The effect of COVID-19 pandemic on Croatian tourist sector

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## 0.1 ABSTRACT

This paper analyses the effect of COVID-19 pandemic on the listed tourist stocks in the Zagreb stock exchange by application of the event study methodology. The analysis starts with the descriptive overview of the market wide performance of different sectors in the period before, during and after the initial pandemic outbreak and afterwards explicitly tests for the COVID-19 outbreak effects on the tourist stocks. First, the wide COVID-19 outbreak event window of 35 days is specified so that important events related to the pandemic can be identified. Second, the first officially reported COVID-19 incidence in Italy and World Health Organization declaration of global pandemic are used as identified events in a shorter 10 day event study window estimation. The results point to the significant negative effect of COVID-19 pandemic on the returns of tourist stocks in the Zagreb stock exchange and are robust to the different event window specification. The overall results do not provide evidence to the relatively stronger COVID-19 effects on tourist sector but rather equal effects across different sectors.

# 1 INTRODUCTION

The coronavirus pandemic flooded the globe in just a few months after the first case was registered, leaving huge consequences in the form of threatening the health and human lives, great economic losses, and psychological fear that has crept deep into society. The presence of the virus around the world has prevented potential tourists from feeling safe in the destination which has left deep consequences today and in the future for one of the most affected sectors, and that is tourism. According to the UNWTO (2021) international tourist arrivals (overnight visitors) dropped by 74% in 2020 compared to the 2019, due to massive drop in tourist demand and travel restrictions. This pandemic has caused loss of USD 1.3 trillion in export revenues which is eleven times greater loss compared to the global financial crisis from 2008. UNWTO forecasted that it could pass between 2,5 or even 4 years for international tourism to return on the old track from 2019. The effectiveness of vaccines and the level of vaccination of the population will certainly play an important role, which should contribute to a smaller number of new cases, as well as to the mitigation of travel restriction measures and the restoration of consumer confidence. The consequences are even worse since Croatia is a highly tourism dependent country.

According to the UNWTO, Croatia is among the 10 most vulnerable countries according to the criterion of the direct impact of tourism on the share of GDP. More precisely, in the first place is Macao (China) 48%, followed by: Fiji 13%, Jordan 12%, Spain 12% and Croatia with 11%. Many countries have introduced travel restrictions, and knowing that the share of foreign tourists in Croatia is 89% (UNWTO, 2021), negative results are expected from companies that are directly or indirectly involved in tourism. In Croatia tourism is taking part in a large share of total exports (35%) as well (UNWTO, 2021). Although Croatia achieved a record in 2019 in terms of the total number of arrivals and overnight stays of domestic and foreign tourists in 2020 due to the global corona pandemic, there was a steep decline compared to 2019, which amounts to -55,29% of overnight stays and -64,22% of total arrivals. Poor results in tourism spilled over into the capital market and caused turmoil, so the purpose of this research was to investigate how tourism stock prices respond to the event of the COVID-19 pandemic by using event study technique. This study contributes to the literature by analyzing the impact of global COVID-19 pandemic on tourism stock volatility in Croatia. Tu još nešto fali. The remainder of this study is structured as follows………

# 2 RESEARCH BACKGROUND

Tourist indicators of Croatian tourism before and during the Covid-19 pandemic

The Republic of Croatia systematically follows modern tourist trends and is well positioned on the European tourist market. It is recognized as a stable, safe tourist destination, beautiful and rich natural and cultural-historical heritage. The Croatian tourism sector has been successful since Croatia’s independence and accession to the European Union, and has consistently recorded enviable results, until the outbreak of the coronavirus pandemic in 2020. According to the data published on the official website of the World Health Organization–WHO, by April 20, 2021, a total of 141,754,944 confirmed cases of COVID-19 were recorded, of which 3,025,835 deaths. According to the data reported to the WHO, from 3 January 2020 to 20 April 2021, 310,306 confirmed COVID-19 cases with 6,643 deaths were recorded in Croatia on the total population of 4,058,165

The SARS-CoV-2 virus pandemic has shaken the whole world and caused historically unique problems in all aspects of social and economic life. It has greatly affected the global economic activities. Measures taken to prevent virus spreading (social distancing, traffic restrictions, restrictions on commercial activity, borders closures, etc.) have affected in particular the service sector, tourism and hospitality. The analysis of selected indicators of tourism development in Croatia before and at the time of Covid-19 pandemic in Croatia, shows how much the pandemic affected the results in tourism.

According to the historical review of data on tourist arrivals and overnight stays in Croatia (table 1), a constant growth in tourist arrivals and tourist overnight stays can be observed until 2020. If we compare the nights and arrivals in 2019 with those from 2010, it could be stated that the results have almost doubled. Despite the favorable results, a sharp decline followed in 2020 with decrease in tourist arrivals by 64.2% and decrease in overnight stays by 55.3% in commercial accommodation in 2020 compared to 2019 year. The decline in arrivals and overnight stays followed among domestic and foreign tourists, with the same being more pronounced among foreign tourists, which can also be seen from Charts 1 and 2.

# 3 LITERATURE REVIEW

Tu fali uvodni dio.

Panyagometh ([2020](#ref-Pany)) used a sample of 46 stocks listed in the Stock Exchange of Thailand in order to analyze stock price reactions during pandemic. After applying event study methodology in order to empirically measure abnormal returns and volatility, research results suggest that the majority of stocks in the Stock Exchange of Thailand have been negatively affected by Covid-19 pandemic. On the other side authors have also found that some stocks had positive returns, these stocks are included in commerce sector- companies which are included in distribution of pharmaceutical products and services. Irfan, Kassim and Dhimmar (2021) analyzed the impact of COVID-19 on the performance of Indian stock exchange and Indonesian Stock Exchange. Author included three different event windows because they wanted to check results in different time periods. The analysis of both countries showed opposite results since Indian stock market showed downward sloping after WHO declaration, and Indonesian upward. Albulescu ([2020](#ref-Abul)) researched new COVID-19 official cases announcements and death ratio on the financial markets volatility index (VIX). Authors has concluded that new cases reported outside China has positive impact on VIX, death ratio has significant positive impact on VIX, and the spread of the COVID-19 increase financial volatility. Chia, Khim-Sen Liew and Rowland (2020) research the relation between Malaysian stock market and variables related to COVID-19 their results suggest that daily new cases had negative but insignificant impact on the indices returns. On the other hand authors also found that movement control order had significant and positive impact on all indices’ returns which is quite surprising.

# 4 METHODOLOGY

## 4.1 DATA

This research paper analyses the impact of the COVID 19 pandemic on the shares of the tourism sector listed on the Croatian capital market. The retrieved data sample consists of 23 traded tourist firms for the period between the first trading day in 2019. and April 13th 2021. Due to the low liquidity, i.e. infrequent trading, we reduce the empirical sample to 12 firms according to the criteria of minimum of 100 trading days over the sampled period. For these 12 firms we use daily closing stock prices in order to calculate daily percentage returns. Since the pandemic was gaining momentum worldwide and it was highly anticipated by investors that it will spread into the Europe, we devide the time period into three parts: *pre* epidemic part ranging from the first trading day in 2019. until one week before the first reported case in Italy (Feb, 21th 2020.), *ongoing* pandemic event from the first incidence in Italy until one week after the the lockdown was introduced in Croatia (March,19th 2020.) and *post* event period from March, 26th 2020 until the end of the time sample (April, 13th,2021). We specify the beginning of the event period one week before first COVID-19 incidence in Italy and end one week after the lockdown in Croatia to allow uncertainty and information to become incorporated in the market valuations.

The overview of the Croatian capital market reaction to the COVID-19 pandemic spread in Europe is summarised in the Table 1. It can be seen that COVID-19 pandemic caused a significant drop in the overall market valuation (CrobexTr) of 25.9% and all sectoral indexes. The Crobex Nutrition index had the biggest drop (26.1%) followed by the Crobex Tourist index that lost 25.2% of the value. The negative pandemic effect seems even more pronounced taken that since the beginning of the analyzed period the overall stock market trend was positive and gained 19% but with pronounced bad performance of the construction sector (CrobexKonstr). During the post event period, a significant market rebound can be observed and overall market valuation (CrobexTr) rose by 17.7% followed by all sectoral indexes. The tourist sector had the worst performance relative to the other sectors in the pre event period (-0.4%) but reacted very similar to the overall market during the event period. The rebound of the tourist sector was only somewhat better than the market average but significantly smaller than other sectoral indexes like construction and food sector. It can also be seen that standard deviation of the tourist sector return remains lower than the average market during the event and in the post evend period. Furthermore, the standard deviation of the tourist sector return is lower relative to the other sectoral indexes in all periods indicating that the effect of the COVID-19 pandemic wasnt strongest for the tourist sector but rather very similar to the market average. It is also interesting to note that the market rebound after the event was stronger in industry and construction sectors than tourism sector.

Table 4.1: Table 1: Overview of the market reaction to COVID-19 pandemic

Pandemic

Index

Return\_sum

Return\_avg

Return\_sd

Return\_min

Return\_max

Ongoing

CrobexInd

-24.359

-0.609

4.116

-14.690

7.481

Ongoing

CrobexKonstr

-16.624

-0.416

4.652

-15.300

10.850

Ongoing

CrobexNutr

-26.150

-0.654

3.719

-12.460

6.432

Ongoing

CrobexTr

-25.882

-0.647

3.363

-11.313

5.460

Ongoing

CrobexTur

-25.204

-0.630

3.361

-10.975

6.572

Post

CrobexInd

40.059

0.159

1.282

-3.772

8.295

Post

CrobexKonstr

77.072

0.306

2.340

-6.538

8.203

Post

CrobexNutr

9.040

0.036

1.423

-11.098

6.014

Post

CrobexTr

17.694

0.070

0.631

-1.821

2.998

Post

CrobexTur

22.590

0.090

1.150

-3.223

5.170

Pre

CrobexInd

-1.412

-0.005

1.256

-4.032

6.658

Pre

CrobexKonstr

-31.339

-0.114

2.261

-8.131

6.921

Pre

CrobexNutr

42.658

0.156

1.763

-10.661

8.707

Pre

CrobexTr

19.076

0.070

0.418

-1.609

2.053

Pre

CrobexTur

-0.430

-0.002

0.623

-2.004

2.868

## 4.2 MODEL

This paper applies the event study methodology as described in Brown and Warner ([1985](#ref-BWarner)). This methodological approach is used to analyze stock markets reaction to the universe of possible events and in this study we are interested in the effect of COVID-19 pandemic outbreak on the tourist stocks listed on the Zagreb stock exchange. In order to estimate the economic impact of the event on the stock market performance, event study methodology measures the deviation of the stock`s returns from their historical average and tests weather the influence is translated into abnormal returns. Under the efficient market hypothesis, the stock market returns reflect all available information and price adjustment to the announcement of new information follows immediately (Fama ([1969](#ref-FamaETAL))).

Stock market returns are estimated in the pre-event time period, according to the formula:

where is the price of the stock *i* in the period *t*. The abnormal return is defined as a difference between the actual and expected return during the event window:

.

The expected returns during the event window are parametrised according to the OLS specification:

where represents the return model such as market model, capital asset pricing model(Mossin ([1966](#ref-Mossin))), Fama-French factor model(Fama and French ([1992](#ref-FamaFrench))) and Carhart four factor model(Carhart ([1997](#ref-Carhart))). In this analysis, the market model is applied. The abnormal return is defined as a difference between the actual and expected return during the event window:

or

where and represent estimated parameters from the OLS model.

If AR systematically deviates from 0, this implies that the market misprices the event and implies a profitable arbitrage strategy. The cumulative abnormal return is computed by aggregating abnormal returns:

.

The null hypothesis of a zero cumulative abnormal return () is tested against the alternative of a nonzero CAR by *t* statistic obtained with the following procedure:

where M is the length of the estimation window and L is the legnth of the respective event window.

# 5 RESULTS AND DISCUSSION

As previously noted, we define the event in broad terms of COVID-19 pandemic transitioning from global shock to taking measurable effect in Europe. We proxy the event effect with first reported case in Italy on Feb, 21th but allow one week prior to the event for information to get incorporated in the market valuations. The reason for taking one week before the actual first reported case is because investors were already aware of the ongoing pandemic and the virus was already spreading in Italy before the official announcement. In a similar fashion, we end the event period three trading days after the official lockdown was introduced in Croatia on March 19th to allow investors to process the information and adjust the market valuation accordingly. The results of the several nonparametric event study tests are presented in the Table 2. The table shows clusters of hig significance across different tests on the first trading day after the lockdown was introduced in Italy (Feb 24th) as well as the following day (Feb 25th) but with somewhat lower robustness. Clusters of signiciance across different tests is observed around March 11th when World Health Organisation declared COVID-19 a global pandemic pointing to the significant effect on the listed tourist firms on Zagreb Stock Exhange. It is also noticable that robustly siginficant COVID-19 effects can be observed on March 9th, 12th, 16th, and 17th pointing to the investor`s anticipation of official declarations.

Table 5.1: Table 2: The event study reuslts for the parametric tests

Date

BW80

sig

BW85

sig

t-stat

sig

pt

sig

BH

sig

LMB

sig

2020-02-17

0.155

0.154

0.500

0.938

0.899

0.154

2020-02-18

0.552

0.548

1.100

1.799

* 1.642
* 0.547
* 2020-02-19
* -0.730
* -0.725
* -1.806
  + -2.519
  + \*\*
  + -1.536
  + -0.724
  + 2020-02-20
  + 0.259
  + 0.257
  + 1.312
  + 1.052
  + 1.345
  + 0.256
  + 2020-02-21
  + 0.869
  + 0.863
  + 0.868
  + 1.248
  + 1.166
  + 0.862
  + 2020-02-24
  + -4.217
  + \*\*\*
  + -4.187
  + \*\*\*
  + -2.027
    - -11.658
    - \*\*\*
    - -2.235
    - \*\*
    - -3.407
    - \*\*\*
    - 2020-02-25
    - -2.819
    - \*\*\*
    - -2.799
    - \*\*\*
    - -1.751
    - -4.203
    - \*\*\*
    - -1.632
    - -2.739
    - \*\*\*
    - 2020-02-26
    - -0.482
    - -0.479
    - -0.527
    - -0.120
    - -0.072
    - -0.471
    - 2020-02-27
    - -0.187
    - -0.186
    - -0.259
    - 0.408
    - 0.191
    - -0.184
    - 2020-02-28
    - -0.659
    - -0.654
    - -0.759
    - -1.527
    - -0.875
    - -0.628
    - 2020-03-02
    - 1.810
      * 1.797
        + 1.335
        + 3.738
        + \*\*\*
        + 1.835

1.792

2020-03-03

0.258

0.256

0.267

0.089

0.062

0.255

2020-03-04

-0.376

-0.374

-0.268

0.230

0.117

-0.373

2020-03-05

-0.554

-0.550

-0.646

-2.726

\*\*\*

-1.337

-0.547

2020-03-06

-1.390

-1.380

-1.053

-5.260

\*\*\*

-1.565

-1.314

2020-03-09

-5.554

\*\*\*

-5.515

\*\*\*

-1.900

-8.950

\*\*\*

-2.210

\*\*

-3.254

\*\*\*

2020-03-10

-0.117

-0.116

-0.076

-2.800

\*\*\*

-1.078

-0.115

2020-03-11

-4.943

\*\*\*

-4.908

\*\*\*

-2.259

\*\*

-7.922

\*\*\*

-2.397

\*\*

-4.122

\*\*\*

2020-03-12

-2.011

\*\*

-1.997

\*\*

-0.633

-5.292

\*\*\*

-1.338

-1.103

2020-03-13

0.607

0.603

0.335

2.030

\*\*

0.691

0.475

2020-03-16

-2.549

\*\*

-2.531

\*\*

-0.945

-7.119

\*\*\*

-1.648

-1.761

2020-03-17

-2.212

\*\*

-2.196

\*\*

-1.693

-2.267

\*\*

-0.638

-2.118

\*\*

2020-03-18

-1.314

-1.304

-0.734

-4.098

\*\*\*

-0.984

-1.183

2020-03-19

-0.440

-0.437

-0.241

0.248

0.060

-0.431

2020-03-20

-1.086

-1.078

-1.051

-2.758

\*\*\*

-1.096

-1.022

2020-03-23

-0.901

-0.895

-0.559

-3.662

\*\*\*

-1.064

-0.819

To check the robustness of the results, we also run several nonparametric tests and show results in Table 3. Nonparametric tests generally show less significance but point in the same direction. First significance cluster can be observed on Feb 20th, a one day before the first officially reported case in Italy and another cluster is related to March 11th, a day when WHO declared global pandemic. Also, cluster of significance across tests is observed on the March 17th and could be related to the anticipation of the introduction of lockdown in the Croatia on March 19th.

Table 5.2: Table 2: The event study reuslts for the nonparametric tests

Date

SIGN

sig

GSIGN

sig

CSIGN

sig

RANK

sig

MRANK

sig

WLCX

sig

2020-02-17

0.000

0.823

1.103

1.017

1.017

40

2020-02-18

-0.577

0.229

-0.276

0.696

0.696

43

2020-02-19

-0.577

0.229

0.827

-0.226

-0.226

20

2020-02-20

1.155

2.009

\*\*

1.378

1.755

* 1.755
  + 55
  + 2020-02-21
  + -1.155
  + -0.364
  + 0.689
  + 0.557
  + 0.557
  + 26
  + 2020-02-24
  + -0.577
  + 0.229
  + -0.276
  + -0.711
  + -0.711
  + 19
  + 2020-02-25
  + 0.000
  + 0.823
  + 0.000
  + -0.191
  + -0.191
  + 27
  + 2020-02-26
  + -0.577
  + 0.229
  + -0.276
  + -0.497
  + -0.497
  + 33
  + 2020-02-27
  + 0.000
  + 0.823
  + 0.551
  + 0.832
  + 0.832
  + 41
  + 2020-02-28
  + 0.577
  + 1.416
  + 0.551
  + 0.892
  + 0.892
  + 38
  + 2020-03-02
  + 0.577
  + 1.416
  + 1.103
  + 1.654
    - 1.654
      * 55
      * 2020-03-03
      * -0.577
      * 0.229
      * -0.276
      * -0.148
      * -0.148
      * 34
      * 2020-03-04
      * 0.000
      * 0.823
      * 0.827
      * 0.269
      * 0.269
      * 38
      * 2020-03-05
      * -0.577
      * 0.229
      * 0.276
      * 0.314
      * 0.314
      * 29
      * 2020-03-06
      * 0.000
      * 0.823
      * 0.276
      * 0.358
      * 0.358
      * 31
      * 2020-03-09
      * -0.577
      * 0.229
      * -0.276
      * -0.653
      * -0.653
      * 15
        + 2020-03-10
        + -1.155
        + -0.364
        + -0.551
        + -1.050
        + -1.050
        + 27
        + 2020-03-11
        + -2.309
        + \*\*
        + -1.551
        + -1.103
        + -2.225
        + \*\*
        + -2.225
        + \*\*
        + 14
        + \*\*
        + 2020-03-12
        + 0.000
        + 0.823
        + 0.276
        + 0.284
        + 0.284
        + 37
        + 2020-03-13
        + -0.577
        + 0.229
        + -0.276
        + -0.528
        + -0.528
        + 35
        + 2020-03-16
        + 0.000
        + 0.823
        + 0.000
        + 0.033
        + 0.033
        + 34
        + 2020-03-17
        + -2.309
        + \*\*
        + -1.551
        + -1.103
        + -2.036
        + \*\*
        + -2.036
        + \*\*
        + 13
        + \*\*
        + 2020-03-18
        + 1.155
        + 2.009
        + \*\*
        + 0.551
        + 0.959
        + 0.959
        + 43
        + 2020-03-19
        + 0.577
        + 1.416
        + 0.827
        + 1.288
        + 1.288
        + 50
        + 2020-03-20
        + -1.732

-0.958

-0.827

-1.526

-1.526

22

2020-03-23

0.577

1.416

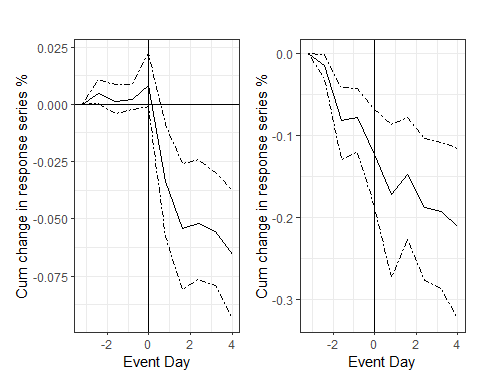
0.276

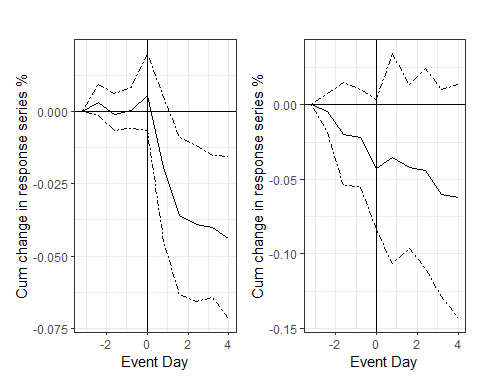
0.396

0.396

34

We additionally examine cummulative change in the return series graphically for two events, the first COVID-19 incidence in Italy and WHO declaration of COVID-19 a global pandemc, that have been characterized by clustering of significance across multiple parametric and nonparametric tests. Here we specify event window to be shorter (10 days). The Graph 1 shows the results when no control variables are included in the model and Graph 2 is related to the extended model with Crobex index returns as a control variable. The left panel shows the results for the first COVID-19 incidence in Italy and the right panel is related to the WHO declaration of global pandemc. In every case we are not able to reject the null hypothesis of the abnormality of returns since the full line, representing the stock returns, is inside 95% confidence intervals represented by dotted lines





Overall, the results point to the significant negative effect of COVID-19 pandemic on the returns of tourist stocks listed on the ZSE. When the event winow is defined in broader terms we observe clusters of signicfiance across variety of tests around two events, the first official incidence of COVID-19 in Italy and WHO declaration of global pandemic. This result points to the importance of international and global events for trends on the Croatian capital market. This result is robustly confirmed with the rage of parametric and nonparametric tests. Furthermore, this finding is coroborated with shorter event window specification and robust to inclusion of external variable controling for the overall market return. The descriptive statistics point to the effect of COVID-19 on the tourist stocks in the comparable size to the general market and also very similar to the other sectors. Therefore we conlude that COVID-19 pandemic had a similer market wide effect and no particular sectoral effect is present. It is also interesting to note that international events potentially cary higher importance for the local stock market trends than local epidemiological policy. This result implies a high level of international capital integration for the ZSE.

# 6 CONCLUSION

This analysis provides empirical evidence on the direct reactions of ZSE listed tourist firm to the outbreak of COVID-19 global pandemic by application of the event study methodology. The results confirm that COVID-19 pandemic has affected tourist stocks by triggering the negative above average cumulative return during the event period. The findings are robust to the different length of event window and controlling for the general market returns. Interestingly, the pandemic effects seem to be similar in size across different sectors and tourist sector is no exception to this rule. This result might be due to the low liquidity of tourist stocks on the ZSE or structure of croatian economy and financial market but this would be an interesting area for future research. exclusion of croatian stock market from global financial trends. It would be useful to further examine the reasons for the unequal sectoral distribution of pandemic effects in the local and global markets.

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