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# COVID–19's Impact on Stock Prices Across Different Sectors—An Event Study Based on the Chinese Stock Market

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**ABSTRACT**

In this article, we use an event study approach to empirically study the market performance and response trends of Chinese industries to the COVID-19 pandemic. The study found that transportation, mining, electricity & heating, and environment industries have been adversely impacted by the pandemic. However, manufacturing, information technology, education and health-care industries have been resilient to the pandemic.

**KEYWORDS**

COVID-19; industry heterogeneity; event study; stock price

## 1. Introduction

The year 2020 is destined to be recorded in history because of extraordinary turn of events. The outbreak and spread of novel coronavirus (COVID-19) disease across the world have seriously affected people's production and life in general. Economies around the world are presently facing severe challenges due to the COVID-19 outbreak. According to real-time statistical data released by Johns Hopkins University, as of June 5, 2020, globally there have been 6,601,349 diagnosed cases of and 389,620 deaths from COVID-19. There are already clear signs of a recession in the global economy. In the "Global Economic Outlook" report in April 2020, the International Monetary Fund predicted that global gross domestic product (GDP) would fall by 3% throughout the year, while the World Trade Organization predicted that global trade could decline by as much as 32% in 2020. The impact of COVID-19 on the economy is not a cyclical fluctuation in the traditional economic development process. The short-term disasters generated by the pandemic also surpass any endogenous and extreme events in the past. Assessing and understanding the economic impact of COVID-19 has become an important issue. The purpose of this article is to evaluate the impact of COVID-19 on stock prices.

The traditional economic and financial theory holds that stock prices are mainly affected by market and firm characteristic-based factors. Companies in the same industry face the same regulatory and policy environment and similar macroeconomic conditions. When faced with changes in the economic environment, the operating conditions of companies in the same

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industry are highly correlated (Moskowitz and Grinblatt 1999). According to the theory of behavioral finance, in addition to the basic value of stocks, emergencies will have an impact on investors' psychological and behavioral factors, which in turn will have an important impact on stock prices. Lee and Jiang (2002) believe that investor optimism will reduce earnings volatility, while investor pessimism will increase earnings volatility. Therefore, the outbreak of COVID-19 will have an impact on the economic environment, which will affect investor sentiment, causing stock price changes.

The COVID-19 pandemic, as a public health emergency, is not only causing human infections and deaths, it is also disrupting the stock market. According to the China Health Committee, as of June 5th, the cumulative number of COVID-19 diagnoses in China was 84,617, with a cumulative death of 4,645. As the first country to respond to COVID-19, China made great efforts to resume work and production. When COVID-19 was declared, the Chinese government called for greater macro-policy adjustments and an active fiscal and taxation policy (Li, Zhang, and Zhao 2020). Yang, Chen, and Zhang (2020) found that the outbreak of the pandemic caused a sharp rise in risks in the financial sector, which transmitted to other industries. However, different industries are affected by the pandemic to varying degrees, and their responsiveness also varies. To comprehensively evaluate the impact of COVID-19 on stock prices of various Chinese industries, we adopted an event study approach. We examine the stock prices of industries that react to the pandemic.

The empirical results show that the COVID-19 pandemic has a severe impact on China's traditional industries, such as transportation, mining, electricity and heating, and environment. In contrast, it created opportunities for the development of high-tech fields. The manufacturing, information technology, education, and health industries responded positively to the pandemic. Our study contributes to the literature as follows. First, we explore the impact of the pandemic on the stock prices of various subsectors and explored the responsiveness of each industry to the pandemic. Secondly, our research is the first to employ the event study method to examine the effects on COVID-19 at the industry level. Our study therefore contributes to a small but growing literature on COVID-19 and its repercussions on different aspects of the economic and financial system (see, inter alia, Ali, Alam, and Rizvi 2020; Apergis and Apergis 2020; Fu and Shen 2020; Gil-Alana and Monge 2020; Narayan 2020). We contribute from the stock market reaction point of view.

The article proceeds as follows. Section 2 presents the literature review. Section 3 outlines the sample, variables, and models. Section 4 presents the empirical results and analysis. Section 5 presents further analysis, while Section 6 concludes the article.

## 2. Literature Review

In the capital market, emergencies often affect investor behavior by affecting investor sentiment, which ultimately affects stock prices. The earliest event study proposed by Fama et al. (1969) can be used to understand whether market security prices are related to specific events. In recent years, event study has been widely used in the field of accounting and financial practice and has gradually become a common research method in business studies. The existing research literature on the relationship between emergencies and stock prices mainly focuses on terrorist attacks, natural disasters, political behavior, and financial crises. Kalra, Henderson, and Raines (1993) studied the catastrophe of the Soviet Chernobyl nuclear power plant. Nikkinen et al. (2008) found that the "911" incident caused a significant drop in global stock prices, but they quickly recovered. Al-Rjoub (2011) and Al Rjoub and Azzam (2012) studied the Mexican tequila crisis in 1994, the Asian-Russian financial crisis from 1997 to 1998, the American "911" attack in 2001, the Iraq war in 2004, the financial crisis of November 2005, and the global financial crisis of 2008–2009. These authors explored whether these periods have an impact on the stock compensation behavior of the Jordan Stock Exchange.

Righi and Ceretta (2011) found that the European debt crisis of 2010 changed the risk of major European markets, particularly the volatility of the German, French, and British markets. Schwert (2011) studied the fluctuation of US stock prices during the financial crisis. Rengasamy (2012) studied the impact of Eurozone sovereign debt-related policy announcements and development rewards, as well as the stock market volatility of the BRIC countries (i.e., Brazil, Russia, India, China, and South Africa). Bai et al. (2019) applied rare disasters to a general equilibrium model and found that the capital asset pricing model (CAPM) considering emergencies can better reflect the stock price. Lanfear, Lioui, and Siebert (2018) studied the impact of US hurricanes on stock returns and found that emergencies affecting consumer growth will impact the stock market. Yin, Lu, and Pan (2020) studied the impact of the Sino-US trade war on the Chinese stock market and found that negative events have a longer-lasting impact on the stock market than positive events. There are also studies that focus on industry segments. Kaplanski and Levy (2010) discuss the impact of aviation accidents on stock prices and believe that unstable stock prices are more vulnerable to this effect. Ragin and Halek (2016) studied the 43 largest disasters in the insurance industry since 1970 and found that insurance brokers received abnormal stock returns on the day of the incident. Al Rjoub (2009) analyzed the impact of the financial crisis on the stock market.

The literature on the impact of emergencies on stock markets is quite broad but few studies examine the negative impact of major public health events on stock markets. Existing studies mainly focus on influenza and SARS pandemic s. A representative study by Goh and Law (2002) found that the 1997 Asian

financial crisis and the 1998 Hong Kong avian influenza outbreak had a significant negative impact on tourism. Mctier, Tse, and Wald (2011) studied the impact of flu on the US stock market and found that an increase in the flu rate would reduce the enthusiasm of trading activities and stock returns. Chen, Jang, and Kim (2007) studied the impact of SARS on the hotel industry in Taiwan and found that SARS caused the stock price of the hotel industry to plummet. Chen, Jang, and Kim (2007) studied the long-term impact of the SARS pandemic on four major stock markets in China and Asia and found it has a significant impact on the financial integration of the stock market. In general, there is no comprehensive analysis of the impact of emergencies on the stock price of the entire industry in the literature.

As a public health incident of international concern, COVID-19 has a huge and sustained negative impact on the global economy (Iyke 2020a). Mei-Ping et al. (2018) studied the impact of SARS on Asian financial markets. Narayan and Phan (2020) studied the impact of COVID-19 on the stock market and the response of countries. Sobieralski (2020) analyzed the impact of COVID-19 on the aviation industry and employment. Many stock prices in China's A-share market have fallen to historical low levels, and the US stock market has four unprecedented nosedives. The negative COVID-19 impact on the stock market has increased the difficulty of risk prevention and control (Guidolin, Hansen, and Pedio 2019; Laura, Barbara, and Ana 2016). However, there is limited industry-level research on the effect of COVID-19 on stock prices in the existing literature, and there are industry limitations on the economic level of COVID-19 (Iyke 2020b; Reilly 2020; Saadat, Rawtani, and Hussain 2020). Qin et al. (2020) analysed the impact of the pandemic on oil markets. Ali, Alam, and Rizvi (2020) studied the impact of COVID-19 on different financial securities and compared the situation of China and other countries but paid less attention to industry heterogeneity. Liu et al. (2020) discussed the impact of COVID-19 on crude oil prices and stock prices in the US. In this context, we delved into the different changes in the stock prices of various industries during the pandemic window period in order to discover the ability of different industries to respond to the pandemic.

## 3. Samples, Variables and Models

### *3.1. Research Model*

Event study mainly examines the abnormal changes of sample stock prices (or abnormal returns) after a specific event occurs. Han and Ming (2018) made a systematic study of the event method. We used event study in this article to examine the impact of the COVID-19 pandemic on the stock market. There are three main models for calculating abnormal returns: the average adjusted return rate model; the market index adjusted return rate model; and the market model.

The average adjusted rate of return model has a large deviation, when a bull or bear market occurs on the event day (Klein and Rosenfeld 1987). The market index adjusted return model has a strong relationship assumption, which is not applicable in most cases (Huang and Li 2018). Market models are the most commonly used and have good predictive power (Brenner 1979). In this article, we used the market model, which is outlined as follows.

Calculate the normal rate of return:

$$R_{i,t} = \alpha_i + \beta_i R_{i,M_{i,t}} \tag{1}$$

Calculate the average abnormal rate of return:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{i,M_{i,t}}) \tag{2}$$

Calculate the cumulative abnormal rate of return:

$$CAR_{i(t_1,t_2)} = \sum_{t_2}^{t=t_1} AR_{i,t} \tag{3}$$

where,$R_{i,t}$is the return rate of stock $i$ on the trading day $t$,$R_{i,M_{i,t}}$is the market return rate of the trading market, $\alpha_i$and$\beta_i$ are the regression coefficients of the daily return rate of the stock $i$ and the market return rate. The expected normal return of individual stock $i$ can be calculated, if $\alpha_i$ and $\beta_i$ remain stable during the estimation period. $AR_{i,t}$ is the average abnormal return rate of stock $i$ on the trading day $t$, obtained by subtracting the expected return from the actual return. $CAR_{i(t_1,t_2)}$ is the cumulative abnormal return rate of stock $i$ in the event window period ($t_1$, $t_2$).

### 3.2. Event Window and Sample Selection

From December 30, 2019, news about the COVID-19 outbreak in the southern China seafood market in Wuhan started circulating online, and this began causing crowd panic. We took the closure of Wuhan on January 23, 2020, as reported by the official media such as People's Daily and Xinhuanet, as the event day of the COVID-19 outbreak. If the estimation window is too short, the results will be biased. If the estimation window is too long, the forecast structure may change. In order to improve the forecast accuracy as much as possible, we selected 160 trading days before the event date as the forecast period. We choose every five trading days around the event occurrence date as the event window period. Figure 1 shows the event window.

The sample selected in this article comes from the Shanghai and Shenzhen A-share market and consists a total of 2,895 listed companies. The time interval is from June 3, 2019, to March 13, 2020. The companies' individual stock returns and comprehensive market returns come from the CSMAR database. We used the T-test to observe the abnormal return rate during the window period.

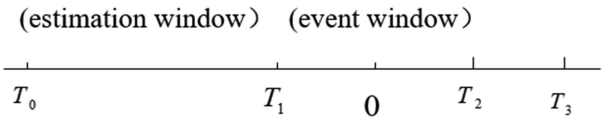


Figure 1. Event window. The T0-T1 segment is the estimation window, the T1-T2 segment is the event window and the T2-T3 segment is the post-event window.

## 4. Empirical Results and Analysis

### 4.1. Industry-wide Analysis in the Event Windows

We first drew on the research method of He et al. (2019), divided the market into different markets, and analyzed the market value of Shanghai and Shenzhen A-shares before and after the outbreak of COVID-19. The regression results showed that on the day COVID-19 broke out, the overall stock value of the Shanghai and Shenzhen A-share markets did not significantly fluctuate. However, as the pandemic intensified, from the 15th trading day after the event, the market value of Shanghai and Shenzhen A shares significantly dropped and continued along that path for a long time. Breakdown of the Shenzhen Stock Exchange and Shanghai Stock Exchange samples, we observed that both markets responded quickly to COVID-19. The abnormal returns of listed companies on the Shanghai Stock Exchange significantly dropped, whereas the excess returns of listed companies on the Shenzhen Stock Exchange rose.

To explore the reasons behind these heterogenous reactions, we analyzed the industry characteristics of listed companies on the Shanghai and Shenzhen markets. The main service entities of the Shanghai Stock Exchange are mainly Chinese central enterprises and state-owned enterprises, which are mostly traditional industries, whereas the listed companies on the Shenzhen Stock Exchange are mostly high-tech enterprises. In summary, the outbreak of COVID-19 had a serious negative impact on China's traditional industries, but created opportunities for the development of high-tech industries. To further explore the impact of the COVID-19 outbreak, we conducted in-depth research on 18 sub-sectors in China.

### 4.2. Analysis of Various Industries in the Event Window

Tables 2–4 show the impact of the COVID-19 pandemic on the market value of 18 sub-sectors in China. It can be seen from Table 2 that, on the day of the COVID-19 outbreak, the stock prices of the agriculture, mining, electric and heating, and construction industries all significantly declined, and the value of companies in other industries except agriculture continued to decline during the window period. However, the manufacturing industry continued to rise on

the day of the outbreak and subsequent days, and the wholesale and retail industries were not significantly affected.

As can be seen from Table 3, the market value of companies in transportation, real estate, and environmental industries significantly decreased on the day of the outbreak and subsequent days, and lodging and catering, and business service industries were also affected to a certain extent. The stock price of the information technology industry significantly increased on the day of the outbreak, and again markedly increased during the (0, +20) window period.

It can be seen from Table 4 that the education and health industries were significantly hit when the pandemic broke out, but rebounded in the subsequent event window. The financial services, scientific research, sports and entertainment, and public management industry have been significantly affected by the pandemic.

**Table 1.** Results of the impact of COVID-19 shock on the stock market value.

| | Shanghai A-share | | Shenzhen A-share | | Shanghai & Shenzhen | |
|---|---|---|---|---|---|---|
| Event window | CAR | t value | CAR | t value | CAR | t value |
| (−30, 0) | −0.0026*** | −8.3631 | 0.0010*** | 3.2400 | −0.0008*** | −3.6554 |
| (−25, 0) | −0.0023*** | −8.6949 | 0.0011*** | 3.7277 | −0.0007*** | −3.4667 |
| (−20, 0) | −0.0019*** | −6.5061 | 0.0011*** | 3.4741 | −0.0005** | −2.0991 |
| (−15, 0) | 0.0020*** | −6.0126 | 0.0015*** | 4.0150 | −0.0003 | −1.2748 |
| (−10, 0) | 0.0015*** | −3.5329 | 0.0012*** | 2.6477 | −0.0002 | −0.5711 |
| (−5, 0) | −0.0014** | −2.2324 | 0.0020*** | 2.9782 | 0.0003 | 0.5756 |
| (0, 0) | −0.0023 | −1.1299 | 0.0048** | 2.0413 | 0.0011 | 0.7257 |
| (0, +5) | −0.0025*** | −3.3820 | 0.0019** | 2.2955 | −0.0004 | −0.6548 |
| (0, +10) | −0.0020*** | −4.1906 | 0.0017** | 2.1853 | −0.0004 | −1.3138 |
| (0, +15) | −0.0024*** | −6.2579 | 0.0015*** | 3.4582 | −0.0005*** | −1.7924 |
| (0, +20) | −0.0026*** | −7.9244 | 0.0016*** | 4.4673 | −0.0005*** | −2.1927 |
| (0, +25) | −0.0024*** | −8.2220 | 0.0013*** | 3.9040 | −0.0006*** | −2.8623 |
| (0, +30) | −0.0024*** | −6.8778 | 0.0014*** | 3.5839 | −0.0006*** | −2.1401 |

CAR stands for cumulative abnormal return. The ordinate represents the event window. ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

**Table 2.** Results of the impact of COVID-19 in various industries.

| Event window | Agriculture | Mining | Manufacturing | Electric& heating | Construction | Wholesale & retail |
|---|---|---|---|---|---|---|
| (−30, 0) | −0.0062*** | −0.0121*** | 0.0011*** | −0.0079*** | −0.0051*** | 0.0006 |
| | (−2.43) | (−8.27) | (3.75) | (−10.86) | (−5.35) | (0.65) |
| (−20, 0) | −0.0011 | −0.0099*** | 0.0010*** | −0.0075*** | −0.0025** | 0.0013 |
| | (−0.46) | (−6.99) | (3.55) | (−10.34) | (−2.49) | (1.45) |
| (−10, 0) | −0.0145*** | −0.0175*** | 0.0018*** | −0.0059*** | −0.0030** | 0.0026* |
| | (−4.84) | (−9.37) | (4.24) | (−5.65) | (−2.04) | (1.83) |
| (0, 0) | −0.0316** | −0.0389*** | 0.0063*** | −0.0262*** | −0.0155** | 0.0056 |
| | (−2.40) | (−3.95) | (3.06) | (−4.76) | (−2.07) | (0.74) |
| (0, +10) | 0.0045 | −0.0096*** | 0.0010 | −0.0070*** | −0.0082*** | −0.0002 |
| | (1.28) | (−5.02) | (2.01) | (−6.12) | (−5.05) | (−0.10) |
| (0, +20) | 0.0012 | −0.0105*** | 0.0007** | −0.0068*** | 0.0001 | −0.0014 |
| | (0.55) | (−7.67) | (2.12) | (−8.43) | (0.11) | (−1.38) |
| (0, +30) | 0.0024 | −0.0112*** | 0.0007* | −0.0059*** | −0.0008 | 0.0001 |
| | (1.09) | (−8.23) | (1.91) | (−6.74) | (−0.58) | (0.10) |

CAR stands for cumulative abnormal return. The abscissa represents the industry, and the ordinate represents the event window. ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

**Table 3.** Results of the impact of COVID-19 in various industries-Continued Table 1.

| Event window | Transportation | Lodging & catering | Business service | Real estate | Environment | Information technology |
|---|---|---|---|---|---|---|
| (−30, 0) | −0.0016* | −0.0033 | 0.0023 | −0.0050*** | −0.0141*** | 0.0006 |
| | (−1.86) | (−1.03) | (1.21) | (−5.73) | (−9.34) | (0.47) |
| (−20, 0) | −0.0019** | −0.0032 | 0.0037** | −0.0025*** | −0.0151*** | 0.0019* |
| | (−2.19) | (−0.97) | (2.06) | (−2.80) | (−9.94) | (1.68) |
| (−10, 0) | 0.0016 | −0.0026 | 0.0006 | −0.0040 | −0.0113*** | 0.0000 |
| | (1.17) | (−0.61) | (0.25) | (−3.36) | (−5.06) | (0.01) |
| (0, 0) | −0.0109* | −0.0016 | 0.0096 | −0.0270*** | −0.0219** | 0.0246*** |
| | (−1.73) | (−0.06) | (0.96) | (−4.41) | (−2.39) | (3.69) |
| (0, +10) | −0.0032** | −0.0051 | 0.0003 | −0.0038*** | −0.0087*** | 0.0022 |
| | (−2.28) | (−0.93) | (0.11) | (−2.73) | (−3.25) | (1.33) |
| (0, +20) | −0.0047*** | 0.0005 | −0.0008 | −0.0013 | −0.0080*** | 0.0040*** |
| | (−4.97) | (0.12) | (−0.46) | (−1.34) | (−4.13) | (3.30) |
| (0, +30) | −0.0033*** | −0.0011 | −0.0003 | −0.0014 | −0.0073*** | 0.0019 |
| | (−3.17) | (−0.26) | (−0.18) | (−1.33) | (−3.59) | (1.44) |

CAR stands for cumulative abnormal return. The abscissa represents the industry, and the ordinate represents the event window. ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

**Table 4.** Results of the impact of COVID-19 in various industries—Continued Table 2.

| Event window | Scientific research | Education | Health | Sports&Entertainment | Public management | Information technology |
|---|---|---|---|---|---|---|
| (−30, 0) | −0.0032* | −0.0107*** | −0.0016 | 0.0005 | 0.0014 | −0.0076*** |
| | (−1.83) | (−2.89) | (−0.39) | (0.26) | (0.47) | (−7.24) |
| (−20, 0) | −0.0034* | −0.0091** | −0.0018 | 0.0013 | 0.0015 | −0.0081*** |
| | (−1.93) | (−2.55) | (−0.44) | (0.69) | (0.53) | (−8.86) |
| (−10, 0) | 0.0035 | −0.0213*** | 0.0024 | −0.0083*** | 0.0018 | −0.0030** |
| | (1.36) | (−4.48) | (0.37) | (−3.28) | (0.40) | (−2.46) |
| (0, 0) | −0.0003 | −0.0305 | −0.0276*** | 0.0111 | 0.0402 | −0.0065 |
| | (−0.02) | (−1.05) | (−4.65) | (0.79) | (1.56) | (−1.16) |
| (0, +10) | −0.0009 | −0.0058 | 0.0051 | 0.0023 | 0.0022 | −0.0038*** |
| | (−0.30) | (−0.74) | (0.83) | (0.73) | (0.46) | (−2.82) |
| (0, +20) | −0.0044** | 0.0104* | −0.0028 | −0.0023 | −0.0014 | −0.0049*** |
| | (−2.18) | (1.81) | (−0.64) | (−1.18) | (−0.51) | (−4.76) |
| (0, +30) | −0.0021 | 0.0031 | 0.0021 | −0.0029 | −0.0007 | −0.0065*** |
| | (−0.95) | (0.51) | (0.40) | (−1.45) | (−0.22) | (−6.39) |

CAR stands for cumulative abnormal return. The abscissa represents the industry, and the ordinate represents the event window. ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

### *4.3. Impact of COVID-19 on the Whole Industry*

In the context of economic globalization, the large-scale spread of the pandemic has forced most countries and regions to adopt strict control measures, which will inevitably affect the normal operation of the globalized production system, as well as the industrial and capital chains. It is worth noting that, in the current and near future, the pandemic situation in other countries would intensify, resulting in further disruption in the global economy. Currently, China is in a golden period of full-scale recovery and production. Order reduction is another severe challenge for these industries and enterprises after suffering the winter. To discuss, in depth, the impact of COVID-19 on various industries, we produced a graph (as shown in Figure 2) of the average daily stock price movement across the industries during the event window. The industry's stock price performance on the day of the COVID-19 outbreak

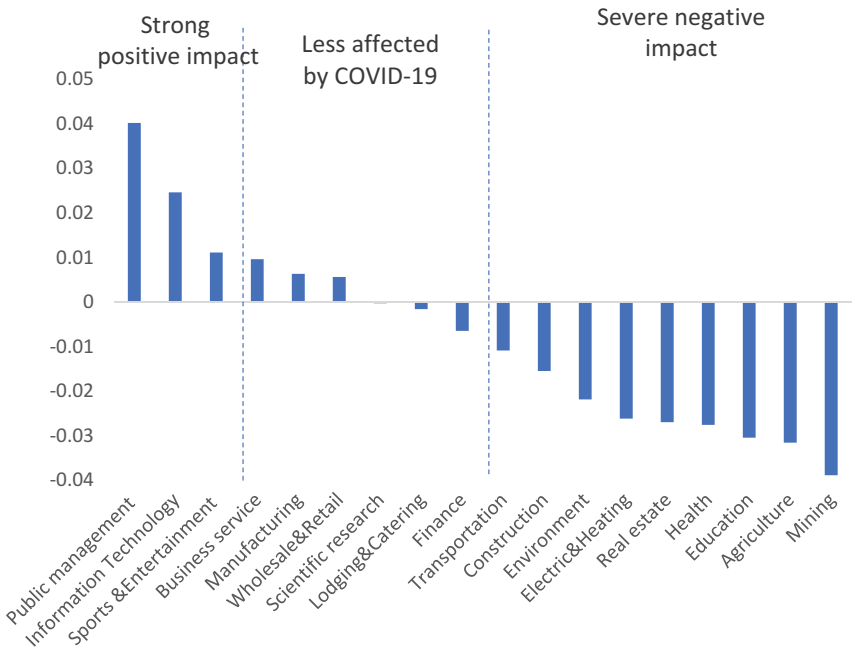


**Figure 2.** The average change of stock prices in various industries on the event day. The data in the table refer to the stock price fluctuations of various industries on the event day, which can be divided into strong positive impact, less affected by COVID-19, and severe negative impact according to the size of the fluctuation.

can be divided into three categories: mildly affected industries, severely positively affected industries, and severely negatively affected industries.

Overall, most industries suffered strong negative impacts, among which the mining industry and agriculture were the most severely impacted. As the COVID-19 pandemic intensified globally, mining companies took measures to protect extractors and communities, postponed projects, and closed mines. Some companies closed their headquarters and implemented the home office to help curb the spread of the virus. Judging from the agricultural situation, the spread of the pandemic caused the country to halt large-scale assembly activities, which hindered agricultural activities and caused severe damage to the agricultural economy. The pandemic quickly swept across the country and had a major impact on agricultural production, migrant workers, and rural investment. These were quickly reflected in the capital market. The business service, manufacturing, retail, and other industries are less affected by COVID-19. The public management, information technology, and sports and entertainment industries did not only withstand the negative impact on the day of the incident, but also showed a strong coping ability – stock prices increased, to a certain extent, across these industries.

We further divided the event window and selected the process of the entire industry affected by the pandemic. The detailed results are shown in

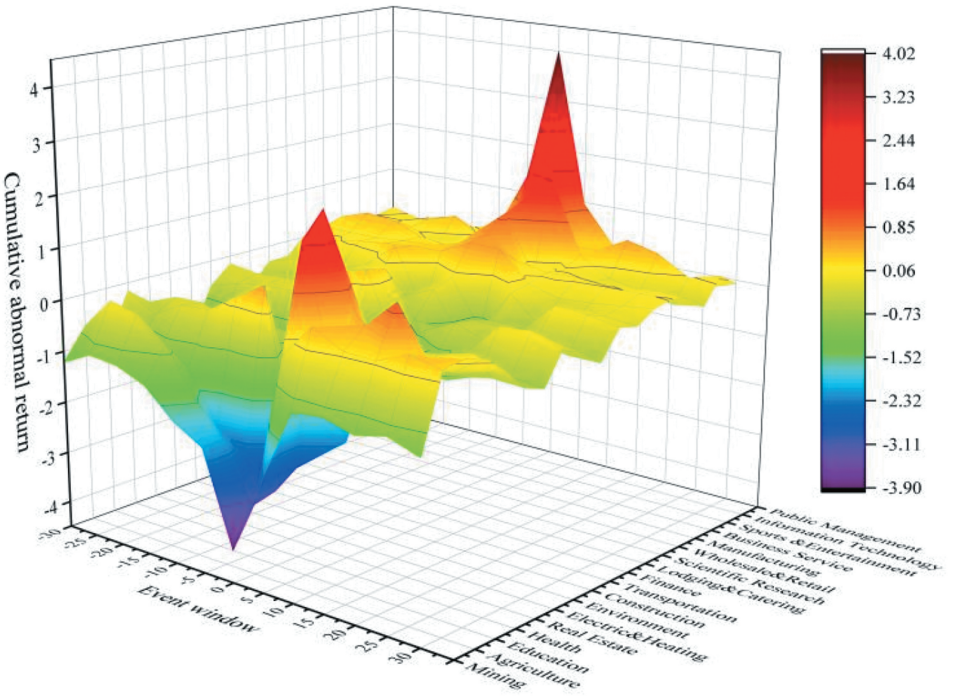


**Figure 3.** Curved surface curve of stock price changes of industries in each event window. The data in the table are the trends of CARs in different industries following different event windows. The X-axis is the industry, the Y-axis is the event window, and the Z-axis is CAR.

Figure 3. When the COVID-19 broke out, China took quarantine measures to prevent the spread of the virus. The first industry to be hit was transportation. The share price of the transportation industry continued to fall after several event windows. The share price of the mining industry, which is closely related to the transportation industry, plummeted after the outbreak, and, in turn, the average daily abnormal return rate fell below 0.0389. This was the largest decline in the industry's average daily abnormal return rate on the China's A-share market that day; the decline continued for the next six event windows. The main reason behind this decline is that the mining industry is highly dependent on logistics and transportation. When the COVID-19 broke out, roads were closed, and product transportation is stagnated, which affected investor sentiment and, in turn, caused stock prices to fall. At the same time, the electric and heating, and environmental industries, which mainly rely on infrastructure construction, often required substantial labor support. Following the COVID-19 outbreak, these industries encountered labor shortages, and their stock prices also fell.

Despite the overall decline of the China's stock market, some industries went against the trend, showing a strong immunity to the COVID-19

outbreak. In multiple event windows on and after the COVID-19 outbreak, the excess return rate of the manufacturing and information technology industries was always positive, whereas the average abnormal return rate of the education and health industries was negative on the event day. After multiple event window fluctuations, the cumulative excess return rate became positive, and the stock price steadily rebounded. The reason for this phenomenon may be that the COVID-19 outbreak incentivized the manufacturing industry to respond quickly by stepping up the production of masks, ventilators, and other medical equipment to fight against the pandemic, which then boosted the momentum of the stock market. In the case of crowd isolation, information technology played an important role in the timely sharing of information and the spread of digital pandemic prevention and control; with the success of the Chinese medical team's anti-pandemic war, the pandemic situation is gradually controllable. "Suspended classes and non-stop learning" and the comprehensive promotion of online classes gradually restored investors' confidence in the health and education industry.

## 5. Further Research

Companies with different equity types often have different abilities to cope with external shocks. To explore the mechanism underlying COVID-19's impact on the stock market, we further conducted group research on companies with different equity properties. It can be seen from Table 5 that, on the day of the outbreak and various incident windows, the cumulative abnormal returns of Chinese state-owned enterprises were significantly negative, and non-state-owned enterprises showed a small increase. This shows that COVID-19 has a significant impact on state-owned

**Table 5.** Results of the impact of COVID-19 on the market value with different equity types.

| | State-owned enterprise | | Non-State-owned | |
|---|---|---|---|---|
| Event window | CAR | t value | CAR | t value |
| (−30, 0) | −0.0044*** | −13.6065 | 0.0016*** | 5.4283 |
| (−25, 0) | −0.0043*** | −14.8563 | 0.0017*** | 6.2801 |
| (−20, 0) | −0.0037*** | −11.7272 | 0.0017*** | 5.5661 |
| (−15, 0) | −0.0038*** | −10.4429 | 0.0019*** | 5.3276 |
| (−10, 0) | −0.0031*** | −6.6895 | 0.0014*** | 3.3328 |
| (−5, 0) | −0.0022*** | −3.2951 | 0.0014*** | 2.1533 |
| (0, 0) | −0.0023 | −0.9852 | 0.0029 | 1.3897 |
| (0, +5) | −0.0038*** | −4.6013 | 0.0017** | 2.3049 |
| (0, +10) | −0.0029*** | −5.3999 | 0.0009* | 1.8206 |
| (0, +15) | −0.0032*** | −7.5579 | 0.0011*** | 2.7569 |
| (0, +20) | −0.0028*** | −7.8893 | 0.0009*** | 2.6301 |
| (0, +25) | −0.0029*** | −9.1710 | 0.0008*** | 2.7968 |
| (0, +30) | −0.0029*** | −7.4830 | 0.0009** | 2.4385 |

CAR stands for cumulative abnormal return. The ordinate represents the event window. ***, **, and * are significant at 1%, 5%, and 10% confidence levels, respectively.

enterprises. State-owned enterprises are mostly traditional industries, and this conclusion is consistent with the one for the Shanghai Stock Exchange and Shenzhen Stock Exchange samples. This strengthened our finding that the COVID-19 outbreak has a serious impact on China's traditional industries, such as transportation, mining, electric and heating, and environment industries. The estimates also strengthened our finding that the pandemic created opportunities for the development of high-tech industries such as information technology, education, health, manufacturing, and other industries.

## 6. Conclusions and Recommendations

We used an event study approach to empirically explore the impact of the COVID-19 outbreak on the stock prices of various Chinese industries. We found that the pandemic negatively impacted stock prices on the Shanghai Stock Exchange, whereas it positively impacted the stock prices on the Shenzhen Stock Exchange. COVID-19 hit the traditional industries of China negatively and more seriously but created opportunities for the development of high-tech industries. The pandemic greatly affected the transportation, mining, electric and heating, and environmental industries. However, the manufacturing, information technology, education, and health industries strongly responded to the pandemic in a positive fashion, providing a boost to confidence on the stock market. China's large economy, complete infrastructure and industrial chain, and strong supporting capabilities helped the country to quickly overcome the adverse effects of COVID-19.

At the same time, the "new infrastructure" that the Chinese government is strongly supporting, including manufacturing, information technology, and other industries, can quickly boost effective investment now, thereby boosting effective market demand and consumption. Taking 5 G network construction as an example, it cannot only drive the research and development and production of related equipment, but can also foster the growth of online education, smart home, immersive gaming, and other consumption. COVID-19 is also forcing the upgrading of China's industrial chain. Digital technologies such as big data and cloud computing can transform the industrial chain, realize precise perception, online processing, and intelligent decision-making, and help to break through the industry bottleneck of China.

COVID-19 is a typical black swan event, and its occurrence, development, and even disappearance, as well as the depth, breadth, and intensity of its impact, are all unknown. The stock market is a barometer of the economy, and the capital market reflects the overall situation of a country's economy to a certain extent. This article discussed the market performance of all industries in China under the influence of COVID-19 and analyzed, in detail, the response trends and capabilities of industries that are hard hit. The article

expanded the research field of COVID-19 and explored the heterogenous reaction of industries to major emergencies. The conclusions of this article also provided reference for countries across the world in their fight against the pandemic and resume economic production.

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