

Analysis of the Impact of COVID-19 on the Tourism Stock Market ---Taking Caissa Touristic as an Example

Yumeng Chai^{1,*}

¹*School of Finance, Yunnan University of Finance & Economics, Kunming 650221, China*

**Corresponding author. Email: chaiyumeng@stu.ynufe.edu*

ABSTRACT

This paper carries out some analysis of the daily data of Caissa Tourism and SZSE (Shenzhen Stock Exchange) by Chinese stock market and accounting research database. Our benchmark model is a market model. Taking Caissa touristic as an example, this paper uses market model to analyze the specific reactions of the tourism stock market to COVID-19. Finally, the study finds that the COVID-19 has a significant negative effect on tourism markets. This paper presents the impact of the tourism stock market after COVID-19 as a contribution to the tourism stock market.

Keywords: *Market model, Event study, COVID-19, Caissa touristic*

1. INTRODUCTION

Since the first cases were discovered in December 2019, COVID-19 has rapidly spread around the world [1]. It is reported that COVID-19 has affected more than 213 countries/regions worldwide [2]. There have been more than 5,206,614 confirmed cases as of 25 May 2020, including 337,736 deaths, of COVID-19 globally [3]. Every country has been making tremendous efforts to minimize the number of cases and deaths and control the further spread of COVID-19. There is no doubt that COVID-19 has had a considerable impact on the entire world economy. Every country is suffering economic injuries that are caused by COVID-19. Almost all businesses/industries, especially the tourism sector which is one of the hardest-hit industries, have been devastated by this ongoing pandemic [4][5][6].

In early January 2020, a total of 41 patients with confirmed infections by a novel coronavirus (COVID-19) had been found in China [7], since then, the disease spread rapidly in China. On 11 March, COVID-19 was defined as a pandemic by the World Health Organization, the outbreak of COVID-19 impact Chinese financial market. The COVID-19 disease has impacted heavily on the international travel, tourism demand, and hospitality industry [8]. This unprecedented pandemic closed borders in many industrialized countries, and virtually all other countries

have implemented some travel restrictions, including bans on travel from selective countries, arrival quarantines, and/or health certificate requirements [9]. With the borders closed, airlines suspending flights, airports closing, exit bans and further daily restrictions travel is becoming more difficult [10].

The United Nations World Tourism Organization predicts that the number of international tourists will decrease by 20% - 30% in 2020, and the international tourism income will decrease by 300-450 billion US dollars. The UNWTO issued a press release on 27 March 2020 saying that the coronavirus disease would cause 20-30% loss in international arrivals (compared to 2019) rather than the forecasted 3-4% growth [11][12]. The Chinese Academy of Social Sciences and other research institutions predict that the total number of tourists and total income of China will be decrease by 30% - 40% in 2020 [13]. The future of tourism will face fierce competition [14]. Therefore, this paper studies the stock price reactions for a specific industry to COVID-19.

In order to prevent and control the epidemic, the government has issued policies to reduce people's travel. Many people go out less in order to ensure their health choices, which has a great impact on the tertiary industry, including tourism. This work chooses the representative stock of Caissa touristic as the research object in this report. Wuhan city closure is a node,

before the closure the overall trend of the stock rose, then the price fell sharply.

This report uses market adjustment model because it requires fewer forecast periods than the other. we exploit that changes in stock prices within the event window are affected by the emerging new crown epidemic and are negatively affected. The statistical analysis results were completed using Excel and R. This report finally provides the analysis of stock price responses to the emergence of COVID-19, shedding light on how markets react to it.

2. LITERATURE REVIEW

Many researchers investigate the topic of macroeconomic shock on tourism market. Most of the literatures illustrate the impact of crises or sudden disasters on tourism market. Song and Li (2020) states in their research that the tourism cost, both financial cost and safety cost, had increased sharply and there had been a huge decline in tourists going for a trip during the time of Spring Festival, which had decreased the revenue of tourism market. Zhang and Yang (2020) utilize the data and conduct analysis based on the data and they find that the tourism market witnessed a 71% year-over-year decline of occupancy during the time period of Jan. 23rd, 2020 to Jan. 26th, 2020. The common point of view in all these researches is that the event like crisis and sudden disasters will have an adverse effect on tourism market.

However, there are few literatures deal with the performance of tourism stocks during the period of pandemic like COVID-19 and this paper focuses on performance of tourism stock to research the impact of COVID-19. The Caissa Touristic has been selected as sample stock for research.

3. METHODOLOGY

3.1. Data

The data collected for analysis includes the information of stocks traded in SZSE (Shenzhen Stock Exchange), SZSE Component Index and stock performances of sample firms. The data is collected from Chinese stock market and accounting research database and the analysis is conducted using Excel and R.

3.2. Event Date and Event Window

In event study, it is of great importance to determine the event to be researched and the event window in which the valuation and performance of stocks are affected by the event. The event study concerns two windows, event window and estimation window. The event window is set to check whether the market responds to the COVID-19 and it is generally set few

days before and after the event. The event window should not be too long to avoid the effect of noises. The estimation window is used to calculate the normal return without the market shock and the estimation window is normally before the event window.

Given the research object in this paper, the event date and event window are determined. The event of Wuhan lockdown happened at Jan. 23rd, 2020 and the date is set as. Then, the event window is selected to be ten days before and after Jan 23rd and the it is finally determined to be 21 days that is from Jan 9th, 2020 to Feb. 14th, 2020, excluding the holiday and suspension. The estimation window consists of 191 days that is from Apr. 1st, 2019 to Jan. 8th, 2020.

3.3. Model

First, the regression model is created to obtain the returns of stock in estimation window, which is from Apr. 1st, 2019 to Jan. 8th, 2020. Generally, there are three types of model of calculating normal return, mean-adjusted model, market-adjusted model and market model. For event with short event window, these three models will generate slightly different results of normal return, however, the sign of abnormal returns will not have significant difference. In this paper, the market model is selected to research the normal returns of tourism stocks. The regression formula is,

$$R_t = \alpha + \beta * RM_t + \epsilon_t \quad (1)$$

Where R_t is the realized return in time t and it is obtained using the formula,

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \quad (2)$$

where P_t is the closing price of stock in time t ; RM_t is the market return of stock in time t and it is obtained using the formula,

$$RM_t = \frac{I_t - I_{t-1}}{I_{t-1}} \quad (3)$$

Where I_t is the closing price of SZSE Component Index I time t ; α and β are estimation coefficients of regression mode, ϵ_t is the residual term. In addition, α and β are estimated using the OLS (Ordinary Least Square) method.

Next, the forecasted returns, $E(R_t)$, in event window are obtained using the market model.

Then, the abnormal return, AR_t , and the cumulative abnormal return, CAR_t , during the event window are computed using the formula,

$$AR_t = R_t - E(R_t) = R_t - (\hat{\alpha} + \hat{\beta} * RM_t + \epsilon_t) \quad (4)$$

$$CAR_t = \sum AR_t \quad (5)$$

Observed that σ_ϵ^2 is unknown and thus it is estimated,

$$\hat{\sigma}_\epsilon^2 = \sum_{t \in D} \frac{(R_t - \hat{R}_t)^2}{D-2} \quad (6)$$

For analysis, the null hypothesis is that the COVID-19 had not impact on Chinese tourism market.

$$[-1.96 * \sqrt{2T}\sigma_\epsilon, 1.96 * \sqrt{2T}\sigma_\epsilon] \quad (7)$$

Given that if the value of CAR located in this area, the result fail to reject the null hypothesis and we can conclude that the COVID-19 has no impact on Chinese

tourism market. If the value of CAR is outside of the interval, we can reject the null hypothesis and conclude that the COVID-19 did affect the tourism market.

3.4. The Result and Analysis

The stock, Caissa Touristic, is selected as the research object and the following figure displays the daily market performance of Caissa.

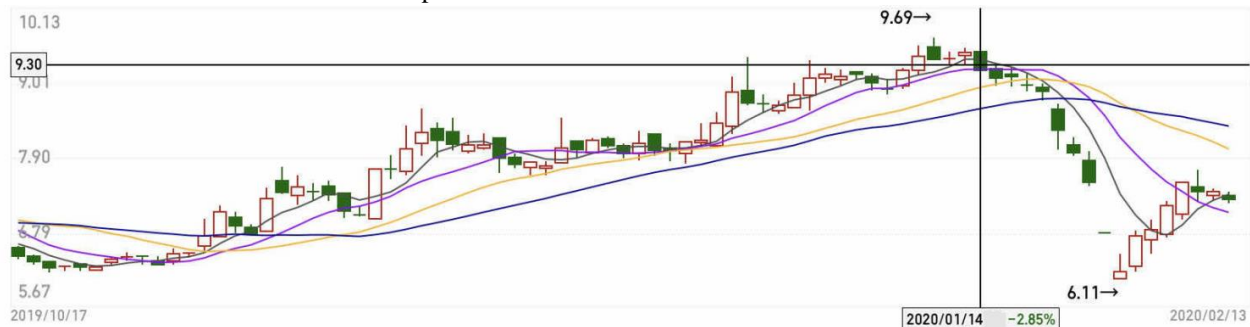


Figure 1 The Market Performance of Caissa

It is observed that the overall trend before Jan. 14th, 2020 was upward but it began to decline sharply after the Wuhan lock down.

Then, the regression model is carried out in R to research the impact of COVID-19 statistically. The

relationship between return of Caissa and the market return is then obtained. The following table displays the regression result.

Table 1 The Regression Result

Event Date	Regression Model	F-statistics	p-value
2020.1.13	$R_t = 0.00035 + 1.084R_{Mt} +$	69.97	1.24E-14

It is obvious that the model is statistically useful since the p-value of F statistic is much smaller than 0.05, or 5% significance level. In addition, Table 2

displays the estimation of regression coefficients and relative significance.

Table 2 The Regression Model

	Estimate	std.error	t value	p value
RM	1.084	0.1296	8.365	1.24E-14
c	0.00035	0.0018	0.201	0.141

The T test statistics of slope coefficient is 8.365 and the p-value is much smaller than 0.05, indicating that the slope coefficient is statistically significant at 5%

level. Thus, the model can be used to estimate the realized return in time t of event window. The following figure displays the scatterplot and the regression line.

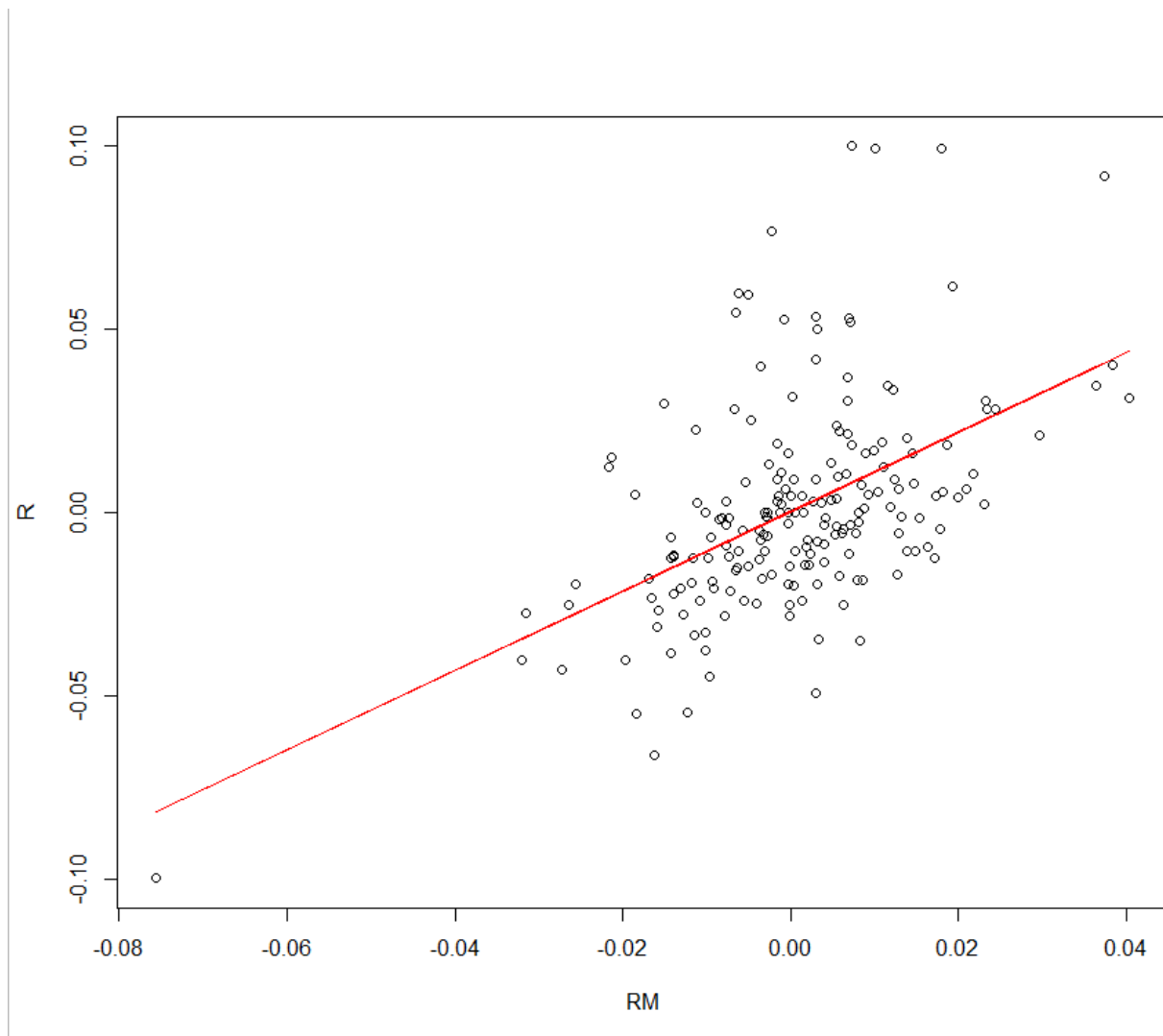


Figure 2 The Scatterplot and Regression Line

Then, the abnormal return and cumulative abnormal return during the event window is calculated and the confidence interval is also obtained, which is presented

in the following figure. In figure 3, the red line represents the confidence interval and the blue line represents the cumulative abnormal return.

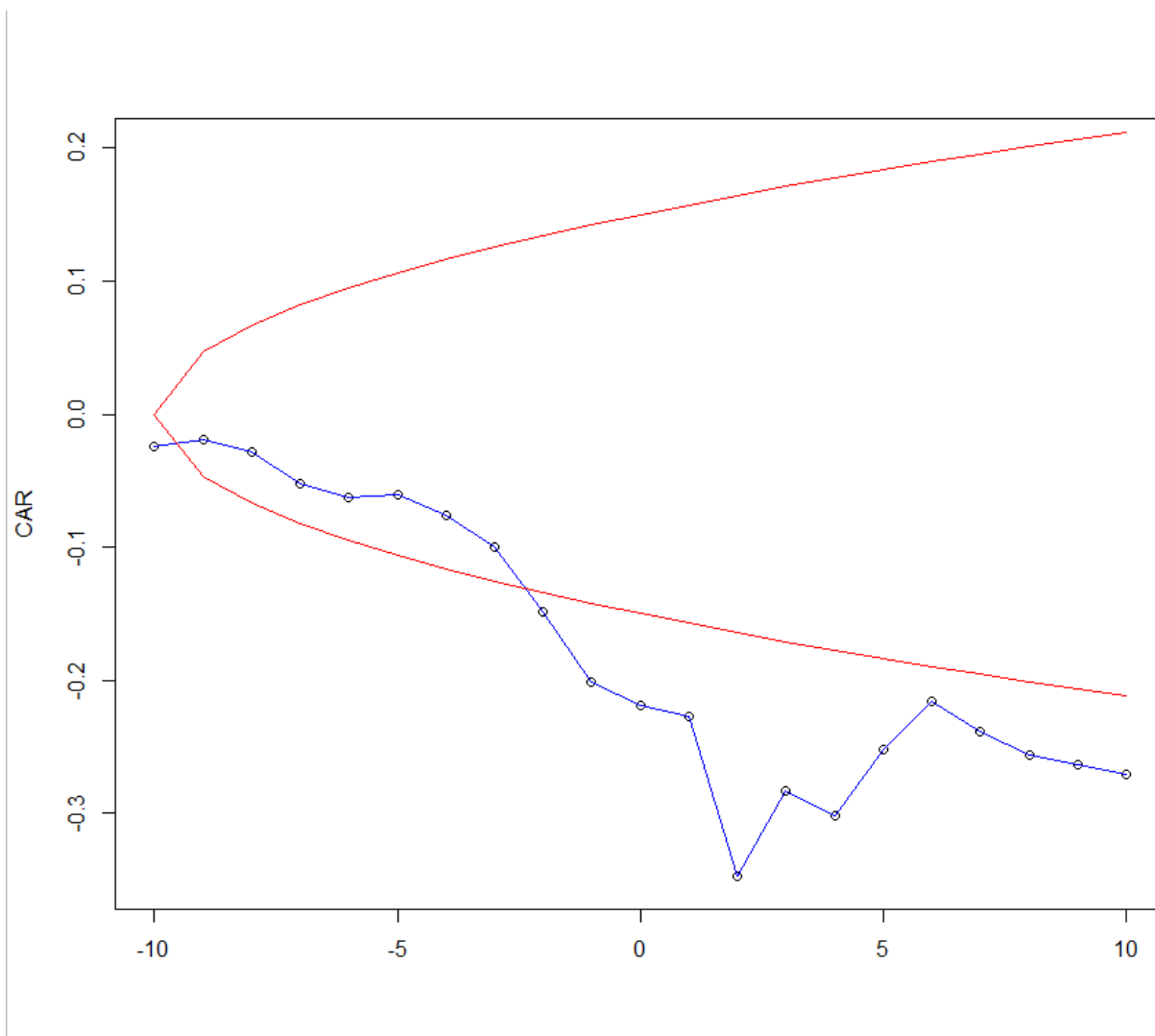


Figure 3 The Cumulative Abnormal Return and its Confidence Interval

It is observed that the cumulative abnormal return runs beyond the confidence interval after the time in the negative side, indicating that the market performed well before the Wuhan lockdown, however, the lockdown adversely affect the market, which is represented by the Caissa, and the market declined sharply and achieve significant negative abnormal return.

4. CONCLUSION

This paper takes Caissa's tourism as the research object. The reason we choose Caissa touristic is that this stock is comparatively developed well in Chinese tourism market and it is representative. We Use the event analysis method to study the impact of the COVID-19 on the Chinese tourism market.

From the above analysis in this paper, it can be seen that before the event day, The CAR value has a downward trend. On the day of the event ($t=0$), the CAR value dropped significantly and exceeded the confidence interval. And shows a significant decline on the second day after the event. Since then, CAR has

picked up, but it still does not satisfy the confidence interval. Therefore, this paper argues that the COVID-19 has a significant negative effect on capital markets.

There are some weakness in this research. We use Caissa touristic as the object instead of the entire market, so the results cannot fully summarize the entire market. Analyzing all the stocks is a very challenging task. Our ability is insufficient to conduct a comprehensive study of the market, so the conclusion still has shortcomings. We believe that future exploration can improve the shortcomings.

REFERENCES

- [1] J. De Vos, The effect of COVID-19 and subsequent social distancing on travel behavior. *Trans. Res. Interdiscip Perspect.* 2020, 5, 100121. [CrossRef]
- [2] Worldometer. COVID-19 Coronavirus Pandemic Dashboard. 2020. Available online: https://www.worldometers.info/coronavirus/?utm_

- campaign=homeAdTOA? (accessed on 2 September 2020).
- [3] WHO (World Health Organization) Coronavirus Disease (COVID-19) Dashboard. 2020. Available online: <https://covid19.who.int/> (accessed on 2 September 2020).
- [4] P. Johnson, P. Boone, From Lockdown to Locked in, Here's What Post-Pandemic Travel Could Look Like. World Economic Forum, 2020. Available online: <https://www.weforum.org/agenda/2020/05/coronavirus-lockdown-travel-tourism/> (accessed on 2 September 2020). *Int. J. Environ. Res. Public Health* 2020, 17, 6485 14 of 15.
- [5] P. Maniga, The Impact of COVID-19 on Tourism. Opinion. 2020. Available online: <https://www.policycenter.ma/opinion/impact-covid-19-tourism#.Xss0zDozaUk> (accessed on 2 September 2020).
- [6] UNWTO. Impact Assessment of the COVID-19 Outbreak on International Tourism. 2020. Available online: <https://www.unwto.org/impact-assessment-of-the-covid-19-outbreak-on-international-tourism> (accessed on 2 September 2020).
- [7] C. Huang, Y. Wang, X. Li, et al. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan. *The Lancet*, 395 (10223), 497–506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5) [Crossref], [PubMed], [Web of Science ®], [Google Scholar]
- [8] Chia-Lin Chang, Michael McAleer, Vicente Ramos. A Charter for Sustainable Tourism after COVID-19. 2020, 12(9).
- [9] Stefan Gössling, Daniel Scott & C. Michael Hall (2021) Pandemics, tourism and global change: a rapid assessment of COVID-19, *Journal of Sustainable Tourism*, 29:1, 1-20, DOI: 10.1080/09669582.2020.1758708.
- [10] FCO (The Foreign & Commonwealth Office). (2020). Foreign Secretary advises all British travelers to return to the UK now. Retrieved March 31, 2020, from <https://www.gov.uk/government/news/foreign-secretary-advises-all-british-travellers-to-return-to-the-uk-now> [Google Scholar]
- [11] STR. (2020a) COVID-19: Hotel industry impact . Retrieved April 5, 2020, from. <https://str.com/data-insights-blog/coronavirus-hotel-industry-data-news> [Google Scholar]
- [12] 2.STR . (2020b). U.S. hotel RevPAR forecasted to drop 50.6% for 2020. Retrieved April 5, 2020, from <https://str.com/press-release/us-hotel-revpar-forecasted-drop-50-point-6-2020> [Google Scholar]
- [13] Y. Zheng, Study on the characteristics and countermeasures of China's tourism market since the epidemic. *China Prices Press*, 2020, vol.10, pp.107-109.
- [14] Freya Higgins-Desbiolles (2020) The “war over tourism”: challenges to sustainable tourism in the tourism academy after COVID-19, *Journal of Sustainable Tourism*, DOI: 10.1080/09669582.2020.1803334