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Market Shockwaves: The Impact of Russia-Ukraine Invasion on Oil and Gas Stocks In ASEAN

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Abstract
This Research analyzes market reactions to the Russian invasion of Ukraine, focusing on oil and gas sector stocks in ASEAN markets. The primary variable analyzed is the cumulative abnormal return (CAR) as the dependent variable, with return on equity (ROE) and return on assets (ROA) as independent variables. The data includes all oil and gas sector stocks listed on ASEAN exchanges, selected through purposive sampling based on specific criteria. Analysis methods include paired sample t-test and multiple linear regression. The findings indicate that there was a positive abnormal return on pre-event and event days across all ASEAN countries. However, on post-event days, positive abnormal returns were only seen in Vietnam, Indonesia, Thailand, the Philippines, and Singapore, while Malaysia experienced a negative abnormal return. The abnormal return at 3 days, 2 days, 1 day before and 1 day, 2 days, 3 days after the event is significantly lower than on the event day. The results showed that ROE has a significant positive effect on CAR, while ROA has a significant negative effect on CAR. The negative influence of ROA is attributed to high corporate debt, which became a concern for investors amid geopolitical events.

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1. Pendahuluan

Geopolitical events frequently exert a profound impact on global stock markets. A recent development that has significantly heightened uncertainty in global financial markets is Russia's invasion of Ukraine. On February 24, 2022, tensions between Russia and Ukraine escalated to a critical juncture when Russia initiated a military offensive on Ukrainian territory. This event has not only precipitated widespread political and humanitarian crises in Europe but also generated substantial economic repercussions, affecting stock markets globally.

Russia and Ukraine wield considerable influence in key sectors such as oil, gas, and food. A conflict between these nations could drive significant price increases in these sectors (Matondang, Meisha, Indirani, Handayani, & Br Simanjuntak, 2022).

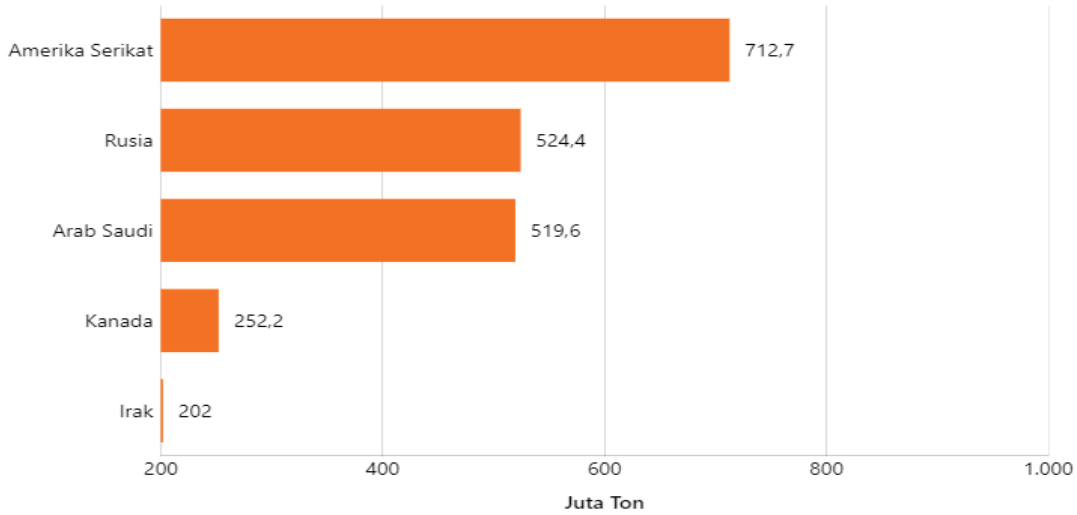

Figure 1. World's Largest Oil Producing Countries (2020)
Source: katadata.co.id

Figure 1 illustrates that Russia is the world's second-largest oil producer, following the United States. The conflict between Russia and Ukraine has disrupted production and export processes, significantly affecting countries reliant on Russian oil imports. In the event of an oil shortage, global energy scarcity could ensue, profoundly impacting the energy industry and companies operating within this sector (Huka and Kelen, 2022). The conflict has also led to disruptions in production and export activities, particularly affecting nations dependent on oil imports from Russia. In response to the invasion, the United States imposed economic sanctions on Russia, including the suspension of all operations of Russian financial institutions within the U.S. and the freezing of investment assets and personal properties linked to the Russian president. Furthermore, the U.S. and the European Union issued an embargo on Russian crude oil imports (Wartindas, Komalasari, & Dharma, 2023).

In retaliation to these sanctions from Western nations, the Russian president announced plans to reduce gas supplies and implement a new payment system for European countries, such as Germany, which relies on Russia for 35% to 40% of its gas supply. Consequently, energy commodity prices experienced a sharp increase due to heightened demand (www.kompas.com, 2022).

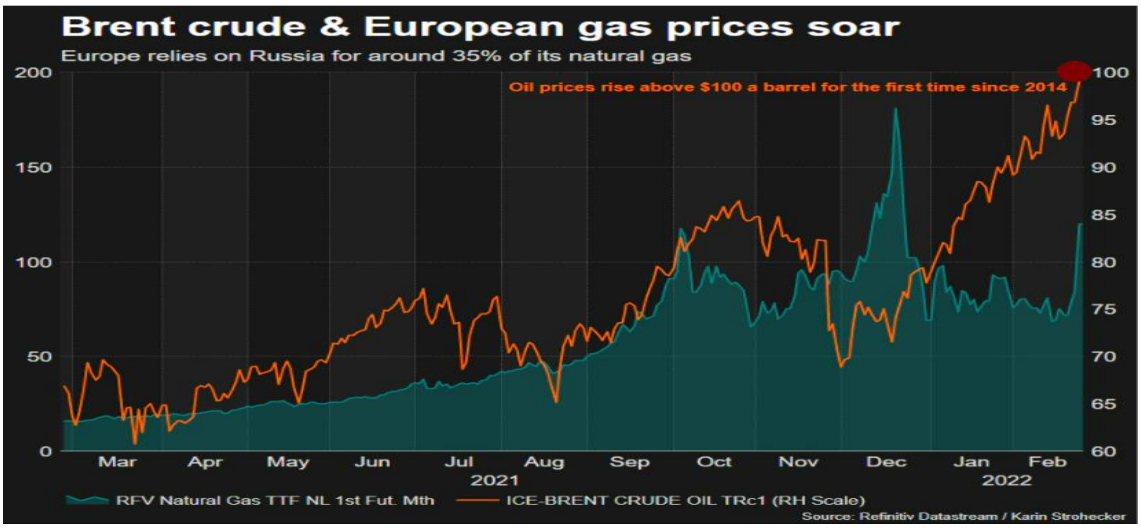

Figure 2. Crude Oil and Natural Gas Price
Source: weforum.org

Figure 2 illustrates that Brent oil and European gas prices experienced a significant increase in mid-February 2022 following Russia's invasion of Ukraine.

The stock market is influenced by both economic and non-economic events, providing critical information to investors. Relevant information directly impacts market reactions, which can be measured through changes in stock prices (Wartindas et al., 2023). The Russia-Ukraine conflict disrupted global energy supplies, leading to a surge in energy commodity prices. This rise in energy costs adversely affected the profitability of companies, particularly those in the oil and gas sector within ASEAN. Companies in this sector are highly sensitive to sudden fluctuations in oil and gas prices, as well as shifts in investor sentiment driven by global uncertainty. Market volatility intensified as participants reacted to news of the invasion and subsequent sanction policies, often resulting in sharp fluctuations in stock prices. These fluctuations may lead to abnormal returns for oil and gas sector stocks in ASEAN.

A company's primary objective is to generate profits, making profitability ratios a key focus for investors. Profitability is commonly measured using Return on Assets (ROA) and Return on Equity (ROE). Research by Warsono, (2016)indicates that ROE significantly impacts abnormal returns, while Safiroh and Sholichah, (2023) found no significant effect of ROE on abnormal returns. Similarly, Felicia and Salim, (2019) demonstrated that ROA significantly influences abnormal returns, whereas Triana and Lukman, (2021) concluded that ROA has no effect on abnormal returns.

Previous studies have focused primarily on the Indonesian capital market. To provide a deeper understanding of market reactions to geopolitical events, this study expands to the capital markets of ASEAN countries.

Signalling theory explains how management's outlook on a company's future prospects can influence investor decisions (Brigham & Houston, 2013). Investors analyze these signals to determine whether they are positive or negative, then make decisions accordingly. If the information is perceived as positive, investors tend to respond favorably, helping to distinguish high-quality companies from lower-quality ones. This often leads to rising stock prices and increased company value. Conversely, if the signal is seen as negative, investor interest may decline, leading to a decrease in company value (Pratama, 2021).

According to Hartono (2016), in an efficient market, new information impacts the value of existing securities, causing prices to move toward a new equilibrium. A market is considered efficient if securities can quickly adjust their prices to reach this equilibrium.

The aim of an event study is to identify whether a particular event significantly affects asset values or the market, in this case by examining market reactions to the Russia-Ukraine war using abnormal returns and profitability ratios. According to Yudaruddin dan Lesmana, (2024) conducting an event study requires specifying the event date and event period. The event window will include

3 days before the invasion announcement as the pre-invasion period and 3 days after as the post-invasion period. Additionally, a 100-day trading period will be used as the benchmark to estimate normal returns.

Abnormal return is the difference between the actual return and the expected return. A positive abnormal return occurs when the actual return is higher than the expected return, while a negative abnormal return occurs when the actual return is lower or negative compared to the expected return (Hartono 2016). Huka and Kelen, (2022) found no significant difference in the average abnormal return obtained by investors during the event period, while Kurniawan and Sudirman, (2023) identified significant abnormal returns during the Russian invasion of Ukraine in 2022.

Return on Equity (ROE) is a ratio that measures the rate of return generated by a company using its own equity. A high ROE signals to investors that the company is efficiently using its equity to generate profits, often encouraging them to buy its stock (Sutrisno, 2012). Warsono, (2016) indicates that ROE has a significant impact on abnormal returns, while Safiroh dan Sholichah, (2023) found that ROE has no effect on abnormal returns.

Return on Assets (ROA) is a ratio that measures the rate of return generated by a company relative to its assets. A low ROA indicates that the company is generating low income in relation to its assets (Rahmawati, 2020). Felicia dan Salim, (2019) showed that ROA significantly affects abnormal returns, whereas Triana dan Lukman, (2021) concluded that ROA has no effect on abnormal returns.

Return on Equity is a ratio that measure company's ability to generate profit using their own equity. A high ROE indicates that the company is able to generate significant profits from its own equity, whereas a low ROE suggests that the company is producing relatively low profits from its equity.

Based on signaling theory and efficient market theory, a company's return on equity provides signals to investors that influence their decisions, with investors quickly reacting to the signals they receive. The study by Warsono, (2016) indicates that return on equity has a significant effect on abnormal return. Based on the explanation above, the hypothesis formulated is:

H1: Return on Equity affects the cumulative abnormal return of oil and gas sector stocks in the ASEAN capital markets during the event period of Russia's invasion of Ukraine.

Return on Asset (ROA) is a ratio that measures company's ability to generate profit using their assets. A low ROA indicates that the company generates low income relative to its assets, while a high ROA suggests that the company generates high income relative to its assets.

Based on signaling theory and efficient market theory, a company's return on assets signals to investors the company's ability to generate profits from its total assets, with investors quickly reacting to the signals they receive. The study by Felicia and Salim (2019) found that return on assets has a significant effect on abnormal returns. Based on the explanation above, the hypothesis formulated is:

H2: Return on Asset has an effect on the cumulative abnormal return of oil and gas sector stocks in the ASEAN capital markets during the Russia-Ukraine invasion event period.

2. Method

This study utilizes independent and dependent variables. The independent variables are Return on Equity (X1) and Return on Assets (X2), while the dependent variable is the Cumulative Abnormal Return (Y).

2.1. Abnormal Return

Abnormal return refers to the difference between the actual return achieved and the expected return anticipated by investors.

$$ARit = Rit - E(Rit)$$

2.2. Actual Return

Actual return is the difference in price between day t and day t-1 (the previous day).

$$Ri,t = \frac{Pi,t - Pi,t-1}{Pi,t-1}$$

2.3. Expected Return

Expected return is the return that investors anticipate to be generated in the future.

$E(Rit) = ai + \beta iRmt$

2.4. Cumulative Abnormal Return

Cumulative abnormal return (CAR) is the accumulation of abnormal returns over a specific period. By accumulating abnormal returns, CAR provides an overview of the total impact of an event over a certain time frame.

$$CAR_{\{t_1,t_2\}} = \sum_{\{t\ =\ t_1\}}^{\{t_2\}} \text{ARt}$$

2.5. Return on Equity

Return on Equity (ROE) reflects a company's ability to generate profit from its equity. A higher ROE indicates that the company is earning more profit relative to the equity invested, making it more attractive to investors.

$$\text{Return on Equity} = \frac{\text{Earnings After Tax}}{\text{Total Shareholders Equity}}$$

2.6. Return on Asset

Return on Assets (ROA) is a financial ratio that measures a company's ability to generate net income from its assets. A higher ROA indicates that the company is effectively using its assets to produce greater profits.

$$\text{Return on Asset} = \frac{\text{Earnings After Tax}}{\text{Total Assets}}$$

2.7. Research Population and Sample

The population refers to the complete set of individuals, objects, or events that possess certain characteristics being studied in a research project. In this study, the population consists of all publicly listed companies in ASEAN countries operating in the oil and gas (MIGAS) sector. A sample is a subset of the population selected for analysis or observation. In this research, the sampling technique used is purposive sampling, with the following criteria:

1) All oil and gas sector companies listed on stock exchanges in ASEAN countries in 2021-2022.
2) The companies' stocks were actively traded during the period of the Russia-Ukraine invasion event.
3) Oil and gas companies in the oil and gas operations industry listed on the Reuters website.

Table 1. Sample Criteria

No	Description	Amount
1	Oil and gas sector companies listed on stock exchanges in ASEAN countries in 2021-2022	155
2	Companies not actively traded during the period of the Russia-Ukraine invasion event	(17)
3	Non-oil and gas operations industry companies	(89)
Total Sampel		49

2.8. Data Analysis Methods

The data analysis method used in this study involves multiple linear regression analysis and paired-sample t-test, with the assistance of STATA 14 software.

3. Result and Discussion

3.1. Result

3.1.1. Abnormal Return

Table 2 present the average cumulative abnormal return from each ASEAN country shows that there was a positive abnormal return on both pre-event and event days across all ASEAN countries. On the post-event days, a positive abnormal return was observed in Vietnam, Indonesia, Thailand, the Philippines, and Singapore. However, a negative abnormal return was recorded in Malaysia during the CAR(0,+1), CAR(0,+2), and CAR(0,+3) intervals.

Table 2. Average Cumulative Abnormal Return

Country	Pre-event days	Event days	Post-event days
	CAR (-3,0)	CAR (-2,0)	CAR (-1,0)
Vietnam	0.0313	0.0449	0.0350
Indonesia	0.0347	0.0647	0.0509
Thailand	0.0187	0.0266	0.0195
Philippines	0.0248	0.0224	0.0335
Malaysia	0.0166	0.0229	0.0269
Singapore	0.0557	0.0641	0.0268

The impact of the Russia-Ukraine invasion on oil and gas sector companies in ASEAN during the event period, specifically from 3 days before to 3 days after the invasion announcement, is shown in Table 3. The results reveal a significant difference in abnormal returns between the 3-day periods before and after the announcement and the event day (the day of the invasion). All tested periods, both before and after the invasion announcement, show a significant difference in abnormal returns compared to the event day. Therefore, it can be concluded that the Russia-Ukraine invasion had a significant impact on the market and the stock prices of oil and gas companies in ASEAN, as reflected in the abnormal returns during these periods when compared to the event day. Since the t-count is negative, the abnormal return from 3 days before to 3 days after 3 the event is **significantly lower** than on the event day.

Table 3. Paired Sample t-test

Event Window	Average AR	t count	t table	Result
-3	-0.00928	-4.7857	2.010	Significant
-2	0.00663	-3.2768	2.010	Significant
-1	0.00195	-2.9200	2.010	Significant
1	-0.01644	-4.0478	2.010	Significant
2	0.01052	-2.2054	2.010	Significant
3	0.00460	-2.2845	2.010	Significant

3.1.2. Descriptive Statistics

Descriptive statistical analysis explains the comparison of the mean and standard deviation values of both independent and dependent variables. The independent variables used in this study are profitability ratios, represented by the return on equity (ROE) ratio and return on assets (ROA) ratio, while the dependent variable is Cumulative Abnormal Return (CAR).

Table 4. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CAR (-3,0)	49	0.0282	0.0803	-0.1649	0.2379
CAR (-2,0)	49	0.0374	0.0724	-0.1104	0.2374
CAR (-1,0)	49	0.0307	0.0553	-0.1104	0.1917
CAR (0,0)	49	0.0285	0.0530	-0.0595	0.1829
CAR (0,+1)	49	0.0123	0.0397	-0.0700	0.1412
CAR (0,+2)	49	0.0232	0.0506	-0.1056	0.1809
CAR (0,+3)	49	0.0277	0.0619	-0.0753	0.2321
CAR (-3,+3)	49	0.1879	0.3462	-0.3896	1.2219
AR -3	49	-0.0093	0.0261	-0.0939	0.0794
AR -2	49	0.0066	0.0321	-0.0659	0.0959
AR -1	49	0.0019	0.0281	-0.0722	0.0818
AR 0	49	0.0285	0.0520	-0.0576	0.1741
AR +1	49	-0.0164	0.0330	-0.0860	0.0646
AR +2	49	0.0105	0.0323	-0.0670	0.1365
AR +3	49	0.0046	0.0452	-0.1018	0.1697
ROE	49	6.20	14.44	-65.52	54.59
ROA	49	2.50	9.55	-55.40	18.10

3.1.3. Normality Test

The normality test is conducted using the Shapiro-Wilk W test for normal data. Data is considered normally distributed if the significance value is greater than 0.05.

Table 5. Shapiro-Wilk Test

Variable	Obs	W	V	z	Prob>z
Data_Res	49	0.97846	0.997	-0.006	0.50258

Based on the results of the Shapiro-Wilk test in Table 5, the obtained prob>z value is 0.50258, which is above the significance level of 0.05. This indicates that the data in this study is normally distributed.

3.1.4. Multicollinearity Test

To test for the presence of multicollinearity, the variance inflation factor (VIF) value is examined. A regression model is considered free of multicollinearity if the VIF value is less than 10.

Table 6. Multicolinearity Test

Variable	VIF	1/VIF
ROA	6.91	0.144675
ROE	6.91	0.144675
Mean VIF	6.91	

3.1.5. Heteroskedasticity Test

To determine whether heteroskedasticity is present, the Breusch-Pagan/Cook-Weisberg test is performed. If the p-value is greater than 0.05, it indicates that heteroskedasticity is not an issue.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of CAR

         chi2(1)      =     0.25
         Prob > chi2  =   0.6167
```

Figure 3. Breusch-Pagan/Cook-Weisberg Test

3.1.6. Hypothesis Test

Hypothesis testing using the t-test is conducted to determine the individual effect of the independent variables, return on equity (ROE) and return on asset (ROA), on the dependent variable, cumulative abnormal return (CAR).

Table 7. Hypothesis Test

CAR	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ROE	0.0335954	0.0077982	4.31	0.000	0.0178985	0.0492923
ROA	-0.0510353	0.0117899	-4.33	0.000	-0.0747672	-0.0273035
_Cons	0.10745	0.0486298	2.21	0.032	0.0095633	0.2053368

In Table 7, The results for ROE indicates that H1 is accepted, suggesting that ROE has a significantly positive impact on the cumulative abnormal return (CAR) of oil and gas sector stocks in the ASEAN capital market during the Russia-Ukraine invasion event period. This indicates that the market responds positively to companies with high ROE, suggesting that investors pay attention to firms with strong financial performance (in terms of equity returns) amid global uncertainty. For ROA, H2 is accepted, indicating that return on assets has a significantly negative impact on the cumulative abnormal return (CAR) of oil and gas sector stocks in the ASEAN capital market during the Russia-Ukraine invasion event period. When a company uses debt in its operations, it may increase total assets but also adds interest expenses and financial risk amid global uncertainty. This leads to a negative market reaction to the company's stock, reflected in a decline in the Cumulative Abnormal Return (CAR).

3.2. Discussion

3.2.1. Abnormal Returns of Oil and Gas Sector Stocks in Each ASEAN Country

The results of the study show that the average cumulative abnormal return (CAR) across ASEAN countries, positive abnormal returns were observed on pre-event and event days in Vietnam, Indonesia, Thailand, the Philippines, Malaysia, and Singapore. On post-event days, positive abnormal returns occurred in Vietnam, Indonesia, Thailand, the Philippines, and Singapore. However, there were negative abnormal returns in Malaysia during the CAR (0,+1), CAR (0,+2), and CAR (0,+3) intervals. Additionally, the abnormal returns for the 3-day period before and after the announcement were significantly lower compared to the event day.

According to the Efficient Market Hypothesis (EMH), a market is considered efficient if it quickly adjusts to a new equilibrium price in response to incoming information. The results of this study are consistent with the research conducted by Kurniawan and Sudirman (2023), which found significant abnormal returns during the Russia-Ukraine invasion event period. However, the findings of this study contradict those of Huka and Kelen (2022), who concluded that there was no significant difference in abnormal returns during the Russia-Ukraine invasion period.

3.2.2. The Effect of Return on Equity (ROE) on Cumulative Abnormal Return (CAR)

The results of the study show that return on equity (ROE) has a significantly positive effect on cumulative abnormal return (CAR) for oil and gas sector stocks in the ASEAN capital markets during the Russia-Ukraine invasion event period. This is supported by a significance level of 0.000 < 0.05.

These findings indicate that as ROE, which represents the return to shareholders, increases, the return obtained by shareholders also increases. This signals positive information to investors, leading to abnormal returns on the company's stock during the Russia-Ukraine invasion event.

Based on signaling theory, an increase in return on equity (ROE) signals positively to investors, thereby boosting their interest in investing in the company. The findings of this study align with the research conducted by Warsono (2016), which states that improved company performance triggers a positive reaction from investors, leading to higher stock prices and increased abnormal returns. This study finds that ROE has a significant impact on abnormal returns. However, the results contradict the study by Safiroh and Sholichah (2023), which argues that ROE does not significantly affect abnormal returns, suggesting that the size of ROE does not influence investors' decisions or interest in making investment choices.

3.2.3. The Effect of Return on Asset (ROA) on Cumulative Abnormal Return (CAR)

The results of the study indicate that return on asset (ROA) has a significantly negative effect on cumulative abnormal return (CAR) for oil and gas sector stocks in the ASEAN capital markets during the Russia-Ukraine invasion event period. This is supported by a significance level of 0.000 < 0.05.

These findings suggest that an increase in ROA leads to a decrease in abnormal return. This is because ROA reflects the company’s ability to generate profit from its total assets, which include the company's debt in its calculation. The geopolitical event of Russia’s invasion of Ukraine led to a surge in commodity prices, particularly oil, which caused inflation to spike. As a result, central banks in ASEAN and around the world had to raise interest rates to combat inflation. This increase in interest rates raises the financial burden on companies, as the cost of servicing debt rises.

According to signaling theory, an increase in return on assets (ROA) sends a positive signal to investors, which in turn boosts their interest in investing in the company. The findings of this study, however, do not align with the research by Triana and Lukman (2021), which states that return on assets does not have a significant impact on abnormal returns.

4. Conclusion

The results of the study show that positive abnormal returns were observed in the pre-event days and the event day in Vietnam, Indonesia, Thailand, the Philippines, Malaysia, and Singapore. In the post-event days, positive abnormal returns were also observed in Vietnam, Indonesia, Thailand, the Philippines, and Singapore. However, a negative abnormal return was observed in Malaysia. A significant difference was found in the 3-day period before and after the announcement, which was lower compared to the event day. Return on equity (ROE) has a significantly positive effect on cumulative abnormal return (CAR). This suggests that an increase in ROE sends a positive signal to investors, leading to abnormal returns in the company's stock during the Russia-Ukraine invasion event. On the other hand, return on asset (ROA) has a significantly negative effect on CAR. This indicates that an increase in ROA leads to a decrease in abnormal returns, as investors also consider the company's high debt, which presents a risk during geopolitical events.

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