
| 2019 | 198 | 12700 | 1.56 |

*Source:* Own calculation based on data taken from (STATISTA, 2021) (State Statistical Office, 2021) (NBRM, 2021)

Tourist revenues generated in the Municipality of Ohrid reached the highest share in total GDP in our national economy in 2007 with 1.70%, while the expected lowest share was just over 1% in 2001 (Table 2). In the last few years, the share of tourist revenues from the municipality of Ohrid has been over 1.40% up to 1.56% of the total GDP.

Data shows that tourist revenues generated in the tourism sector in the municipality of Ohrid significantly contribute to the national GDP. All distortions in the sector will also have an impact on the national economy in general.

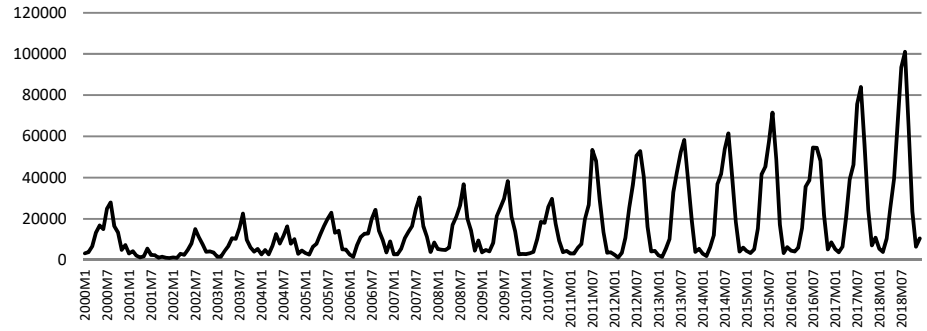
## 3. Modelling time series and predicting values for foreign tourist overnights

Graph 3 shows the values of foreign tourists' overnights by months. Monthly records provide a critical amount of data for modelling and predicting future values. the National State Statistical office provides real values of tourists' overnights are provided from (State Statistical Office, 2021).

As seen from Figure 2, the series has an evident seasonality, which is expected for Ohrid as it is recognized as a tourist destination with a seasonality caused by natural factors (Trajkov, Biljan, & Andreeski, Overview and Characteristics of Tourism Seasonality in Ohrid, 2016)

For the research, the original series will be modified to obtain a stationary series, after which the presence of structural changes in the series will be examined. Then, the series will be modelled and future values will be predicted. The theory of time series analysis is used as a basis for this analysis together with the respective statistical indicators that will be additionally presented.

**Figure 2. Foreign tourists overnights in Ohrid, monthly data**




*Source:* (State Statistical Office, 2021)

At the beginning, an analysis of the real values of the number of nights spent by foreign tourists in the analysed period (January 2000-December 2018) will be done. Although we know that this series should show a structural change in 2001 due to the conflict in the country and 2011 when subsidizing of the number of foreign tourists has begun, we will still test those assumptions.

To obtain a stationary time series, it is necessary to differentiate the original series. We have made stationary testing with the Unit Root Test. After one differentiation of the original series, from the given values of the stationary rejection probability – p, it can be concluded that the differentiated series is stationary (Table 3).

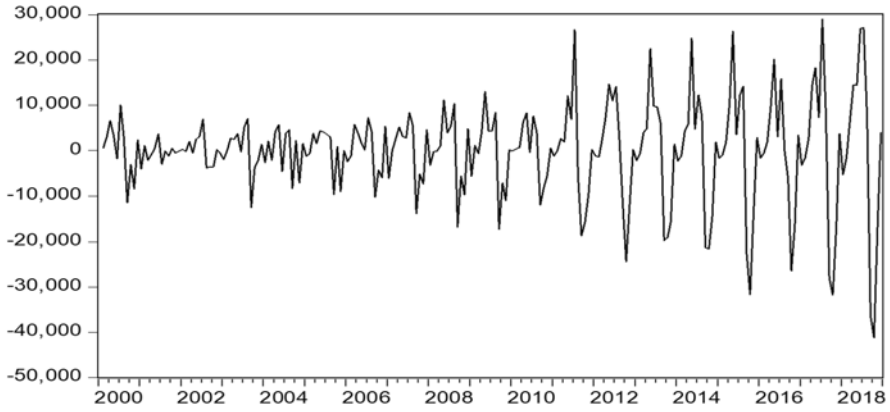
**Table 3. Results of the Unit roots tests for differential series**

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.402496 | 0.0000 |
| Test critical values: | 1% level | -3.460739 | |
| | 5% level | -2.874804 | |
| | 10% level | -2.573917 | |

*Source:* own calculation

As seen from the table, the obtained statistics has a lower value than the critical values for the different degrees of confidence, which means that this series can be used as a stationary for further modelling. Figure 3 shows the differentiated series of realized overnight stays of foreign tourists in Ohrid.

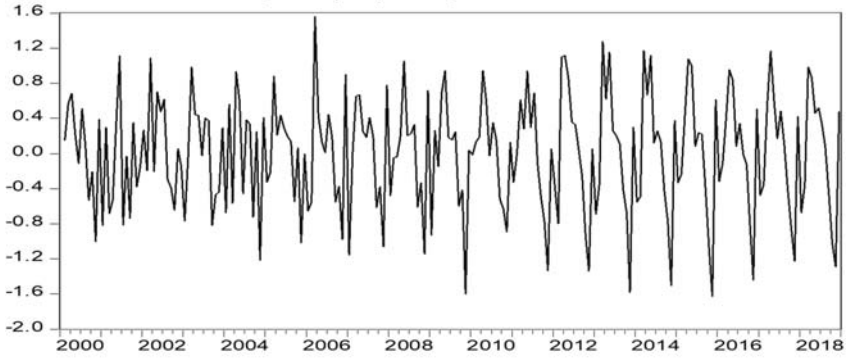
**Figure 3. Graphic presentation of the differentiated series of overnight stays by foreign tourists in Ohrid**




*Source:* own illustration

As illustrated in Figure 3, the series has changes in 2001 and 2010, but still, the heteroscedasticity (increase of variance over the years) of the series is evident. Therefore, it is necessary to make additional series transformations by applying a logarithmic function. This transformation is the last to be done to obtain a stationary series with reduced heteroskedasticity. Figure 4 shows the logarithmic and the differentiated series of realized foreign tourists' overnights.

**Figure 4. Graphic presentation of the logarithmic and differentiated series of realized overnight stays by foreign tourists in Ohrid**




*Source:* own illustration

The fugure shows the reduced heteroskedasticity of the transformed series. In order to determine the non-structural variables that will be used for creation of the series model, we have generated a correlogram. The results of the correlogram are given in Table 4.

**Table 4. Correlogram of transformed series of the foreign tourists overnights**

Sample: 2000M1 2018M12, Included observations 227

| Autocorrelation | Partial Correlation | | AC | PAC | Q – Stat | Prob. |
|---|---|---|---|---|---|---|
| | | 1 | 0.193 | 0.193 | 8.5415 | 0.003 |
| | | 2 | 0.190 | 0.159 | 16.898 | 0.000 |
| | | 3 | -0.012 | -0.078 | 16.931 | 0.001 |
| | | 4 | -0.162 | -0.190 | 23.017 | 0.000 |
| | | 5 | -0.326 | -0.281 | 47.967 | 0.000 |
| | | 6 | -0.627 | -0579 | 140.55 | 0.000 |
| | | 7 | -0.391 | -0.427 | 176.59 | 0.000 |
| | | 8 | -0.158 | -0.169 | 182.53 | 0.000 |
| | | 9 | 0.027 | -0.007 | 182.71 | 0.000 |
| | | 10 | 0.178 | 0.042 | 190.31 | 0.000 |
| | | 11 | 0.237 | -0.197 | 203.87 | 0.000 |
| | | 12 | 0.722 | 0.386 | 329.82 | 0.000 |
| | | 13 | 0.262 | -0.018 | 346.53 | 0.000 |

*Source:* own calculations

The correlogram shows the serial correlation of the delays, as well as significant values of the 12th delay. We will take those two parameters in the model. The mean value of the stationary series is zero and therefore we will not have a constant in the model.

**Table 5. Series structural changes test - foreign tourists overnights**

Multiple breakpoint tests
Bai – Perron tests of L+1 vs. L sequentially determined breaks
Sample 2000M01 2018M12
Included observations: 228
Breaking variables: C
Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05

| Sequential F – Statistic determined brakes | | | 1 |
|---|---|---|---|
| Break Test | F – Statistic | Scaled F – statistic | Critical Value ** |
| 0 vs. 1 * | 56.94850 | 56.94850 | 8.58 |
| 1 vs. 2 | 6.729383 | 6.729383 | 10.13 |

* Significant at the 0.05 level.
** Bai – Perron (Bai & Perron, 2003) critical values.

Break dates

| | Sequential | Reparation |
|---|---|---|
| 1 | 2012M05 | 2012M05 |

*Source:* own calculations

Structural change testing was done for the original series, where a constant was taken as a modelling parameter. The time series analysis theory recommends having a significant change in the series trend for structural change testing. Test results indicate an evident structural change in 2012, due to the introduction of subsidies for foreign tourists as a governmental measure for tourism support.

Therefore, the series that we will model will cover the period 2013-2019. The analysed period contains a series with over 50 records, which is significant data to create a relevant model.

The model considers the parameters AR (12) and MA (1) that consider the serial correlation of the data and the seasonal component that appears annually in the series. Additionally, the second delay in the series is significant. The analysis uses as MA(2) parameter and the relevant statistics show that this parameter is as valid as the other two. The modelling results are given in Table 6.

**Table 6. Result of the modelling of the transformed series**

Dependent Variable: REALNI DLOG
Method: ARMA Maximum likelihood (OPG – BHHH)
Sample 2013M01 2018M12
Included observations: 72
Convergence achieved after 30 iterations
Coefficient covariance computed using outer product of gradients

| Variable | Coefficient | Std. Error | t – Statistic | Prob. |
|---|---|---|---|---|
| AR(12) | 0.984029 | 0.009697 | 101.4809 | 0.0000 |
| MA(1) | -0.501747 | 0.091547 | -5.480774 | 0.0000 |
| MA(2) | -0.163729 | 0.092214 | -5.028843 | 0.0000 |
| SIGMASQ | 0.026039 | 0.004441 | 5.863500 | 0.0000 |

| | | | |
|---|---|---|---|
| R – squared | 0.949759 | Mean dependent variable | 0.011907 |
| Adjusted R – squared | 0.947543 | S.D. dependent variable | 0.724980 |
| S.E. of regression | 0.166046 | Akaike info criterion | -0.126285 |
| Sum squared resid. | 1.874842 | Schawarz criterion | 0.000197 |
| Log likelihood | 8.546256 | Hannan – Qiunn criterion | -0.075932 |
| Durbin – Watson stat | 1.927029 | | |

*Source:* own calculations

Based on the results and relevant statistics, the following can be concluded:

- Both selected parameters are valid for the model, i.e. the probability of their ejection from the model is less than 1%;
- The model describes more than 94% of the variance of the series;
- The value of Durbin-Watson statistics is close to 2, which means that there is no serial correlation of residuals, i.e. it is below the confidence level;
- The values of the information criteria are low.

A correlogram of the residuals was made to check the model's validity. The results are given in Table 7.

From the results given in Table, it can be concluded that all residuals are within the confidence levels, which confirms that the selected model describes well the analyzed time series.

Finally, it remains to predict the future values of the series and reverse the data transformation to obtain the values of the original series and not the transformed one.

**Table 7. Correlogram of the residuals**

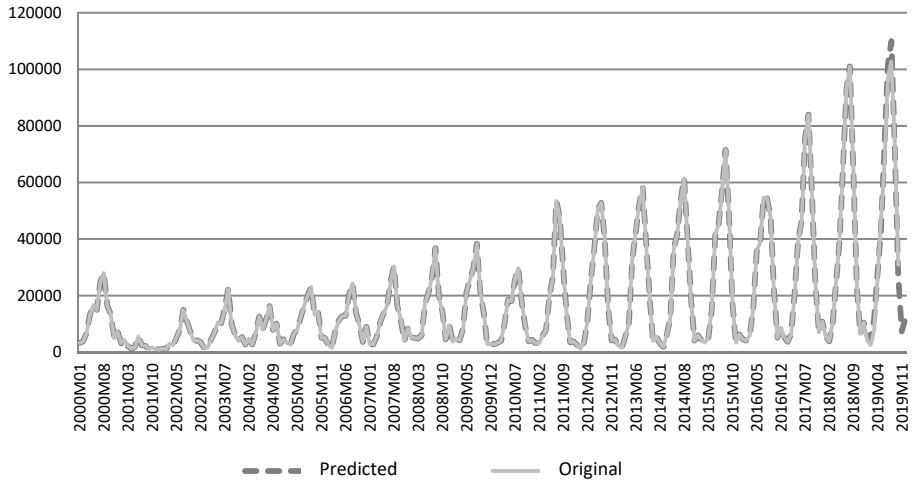
| Autocorrelation | Partial Correlation | | AC | PAC | Q – Stat | Prob. |
|---|---|---|---|---|---|---|
| | | 1 | 0.001 | 0.001 | 0.0001 | |
| | | 2 | 0.064 | 0.064 | 0.3088 | |
| | | 3 | 0.035 | 0.035 | 0.4050 | |
| | | 4 | 0.028 | 0.024 | 0.4655 | 0.495 |
| | | 5 | -0.053 | -0.053 | 0.6527 | 0.722 |
| | | 6 | -0.125 | -0.131 | 1.9223 | 0.589 |
| | | 7 | 0.160 | 0.168 | 4.0225 | 0.403 |
| | | 8 | 0.054 | 0.077 | 4.2695 | 0.511 |
| | | 9 | 0.036 | 0.026 | 4.3800 | 0.625 |
| | | 10 | 0.010 | -0.010 | 4.3878 | 0.734 |
| | | 11 | -0.078 | -0.119 | 4.9179 | 0.766 |
| | | 12 | -0.052 | -0.061 | 5.1539 | 0.821 |
| | | 13 | -0.060 | 0.004 | 5.4820 | 0.857 |
| | | 14 | -0.095 | -0.088 | 6.3181 | 0.851 |
| | | 15 | -0.130 | -0.138 | 7.9016 | 0.793 |
| | | 16 | -0.047 | -0.063 | 8.1132 | 0.836 |
| | | 17 | 0.018 | 0.010 | 8.1450 | 0.882 |
| | | 18 | -0.070 | -0.035 | 8.6347 | 0.896 |
| | | 19 | -0.020 | -0.000 | 8.6768 | 0.926 |
| | | 20 | 0.069 | 0.066 | 9.1583 | 0.935 |
| | | 21 | 0.084 | 0.100 | 9.8961 | 0.935 |
| | | 22 | -0.098 | -0.066 | 10.925 | 0.926 |

*Source:* own calculations

In the beginning, a forecast was made for one year, and those data are compared with the accurate data provided by the MAKSTAT database of the Statistical Office. Figure 5 shows the original series of achieved overnight stays by foreign tourists in the analysed period and the forecast from the model.

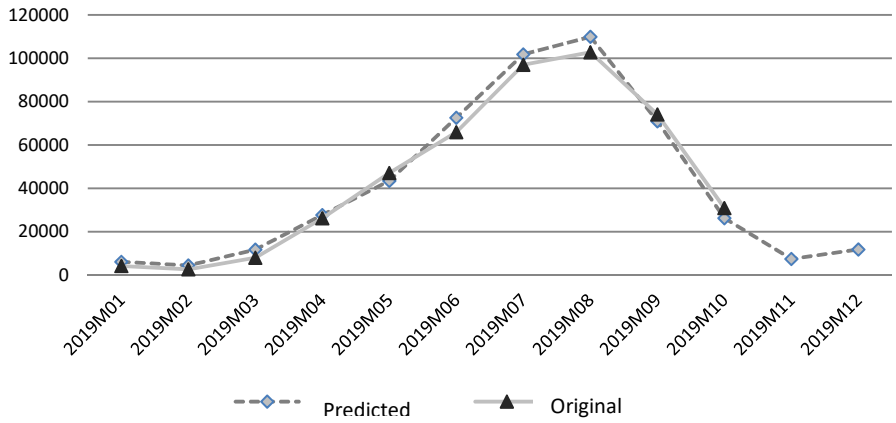
Data for the period between the 1st and 10th month in 2019 are used to test the created model. The error made for the period is 3.5%, which is within the confidences level of ±2 standard errors of the model. The largest error occurs in July and August when the values are the highest in the series (Figure 6). The difference exists because the increase of the overnights of foreign tourists in 2019 is smaller than the increase in the number of overnight stays in the previous three years. The covered variance of the model is less than 95%.

**Figure 5. Predicted and real values of foreign tourists overnights in Municipality of Ohrid (2000 – 2019)**




*Source:* own ilustration

**Figure 6. Predicted and real values of foreign tourists overnights in Municipality of Ohrid, 2019**




*Source:* own illustration

The following table shows the predicted values for the number of overnight stays in 2020. The given values should be considered within ± 2 standard errors, i.e. around ± 5%.

**Table 8. Projected values for the foreign tourists overnights based on the model in 2020**

| Year / Month | Projected values |
|---|---|
| **2019M11** | 7379 |
| **2019M12** | 11819 |
| **2020M01** | 6903 |
| **2020M02** | 5093 |
| **2020M03** | 13236 |
| **2020M04** | 30752 |
| **2020M05** | 47944 |
| **2020M06** | 79422 |
| **2020M07** | 110816 |
| **2020M08** | 119553 |
| **2020M09** | 77675 |
| **2020M10** | 29161 |
| **2020M11** | 8375 |
| **2020M12** | 13316 |

*Source:* own calculations

As seen from the data in Table 8, the projected values for the foreign tourists' overnights in the municipality of Ohrid for the first two months in 2020, before implementing restrictive measures as a result of the health crises, reached 12059 in total. On the other hand, the real values of foreign tourists' overnights in Ohrid in the same period (January – February 2020) were 11966 (State Statistical Office, 2021). The derogation of the values is only 0.53% which fits the model standard error.

## 4. Calculating loses in foreign tourist receipts in Municipality of Ohrid

Based on the generated model, predicted values for the foreign tourist overnights in Municipality of Ohrid, can be used to calculate the disproportion between expected overnights in 2020 and the real values of the foreign tourist overnights in the same period in Ohrid as given by the State Statistical Office. Results in Table 9 indicate a huge reduction of over half a million foreign tourist overnights in the period March – December 2020.

The difference between expected and realized foreign tourists overnights in 2020 is base for calculating losses in revenues generated by foreign tourists due to restrictive governmental measures implemented in 2020. If we take a foreign tourists average consumption in the last 5 years (period 2015 – 2019) we can calculate expected foreign tourist receipts and the real foreign tourist receipts in the municipality of Ohrid in 2020 (Table 8)

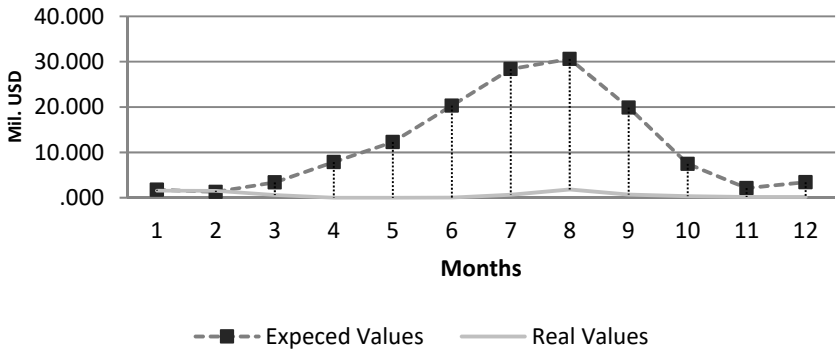
**Table 9. Impact of COVID – 19 crises on foreign tourist overnights and foreign tourist revenues in Municipality of Ohrid, 2020**

| Month | Expected foreign tourist overnights (EO) | Realized foreign tourist overnigh t (RO) | EO – RO | Average foreign tourist consumption by overnight, 2015 – 2019, USD (ATC) | Expected foreign tourist revenues, mil USD (EO * ATC) | Realized foreign tourist revenues, mil USD (RO*ATC) |
|---|---|---|---|---|---|---|
| **2020M01** | 6903 | 6132 | -771 | 256 | 1.77 | 1.57 |
| **2020M02** | 5093 | 5927 | 834 | 256 | 1.30 | 1.52 |
| **2020M03** | 13236 | 2314 | -10922 | 256 | 3.39 | 0.59 |
| **2020M04** | 30752 | 4 | -30748 | 256 | 7.87 | 0.00 |
| **2020M05** | 47944 | 31 | -47913 | 256 | 12.27 | 0.01 |
| **2020M06** | 79422 | 82 | -79340 | 256 | 20.33 | 0.02 |
| **2020M07** | 110816 | 2545 | -108271 | 256 | 28.37 | 0.65 |
| **2020M08** | 119553 | 7130 | -112423 | 256 | 30.61 | 1.83 |
| **2020M09** | 77675 | 2718 | -74957 | 256 | 19.88 | 0.70 |
| **2020M10** | 29161 | 1360 | -27801 | 256 | 7.47 | 0.35 |
| **2020M11** | 8375 | 672 | -7703 | 256 | 2.14 | 0.17 |
| **2020M12** | 13316 | 615 | -12701 | 256 | 3.41 | 0.16 |
| **TOTAL** | **542246** | **29530** | **-512716** | | **138.81** | **7.56** |

*Source:* own calculation, (State Statistical Office, 2021)

Based on those data, the difference between expected and real revenues can be calculated for Municipality of Ohrid and the impact of COVID – 19 crises on foreign tourist revenues reduction can be illustrated (see figure 7)

**Figure 7. Lost foreign tourist receipts in Ohrid, 2020**




*Source:* own presentation based on data in table 8

Calculations from Table 8 indicate that there is over 131 million USD decline in foreign tourist receipts in Municipality of Ohrid in 2020, because of governmental restrictive measures implemented in dealing with health crises.

## 5. Conclusions

Tourism as an economic activity is crucial for developing any national economy and the world economy as well. Revenues generated through tourism services affect GDP and directly stimulate economic growth.

The health crisis caused by the pandemic COVID – 19 has led to restrictive governmental measures that had a negative impact on tourist travel, and thus on the revenues generated from the export of tourist services. The health crisis has caused an unprecedented fall of international tourism at the global level with a record drop of international tourist arrivals of 74% leading them to the levels of nearly 30 years ago. The global decrease of 1.1 billion arrivals in 2020 caused a 1.3 trillion USD loss in export revenues of international tourism, and the estimated loss in global GDP is over 2 trillion USD. The pandemic has also put about 100-120 million direct tourism jobs in the world at risk.

Research results show that the total tourist income in Ohrid in the pre COVID – 19 period (2000 – 2019) amounted to 2472 million USD, of which 1167 million USD were realized on the basis of foreign overnight stays, and 1305 million USD were realized on the basis of domestic overnight stays. Tourist revenues generated in the Municipality of Ohrid reached the highest share in total GDP in our national economy in 2007 with 1.70%.The expected lowest share was in 2001 of just over 1% (Table 2). In the last few years, the share of tourist revenues from the municipality of Ohrid have been over 1.40% up to 1.56% of the total GDP. Data shows that tourist revenues generated in the tourism sector in the municipality of Ohrid has a significant contribution to the national GDP. All distortions in the sector will also have an impact on the national economy in general.

Time series modelling is used to predict values for foreign tourist overnights in Ohrid and to calculate the loss in foreign tourist revenues. The model covers the period 2013-2019. The analyzed period contains a series with over 50 records, which is significant data to create a relevant model. The model considers the parameters AR (12) and MA (1) that consider the serial correlation of the data and the seasonal component that appears annually in the series. Both selected parameters are valid for the model, i.e. the probability of their ejection from the model is less than 1%; The model describes more than 94% of the variance of the series; The value of Durbin-Watson statistics is close to 2, which means that there is no serial correlation of residuals, i.e. it is below the confidence level; The values of the information criteria are low; All residuals are within the confidence levels, which confirms that the selected model describes well the analysed time series.

Projected values for the foreign tourists' overnights in the municipality of Ohrid for the first two months in 2020, before restrictive measures were implemented as a result of the health crises, reached 12059 in total. On the other hand, the real values of foreign tourists overnights in Ohrid in the same period (January – February 2020) were 11966. The derogation of the values is only 0.53% which fits the model standard error.

Difference between expected and realized foreign tourists overnights in 2020 is base for calculating losses in revenues generated by foreign tourists due to restrictive governmental measures implemented in 2020. Based on those data, the difference between expected and real revenues was calculated for the municipality of Ohrid and the impact of the COVID-19 crises on foreign tourist revenues reduction was estimated on over 131 million USD.

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## MERENJE UTICAJA KRIZE COVID-19 NA DOLASKE STRANIH TURISTA

**Apstrakt:** Turizam je značajna privredna delatnost za razvoj svake nacionalne privrede, ali i svetske privrede. Prihodi ostvareni kroz turističke usluge utiču na BDP i direktno stimulišu privredni rast. Za nacionalne privrede su važni prihodi, odnosno devizni priliv, ostvaren izvozom turističkih usluga. Međutim, mnogi faktori direktno utiču na obim dolazaka stranih turista, a samim tim direktno utiču i na devizni priliv i na BDP. Mere Vlade preduzete iz različitih razloga koje direktno utiču na kretanje ljudi značajno smanjuju turistička putovanja. To može izazvati brojne i snažne negativne efekte na nacionalnu ekonomiju. Zdravstvena kriza izazvana pandemijom COVID-19 dovela je do restriktivnih vladinih mera koje su se negativno odrazile na turistička putovanja, a samim tim i na prihode od izvoza turističkih usluga. Rad ima za cilj da izmeri efekat krize COVID-19 na prihode dolazaka stranih turista u Ohrid, kao studiju slučaja destinacije u Severnoj Makedoniji. Rezultati istraživanja pokazaće gubitke koje je ovaj privredni sektor pretrpeo od „zaključavanja" izazvanog pandemijom.

**Ključne reči:** turistički prihodi, dolasci, noćenja stranih turista, COVID – 19, zdravstvene krize, Ohrid, Severna Makedonija

## Authors' biographies

**Aleksandar Trajkov** is an Associate Professor at the St. Kliment Ohridski University – Bitola, Faculty of tourism and hospitality (FTU) in Ohrid. He holds a PhD in Economy from the Faculty of Economics on Ss. Cyril and Methodius University – Skopje. His special research interests are focused on International economics, International trade, trade logistics and International tourism. He has contributed with over 30 scientific and professional papers in many international scientific journals and conference proceedings. He is also an author of two university textbooks. He participated on various international and national scientific and research projects as a project leader and project member. He has been awarded Erasmus+ and Ceepus scholarships and has conducted many study visits on other universities abroad. He is a member of scientific committee of two international scientific journals and two international conferences. He has also been a member of the Center for scientific research of the Faculty. He is a Vice Dean of academic affairs on FTU Ohrid.

**Cvetko Andreeski** is a Professor at the St. Kliment Ohridski University – Bitola, Faculty of Tourism and Hospitality (FTU) in Ohrid. He holds a PhD in Information Technologies from the Faculty of Electrotechnics and Information Technologies on Ss. Cyril and Methodius University – Skopje. His special research interests are focused on algorithms for identification and classification. He's an author of more than 50 scientific papers published in Journals or Conference Proceedings. Some of his papers are applied algorithms in Social Sciences and Economy. He is a member of IFAC organization and ETAI organization of engineers. He's a member of editorial board of some journals, and he has been part of the program committee on several scientific conferences. He has been awarded for Erasmus plus scholarship. He was the invited professor in some Universities in Europe and USA.

**Jovanka Biljan** is a full time professor at the Faculty of Tourism and Hospitality Ohrid, St. Kliment Ohridski University – Bitola. Her special fields of research are International economics and business, Customs operations, Applied economics. She is an author of numerous university textbooks. She has also contributed with numerous scientific and research papers in many international scientific journals and international conferences in the country and abroad. She has participated in several national and international research projects. She has been awarded with Fulbright and Erasmus scholarships and has conducted many study visits in USA and Europe. She is a member of program and organizational committees on several international scientific journals and international conferences.