WEP Warwick Evans Publishing

Transactions on Economics, Business and Management Research
ISSN: 2960-1789, eISSN: 2960-2254 | Volume 1
FIEM 2023

The Influence of Negative Public Opinion on the Stock Market of Biopharmaceutical Enterprises under Covid-19

Jiayue Wang

Beijing Forestry University, Beijing, 100091, China

Abstract. This report investigates the impact of negative public opinion on the stock prices of biopharmaceutical companies during the Covid-19 pandemic. The research questions include why public opinion affects the stock market of biopharmaceutical companies, the extent to which public opinion impacts biopharmaceutical enterprises, and what biopharmaceutical companies can do to avoid or manage these effects. The study first summarizes the process through which public opinion affects stock prices using a literature analysis. Next, it employs event study methodology to determine the Cumulative Abnormal Rate of Return (CAR) of negative events on stock prices. The reading and discussion volume of these events are used as independent variables in a regression model to quantify their effect on CAR, revealing that negative public opinion has a significant impact on stock prices.

Keywords: Public Opinion; Stock Price; Covid-19.

1. Introduction

Since its outbreak in the early 2020s, the new crown epidemic (COVID-19) has profoundly altered the global economic and social landscape. As one of the most influential health crises on a global scale, the outbreak not only threatens people's lives and health, but also has a wide-ranging impact on the business community. During this global crisis, biopharmaceutical companies play a key role, not only as developers of vaccines and drugs, but also as supporters of global health health systems.

COVID-19 has been going on for three years now and has had a huge impact on the normal lives of people around the world and brought countless businesses to bankruptcy. As of 29 January 2023, WHO has reported about 750 million confirmed cases of COVID-19, of which about 6.8 million have died. Fortunately, at such a terrible cost, humanity has finally put an end to the pandemic [1].

During the COVID-19 period, countless companies closed and went bankrupt, but the revenues, profits and share prices of biopharmaceutical companies and PCR testing companies soared. According to data from Yiwang Finance (a media outlet that does financial analysis), in the first half of 2022, the ten listed PCR testing companies in China reported a combined revenue of 48.518 billion yuan and a combined net profit of 16.297 billion yuan, with the largest increase in net profit at 376.29% [2]-[6]. Similarly, Ealing Pharmaceuticals, which specialises in the production of drugs to treat COVID-19, is expected to achieve a net profit of 2.15 billion yuan to 2.42 billion yuan, close to the total profit of the previous two years, according to the financial report.

While biopharmaceutical companies have reaped handsome profits, they have also been plagued by negative publicity. Specifically, the negative press included controversies surrounding pricing practices, falsified test results, and a lack of transparency in clinical data reporting, some of which were unsubstantiated rumours that circulated widely, and some of which were official news confirmed by the government.

However, this historic moment also brought negative public opinion and social unrest. A variety of voices have emerged from social media, news reports, and public discussions about vaccine safety, vaccine efficacy, drug pricing, and the ethics of biopharmaceutical companies [7][10]. These voices may have far-reaching effects on the stock market performance of these companies, thus raising a question of great interest: can negative public opinion significantly affect the stock market performance of Corvus-19 biopharmaceutical companies?

This study aims to provide insights into the impact of negative public opinion on the stock market of biopharmaceutical companies, particularly in the context of the COVID-19 pandemic. We will examine the main sources of negative public opinion, including social media, news reports, the scientific community, government policy and regulation, and general public perception. This will help us to better understand why these negative views have emerged [11]. We will analyse the nature of negative public opinion, including on vaccines, medicines, corporate ethics, pricing and supply chains [12]. We will also explore the extent and speed at which negative opinions spread. We will examine the correlation between negative public opinion and the stock market performance of Covus-19 biopharmaceutical companies. This includes both short-term and long-term effects, as well as possible moderating factors. We will look at the public relations strategies and crisis management measures adopted by biopharmaceutical companies to mitigate the adverse impact of negative public opinion on the stock market [13][19]. We will evaluate the effectiveness of these strategies and explore best practices.

By delving into these issues, we hope to provide investors, policymakers, biopharmaceutical companies, and the public with key insights into how to understand and respond to negative public opinion [20]. This research will contribute to a better understanding of the impact of public opinion on companies and markets during the global health crisis, thus providing valuable lessons for future health crises and societal challenges.

2. Related Work

Due to the complexity of information and the obstruction of its dissemination, the stock market is prone to information asymmetry, and investors are unable to distinguish the truth from the falsehood, thus leading to irrational investment [21]. Negative media coverage can affect the reputation of a company,Negative media coverage can force companies on the US "Worst Boards" list to take the right action through the reputation mechanism [22]. However, the media tends to exaggerate negative public opinion in order to earn financial benefits, which can deal a major blow to a company's reputation in the market and lead to the accumulation of negative news. Therefore when significant shareholders reduce their positions or exit, short-term investors will follow suit, causing the company's share price to plummet or even crash [23]. As both the financial field and the media field continue to evolve with the times, research in the field also changes with the times and the depth of research. However, the views of scholars generally fall into two broad categories

Until the 21st century, the research in this area has become more detailed and the views of scholars have become more diversified [24]. Rumours can bring short-term abnormal returns to investors, while in the long run, rumours only lead to large fluctuations in the share prices of listed companies and do not bring abnormal returns.

Response to negative public opinion has also been studied in the 2010s. Negative rumours have significant abnormal effects on stock prices, especially in the Chinese stock market, but responding to public opinion does not restore stock prices Responding to public opinion through "earnings management" can alleviate stock price volatility, but the effect is not significant [25]. In daily operations, enterprises should enhance their sense of social responsibility and maintain a good reputation. Specific measures include paying more attention to the maintenance of political and labour network relationships and the improvement of product quality [26]. Enterprises should elevate corporate responsibility to a strategic level and closely integrate it with their business strategies to prevent negative events from occurring.

When public opinion emerges, enterprises should face the crisis of public opinion, communicate with investors frankly, and reduce misunderstandings in the transmission of information [27]. Enterprises should avoid negative attitudes, try to avoid covering up the sources of public opinion information, block the dissemination of public opinion, and prevent angering the media and the public. It is necessary to take effective measures to strengthen the governance of online public opinion and reduce

the impact of negative public opinion on the stock market. Enterprises should also pay close attention to changes in stakeholders' sentiments and demands and standardise their response behaviour [28].

In a joint government-enterprise approach after the outbreak of public opinion, enterprises make use of government credibility to work with the media to make good disclosure of information and avoid the escalation and spread of false information.

3. Research Methods

The researchers utilized qualitative methods such as literature analysis, as well as quantitative methods including Event Study and Regression Models, and a questionnaire survey to address the research questions. The primary data collected in this study was obtained through the questionnaire survey, while the secondary data was sourced from various platforms, such as academic journals, CNKI, Google Scholar, CSMAR, and Sina Weibo [29].

Key events with a large number of media reports summarized by existing media platforms were selected. The data of the event are shown in.

For the selected events, collect the number of reads, discussions and original people on Sina Weibo which is a one of the largest social media in China, with an average daily active user of 252 million in 2022. So the amount of data is large enough to help us analyse the data.

Then, taking the cumulative abnormal rate of return (CAR) as the dependent variable and the number of reads, discussions, and original people, as the independent variable, the regression equation is constructed as follows:

$$|CAR| = c_1 r + c_2 d + c_3 o + \varepsilon \tag{1}$$

which r, d, o represented the number of reads, discussions, original people, and media published respectively, and the parameters are calculated by the OLS method to determine the final formula which is used to quantify the impact of negative public opinion events on stock prices.

By summarizing scholars' views on measures to avoid the impact of public opinion on stock prices, different measures are categorized [30]. The reason for this is to better summarize the recommendations for biomedical companies. And then based on the classification results a questionnaire will be designed to further collect the public's agreement on how to avoid the impact of public opinion on the stock price, so that the recommendation can be evaluated from the perspective of the masses.

4. Results

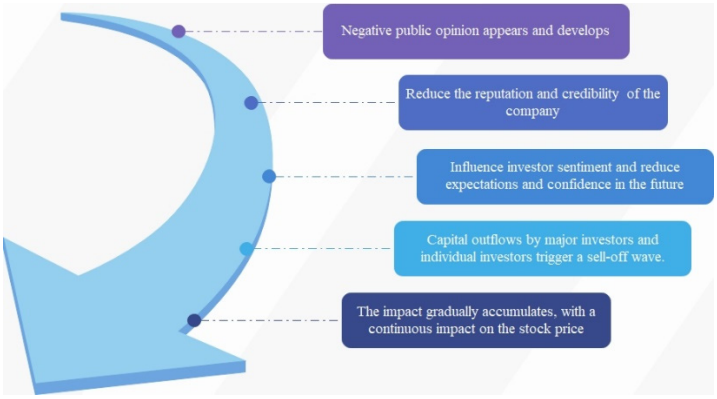

Figure 1. The reasons for negative public opinion affecting stock prices

As shown in Figure 1, negative public opinion does not have a direct impact on the stock price, and what directly affects the stock price is a large number of sell-offs, etc., but the emergence of negative

public opinion will damage the corporate image, which in turn affects investor sentiment and confidence in the future, leading to a large amount of capital outflow and sell-off, and eventually making the stock price fluctuate.

The linear regression analysis was conducted with the absolute value of CAR as the dependent variable and the variables r, d, and o as independent variables. The parameter regression results are presented in Table 1 below:

Table 1. Initial regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.698189	1.493550	3.815197	0.0124
r	0.044348	0.029825	1.486944	0.1972
d	0.162266	0.044434	3.651814	0.0147
o	-0.001259	0.002412	-0.522068	0.6239

As can be seen from Table 1, the t-test on r and o, the t-value of r is 1.486944, with a P-value of 0.1975, and the t-value of o is -0.522068, with a P-value of 0.6239. Neither of them passed the t-test. Therefore, after excluding variable o from the model, the model was rerun with regression analysis. The parameter regression results are presented in Table 2 below:

Table 2. Final regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	VIF
C	5.500690	1.354430	4.061258	0.0066	2.1810
r	0.032661	0.018476	1.767816	0.1075	4.3243
d	0.173180	0.036756	4.711635	0.0033	2.6319

As observed in Table 2, the constant, r, and d variables have all passed the t-test at a significance level α of 0.1 (due to the small sample size). Therefore, the model can be represented as follows:

$$|CAR| = 0.032661r + 0.173180d + 5.500690 \quad (2)$$

The testing results for the above formula 2 are presented in Table 3 as follows:

Table 3. Regression model testing

R^2	Adjusted R^2	S.E. of regression	Sum squared resid	F-statistic	Prob(F)
0.929047	0.905396	2.751347	45.41945	39.28135	0.000357

Table 3 shows that the Adjusted R^2 value is greater than 0.9, indicating a good correlation between the model and the data. Additionally, the F-value is 39.28135 and P-value is less than 0.05, indicating that the model has passed the F-test.

5. Conclusion

The study found that during the COVID-19 pandemic, biopharmaceutical companies were affected by negative public views, leading to a decline in their stock prices. This may be related to public concerns about issues such as vaccine safety, drug pricing or ethical corporate behaviour. The impact of negative public views on the stock market may be significant in the short term, but may be mitigated in the long term. Companies may be able to improve public perceptions through aggressive public relations efforts or transparency. A company's size, financial stability, and reputation may play an important role in determining the specific impact of negative public perceptions on the stock

market. Some companies may be able to recover more easily from negative sentiment, while others may suffer longer-term effects. Highlight the importance of government policy and regulatory initiatives in shaping public opinion and influencing stock markets. Government policy decisions and regulatory actions can exacerbate or mitigate the impact of negative public perceptions.

6. Discuss

Analyse the public relations strategies and crisis management measures adopted by biopharmaceutical companies in the face of negative public opinion. Evaluate the effectiveness of these strategies and their impact on stock market performance. Conduct social media analyses to track and measure public attitudes toward biopharmaceutical companies. Examine the impact of key events, topics and key opinion leaders on social media on stock prices. Compare the impact of negative public opinion on the stock market among different biopharmaceutical companies.

Examine the different strategies and performance of these firms to explain these differences.

Examine the impact of government policy and regulatory changes on public opinion and the stock markets of biopharmaceutical companies. Examine how government interventions during the health crisis affected investor confidence. Compare the short-term and long-term effects of negative public opinion on stock markets. Consider the time dimension of investor behaviour and market volatility to understand the relationship more fully. Explore ways to improve public understanding of biopharmaceutical companies to mitigate the impact of negative opinions. Analyse effective science communication strategies and educational programmes. Examine the impact of sustainability practices and ethical standards of biopharmaceutical companies on public perceptions and the stock market.

Examine the importance investors place on sustainability and social responsibility. These lines of research can help provide insight into the impact of negative public opinion on the stock markets of biopharmaceutical companies and provide insight into how to manage and respond to these impacts. Future research should use a variety of methods, including quantitative and qualitative analyses, to fully assess the complexity of this relationship. In addition, ensure that the most up-to-date data and information are used to reflect changes in the current market and social environment.

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