The Impact of COVID-19 on the E-commerce Companies in China

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ABSTRACT

This study analyzes the impact of COVID-19 on Chinese e-commerce companies. We measure how the daily increases in cases and deaths affect the stock returns between January and March 2020. Understanding the impact of e-commerce companies in this epidemic can help e-commerce companies to examine future market changes and development. We find that stock returns were positively related to the number of additional cases per day and COVID-19 deaths per day for Chinese E-commerce companies. We conclude that the COVID-19 has a positive impact on the E-commerce companies in China.

Keywords: E-commerce, COVID-19.

1. INTRODUCTION

Since the outbreak of COVID-19 in early 2020, the development of most industries in China has been dramatically affected by the addition of masks and other related industries. As an emerging industry, the e-commerce industry has the nature of providing services through the network. When China's policy prohibits people from face-to-face talks and meetings, can it generate greater profits and achieve better development. The logistics service of many e-commerce companies is their core operating profit. Logistics services were at a standstill in the early stage of the Covid-19 outbreak and only resumed regular operation in the middle and late stages. It can be seen that the impact of the epidemic on e-commerce companies is good and evil. Nakhate and Jain (2020) have counted 205 countries affected by the new crown virus and mentioned China as the first outbreak site. Millions of Chinese have been infected with the virus within the first week of the outbreak, and this crisis has affected the whole global e-commerce market. Alibaba, the Chinese company that provides e-commerce services, has struggled to maintain growth during the economic slowdown in its home market and has faced uncertainty over the coronavirus pandemic. The major companies affected worldwide include Alibaba Group Holding LTD, Amazon, JD, Wal-Mart Stores Inc, Letang Group, eBay Inc, and others. For example, Amazon has made some considerable investments in one-day shipping that have yet to be compensated. In

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2019, its net income fell 26 percent, and shipping costs rose 46 percent (Elrhim and Elsayed, 2020).

COVID-19 has dramatically influenced the electronic supply chain e-commerce company. Many countries closed many factories, and exports and imports were cut because of the outbreak. However, it has a positive effect. Because the buyers and sellers do not need to meet face-to-face and are carried out in the open Internet network environment, various business activities of e-commerce have incredibly played its advantages.

The rise of E-commerce means the rise of online shopping and trading of consumers, and it also provides a variety of business and financial activities and related comprehensive service activities, so it is considered as a new way of consumption. Previous literature did not specifically analyze the changes in China's e-commerce companies' return of stock during the epidemic. This paper intends to study the impact of the outbreak on the stock market of China's e-commerce industry. Whether COVID-19 is promoting or hindering the development of China's e-commerce companies is still a problem. This paper hopes to determine the overall outcome of e-commerce companies and comprehensively evaluate the epidemic's impact on the whole Chinese e-commerce industry by studying the stock performance of Chinese e-commerce companies changed. The impact of the COVID-19 pandemic is reflected in the daily increase in cases and deaths. Therefore, this paper attempts to solve the problems of what is the overall impact of Covid-19 on Chinese e-commerce companies in 2020. After analyzing the data, we found that both daily new cases and daily new deaths positively impacted the stock return of Chinese e-commerce companies. The epidemic has played a role in promoting the development of E-commerce companies in China.

The second part is a literature review and hypothesis development. The third part is our data and methodology. The fourth part is our analysis and discussion, including the main results, additional results, and robustness check. The last part is our conclusion.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In this section, WE try to introduce some previous literature for this study—research on the impact of Covid-19 and e-commerce. Many works of the literature suggest that Covid-19 will promote the growth and development of e-commerce companies, but others believe that Covid-19 hurts e-commerce companies.

2.1 POSITIVE IMPACT OF COVID-19 ON E-COMMERCE COMPANIES

Alber (2020) has verified the impact of COVID-19's spread on global e-commerce companies, and he selected the world's five largest e-commerce companies, including China's top e-commerce company Alibaba. He analyzed the impact of cumulative cases and death variables on the stock returns of global e-commerce companies to reflect the effect of COVID-19's spread on global e-commerce companies. He found that China's Alibaba company had the most significant impact on the stock returns.

According to Nakhete and Jain (2020), 205 countries and their economies and politics have been infected with the virus. Millions of people in China have been infected with the virus within a week, which is a very challenging crisis for the world and affects the e-commerce market. Bhatti(2020) argued that the emergence of the coronavirus has boosted e-commerce and sees trends in e-commerce. According to the survey, 52% of consumers avoid shopping in physical stores, and 36% of them do not go to the physical stores before they are vaccinated with the COVID-19 vaccine, which means that the short run of the fundamental business is declining. In contrast, e-commerce retail sales representing e-commerce companies are expected to reach a staggering $6.5 trillion by 2023 (Jones, 2020). Ayittey (2020) estimated that if the world does not take urgent action to combat the spread of Covid-19, China is expected to lose up to the US $62 billion in the first quarter of 2020, and all China's tertiary industry, namely the service industry, will decline to a great extent. Almost all e-commerce companies belong to the service industry in the tertiary sector.

At present, all research is studying the impact of COVID-19 on China's economy, and the research on China's e-commerce market is very lacking. Although Alber (2020) has verified the effect of COVID-19 on global e-commerce companies, China has chosen the five largest e-commerce companies globally, including China's top e-commerce company Alibaba. He analyzed the change in cumulative cases and death variables and found the impact of these variables on the stock returns of global electricity supplier companies to reflect the effect of the spread of COVID-19 on global electricity supplier companies. He found that China Alibaba had the most significant impact on stock returns. Although he chose China's leading Alibaba in the industry, he confirmed the effect of the spread of COVID-19 on it. However, he did not comprehensively evaluate the impact of COVID-19 on the whole e-commerce companies in China. The case study can not represent the overall study. We need to refer to more e-commerce companies in China to determine the impact of COVID-19 on them.

Online shopping is the primary means for many e-commerce companies to make profits. Due to the restriction of social life during the epidemic period, consumers in many countries can only choose online shopping to meet their needs. Koch (2020) believed that e-commerce began to dominate after the advent of COVID-19 because most physical retail stores and services had to be closed.

Hypothesis 1: COVID-19 has a positive impact on Chinese E-commence companies

2.2 NEGATIVE IMPACT OF COVID-19 ON E-COMMERCE COMPANIES

There is still literature suggesting that COVID-19 harms e-commerce companies. Bhatti (2020) proposed that COVID-19 has had many positive effects on world e-commerce, but it has had a negative impact in some cases. The demand for many products is still great, such as hand sanitizer, sanitary liquid, disposable gloves, groceries, and dairy products. Still, under the influence of COVID-19, many e-commerce retailers can not meet the demand. Retailers faced the dilemma that products cannot go abroad in e-commerce due to the existence of the virus (Hasanat et al., 2020), which means that many e-commerce companies with foreign trade businesses will lose a lot of profits. The process of transportation and supply has also become slow because the virus

reduces direct contact between people, and they can only use the Internet for indirect contact. COVID-19 has also dealt a devastating blow to South Korea's tourism economy (Alaa et al., 2020). The lack of flights also makes international trade in trouble. COVID-19 harms world e-commerce companies, as well as Chinese companies.

Hypothesis 2: COVID-19 has a negative impact on Chinese E-commence companies

Most of the previous literature studies global e-commerce companies. This research focuses on Chinese e-commerce companies. COVID-19 has both positive and negative effects on them. This paper will comprehensively evaluate the impact of COVID-19 on Chinese e-commerce companies.

3. DATA AND METHODOLOGY

Because the peak of the COVID-19 is not the start date and will last several days, we do not use the classic event study method. Baltagi (2021) and Hsiao (2014) believe that panel data regression reduces estimation bias and multicollinearity, controls individual heterogeneity, and determines the time-varying relationship between dependent and independent variables. This paper aims to study the stock performance changes of Chinese e-commerce companies during the epidemic period, i.e., 2020, so the time-varying relationship is significant. Therefore, we used panel tests to examine the relative performance of Chinese e-commerce company stocks about COVID-19 while controlling for company-specific characteristics. We estimate the stock returns as follows:

$$DR_{i,t} = \beta_0 + \beta_1 COVID_{i,t-1} + \beta_2 MTB_{i,t-1} + \beta_3 Lnev_{i,t-1} + \varepsilon_{i,t} \qquad (1)$$

Among them, $DR_{i,t}$ is the stock returns of Chinese e-commerce companies i on day t and regresses on the lag value of enterprise return predictor $COVID_{i,t-1}$ is either (1) the daily growth of confirmed cases COVID-19 or (2) the daily growth of COVID-19 deaths. $MTB_{i,t-1}$ is a vector of firm-specific characteristics, including the daily market-to-book ratio, $Lnev$ is computed as the natural logarithm of the market capitalization of the firm and $\varepsilon_{i,t}$ is the error term.

We used company data from January 20 to March 31, 2020. The data comes from WIND and includes stock prices, market capitalization, and market to book (Price to book) ratios for the period, including 30 stocks and 1380 observations. From Worldometer, we get the data about COVID-19 in China, including new cases and deaths per day from January to March 2020.

Table 1 presents the summary statistics of the data included in our research. It can be seen that the maximum daily stock return from January 20 to March 31, 2020, is 10.05, and the minimum is −10.07. The mean, number of observations, deviation, maximum and minimum values of each variable are presented in the table.

Table 1 Summary statistics

Variables	Number of Observations	Mean	StdDev	Min	Max	Skewness	Kurtosis
DR	1380	-0.26	3.876	-10.07	10.05	-0.07	3.63
Case	1380	1176.28	2,424	18.00	15,152.00	4.25	2.331
Death	1380	46.17	51.40	2.00	254.00	6.75	6.182
MTB	1380	5.22	5.605	0.61	33.71	25.782	6.61
Lnev	1380	23.08	0.905	21.47	25.30	0.49	2.79

Table 2 shows the correlation matrix of the data. It can be seen that daily stock returns are negatively correlated with both the daily growth in total confirmed cases and the daily growth in total cases of deaths caused by COVID-19. ***, ** and * represent the significance levels at 1%, 5% and 10%, respectively.

Table 2 Correlation matrix

	DR	*Case*	*Death*	*MTB*	*Lnev*
DR	1.000				
Case	0.083***	1.000			
death	0.201***	0.752***	1.000		
MTB	0.046*	-0.015	0.0086	1.000	
Lnev	0.042	-0.013	0.0087	0.065**	1.000

4. RESULTS AND DISCUSSIONS

4.1 MAIN RESULTS

Our main regression is based on Equation (1) and is shown in Table 3. It reports the coefficients of the panel regressions for the ratio of daily growth in total confirmed cases(death). We analyzed 30 stocks of E-commerce during the outbreak of COVID-19.

The results suggest that Chinese e-commerce stock returns are significantly positively correlated with the daily increase in COVID-19 confirmed cases and deaths. When other factors remain unchanged, the stock return can rise by one ten-thousandth for each increase in daily cases and 0.015 for each increase in daily deaths.

Table 3 Main regression results

	DR	DR	DR	DR
Case	.0001***	.0001***		
	(0)	(0)		
Death			.015***	.015***
			(.002)	(.002)
MTB	.033*	.031*	.031*	.029
	(.019)	(.019)	(.018)	(.018)
lnev		.172		.161
		(.115)		(.113)
Constant	-.593***	-4.552*	-1.125***	-4.822*
	(.151)	(2.653)	(.167)	(2.608)
Observations	1380	1380	1380	1380
R-squared	.009	.011	.042	.044

It can be seen that the daily new cases and daily new deaths of the independent variable are significant for the dependent variable. Moreover, the impact of daily new deaths on the dependent variable is more prominent. After controlling the two control variables of market value, market price, and book value ratio, we found that the coefficient of the independent variable has not changed too much, which shows that cases and deaths have a positive effect on the stock income of Chinese e-commerce companies. We analyzed 30 stocks of E-commerce during the outbreak of COVID-19. The results suggest that stock returns are significantly negatively related to the daily growth in total confirmed cases and the daily growth in total cases of death caused by COVID-19.

4.2. ADDITIONAL RESULTS

We use the fixed effects model in Table 4 to control the difference of the E-commerce companies and find the coefficient decrease a lot. Though stock returns are still positively related to both the daily growth in total confirmed cases and the daily growth in total cases of death caused by COVID-19, the effect of our independent variables to the dependent variables cuts back after we control their difference a lot. However, we find that daily stock returns are still positively correlated with the daily growth in total

confirmed cases and the daily growth of death caused by COVID-19. It confirms our main result in Section 4.1.

Table 4 Fixed effects model

	DR	DR
Case	0.0001***	
	(4.22)	
Death		0.014***
		(7.03)
MTB	-0.072	-0.095
	(-0.40)	(-0.53)
lnev	10.434***	9.220***
	(6.56)	(5.87)
Constant	-240.910***	-213.201***
	(-6.68)	(-5.99)
R-squared	0.059	0.080

In Table 5, we squared the two independent variables and re-performed panel analysis on them. $Case^2$ is the square of the daily growth of confirmed cases COVID-19, and $Death^2$ is the square of daily growth of COVID-19 deaths. Although the significance is reduced, we find daily stock returns are still positively correlated with the daily growth in total confirmed cases and the daily growth of death caused by COVID-19.

4.3. ROBUSTNESS CHECKS

In robustness checks, we found that several companies do not represent e-commerce. Their primary markets with products and services are in other areas, which means that the samples are precious. Therefore, in the robustness check, we need to get rid of a group of separation values or select the most suitable for our research purposes in the sample samples to test whether our conclusion remains robust. This paper presents the results of empirical analysis after removing the samples of these three companies. In Table 6, we still find that daily stock returns are still positively correlated with both the daily growth in total confirmed cases and the daily growth of death caused by COVID-19.

Table 5 Nonlinear regression result

	DR	DR
Case²	0.0007**	
	(2.32)	
Death²		0.00005***
		(5.98)
MTB	0.031	0.030
	(1.64)	(1.63)
lnev	0.169	0.165
	(1.47)	(1.45)
Constant	-4.377*	-4.515*
	(-1.65)	(-1.72)
R-squared	0.008	0.029

Table 6 Subsample result

	DR	DR
Case	0.0001***	
	(2.83)	
Death		0.014***
		(7.03)
MTB	0.024	0.023
	(1.22)	(1.16)
lnev	0.153	0.144
	(1.32)	(1.26)
Constant	-4.099	-4.406*
	(-1.53)	(-1.67)
R-squared	0.009	0.041

In Table 7, we divide our sample period into three parts. The first two columns show how the daily increase in COVID-19 cases and deaths contributed to the stock returns of Chinese e-commerce companies in January. The first two columns show how the daily increase in COVID-19 cases and deaths contributed to the stock returns of

Chinese e-commerce companies in January. The middle two columns show how the daily increase in COVID-19 cases and deaths contributed to the stock returns of Chinese e-commerce companies in February. The last two columns show how the daily increase in COVID-19 cases and deaths contributed to the stock returns of Chinese e-commerce companies in March. Daily growth cases and deaths show a negative relationship for daily stock returns in January, opposite our main result. However, it became positive in February and March. Because the number of samples I selected in January was small, we could still conclude that the epidemic had a positive impact on Chinese e-commerce companies

Table 7 Subperiod Analysis

	DR	DR	DR	DR	DR	DR
Case	-0.028***		0.0001		0.019***	
	(-11.13)		(1.29)		(4.80)	
Death		-0.347***		0.024***		0.089***
		(-3.27)		(5.41)		(5.40)
MTB	0.045	0.052	0.010	0.009	-0.001	-0.010
	(1.51)	(1.09)	(0.25)	(0.22)	(-0.03)	(-0.33)
lnev	0.596***	0.659*	-0.089	-0.106	0.283	0.207
	(2.72)	(1.90)	(-0.32)	(-0.40)	(1.32)	(0.97)
Constant	-11.806**	-15.969*	1.634	0.134	-8.340*	-6.157
	(-2.32)	(-1.98)	(0.26)	(0.02)	(-1.68)	(-1.25)
Observations	68	68	340	340	374	374
R-squared	0.680	0.195	0.006	0.081	0.063	0.077

5. CONCLUSIONS

Previous literature has looked at the impact of COVID-19 on global business firms but not specifically on China. The finding in our study contributes to E-commerce in China. We analyzed the stocks of Chinese E-commerce companies in the A-share market during the COVID-19 contagious infectious disease outbreak in China and found that this pandemic disease interacts positively with Chinese E-commerce stock returns because Chinese e-commerce stock returns are significantly higher positively correlated with the daily increase in COVID-19 confirmed cases and deaths. So, the COVID-19 outbreak has boosted the growth of E-commerce companies in China, with the market expanding as cases and deaths are updated and increased. Besides, this study also finds that the daily growth of death is more significant than the case, which means a daily increase in mortality is a more significant factor affecting stock returns.

This study found the relationship between the effect of COVID-19 and E-commerce firm performance using the OLS model and fixed-effect model. We used two independent variables: daily growth of cases and deaths to show the effect of COVID-19. Our primary analysis results show that the impact of COVID-19 on Chinese e-commerce companies is positive, but this study only focuses on a short period from January to March. This study only focuses on the outbreak's height. Studies of the early and late stages of outbreaks are still lacking.

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