

The Impact of Russia-Ukraine Conflict on Chinese Military Industry Sector -Based on Event Study

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Abstract. The conflict between Russia and Ukraine has had a tremendous impact on the world economy. This paper uses the event study and selects 51 military enterprises in Shanghai and Shenzhen from February 14 to March 4, 2022. The date of the event was set as February 15, and within eight days of the event, the CAAR as a whole was positive. So, the Russia-Ukraine conflict on the Chinese military industry sector had a positive impact, but the impact of the shorter duration, was mainly affected by investor sentiment, and the overall performance of hedging demand. In the long run, the military industry sector will still be driven by fundamentals. Investors need to include the Chinese military industry sector in their portfolios to avoid the risk of geopolitical conflict. It is also important to note that due to the relatively short duration of events, the portfolio needs to be dynamically adjusted and the risk of late price declines cannot be ignored.

Keywords: Russia; Ukraine; Conflict; Chinese military industry sector; Event study.

1. Introduction

The conflict between Russia and Ukraine has become an important topic of global concern. As conflict situations change, they have a tremendous impact on economies around the world, such as stock market volatility, soaring oil prices, rising food prices, soaring metal and mineral prices, and the global supply chain disorder [1]. Over the past few weeks, the world's stock markets have been shaken. As an economic barometer, the stock market is an important index to judge the economic impact of the conflict between Russia and Ukraine.

Although the conflict between Russia and Ukraine has had a great impact on the global economy, there is little research on the impact of the military industry sector on the Chinese stock markets. As an important component of the country's military science and technology, the military industry is the core of the country's manufacturing industry and can represent the country's advanced technology and equipment manufacturing capabilities, it not only guarantees the territorial integrity of the country, but also is an important component of economic development. This paper adopts the event study, the stock data of 51 listed military enterprises from February 14 to March 4 were selected from the Shanghai and Shenzhen Stock Exchanges. At the same time, the United States announced February 15 economic sanctions against Russia set as an event day.

By analyzing the data of eight days before and after the event, CAAR was positive in the eight days after the event, that is to say, the conflict between Russia and Ukraine had a positive impact on the Chinese military industry sector, but it lasted for a short time. Although the Russia-Ukraine conflict has a certain impact on market sentiment, but in the long run, the Chinese military industry sector will continue to be driven by fundamentals. As global geopolitical uncertainty continues to grow, it will be necessary for investors to include the Chinese military industry sector in their portfolios to hedge against the risk of geopolitical conflict, and at the same time, investors can't afford to ignore the risk of late-stage share price declines.

The research innovation of this paper is mainly reflected in: firstly, this paper has strong timeliness and the conflict between Russia and Ukraine has its particularity compared with other emergency

events; secondly, through the event study, this paper studies the influence of the conflict between Russia and Ukraine on the Chinese military industry sector, enriches the study of the influence of the geopolitical conflict on the financial market, and helps to deepen the countermeasures of the investment decision-making under the current international situation. The following contents of this paper include a literature review, research design, research results analysis and conclusions.

2. Literature review

At present, there are few studies on the impact of the conflict between Russia and Ukraine on the stock markets, however, there are much evidence show about the research on the stock market with a great result on this emergency. Most of the references are focus on COVID-19, terrorist attacks or natural disasters, etc. about this event.

2.1 The emergency event

Emergent events refer to natural disasters, accidents, public health events and social security events that occur suddenly, cause or may cause serious social harm and need to be dealt with by emergency measures [2]. In recent years, the research on emergency events mainly focuses on the impact of the COVID-19 on the stock markets. Different scholars have studied the stock markets in different countries. Verma et al. studied the impact of the on lockdown major sectors of the Indian economy, including pharmaceuticals, FMCG, Financial services, banking, and energy. They used an event study to analyze the data and found the announcement of the lockdown played a positive role in the return of the stock market [3]. Other studies have used QR models to analyze the impact of COVID-19 on Australian stocks, and they have found that different industries are impacted differently, health, information technology and major consumer goods industries have benefited from the epidemic [4]. Further research shows that the higher the uncertainty of COVID-19, the greater the volatility of the stock returns of the composite index and the industry index, and the impact of the coronavirus epidemic on the pharmaceutical industry and IT industry is positive, but sectors such as energy, consumer discretionary, industry, transport and telecommunications have been negatively affected [5, 6].

Terrorist attacks and natural disasters are also a kind of emergency, which can cause changes in investor sentiment and have a huge impact on the economy. Maillet and Michel according to research the influence on the American and French stock markets 9.11 events, they found that the 9.11 event had a significant negative impact on both the American and French stock markets [7]. Other researchers by studying the impact of hurricanes on U.S. stock market, they found different hurricanes had different effects on the U.S. stock market. Among them, a hurricane has a significant impact on insurance stocks, in the ten trading days before and after the arrival of a hurricane [8].

Geopolitics is a theory in the political geography. Geopolitical conflict is a kind of conflict due to the different geographical positions and political interests between countries. The conflict between Russia and Ukraine can be regarded as a geopolitical conflict. CITIC Securities has studied six geopolitical conflicts in history. They conclude that the geopolitical conflicts will not have a great impact on the medium-term trend of China's stock market. However, from a historical perspective, the impact of geopolitical conflict events on the capital market is mainly affected by investor sentiment fluctuations and has the characteristics of short duration and small follow-up impact [9].

2.2 Event study

For the study of emergency events, different scholars use different research methods, this paper will use event study to analyze the impact of the Russian-Ukrainian conflict on China's stock markets.

Event study was first initiated by Ball & Brown and Fama et al. It analyzes the change of stock return rate before and after a specific event, also it is mainly used to test the price change before and after the event or the reaction of the price to the disclosure information [13]. Nowadays event study is widely used in business studies. The event study method consists of the following seven steps:

event definition, selecting criteria, calculating normal and abnormal returns, estimation procedure, testing procedure, empirical results, interpretation and conclusions [10, 11]. Although it has been nearly 90 years since the event study method was put forward, it is still one of the most commonly used methods in empirical analysis. Although it has been nearly 90 years since the event research method was put forward, it is still one of the most commonly used methods in empirical research and analysis, although this method still has some shortcomings, but with the development of the research, it becomes more and more perfect. Like Caves, R. E. said, the event study method is a simple and effective method, its theory is very rigorous, easy to operate, can avoid some follow-up problems, this method should have a place in the academic community [12].

2.3 Summary

Through reading the relevant literature, the scope of research on emergency events is very wide, and draw the conclusion that emergency events have a short-term impact on the stock market. There are two main reasons: first, the impact of unexpected events on the main economy; second, the unexpected events caused panic and pessimism in investors, affecting the stock market [13]. The conflict between Russia and Ukraine is a recent emergency event, and it has had a greater impact on the world economy, at present, there are few empirical studies on the impact of the conflict between Russia and Ukraine on the Chinese stock markets. The event study method is a simple and effective method. This paper will be based on the event study method to analyze the impact of the Russia-Ukraine conflict on the Chinese stock market in the military industry field.

3. Research design

Empirical analysis of the impact of the Russia-Ukraine conflict on stock price fluctuations of listed companies in Chinese military industry.

3.1 Sample and data selection

This paper studies the impact of the Russia-Ukraine conflict on the stock price fluctuations of listed companies in Chinese military industry from February 14, 2022, to March 4, 2022, in turn. The five events are shown in Table 1. Stocks of military industry-listed companies in Shanghai and Shenzhen stock markets are selected. The remaining 50 stocks are selected for event study after excluding stocks, ST shares, and B shares with other important events such as suspension of trading that occurred during the estimation and event period. As Shanghai and Shenzhen 300 index was selected as the reference market index, the stock data were all from I Fin D flush software.

Table 1. Time event (Beijing time)

Time	Event
2022.2.15	The Russian Defense Ministry announced the withdrawal of some land troops deployed on the border with Ukraine that had been participating in large-scale military exercises Russia launches a special military operation against Ukraine, and Ukrainian President Zelensky immediately orders a general mobilization. The United States has announced economic sanctions against Russia.
2022.2.26	The EU has kicked Russian banks out of SWIFT, which means the Russian financial system is isolated from the global financial system.
2022.2.27	Eu imposes additional sanctions to prohibit Russian civil aircraft from entering EU airspace. Meanwhile, Russian state media Sputnik and Russia Today and their subsidiaries have been banned from using EU radio and the Internet.
2022.2.28	Ukraine applies for EU membership. Russia and Ukraine begin the first round of ceasefire talks. The EU bans transactions with Russia's central bank and approves a 500 million euros military aid package for Ukraine's military.
2022.3.1	A 65-km-long Russian military convoy stops on the road to Kyiv. At the same time, Kharkiv and Mariupol in the east and Hersun in the south were under siege.
2022.3.2	Russian tanks enter Hersun, the first regional capital city in Ukraine to fall since the outbreak of the Russia-Ukraine conflict. Meanwhile, Russian troops have surrounded the port city of Mariupol in southeastern Ukraine. Russia blocks media platforms such as Twitter, Facebook, Voice of America, BBC, and Deutsche Welle. In response to the west's public opinion war, Mr. Putin also signed a law criminalizing "fake news."
2022.3.5	Us Secretary of State Antony Blinken has met with Ukrainian Foreign Minister Demitro Kuleba at the Polish-Ukrainian border, and the US has urged its citizens to leave Russia immediately.

This paper uses the event study method to study the impact of the Russia-Ukraine conflict on stock price fluctuations of listed companies in Chinese military industry from February 14, 2022, to March 4, 2022.

3.2 The empirical process is mainly divided into the following steps

The first step is to determine the estimation window, event date, and event window. The estimation window is a long period before the event date without any special major event. The purpose of drawing the estimation window is to estimate the expected rate of return without event by using the data during this period. The event window is the occurrence interval of an event, which is used to examine the impact of an event on stock price changes. The event date is located in the event window.

The second step is to use the market model to estimate the expected return rate. The formula of the market model is as follows:

$$ER_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (1)$$

$$E(\xi_{i,t}) = 0 \text{Var}(\xi_{i,t}) = \delta_{i,t}^2 \quad (2)$$

Where $R_{i,t}$ and $R_{m,t}$ represent the yield of stock i and market portfolio on the day t , respectively. α_i is the intercept. β represents the relationship between stock i and the market portfolio rate of return. ε is the error term. The least-square method is used to determine the regression parameter α_i and β_i . The estimated regression parameters are put into the expected rate of return model, and the expected rate of return $ER_{i,t}$ of stock i in the event window if no such event occurs is obtained.

The third step is to calculate Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR). Abnormal Return (AR) is the difference between the expected Return rate and the actual Return rate, namely:

$$AR_{i,t} = R_{i,t} - ER_{i,t} \tag{3}$$

Just looking at AR is not a good way to conclude because there are so many uncertainties in each company's estimate period that can interfere with the stock price. In order to reduce the influence of individual stock AR by other factors other than the research event, it is necessary to average AR in all samples and calculate the average abnormal return AAR and cumulative average abnormal return $CAAR$, namely:

$$AAR_{i,t} = \frac{1}{n} \sum_{i=1}^n AR_{i,t} \tag{4}$$

$$CAAR = \frac{i+n}{in} \sum_{i=1}^n AAR_{i,t} \tag{5}$$

$$CAAR_{(t_1, t_2)} = \sum_{t_1}^{t_2} AAR_{i,t} \tag{6}$$

Where n represents the number of companies, and AAR_{it} represents the abnormal return rate of its stock in the event window.

The fourth step is to conduct a significance test for $CAAR$ by T-test.

Null hypothesis: $CAR = 0$

Alternative hypothesis: $CAR \neq 0$

So with the one-sample T-test

If $t > 1.96$, it is considered that: at a 5% confidence level, the null hypothesis is rejected and the alternative hypothesis is selected, that is, CAR is not 0, that is, the impact is significant.

If $t < 1.96$, it is considered that the null hypothesis cannot be rejected at a 95% confidence level, that is, the impact is not significant.

Table 2. One-sample t-test

Variable	Obs.	Mean.	Std.Err.	Std.Dev.	5% Conf.	Interval
CAR	51	.1036016	.010181	.0727069	.0831525	.1240508
<i>mean = mean (CAR)</i>						<i>t = 10.1760</i>
<i>Ho: mean = 0</i>						<i>degrees of freedom = 50</i>
<i>Ha: mean < 0</i>		<i>Ha: mean != 0</i>		<i>Ha: mean > 0</i>		
<i>P_r(T < t) = 1.0000</i>		<i>P_r(T > t) = 0.0000</i>		<i>P_r(T > t) = 0.0000</i>		

4. Empirical research results and analysis

Next, the paper will focus on analyzing the empirical results of the Russian-Ukrainian conflict to see the impact of the Russian-Ukrainian conflict on Chinese military industry.

First of all, the paper selected the event date as February 15, when US Secretary of State Blinken announced that he had ordered the closure of the US embassy in Ukraine in Kiev, and would "temporarily" transfer the few diplomats who remained in Kyiv to the western city of Ukraine Lviv

[15]. Blinken called on U.S. citizens in Ukraine to evacuate as soon as possible, a statement that revealed rising tensions between Russia and Ukraine, which is an information shock for Chinese military industry sector.

As shown in Figure 1, the cumulative abnormal returns CAR of the major indices of the A-share military industry sector are all significantly positive. Therefore, on the whole, the Russian-Ukrainian conflict has had a sustained and significant positive impact on the Chinese military industry sector. It reached 0.1036 on the trading day. On the event day ($t=0$), the cumulative abnormal return CAR is 0.0285 and significant. Secondly, the abnormal return AAR of the main index of the A-share military industry sector is 0.0288, indicating that Chinese military industry sector has attracted great attention from investors, and investors are optimistic about the military industry sector, resulting in a higher return on Chinese military industry sector market.

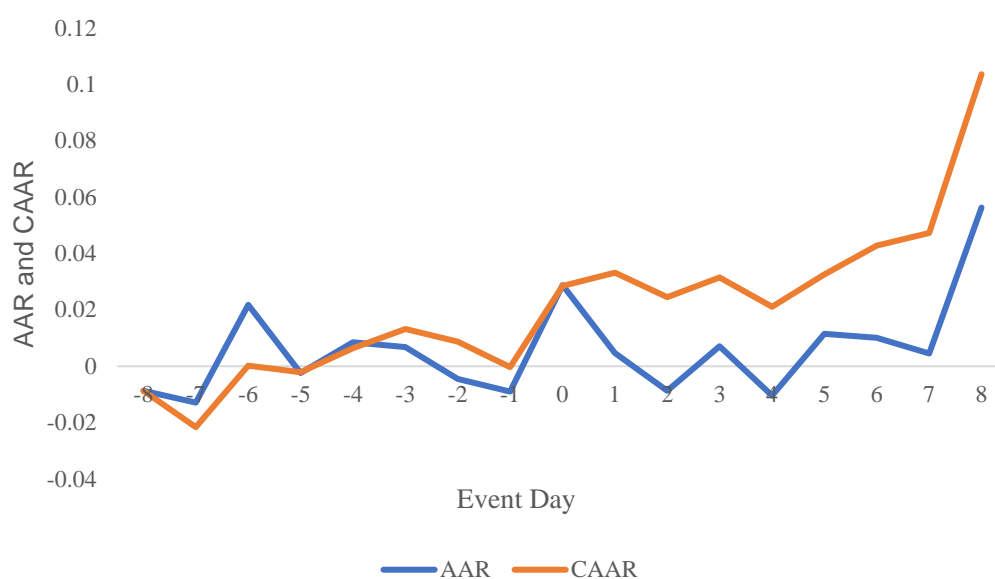
Then, two days after the event day, on February 16 and February 17, the AAR for these two days began to decline, from 0.0288 to -0.0087. It shows that the news of the closure of the US embassy in Ukraine has gradually weakened the positive impact of investors, and investor sentiment has quickly stabilized. Generally speaking, people will make expected judgments on investment decisions based on the existing international market information, and make investment decisions in advance. In other words, investor sentiment will be affected by the situation in Russia and Ukraine, and at the same time adjust their investment decisions according to the evolution of the situation. Combining Table 3 and Figure 1 and observing the event window [2, 7], that is, the trading days between February 17 and February 24, when the Russian-Ukrainian conflict officially started, the abnormal yield AAR of Chinese military industry sector fluctuated up and down, the performance is unstable. At the same time, the cumulative abnormal return CAR of this event window is 0.0183, which is significant. Reflecting that investors predicted that the situation in Russia and Ukraine would continue to be tense during this period, they began to increase investment in Chinese military industry sector in advance. Then, on February 24, Russian President Vladimir Putin declared: At the request of the authorities of the Donetsk and Luhansk republics to help repel the military aggression in Kyiv [16], this marked the official start of Russia's military operations in Ukraine. The official launch of the Russian-Ukrainian military operation actually reflects the increasingly tense geopolitical relations, and the geopolitical pattern that easily leads people to connect with the Asia-Pacific region is also very complex and unstable. Sex and urgency. Most of the investors' expectations were confirmed, and they began to formally increase investment, which made the stock price of Chinese military industry soar.

It can also be seen from Figure 1 that within the event window [7, 8], that is, during the period of 2.23-2.24, its abnormal return AAR began to rise sharply. During the two trading days, the abnormal return rate AAR rose to 0.0045 and 0.0568 respectively, and the cumulative abnormal return rate CAR during this window period was 0.0608, which was significant. It shows that the official launch of the Russian-Ukrainian military operation has had a significant positive impact on the Chinese military industry sector.

Table 3. Empirical results of the impact of the Russian-Ukrainian conflict on the Chinese military industry sector

Day	AAR	T value	P-value	star	CAR	T value	P-value	star
-8	-0.0087	-2.3622	0.0220	**	-0.0087	-2.3622	0.0220	**
-7	-0.0129	-3.2715	0.0019	***	-0.0216	-3.7529	0.0004	***
-6	0.0218	6.2824	0.0000	***	0.0002	0.0381	0.9697	
-5	-0.0024	-0.7290	0.4693		-0.0021	-0.3442	0.7321	
-4	0.0085	4.5115	0.0000	***	0.0064	0.9783	0.3325	
-3	0.0068	3.0770	0.0034	***	0.0132	2.2017	0.0322	***
-2	-0.0045	-2.8308	0.0066	***	0.0087	1.3260	0.1908	
-1	-0.0090	4.5692	0.0000	***	-0.0003	-0.0391	0.9690	
0	0.0288	9.5427	0.0000	***	0.0285	3.6508	0.0006	***
1	0.0047	1.5723	0.1221		0.0332	4.4369	0.0000	***
2	-0.0087	-3.2350	0.0021	***	0.0245	2.7589	0.0080	***
3	0.0071	2.4965	0.0158	**	0.0315	4.0894	0.0002	***
4	-0.0104	-5.3305	0.0000	***	0.0211	2.6910	0.0096	***
5	0.0115	4.1391	0.0001	***	0.0326	3.5706	0.0008	***
6	0.0101	3.6472	0.0006	***	0.0428	4.5953	0.0000	***
7	0.0045	1.6854	0.0980	*	0.0473	5.7005	0.0000	***
8	0.0563	9.3014	0.0000	***	0.1036	10.1760	0.0000	***

Notes: *, **, and *** are significant at 1%, 5%, and 10% confidence levels, respectively.

**Figure 1.** Empirical results of the impact of the Russian-Ukrainian conflict on the Chinese military industry sector

Notes: 0 is the event day - February 15, when US Secretary of State Blinken announced that he had ordered the closure of the US embassy in Ukraine in Kyiv, a statement that revealed the escalation of tensions between Russia and Ukraine. 8 is the eighth trading day after the event. On February 24, Russia officially started military operations in Ukraine.

5. Conclusions

This paper adopts the event research method, selects 51 stocks in the military industry sector in Chinese A shares for empirical analysis, and studies the impact of the Russian-Ukrainian conflict on

Chinese military industry sector. And the empirical process is mainly divided into three steps. The first step is to determine the estimation window, event date, and event window. The second step is to use the market model to estimate the expected return rate. The third step is to calculate Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR). By analyzing the data results, it can be found that during the event window [0,8], the cumulative excess return (CAAR) is generally positive, which means that the Russian-Ukrainian conflict has had a positive impact on the Chinese military industry sector, but the duration is relatively short, mainly affected by investor sentiment. Therefore, in general, the Russian-Ukrainian incident had a significant positive impact on Chinese military industry sector, resulting in a sharp rise in the sector's stock price, but Chinese military industry sector only took a short period of time to eliminate this positive impact, and the impact lasted for a short time. Although the Russian-Ukrainian conflict as a short-term catalyst has a certain impact on market sentiment; in the long run, Chinese military industry sector will still be driven by fundamentals. As the global geopolitical uncertainty continues to be high, it is necessary for investors to include the military industry sector in their investment portfolios to avoid the risk impact caused by geopolitical conflicts. However, at the same time, it should also be noted that since the duration of the impact of the event is relatively short, it is largely caused by market changes caused by investor sentiment. Therefore, investors should pay attention to the real-time adjustment of the portfolio, and cannot ignore the risk of later decline in stock prices.

At the same time, the research in this paper has shortcomings. First of all, the amount of data selected in this paper is insufficient. In the future research process, it is necessary to expand the amount of data selected so that the conclusion can be supported by enough data and be more convincing. Secondly, the event window selected in this paper is short, and the observation scope of the entire event is limited, so more event days will be covered to conduct more complete and sufficient research on the event in the future.

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