

Research on the influence of negative events on the stock price of listed companies-- take the changsheng vaccine incident as an example

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Abstract: Due to the immediacy and universality of the Internet, the exposure of the vaccine incident on July 15, 2018 pushed changchun changsheng listed company to the forefront. In this context, this paper uses the event study method to examine the impact of vaccine events on the stock prices of changchun changsheng listed company and its related listed companies. The study found that the vaccine incident did have an impact on the stock prices of changchun changsheng and non-incident companies in the same industry, but there were differences. On this basis, this paper further divides non-incident companies into vaccine companies and non-vaccine companies. By comparing the abnormal rate of return and the cumulative abnormal rate of return of the two companies, it shows that the changchun changsheng vaccine event also has a different impact on the stock prices of vaccine companies and non-vaccine companies. Based on the above empirical results, this paper puts forward some Suggestions on the measures to be taken by listed companies in the face of negative events.

1. Introduction

In the Internet society, the channels of information dissemination are increasing and the speed of dissemination is increasing, which makes investors more sensitive to information and makes the capital market more sensitive. On July 11, 2018, after the incident of Changchun Changsheng listed company's vaccine was exposed, there has been an upsurge in discussions about the incident on the Internet media. Later, on July 15, 2018, the state drug administration issued a notice after a thorough investigation into the incident, confirming that changsheng had falsified records of rabies vaccines. Changchun changsheng's share price fell by the daily limit on the first trading day after the announcement. The company opened at 22.10 on July 16, 2018, down 9.98 percent from the previous session, and fell by the daily limit shortly after opening. Since then, changchun changsheng has lost \$9.8 billion in market value. Not only that, the shares of biopharmaceutical companies have also been hit. It can be seen from this that the exposure of negative events will not only have an impact on the stock price of the affected companies, but also have a certain impact on non-affected companies in similar industries.

The occurrence of major events not only causes fluctuations in the stock prices of listed companies, but also produces competitive effect or contagion effect on non-incident enterprises in the same industry under specific circumstances. Abroad, Joanne Hill (1983) studied the impact of three mile island nuclear accident on the stock price of power companies, and found that the impact of three mile island nuclear accident on non-nuclear enterprises was less than that on nuclear enterprises [1]. Bessler and Nohel (2000) explained that when Banks announce adjustment policies, non-declared Banks will also be affected, and dividend cut will lead to the decline of non-declared Banks' stock price to some extent [2]. Burzala (2016) studied the four authoritative indexes of the European market during the 2007-2009 financial crisis: Dax of Germany, CAC of France, FTSE100 of Britain and WIG20 of Poland, and concluded that, because of mutual contagion and interdependence, the returns of the four indexes he studied would react to the emergence of

financial crisis at the same time [3]. Most domestic scholars adopt the method of time study to analyze the influence of time on stock price for specific events, and analyze the advantages and disadvantages of response measures by studying the response measures of enterprises. Shi qingchun and xu luying (2014) used the event research method to study the impact of negative news reports on stock prices, which was manifested in the sharp decline of stock prices and the generation of negative abnormal returns, and analyzed the impact of response announcements of listed companies on stock prices [4]. Deng xiang (2015) used 41 negative public opinion events about the pharmaceutical industry collected to study and concluded that the disclosure of negative news of listed companies has a significant and lasting impact on the company's stock price [5]. Yang zhiqiang (2016) analyzed and concluded that in the food industry, due to the contagion effect, quality scandals would not only have a negative impact on the affected enterprises, but also on non-affected enterprises in the same industry within a certain period of time [6]. The above research is mainly based on the event research method to verify the impact of specific events on the relevant financial information of specific enterprises, including stock price, earnings data, assets, etc., but to some extent, it ignores the analysis of the difference in the impact of negative events on the stock price of the affected enterprises and non-affected enterprises.

This paper analyzes the impact of changchun changsheng vaccine event on changchun changsheng company and other biological products companies and the difference between the impact degree by using event study, and then divides non-incident companies into vaccine and non-vaccine companies to compare the impact degree. And then to each market subject to provide reasonable Suggestions.

2. Research methods and data source

2.1. Data source and sample selection

All stock data in this paper are from guotai junan database. In terms of the selection of samples, the samples whose trading was suspended due to major issues were excluded. According to shenyin and wanguo's industry classification, 33 listed companies whose primary subjects were pharmaceutical biology and secondary subjects were biological products were taken as research samples. The reason for choosing shenwan industry classification standard is that shenwan industry classification standard not only fully considers the current industry development status in China, but also mainly considers the relevance of products and services of companies in the market. Shenwan's industry classification tends to be investment management, so it is practical. And will make corresponding adjustments according to the continuous development of the economy, so it is realistic. At the same time, 6 of the 33 sample enterprises belong to the Shanghai stock market and 27 belong to the shenzhen stock market, so the CSI 300 is chosen as the market index when calculating the abnormal rate of return of a single stock. Then, from the latest annual reports disclosed by 32 non-incident companies, their main businesses or main products are confirmed. According to the definition and classification of the above vaccines, there are 12 vaccine companies and 20 non-vaccine companies.

2.2. The research methods

In this paper, the event study was used to analyze the difference of the impact of changchun changsheng vaccine event on the affected company and non-affected companies, and the difference of the impact degree between non-affected companies and non-affected companies. Dolly (1933) published a story about a stock split affects on stock prices in the first time using event study examined a stock split does a certain influence on the stock price, Ball and Brown (1968) published the article by analyzing the interference factors of market effect to the influence of the individual company's special information for surplus data [7] [8], then reveal the prelude of event study and development.

2.2.1. Research hypothesis

Hypothesis 1: there is a difference in the impact of negative events on the stock prices of the affected and non-affected companies.

Hypothesis 2: there is a difference in the impact of negative events on the stock prices of vaccine companies and non-vaccine companies.

2.2.2. Defines the window for events, event days, and events

In this paper, the event was defined as the authoritative announcement of changchun changsheng vaccine incident issued by the state drug administration on July 15, 2018. Since the day of the event was Sunday, the date of the event was set as the first trading day after that, namely July 16, 2018. The estimated period of this paper is the first 115 days of the event period, and the individual stock data of the estimated period is used as the normal earnings of 33 companies. Therefore, the first 15 days of the event date and the 30 days after the event date are taken as the Windows of the whole event period. The estimated period and event period are represented by Numbers respectively, namely (-130,-16) and (-15,30).

2.2.3. Calculate expected normal returns

The expected normal return refers to the return rate of a single stock in the event period if the company's stock price is not affected by the event [9]. In this paper, Capital Asset Pricing Model (CAMP for short) is selected to estimate the normal return in the event period. The Capital Asset Pricing Model is as follows:

$$E(R_{i,t}) = R_f + \beta_i(R_{m,t} - R_f) \quad (1)$$

2.2.4. Calculated abnormal rate of return

Abnormal rate of return refers to the difference between the actual rate of return of an individual stock during the event period and the normal rate of return obtained by using the capital asset pricing model during the event period. The formula represents the following:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (2)$$

2.2.5. Calculate the cumulative abnormal rate of return

The cumulative abnormal return rate refers to the accumulation of the abnormal return rate at each time point in the event period. The formula is as follows:

$$CAR_{i,t} = \sum_{t=T_1+1}^{T_2} AR_{i,t} \quad (3)$$

2.2.6. Calculate the average abnormal rate of return of the sample

$$AAR_t = \frac{1}{n} \sum_{i=1}^n AR_{i,t} \quad (4)$$

3. Empirical results and discussion

3.1. The abnormal rate of return between the incident company and the non-incident companies

According to figure 1, the abnormal return rates of the exposed and non-exposed companies are compared, to the event from the event day zero phase 5 day, changchun longevity of abnormal returns and 32 of the abnormal returns of the companies in the growing trend, period of 6 days until the event started, the gap was more significantly narrowed, but also has certain gap. It can be concluded that the impact of changchun changsheng vaccine event on the stock price of the affected enterprises will be greater than that of the non-affected enterprises in the same industry to a certain extent.

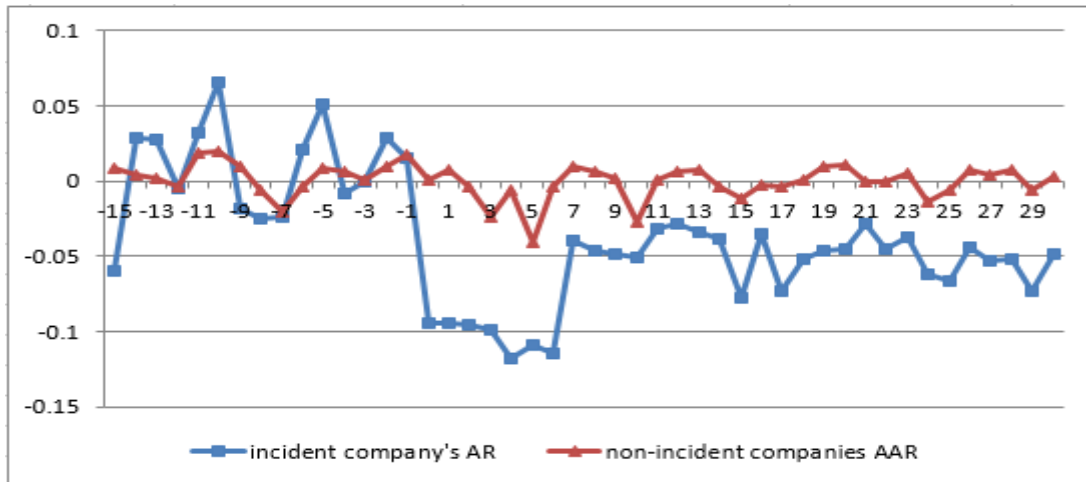


Fig 1. Comparison chart of AR of incident companies to non-incident companies

3.2. The cumulative average abnormal rate of return of the exposed company and the non-exposed companies is compared

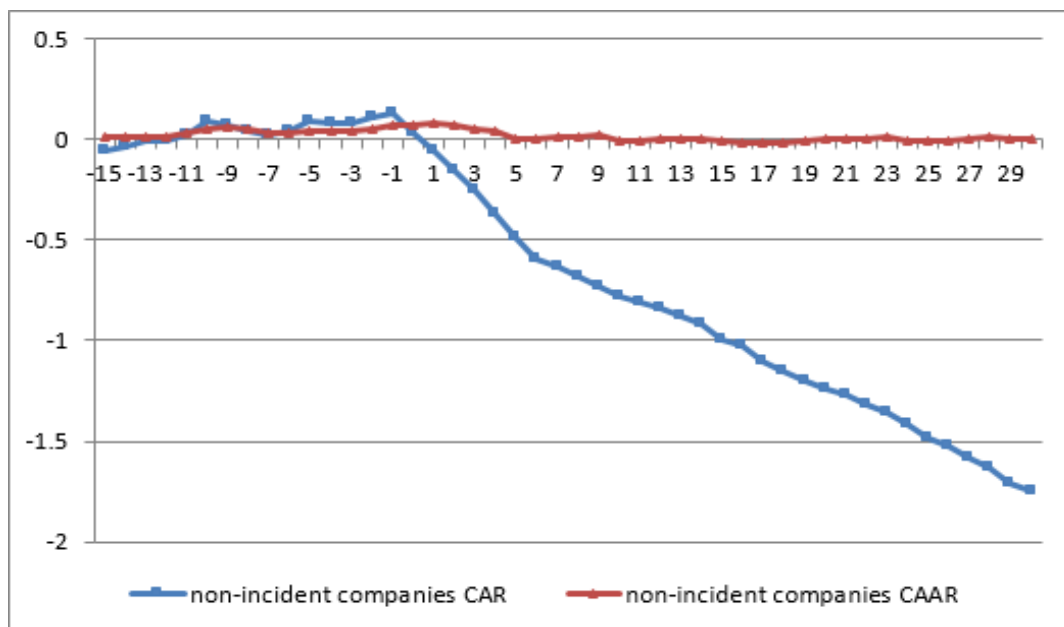


Fig 2. Comparison chart of CAAR of incident companies to non-incident companies

In figure 2, the cumulative abnormal rate of return of changchun changsheng is more significant than that of 32 non-incident enterprises. First of all, the cumulative abnormal return rate of non-incident enterprises did decline to some extent within the range of event period (0,5). This shows that it is due to the contagion effect that the changsheng vaccine event has affected 32 non-incident companies in the same industry. Secondly, within the scope of the event period (0,6), the cumulative abnormal return rate of the incident company not only experienced a process from positive to negative, but also rapidly widened the gap with that of the non-incident companies. It has been proved once again that the changchun changsheng vaccine incident has a different impact on the stock prices of the affected and non-affected companies.

3.3. Empirical analysis of vaccine companies and non-vaccine companies

In figure 3, the abnormal rate of return of vaccine and non-vaccine companies is particularly significant during the event period, especially in the range of (0,5). This situation once again confirms the impact of changchun changsheng vaccine incident on the stock prices of non-incident companies. Within the range of (0,5), it can be seen that the abnormal rate of return of vaccine

companies is generally lower than that of non-vaccine companies, which to some extent indicates that the degree of impact of vaccine companies is greater than that of events received by non-vaccine companies.

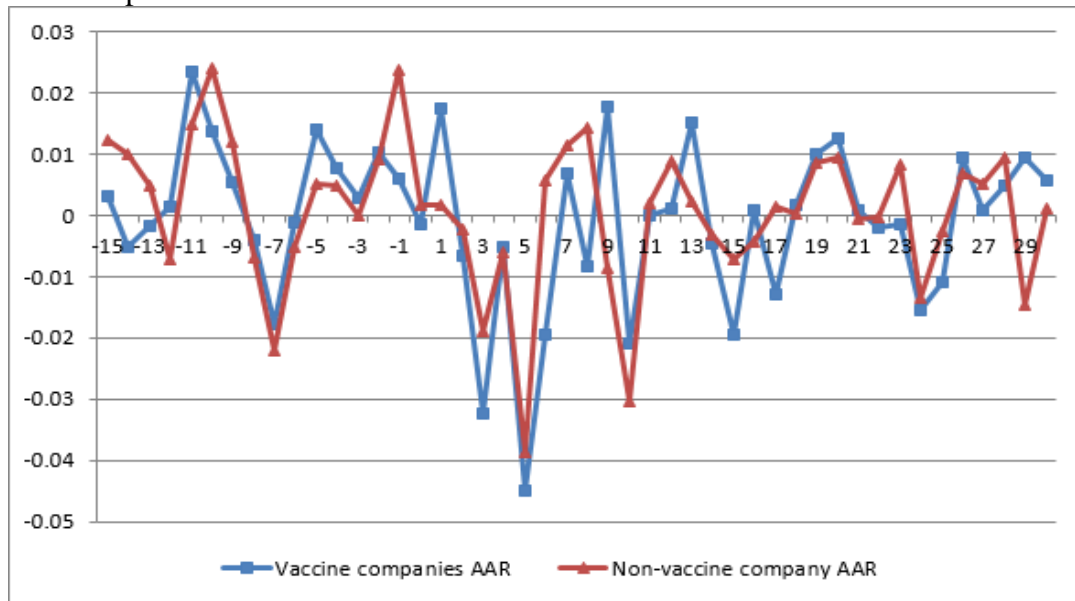


Fig 3. Comparison of AAR between vaccine companies and non-vaccine companies

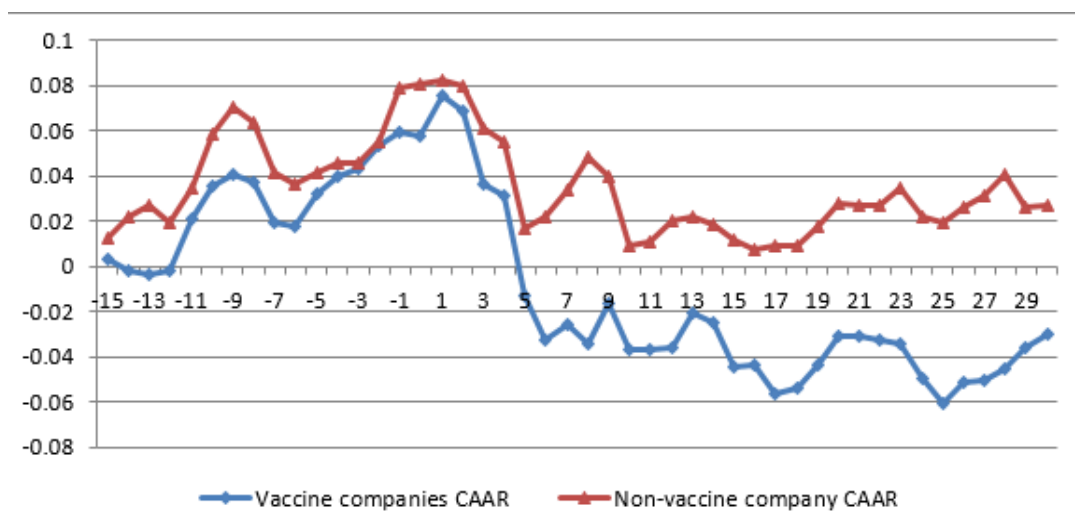


Fig 4. Comparison of AAR between vaccine companies and non-vaccine companies

As can be seen from figure 4, vaccine companies were lower than non-vaccine companies during the whole event period. Both fell sharply during the period (1,5), but the decline in vaccine companies was steeper, so that the cumulative abnormal rate of return fluctuated from day 5 but was not positive. Compared with non-vaccine companies, it is falling too, and fast, but not negative. Therefore, it is proved that the changchun changsheng vaccine event has different impacts on non-vaccine companies and non-vaccine companies.

3.4. Section test for significance

Based on the above empirical analysis, it can be known that the cumulative abnormal return rate of the incident companies, non-incident companies and vaccine companies in the event period decreased rapidly in the event period (0,5), and the speed slowed down from the 6th day. Therefore, in order to more accurately test the impact of the vaccine on non-incident companies, the author shortened the event period to (0,10), and then divided the (0,10) in the event period into (0,5), (0,10) and (5,10) for significance test. The test results of the three are as follows:

Table.1. Significance tests at different time periods

		Changchun Changsheng	Non-incident companies	vaccine companies
(0,5)	T value	-2.719 (0.042)**	4.841 (0.005)**	1.2 (0.284)
(0,10)	T value	-4.987 (0.001)**	3.460 (0.006)**	-2.035 (0.069)***
(5,10)	T value	-15.034 (0.000)**	1.821 (0.128)	-4.245 (0.008)**

Note 1: (0.042) indicates that the two-tailed value is 0.042.

Note 2: ** indicates a significance level of 5% and *** indicates a significance level of 10%.

Can be seen from table 1 vaccine in different period of event to impact on stock prices are different, in the event period (0, 5), t value of vaccine companies under the 5% significant level was not significant as is, in the period of (0, 10) events, and t value is negative, under 10% significance level in (5, 10) t value under 5% significance level was also significantly negative, the events of the fifth day in vaccine companies produced contagion effects. The fifth day was on July 22, 2018, when premier Keqiang Li made a statement on the vaccine issue. For non-incident enterprises, the t value from the significance level of 5% (0,5) is positive to the non-significant positive value of (5,10), indicating that the instructions made by premier Keqiang Li on the vaccine incident on the 5th day had an infectious effect on non-incident companies.

4. Conclusion

In the capital market, information plays a more and more important role. After the exposure of negative events, the market responds rapidly, not only the companies in the event, but also the non-incident companies or companies of the same type in the same industry and enterprises of different types in the same industry will be affected by the contagion effect of the capital market to varying degrees. when a negative event occurs, how should investors, companies involved and companies not involved respond to reduce losses?

For companies involved in negative events, first, they should be brave enough to admit the truth of the events and respond cautiously. They should take the initiative to announce the treatment arrangements for negative events to the public to meet the public's right to know, so as to build a positive corporate image and alleviate the public's aversion to the enterprise. Second, to take effective measures quickly, the company's internal self-inspection, all departments should actively cooperate to find out the root cause of the problem, timely and thoroughly solve the problem, so as to alleviate the continued deterioration of negative events.

For non-incident companies with negative events, self-examination should be conducted at the first time when the negative events occur. Then actively coordinate all departments of the company to deal with the possible impact of this negative event on the company; Secondly, to actively communicate with investors, understand investor psychology, in front of investors to establish a good corporate reputation.

For investors, when they receive the news of a negative event indirectly at the first moment, they should learn to treat it rationally and judge by themselves. The concept of rational investment should be established and self-protection consciousness should be strengthened. After the authoritative official responds to the negative event, we should treat the event objectively and rationally, pay close attention to the official report and the government news report on the event, and make the most favorable decision after fully understanding the beginning and end of the event.

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