

The Impact of COVID-19 on China's Stock Market

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Abstract

In December 2019, the Corona Virus Disease 2019 (COVID-19) outbreak occurred in Wuhan, Hubei Province, and spread rapidly across the country in January 2020. The COVID-19 epidemic has brought a certain degree of negative impact on Chinese social and economic development. From the perspective of financial markets, the reaction has been even more dramatic. This article will use the event research method combined with multiple regression analysis to analyze the stock return rate of the Chinese stock market from January to March, and explore the negative effects of this sudden public event on the stock market in China.

Keywords

COVID-19; Public emergency; Market rate of return; Daily return on individual stocks.

1. INTRODUCTION

1.1. Novel Coronavirus Pneumonia in China

In December 2019, the Corona Virus Disease 2019 (COVID-19) outbreak occurred in Wuhan City, Hubei Province, and spread rapidly across the country in January 2020. The COVID-19 epidemic has brought a certain degree of negative impact on Chinese social and economic development. General Secretary Xi Jinping issued important instructions on the epidemic on 7th January and 20th January, emphasizing that the safety and health of the people should be put first, and resolutely curbing the spread of the epidemic [1] [2]. The World Health Organization listed the epidemic as an "international public health event of international concern", which aggravated people's panic. Some scholars (Peng et al., 2020) [3] classified the concerns of COVID-19 reflected in the media by medical and health professional institutions, governments, and the public as multiple response subjects into the Five Emotions Index of COVID-19 and classified the Five Emotions. The overall trend of information is divided into five stages: the incubation period (before 30th December), the first outbreak period (30th December -1st January), the platform fluctuation period (2nd January-16th January), and the second Outbreak period (17th January -23th January) and platform fluctuation period (after 23th January).

From the perspective of financial markets, the reaction has been even more dramatic. It cannot be denied that during the outbreak of the COVID-19, the Chinese stock market was severely impacted (Guo,2020) [4]. Figure 1 is a trend chart of the comprehensive daily market rate of return (weighted average method of total market value) during the outbreak of the epidemic in the comprehensive market, including comprehensive AB stocks, ChiNext and Science and Technology Innovation Board, considering the reinvestment of cash dividends. As shown in Figure 1, after the outbreak, especially in the early morning of January 23, 2020, the

Wuhan Epidemic Headquarters announced the closure of the city [5]. The daily return rate of the comprehensive market on that day dropped sharply from 0.35% the day before to -3.04%. On the 29th of New Year's Eve in 2020, the Chinese market is about to enter the Spring Festival holiday, and the situation is not completely clear at this time. The stock market has accumulated more than ten days of negativity and broke out on the opening day of February 3, and the comprehensive market return rate fell to nearly -8 %.

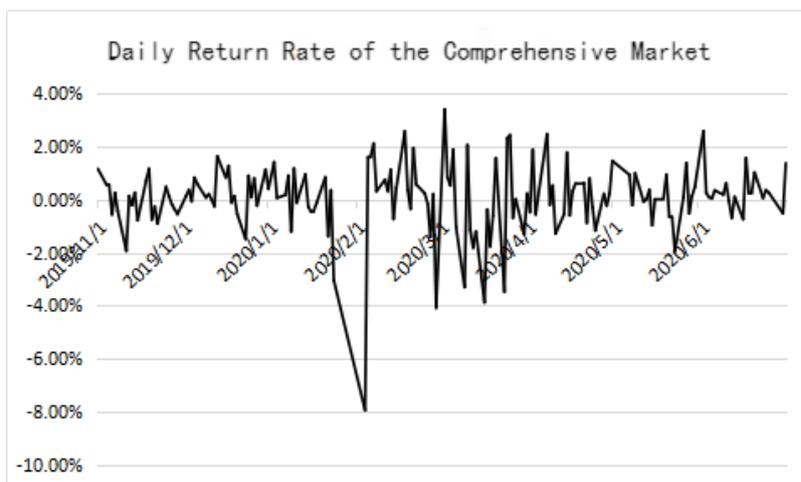


Figure 1. Trend of daily return rate of comprehensive market before and after the outbreak of the epidemic

The emergency management process of emergencies and crisis events is usually divided into three stages: before the event, during the event, and after the event. The pre-event mainly includes risk assessment, monitoring and early warning, prevention and evasion, and emergency preparedness [6]. The incident includes emergency decision-making, coordination and communication, and command and disposal. After the incident, it includes recovery and reconstruction, incident investigation, and learning improvement. In order to effectively reduce the negative impact and losses caused by crisis events, prior monitoring and early warning are particularly important. Thelwall et al. (2011) [7] conducted sentiment analysis on nearly 35 million Twitter messages related to 30 events including earthquakes, tsunamis and other crisis events and found that the popularity of the events is strongly related to the negative degree of online sentiment. Researchers from the Centers for Disease Control and Prevention of the United States and Google Corporation used actual influenza case data in the United States from 2003 to 2008 and Google search data to test the correlation of influenza cases in nine major regions of the United States (Ginsberg, 2009) [8]. When relevant scholars suggest using online public opinion to detect public emergencies, it can indeed play an important role, but it cannot be denied that in addition to timely detection of the incident, relevant effective measures must be taken to solve the problem. The United States can have strong data and intelligence, but there is still no fundamental solution to the problem of curbing the COVID-19 [9] [10].

There are many documents on the stock market of emergencies at home and abroad, most of which focus on the study of the impact of political events such as terrorist attacks, natural disasters such as earthquakes, and industrial disasters such as chemical pollution on the stock market. The research results of Nikkinen et al. (2004) [11], Brounen et al. (2010) [12], Ramiah et al. (2013) [13] and others also prove that the stock market will produce violent turbulence after a terrorist attack. Industrial disasters will also cause fear and panic among investors, which will cause shocks and volatility in the stock market (Capelle-Blancard et al., 2010) [14].

2. DATA SOURCES AND RESEARCH METHODS

2.1. Data Source

All the data in this article comes from the Guotai Junan CSMAR database. In order to fully study the impact of international trade conflicts on the stock market, the samples in this article include Shanghai and Shenzhen AB shares, ChiNext and sci-tech innovation boards. After the missing samples, 3881 listed companies were collected as samples.

2.2. Research Methods

This article mainly uses multiple regression methods and establishes a multiple linear regression model. The market rate of return Dretwd is used as the explained variable. The sample is divided into two groups. Five days before and after the event as the control group, and 60 days before and after the event (excluding Five days before and after the event) as a control group, 11 dummy variables were generated for regression, and an attempt was made to analyze the impact of each single day during the event window on the stock return rate. Four variables, company size, return on net assets, and book-to-market value ratio are also selected as control variables and added to the model for the second regression to see if the results are still stable. Both models control these variables in the industry at the same time. The following table 1 is the variables used in this article and their calculation methods.

Table 1. Variable selection and calculation method

	Variable Name	Variable Symbol	Variable calculation method
Explained Variables	Daily return on individual stocks	Dretwd	Consider cash dividend reinvestment
	5 days before the incident	Pre_5	Dummy variable, if it is the 5th day before the event, it will be 1, otherwise it will be 0
	the 5th day before the event	Pre_4	Dummy variable, if it is the fourth day before the event, it will be 1, otherwise it will be 0
	the third day before the event	Pre_3	Dummy variable, if it is the third day before the event, it will be 1, otherwise it will be 0
	the second day before the event	Pre_2	Dummy variable, if it is the second day before the event, it will be 1, otherwise it will be 0
	the first day before the event	Pre_1	Dummy variable, if it is the first day before the event, it will be 1, otherwise it will be 0
Explanatory Variables	The day of the incident	event	Dummy variable, if it is the day of the event, it will be 1, otherwise it will be 0
	Day 1 after the incident	Past_1	Dummy variable, if it is the first day after the event, it will be 1, otherwise it will be 0
	Day2 after the incident	Past_2	Dummy variable, if it is the second day after the event, it will be 1, otherwise it will be 0
	Day3after the incident	Past_3	Dummy variable, if it is the third day after the event, it will be 1, otherwise it will be 0
	Day 4 after the incident	Past_4	Dummy variable, if it is the fourth day after the event, it will be 1, otherwise it will be 0
	Day 5 after the incident	Past_5	Dummy variable, if it is the 5th day after the event, it will be 1, otherwise it will be 0
Control variable	Company Size	Size	Natural logarithm of total assets
	Return on equity	ROE	ROE=Net profit/equity
	Financial leverage	Lev	Lev = total liabilities/total assets
	Book-to-market ratio	BM	Shareholders' equity / company market value

3. MULTIPLE REGRESSION ANALYSIS

This article mainly uses multiple regression methods and establishes a multiple linear regression model. The market rate of return Dretwd is used as the explained variable. The sample is divided into two groups. Five days before and after the event as the control group, and

60 days before and after the event (excluding Five days before and after the event) as a control group, 11 dummy variables were generated for regression, and an attempt was made to analyze the impact of each single day during the event window on the stock return rate.

Table 2. Total sample regression results

	Modle1 Dretwd	Modle2 Dretwd
Pre_5	-0.008*** (-12.522)	-0.008*** (-12.519)
Pre_4	-0.006*** (-9.602)	-0.006*** (-9.604)
Pre_3	0.005*** (7.055)	0.005*** (7.061)
Pre_2	-0.016*** (-24.346)	-0.016*** (-24.350)
Pre_1	-0.004*** (-5.458)	-0.004*** (-5.456)
Event	-0.038*** (-57.840)	-0.038*** (-57.855)
Past_1	-0.093*** (-143.071)	-0.093*** (-143.109)
Past_2	-0.010*** (-14.683)	-0.010*** (-14.683)
Past_3	0.024*** (36.388)	0.024*** (36.400)
Past_4	0.021*** (32.339)	0.021*** (32.349)
Past_5	0.007*** (11.040)	0.007*** (11.043)
Lev		-0.000 (-0.195)
Size		-0.001*** (-9.726)
ROE		0.000*** (6.002)
BM		-0.000 (-1.285)
_cons	0.005 (48.710)	0.018 (13.363)
Industry	Controlled	Controlled
N	211,609	211,609
R2	0.115	0.115

In order to verify the impact of the epidemic on Chinese stock market, this paper uses the market return rate as the explained variable, generates dummy variables for the five trading days before and after the event, a total of 11 dummy variables, and regresses the dummy variables to the market rate of return, and obtains The results are shown in Table 2.

According to the regression results in Table 2, the market had a statistically significant response to the event on the 3rd, 4th, and 5th days before the event, but its coefficients were extremely small, only -0.008, -0.006, 0.005, and On the 2nd day before the event, the market showed a significant negative reaction at the 1% level, with a coefficient of -0.016. From the day

of the event to the first day after the event, for two consecutive days, the coefficient was significantly negative at the 1% level. , On the day of the incident, the coefficient was -0.03, and on the first day of the incident, its coefficient reached -0.09. This is mainly because the market is further releasing the negative sentiment brought by the epidemic. On the last trading day of the 23rd, the epidemic appeared one The outbreak point, but the market has not had time to digest it, and the epidemic has not yet reached its climax. Therefore, on the first trading day after the incident, the coefficient fell by nearly 0.1. On the second day after the event, the market was significantly negative at the 1% level, and the coefficient was positive for the next three days, but the value was much smaller than before.

In addition, the regression model of Model 2 did not have a significant impact on the 11-day coefficient and T value of the event period after adding the control variables. The possible reason is that the market rate of return spans only 60 trading days before and after the event. The control variable The company size, financial leverage, return on capital, etc. in China have not changed, resulting in almost no difference between the results of the second regression and the results of the first regression.

To sum up, the market had a negative reaction before the incident, which may be because investors had a deeper understanding of the epidemic and had anticipation of the beginning of the epidemic; the stock market on the day of the incident It has a very significant negative impact, and it will continue to significantly affect market volatility in the following 2 days. Therefore, the hypothesis about: The COVID-19 has a significant negative impact on Chinese stock market, which has been confirmed.

4. CONCLUSION

This article concludes that the COVID-19 epidemic has had a certain negative impact on China. The day of the event had an extremely significant negative impact on the stock market, and it had a continuous and significant impact on market volatility in the following 2 days. However, it can be seen from Table 1 that the negative impact of the COVID-19 on the stock market is not very long. The main reason is that the Chinese government has taken timely and effective measures. In the near future, the epidemic will be very effectively controlled after March. Investors Still full of confidence in the future of China's stock market.

This article almost only discusses the impact of the COVID-19 on the entire stock market, and does not study from the point of view. If you can discuss further, you should start with the following: Add a research hypothesis: the impact on related industries will be greater. The COVID-19 epidemic has a greater impact on Chinese economy in the short term, especially the catering, tourism, and retail industries in the tertiary industry. We should think about issues from the perspective of globalization. The COVID-19 not only caused certain losses to the Chinese economy in the early stage, but also looked at the world, whether it is developed countries, the United States or developing countries, Brazil and India, and other countries can not escape it. In the era of trade globalization, the epidemic has undoubtedly harmed the interests of most countries. Therefore, we should pay attention to more other developments when studying problems.

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