**The Effect of COVID-19 Pandemic on Croatian Tourist Sector**

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**ABSTRACT**

This paper analyses the effect of the COVID-19 pandemic spread the into Europe on the tourist stocks in Croatia by application of the event study methodology. The analysis starts with the descriptive overview of 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 sector. First, the 35 day long event window 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 window event study estimation. The results point to the significant negative and robust effect of COVID-19 pandemic on the returns of tourist stocks in the Zagreb stock exchange. However, the overall results do not provide evidence of the relatively stronger COVID-19 effects on tourist sector but rather equal effects across different sectors.

**INTRODUCTION**

The coronavirus pandemic spread around 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. The presence of the virus has prevented potential tourists from feeling safe in the tourist destinations and produced a complete stall in the functioning of tourism business. According to the UNWTO (2021), international tourist arrivals (overnight visitors) dropped by 74% in 2020 compared to the 2019, due to the massive drop in tourist demand and travel restrictions. The pandemic produced a 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 and are expected to reduce the number of new cases, as well as to the mitigation of travel restriction measures and the restoration of consumer confidence. The consequences of the pandemic are especially pronounced in the tourism dependent countries like Croatia.

According to the UNWTO (2021), 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 financial results are expected from companies that are directly or indirectly involved in tourism. Beside aforementioned facts, tourism is a significant contributor to national exports (35%) (UNWTO, 2021) and this contraction will have negative macroeconomic consequences. Although Croatia achieved a record high 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. The pronounced drop in the tourism spilled over into the capital market and caused turmoil, so the purpose of this research is to investigate how tourism stock prices responded to the outbreak of the COVID-19 pandemic by using event study methodology. This methodology has proven to be especially useful in identifying the effect of a particular event on stock market returns.

This study contributes to the literature by analyzing the impact of global COVID-19 pandemic on tourism sector in Croatia. As a practical implication, this study will be particularly useful to current and potential investors as well as policy management during this and other future unexpected crises. The remainder of this study is structured as follows: the section 2 performs an overview of Croatian tourism before and during the Covid-19 pandemic, the section 3 outlines a detailed literature review, the section 4 presents data and methodology, the section 5 reports the results of empirical research and discussion and finally in the last section a conclusion, limitations and future research recommendations are summarized.

**1. TOURISM IN CROATIA BEFORE AND DURING THE COVID-19 PANDEMIC**

The Republic of Croatia systematically follows global tourist trends and is well positioned on the European tourist market. It is recognized as a stable, safe tourist destination with 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 in the world. According to the same source, 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 therefore, it can be concluded that Croatia was severely affected by the pandemic.

The SARS-CoV-2 virus has affected the whole world and caused historically unprecedented 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 strongest affected 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.

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| **Table 1.** Tourist arrivals and overnight stays in Croatia in the period 1980–2020 | | | | | | | | | | | |
|  | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
| Tourist arrivals (in 000) | 56.217 | 60.110 | 62.507 | 64.617 | 66.270 | 71.437 | 77.919 | 86.200 | 89.652 | 91.243 | 40.794 |
| Tourist nights (in 000) | 10.405 | 11.211 | 11.599 | 12.233 | 12.914 | 14.175 | 15.463 | 17.431 | 18.667 | 19.566 | 7.001 |
| Source: Croatian Bureau of Statistics | | | | | | | | | | | |

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, and was more pronounced among foreign tourists, which can be seen from Charts 1 and 2.

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| **Figure 1.** Arrivals and overnight stays of foreign and domestic tourists in Croatia in the last five years (before and during the pandemic) | | |
|  |  |  |
| *Source: Croatian Bureau of Statistics* | | |

According to the data from Figure 1, it can be concluded that the decline of domestic tourist arrivals in 2020 (-34.24%) is much smaller compared to the decline of foreign tourist arrivals (-68.05%). The same effect is present in realized overnight stays, domestic overnight stays in 2020 decreased by -23.68%, while realized overnight stays of foreign tourists had a decrease of -57.95%. These results are a consequence of the fear of the COVID-19 pandemic and lockdown measures.

**2. LITERATURE REVIEW**

Event study methodology is used in a variety of application settings with the aim of measuring the impact of unforeseen or unanticipated events on prices or business performance. This methodology is has therefore found wide usage in the field of finance for measuring corporate announcements on financial performance, investor behavior or similar. The implicit assumption for the application of event study methodology is that markets are efficient, i.e. publicly available information are reflected in the prices of securities, so it was used in economics for testing the market efficiency on the capital market (Kothari and Warner,2007). However, Novak (2019) rejected the weak-form efficiency hypothesis on Croatian capital market. One of the first authors which showed the usefulness of the event study methodology were Ball and Brown (1968) who researched the impact of earnings surprises on stock prices. Brown and Warner (1980) have compared different event study methodologies and concluded that complicated methodologies will not benefit with better results in comparison with a simple one factor market model. Asquith and Mullins (1983) concluded that initiating a dividend policy as an information has a strong and positive impact on the market reaction. Miletić (2011) analyzed impact of dividend announcement on Croatian capital market by event study methodology. Results confirmed that increase or decrease of dividend significantly affect stock price in the same direction while dividend retention had no affect on stock price. Abarbanell and Park (2016) found that companies with larger ex ante earnings response coefficients are linked to a greater propensity to positively bias earnings surprise and more negative intercepts in regressions of announcements returns on earnings surprises. Škrinjarić and Orlović (2019) applied event study methodology in order to test whether political events regarding the concern Agrokor affect stock prices. Their results indicate that stocks which belong to Agrokor concern suffered from lowering returns while other liquid stocks on the Zagreb stock exchange were not affected.

Albulescu ([2020](#ref-Abul)) researched new COVID-19 official cases announcements and death ratio on the financial markets volatility index (VIX). Author has concluded that new cases reported outside China have 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. There is a significant body of recent reseach that explores the impact of COVID-19 on the capital markets (Mazur, Dang and Vega 2021; Ramelli and Wagner, 2020; Phan and Narayan, 2020; Narayan, Devpura, and Wang, 2020; Contessi and Peace, 2021; Erdem 2020; Onali 2020; Rahman, Amin and Al Mamun 2021; Harioto, Rossi and Paglia 2020; Okorie and Lin 2021; Alam, Alam and Chavali 2021) by using the event study methodology. 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, the author found that some stocks had positive returns, in particular the stocks frtom commerce sector 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 to check results in different time periods. The analysis of both countries showed opposite results since Indian stock market showed downward sloping trend after WHO declaration, and Indonesian upward. He et al. (2020) investigated impact of COVID-19 on stock prices of different Chinese industries. Authors concluded that pandemic greatly affected: transportation, mining, electric and heating, and environmental industries, while manufacturing, information technology, education and health-care industries have resisted the impact of the COVID-19 pandemic. Liu et al. (2020) evaluated short-term impact of COVID-19 on stock indices of various countries (Japan, Korea, Singapore, USA, UK etc.) Their results suggested that COVID 19 had significant negative effect on all affected countries. Authors found that Asian stock markets had more negative abnormal returns compared to other countries. Their regression results also support the evidence of adverse effect of confirmed cases on stock indices abnormal returns. Goker, Eren and Karaca (2020) researched impact of COVID-19 on the Istanbul sector indices returns by applying the event study methodology. Authors confirmed that most of the sectors have negative abnormal returns. Sectors which were hit the most are sport, tourism and transportation.

**4 METHODOLOGY**

**4.1 DATA**

This analysis uses data sample of 23 traded tourist firms retrieved from the Zagreb stock exchange (ZSE) in the period between the first trading day in 2019. and April 13th 2021. Due to the low liquidity, i.e. infrequent trading and low turnover, the initial sample is reduced to the final empirical sample of 12 firms according to the criteria of minimum of 100 trading days over the sampled period. For these 12 firms, the daily closing stock prices are used in order to calculate daily percentage returns. Since COVID-19 pandemic was gaining worldwide momentum prior to spreading into the Europe, we divide 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 from the first officially reported COVID-19 incidence in Italy until one week after the lockdown was introduced in Croatia (March,19th 2020.) and *post* event period from March, 26th 2020 until the end of the sample period (April, 13th,2021). The reason to specify the event period loosely, i.e. one week before first COVID-19 incidence in Italy and one week after the lockdown in Croatia, is to allow uncertainty and new information set to become incorporated in the market valuations due to the novelty of the pandemic event and media reporting vs. policy reaction lag related to the pandemic outbreak.

The overview of Croatian capital market reaction to the COVID-19 pandemic spread in Europe is summarized in the Table 1. The 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 relative drop (26.1%), followed by the Crobex Tourist index that lost 25.2% of its value. The negative pandemic effect seems even more pronounced since from the beginning of the analyzed period the overall stock market trend was positive and gained 19%. The worst performing sector in that period was the construction (CrobexKonstr) that lost 31% of its value. During the post event period, a significant overall market rebound can be observed as CrobexTr index rose by 17.7% followed by a positive performance of all sectors. The tourist sector had the worst performance relative to 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 by a margin higher than the market average but significantly smaller than other sectors like construction and food sector. It is interesting to note that the standard deviation of the tourist sector return remained lower than the average market during the event and in the post event period, implying a lower investment risk. Furthermore, the standard deviation of the tourist sector return is lower relative to the other sectors in all periods indicating that the effect of the COVID-19 pandemic was not the strongest in the tourist sector but rather very similar to the market average. It is also important to note that the market rebound after the event was stronger in industry and construction than tourist sector.

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| **Table 1.** Overview of the market returns over the analysed period | | | | | | |
| Pandemic | Index | Total | Average | Stdev | Min | Max |
| Ongoing | CrobexInd | -24.36 | -0.609 | 4.116 | -14.69 | 7.48 |
| Ongoing | CrobexKonstr | -16.62 | -0.416 | 4.652 | -15.3 | 10.9 |
| Ongoing | CrobexNutr | -26.15 | -0.654 | 3.719 | -12.46 | 6.43 |
| Ongoing | CrobexTr | -25.88 | -0.647 | 3.363 | -11.31 | 5.46 |
| Ongoing | CrobexTur | -25.2 | -0.63 | 3.361 | -10.98 | 6.57 |
| Post | CrobexInd | 40.059 | 0.159 | 1.282 | -3.772 | 8.3 |
| Post | CrobexKonstr | 77.072 | 0.306 | 2.34 | -6.538 | 8.2 |
| Post | CrobexNutr | 9.04 | 0.036 | 1.423 | -11.1 | 6.01 |
| Post | CrobexTr | 17.694 | 0.07 | 0.631 | -1.821 | 3 |
| Post | CrobexTur | 22.59 | 0.09 | 1.15 | -3.223 | 5.17 |
| Pre | CrobexInd | -1.412 | -0.005 | 1.256 | -4.032 | 6.66 |
| Pre | CrobexKonstr | -31.34 | -0.114 | 2.261 | -8.131 | 6.92 |
| Pre | CrobexNutr | 42.658 | 0.156 | 1.763 | -10.66 | 8.71 |
| Pre | CrobexTr | 19.076 | 0.07 | 0.418 | -1.609 | 2.05 |
| Pre | CrobexTur | -0.43 | -0.002 | 0.623 | -2.004 | 2.87 |

**4.2 EVENT STUDY MEDHODOLOGY**

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 in general and this study applies it in the case of COVID-19 pandemic outbreak on the tourist stocks listed on the ZSE in particular. In order to estimate the economic impact of the event on the stock market performance, the event study procedure measures the deviation of the stock`s returns from their historical average and tests weather the influence of the event is translated into abnormal returns. Under the efficient market hypothesis, the stock market returns should reflect all available information and price adjustment to the announcement of new information follows immediately (Fama, et al. [1969](#ref-FamaETAL)). Stock market returns are estimated in the pre-event time period, according to the formula:

|  |  |
| --- | --- |
|  | (1) |

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:

|  |  |
| --- | --- |
|  | (2) |

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

|  |  |
| --- | --- |
|  | (3) |

where represents the return model of choice such as market model, capital asset pricing model (Mossin, [1966](#ref-Mossin)), Fama-French factor model (Fama and French, [1992](#ref-FamaFrench)) and Carhart (1997) four factor model. 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:

|  |  |
| --- | --- |
|  | (4) |

or differently:

|  |  |
| --- | --- |
|  | (5) |

where and represent estimated parameters from the ordinary least squares model. Systematical deviations of from 0 imply the market mispricing of the event and offer a profitable arbitrage strategy. The cumulative abnormal return is computed by aggregating abnormal returns according to:

|  |  |
| --- | --- |
|  | (6) |

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:

|  |  |
| --- | --- |
|  | (7a)  (7b)  (7c) |

where M is the length of the estimation window and L is the length of the respective event window. The analysis applies several parametric and nonparametric tests.

First, the battery of parametric tests is applied. The standard Brown and Warner (1985) “BW85” procedure that tests the hypothesis of the theoretical cross-sectional expected value being equal to zero. The test does not require cross-sectional independence and produces robust results even if event window and estimation period are simultaneous. However, it is not robust to part of the variance induced by the event. The Boehmer et al. (1991) cross-sectional "t-stat” test that assumes independence of tested series and examines weather the cross-sectional expected value equals to zero. The test is robust to the event induced variance. The standardized-residuals “pt” test from Patell (1976) that examines the hypothesis of expected theoretical cross-sectional value for a given day being equal to zero. The standardization of residuals balances out the effect of event related variance, especially when compared to Brown and Warner variants. Because of the variance standardization, the “pt” test is appropriate under the presence of a highly volatile series that would potentially influence the whole sample. The test runs under the assumption of a cross-sectional independence and allows for the overlapping of event window and estimation period but is not robust to an event induced variance. The hybrid standardized cross section test from Boehmer (1991) that combines t-test and standardized results as previously described in Pattel`s procedure. The test has a null hypothesis of cross-sectional expected value being zero and runs under the assumption of cross sectional independence. The procedure is robust to the simultaneity of event window and estimation period. Finally, the test described in Lamb (1995) that tests the hypothesis of CAR statistic being different from zero and having the advantage of being robust to the correlation in the cross-section returns.

Second, to control for the robustness, several nonparametric tests are applied. The simple binomial sign test “SIGN” that indicates weather the cross-sectional frequency of abnormal returns differs from 0.5 as described in Boehemer et al. (1991). The test has good properties in the presence of outliers i.e. series with extreme abnormal returns, and non-symmetric cross sectional returns but is not robust in when the estimation period and the event period overlap. The binomial test “GSIGN” that indicates if the cross-sectional frequency of positive abnormal returns differs from the expected value. The test is also robust to outliers, non-symmetric abnormal returns but doesn’t allow for the overlapping periods. The difference relative to the “SIGN” test is that “GSIGN” procedure estimates the expected frequency rather than using assumed value of 0.5. The Corrado and Zivney (1992) “CSIGN” procedure that uses rank ordering and exhibits robustness in the case of non-symmetric abnormal returns as well as variance jumps during the event window. The rank “RANK” procedure that orders abnormal returns according to the corresponding ranks. This procedure is robust to the non-symmetric abnormal returns and variance jumps but isn’t suitable for the event and estimation period overlapping. The modified rank “MRANK” procedure that extends regular rank test in terms of improved ordering procedure but exhibits very similar properties. Finally, the Willcoxon test “WLCX” based on the sum of ranks statistic that correspond to the ranking of non-zero differences of cross-sectional abnormal returns is used. The test is robust to overlapping of estimation and event windows.

**5. RESULTS AND DISCUSSION**

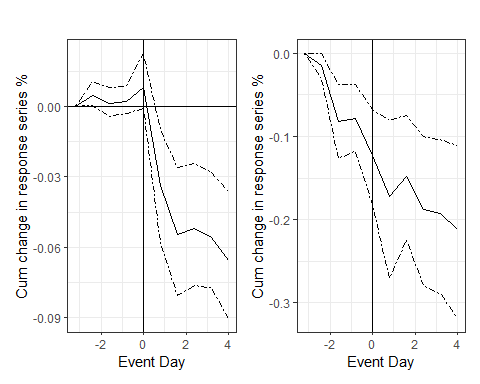
In this analysis we broadly define the event in terms of COVID-19 pandemic transitioning from global shock to taking measurable effect in Europe. To proxy the event effect, the first reported case in Italy on Feb, 21th is chosen and extended one week prior to the event to allow for the information to get incorporated in the market valuations. The reason for extending the event period 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, the end of the event period is extended for 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. For the given period, the results of the several parametric event study tests are presented in the Table 2. The table shows clusters of high 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 less robustness. Clusters of significance across different tests are also observed around March 11th when World Health Organization declared COVID-19 a global pandemic pointing to the significant effect on the listed tourist firms on ZSE. It is also noticeable that robustly significant COVID-19 effects can be observed on March 9th, 12th, 16th, and 17th pointing to the investor`s anticipation of official declarations in the local market.

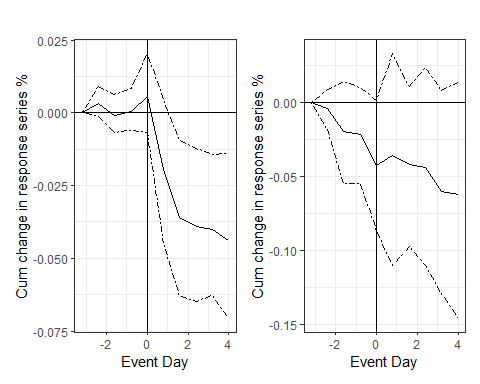
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| **Table 2.** The event study results for the parametric tests | | | | | | | | | |
| **Date** | **BW85** | **t-stat** | **pt** | | | **BH** | **LMB** | |
| 17.2.2020 | 0.154 | 0.5 | 0.938 | | | 0.899 | 0.154 | |
| 18.2.2020 | 0.548 | 1.1 | 1.799 | | | 1.642 | 0.547 | |
| 19.2.2020 | -0.73 | -1.81 | -2.519\*\* | | | -1.54 | -0.72 | |
| 20.2.2020 | 0.257 | 1.312 | 1.052 | | | 1.345 | 0.256 | |
| 21.2.2020 | 0.863 | 0.868 | 1.248 | | | 1.166 | 0.862 | |
| 24.2.2020 | -4.19\*\*\* | -2.03 | -11.66\*\*\* | | | -2.24\*\* | -3.41\*\*\* | |
| 25.2.2020 | -2.8\*\*\* | -1.75 | -4.203\*\*\* | | | -1.63 | -2.74\*\*\* | |
| 26.2.2020 | -0.48 | -0.53 | -0.12 | | | -0.07 | -0.47 | |
| 27.2.2020 | -0.19 | -0.26 | 0.408 | | | 0.191 | -0.18 | |
| 28.2.2020 | -0.65 | -0.76 | -1.527 | | | -0.88 | -0.63 | |
| 2.3.2020 | 1.797 | 1.335 | 3.738\*\*\* | | | 1.835 | 1.792 | |
| 3.3.2020 | 0.256 | 0.267 | 0.089 | | | 0.062 | 0.255 | |
| 4.3.2020 | -0.37 | -0.27 | 0.23 | | | 0.117 | -0.37 | |
| 5.3.2020 | -0.55 | -0.65 | -2.726\*\*\* | | | -1.34 | -0.55 | |
| 6.3.2020 | -1.38 | -1.05 | -5.26\*\*\* | | | -1.57 | -1.31 | |
| 9.3.2020 | -5.52\*\*\* | -1.9 | -8.95\*\*\* | | | -2.21\*\* | -3.25\*\*\* | |
| 10.3.2020 | -0.12 | -0.08 | | -2.8\*\*\* | -1.08 | | | -0.12 |  |
| 11.3.2020 | -4.91\*\*\* | -2.26\*\* | | -7.922\*\*\* | -2.4\*\* | | | -4.12\*\*\* |  |
| 12.3.2020 | -2\*\* | -0.63 | | -5.292\*\*\* | -1.34 | | | -1.1 |  |
| 13.3.2020 | 0.603 | 0.335 | | 2.03\*\* | 0.691 | | | 0.475 |  |
| 16.3.2020 | -2.53\*\* | -0.95 | | -7.119\*\*\* | -1.65 | | | -1.76 |  |
| 17.3.2020 | -2.2\*\* | -1.69 | | -2.267\*\* | -0.64 | | | -2.12\*\* |  |
| 18.3.2020 | -1.3 | -0.73 | | -4.098\*\*\* | -0.98 | | | -1.18 |  |
| 19.3.2020 | -0.44 | -0.24 | | 0.248 | 0.06 | | | -0.43 |  |
| 20.3.2020 | -1.08 | -1.05 | | -2.758\*\*\* | -1.1 | | | -1.02 |  |
| 23.3.2020 | -0.9 | -0.56 | | -3.662\*\*\* | -1.06 | | | -0.82 |  |
| Note: p<0.01\*\*\*, p<0.05\*\*, p<0.1\* | | | | | | | | | |

To check the robustness of the results, several nonparametric tests are additionally run and results are shown in the Table 3. Nonparametric tests show overall less significance relative to the parametric tests 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 investor`s anticipation of the introduction of lockdown in the Croatia on March 19th.

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| --- | --- | --- | --- | --- | --- | --- |
| **Table 3:** The event study reuslts for the nonparametric tests | | | | | | |
| **Date** | **SIGN** | **GSIGN** | **CSIGN** | **RANK** | **MRANK** | **WLCX** |
| 17.2.2020 | 0 | 0.823 | 1.103 | 1.017 | 1.017 | 40 |
| 18.2.2020 | -0.58 | 0.229 | -0.276 | 0.696 | 0.696 | 43 |
| 19.2.2020 | -0.58 | 0.229 | 0.827 | -0.226 | -0.226 | 20 |
| 20.2.2020 | 1.155 | 2.009\*\* | 1.378 | 1.755 | 1.755 | 55 |
| 21.2.2020 | -1.16 | -0.364 | 0.689 | 0.557 | 0.557 | 26 |
| 24.2.2020 | -0.58 | 0.229 | -0.276 | -0.711 | -0.711 | 19 |
| 25.2.2020 | 0 | 0.823 | 0 | -0.191 | -0.191 | 27 |
| 26.2.2020 | -0.58 | 0.229 | -0.276 | -0.497 | -0.497 | 33 |
| 27.2.2020 | 0 | 0.823 | 0.551 | 0.832 | 0.832 | 41 |
| 28.2.2020 | 0.577 | 1.416 | 0.551 | 0.892 | 0.892 | 38 |
| 2.3.2020 | 0.577 | 1.416 | 1.103 | 1.654 | 1.654 | 55 |
| 3.3.2020 | -0.58 | 0.229 | -0.276 | -0.148 | -0.148 | 34 |
| 4.3.2020 | 0 | 0.823 | 0.827 | 0.269 | 0.269 | 38 |
| 5.3.2020 | -0.58 | 0.229 | 0.276 | 0.314 | 0.314 | 29 |
| 6.3.2020 | 0 | 0.823 | 0.276 | 0.358 | 0.358 | 31 |
| 9.3.2020 | -0.58 | 0.229 | -0.276 | -0.653 | -0.653 | 15 |
| 10.3.2020 | -1.16 | -0.364 | -0.551 | -1.05 | -1.05 | 27 |
| 11.3.2020 | -2.31\*\* | -1.551 | -1.103 | -2.225\*\* | -2.225\*\* | 14\*\* |
| 12.3.2020 | 0 | 0.823 | 0.276 | 0.284 | 0.284 | 37 |
| 13.3.2020 | -0.58 | 0.229 | -0.276 | -0.528 | -0.528 | 35 |
| 16.3.2020 | 0 | 0.823 | 0 | 0.033 | 0.033 | 34 |
| 17.3.2020 | -2.31\*\* | -1.551 | -1.103 | -2.036\*\* | -2.036\*\* | 13\*\* |
| 18.3.2020 | 1.155 | 2.009\*\* | 0.551 | 0.959 | 0.959 | 43 |
| 19.3.2020 | 0.577 | 1.416 | 0.827 | 1.288 | 1.288 | 50 |
| 20.3.2020 | -1.73 | -0.958 | -0.827 | -1.526 | -1.526 | 22 |
| 23.3.2020 | 0.577 | 1.416 | 0.276 | 0.396 | 0.396 | 34 |
| Note: p<0.01\*\*\*, p<0.05\*\*, p<0.1\* | | | | | | |

Cumulative changes in the return series are additionally examined for two events, the first COVID-19 incidence in Italy and WHO declaration of COVID-19 a global pandemic, that have been characterized by clustering of significance across multiple parametric and nonparametric tests. In this case the event window is set to be shorter (10 days). The Figure 1 shows the results when no control variables are included in the model and Figure 2 is related to the extended model (i.e. market 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 pandemic. In both cases the null hypothesis of the abnormality of returns can’t be rejected since the full line, representing the stock returns, is inside 95% confidence intervals denoted by the 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 window is defined in broader terms we observe clusters of significance across variety of tests around two events, the first official incidence of COVID-19 in Italy and WHO declaration of global pandemic. This result implies 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 corroborated with shorter event window specification and shows robustness with respect to inclusion of external variable controlling for the overall market return. The descriptive statistics point to the significant effect of COVID-19 pandemic on the tourist stocks in the comparable size to the general market and also very similar to the other stock market sectors. Therefore, we conclude that COVID-19 pandemic had an equal market wide effect and no particular sector effect is can be identified. It is also interesting to note that results imply that international events potentially carry a higher importance for the local stock market trends than local epidemiological policy.

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# CONCLUSION

Coronavirus pandemic outbreak has largely affected economic activities all over the world and governments around the globe implemented policies that reduce movement of people and goods. These measures are expected to have a negative impact on all economic activities and especially pronounced in the service sector like tourism. This analysis provides empirical evidence on the direct reactions of ZSE listed tourist firms 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. Two events related to the first official COVID-19 incidence and WHO declaration of global pandemic could have been identified as most important for the returns. The findings are robust to different length specification of the 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 further inquiry would open an interesting area for future research as well as further examining the reasons for the unequal sectoral distribution of pandemic effects in the local and global markets.

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