# Russia-Ukraine Confrontation: How Does Affect Market Reaction And Stock Performance Of The Mining Subsector?

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## ABSTRACT

This research aims to empirically demonstrate the divergence of capital market responses measured by abnormal returns, trading volume, volatility of security returns, and stock performance measured by returns in the mining subsector listed on the IDX due to the Russia-Ukraine war. This research is vital because geopolitical conflicts such as the Russia-Ukraine War affect financial markets, especially commodity-dependent sectors, thus providing insights for investors and policymakers in the face of uncertainty. Using an event study method for 10 days pre- and post-war, this research used 29 companies with paired sample t-tests in the hypothesis testing. This study is the first to combine the four variables AR, TVA, SRV, and R to analyze the impact of the Russia-Ukraine conflict, thus becoming a novelty in this research. This study revealed a significant change in TVA. At the same time, no considerable divergence was found in AR, SRV, and R in mining subsector companies listed on the IDX, both before and after the Russia-Ukraine war.

Keywords: Abnormal Return; Trading Volume Activity; Security Return Variability; Actual Return; Mining Subsector.

## *Konfrontasi Rusia-Ukraina: Bagaimana Dampaknya Terhadap Reaksi Pasar dan Kinerja Saham Subsektor Pertambangan?*

## *ABSTRAK*

Sasaran riset ini untuk menunjukkan secara empiris divergensi respon pasar modal yang diukur dengan *abnormal return*, volume perdagangan, volatilitas *return* sekuritas, dan kinerja saham yang diukur dengan *return* pada subsektor pertambangan yang terdaftar di BEI akibat dari perang Rusia-Ukraina. Riset ini penting karena konflik geopolitik seperti Perang Rusia-Ukraina memengaruhi pasar keuangan, terutama sektor yang bergantung pada komoditas, sehingga memberikan wawasan bagi investor dan pembuat kebijakan dalam menghadapi ketidakpastian. Dengan metode *event study* selama 10 hari pra dan pasca perang, penelitian ini menggunakan 29 perusahaan dengan *paired sample t-test* pada uji hipotesisnya. Penelitian ini merupakan yang pertama menggabungkan empat variabel AR, TVA, SRV dan R untuk menganalisis dampak konflik Rusia-Ukraina, sehingga menjadi kebaruan dalam riset ini. Penelitian ini mengungkapkan bahwa ada perubahan signifikan pada TVA, sementara tidak ditemukan divergensi yang berarti pada AR, SRV, R di perusahaan subsektor pertambangan yang *lisiting* di BEI, baik pra maupun pasca terjadinya perang Rusia-Ukraina.

*Kata Kunci:* *Pengembalian tidak normal; Aktivitas perdagangan saham; Variabilitas Pengembalian Sekuritas; Pengembalian Aktual; Subsektor Pertambangan.*

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## INTRODUCTION

The capital market has a fundamental task in a country's economy, including Indonesia (M. A. R. Nugraha et al., 2024). Because the capital market itself is a place where parties with excess funds meet with parties who need funds, they carry out buying and selling transactions in securities, including shares (Kuron et al., 2023). Masruroh & Hariyanto (2024) argue that the capital market connects investors with public companies or government agencies that aim to provide additional funds for business. So many investors put their capital into the capital market by trading shares of certain companies with the hope of making profits in the future. Therefore, the more fundamental the capital market's existence is to a country's economy, the more sensitive the capital market will be to the information or events around it. The transparency of information will play an important role in capital market operations because the information obtained by market participants, especially investors, allows them to make investment decisions based on existing information, not because of feelings or emotions (Priyambodo & Yunita, 2023).

One ongoing event that has significantly impacted the global economy, including Indonesia, is the Russia-Ukraine conflict. The confrontation between Russia and Ukraine has been brewing for quite some time. It is important to remember that Ukraine was once part of the Soviet Union, and Vladimir Putin seems reluctant to accept Ukraine's independence. This conflict shows no signs of abating. There have been almost continuous armed clashes throughout Ukraine since the conflict began on February 24, 2022, as announced by President Vladimir Putin (Susetio et al., 2022). The initial conflict arose from differing aspirations between Ukraine-NATO and Russia, as Ukraine sought to join NATO. At that time, NATO believed that a country's aspiration to join a military alliance was correct and could not be interfered with by other nations. Russia, however, viewed Ukraine's accession to NATO as a threat to its national security, given their shared border, and argued that NATO's eastward expansion violated a previous agreement (Kompas Pedia, 2022). Beyond the loss of life, the Russia-Ukraine conflict has profoundly impacted the global economy, including Indonesia, particularly in the energy sector, especially mining (Rhb Tradesmart, 2022). Additionally, Indonesia has long-standing diplomatic relations with both countries, with significant cooperation in the areas of export and import (KBRI Moskow, 2022).

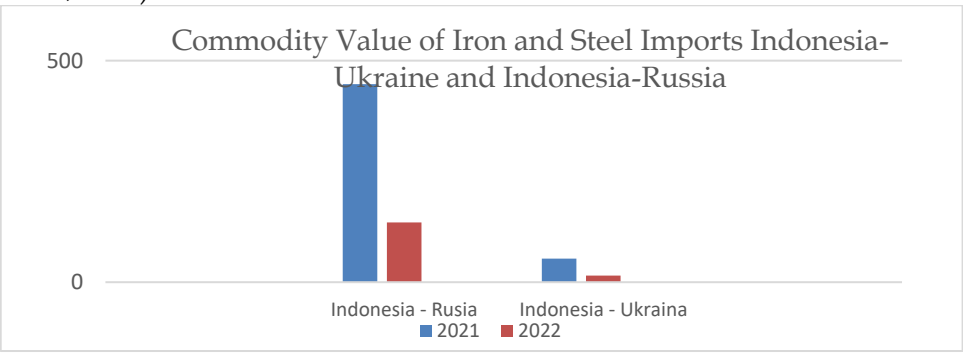


**Figure 1. Iron and Steel Import Value**

Source: Sembiring (2022)

Based on Figure 1, Indonesia imports iron and steel from Russia and Ukraine. It is evident that in 2021, the value of Indonesia's iron and steel imports from Ukraine reached 447 million USD. However, the following year, specifically in January and February 2022, this import value experienced a significant depreciation, dropping to 135 million USD. Meanwhile, the value of Indonesia's iron and steel imports from Russia in 2021 amounted to 53,3 million USD. In the subsequent year, it also drastically decreased, falling to 15 million USD. With this substantial decline in import value between the two conflicting nations, it can be concluded that the Russia-Ukraine conflict has caused significant disruptions to the global supply chain, particularly in the mining sector, especially for major global iron and steel suppliers. This implies that the conflict has affected the production and distribution of mining commodities such as iron and steel, as indicated by the decrease in import value.

Furthermore, this conflict has contributed to the increase in coal prices. In February, coal prices surged by 38,22% month-on-month. The following month, coal prices soared again, reaching 4,46 US dollars per ton. When calculated year-to-date, the price has increased by 233,83% (Kompas.com, 2022). According to Santosa, as quoted in Mediaasuransinews.co.id (2022), if the oil and gas supply from Russia is disrupted, fossil fuels will be utilized again, and coal consumption will likely increase. This will increase global demand for coal. Producers tend to focus on exports to reap greater profits if coal prices rise. However, this could lead to a domestic coal supply shortage due to an imbalance between supply and demand. Consequently, sectors that rely on coal as an energy source may experience fuel shortages, disrupting the energy supply chain.

This research fundamentally relies on the grand theory of the efficient market hypothesis. Fama (1970) first proposed this influential modern finance theory, which assumes that the price of a security reflects all relevant information as it trades. EMH also describes how markets respond to information to reach a new equilibrium price. If the market responds quickly and accurately to available information, it will create an equilibrium price that reflects that information, and the market can be considered efficient (Wijayanti et al., 2020). In the context of the Russia-Ukraine conflict, the EMH theory is relevant in explaining how markets react to information about the conflict. An efficient market will quickly reflect the impact of information such as geopolitical risks, commodity price changes, and government policies, thus helping investors better assess market conditions. According to Fama (1970), there are three levels of market efficiency: weak, semi-strong, and strong. A weak-form efficient market assumes that future prices can only be predicted by analyzing past prices. Therefore, excess returns cannot be consistently obtained using investment strategies based on historical stock prices or other data. Then, the semi-strong form assumes that stock prices adjust quickly and unbiasedly to new public information, so excess returns cannot be obtained by trading stocks based on that information. Furthermore, the strong form states that stock prices reflect all available public and private information so that no individual can obtain excess returns. This form of market efficiency is impossible if there are legal barriers that prevent private information from becoming public, such as laws prohibiting insider trading (Santos et al., 2022).

Furthermore, this study employs signaling theory. First introduced by

Spence (1973) , this theory explains that the informed party, or the sender, provides a signal or cue in the form of information that reveals a company's condition, which benefits the investor (the receiver). This information is crucial for investors and businesses when making investment decisions. In the capital market, such signals can be financial statements, stock indices frequently used by investors to help determine whether to buy, sell, or hold their shares, or news about events that can affect the capital market, such as the Russia-Ukraine conflict. In the case of the Russia-Ukraine war, information about the conflict is a significant market signal. The issues arising from this conflict, such as the decline in the import value of iron and steel commodities and the soaring price of coal, provide signals to investors regarding risks and opportunities in the capital market. Thus, investors use these signals to avoid risky assets, such as shares of directly impacted countries, or to seek opportunities in benefiting sectors, such as energy and defense. Therefore, signaling theory helps explain how information from major geopolitical events influences sentiment and investment decisions in the capital market.

Based on this phenomenon, an event study can examine whether there is a market reaction to the Russia-Ukraine war. According to MacKinlay (1997), this event study measures the impact of a specific event on the stock market of a particular company or companies in a specific segment. Meanwhile, according to Hartono (2022), an event study is a field of study that observes the impact of an announcement event on the capital market. If a conflict, phenomenon, or event contains firm information, it will provide abnormal returns in the market as evidence of a reaction to such a conflict. In short, an examination of how the market responds to an event whose information is published as an announcement (Matsuzawa & Sari, 2020).

This study measures market reactions using abnormal returns, which are calculated as the difference between actual and expected returns (Purnayasa & Sisdyani, 2021). Numerous studies have examined the impact of the Russia-Ukraine war, although they have focused on different research objects. According to Yousaf et al., (2022), Aulia & Fikri (2024), Kurniawan & Sudirman (2023), and Bakhri et al., (2022) , their research indicates a notable divergence in abnormal returns both before and after the Russia-Ukraine conflict. Similarly, an event study by Lukman et al.,(2023) concluded that abnormal returns diverged before and after the announcement of the implementation of the new normal. The study by Ariantika & Davianti (2021) also showed significant divergence in abnormal returns before and after Indonesia's first COVID-19 case announcement. Additionally, research by Harabida & Radi (2020) indicated changes in market reactions, as assessed through abnormal returns, before and after the COVID-19 pandemic in the Moroccan financial market. Mohamed et al. (2017) explained that abnormal returns diverged before and after the announcement of Sukuk issuance. In contrast, the findings from Nugraha et al., (2024), Priyambodo & Yunita, (2023), Kuron et al., (2023), and Nida et al., (2023) demonstrated that the value of abnormal returns was not significant, suggesting that the information content was weak and indicating no discernible divergence before and after the events. This aligns with the study by Masruroh & Hariyanto (2024) , which showed no divergence in abnormal returns surrounding share buyback announcements. Moreover, Nugraha & Suroto (2019) established that the 2019 presidential election did not

impact abnormal returns, with no difference observable before and after the event. Similarly, the research by Rahmawati & Pandansari (2016) indicated no difference in abnormal returns before and after the Plaza Sarinah bombing event.

$H_1$= The empirical results indicate a substantial divergence in abnormal returns for mining subsector stocks listed on the IDX, both before and after the Russia-Ukraine conflict.

The second variable is Trading Volume Activity (TVA). TVA is one of many indicators used to measure how the market responds to information through the parameter of trading volume in the capital market (Amin, 2020). TVA is the ratio between the total shares traded and the total outstanding shares, and it serves as a measure of trading activity for a particular stock (Halimatusyadiyah, 2020). According to Priyambodo & Yunita (2023), Muaya et al., (2023), Bakhri et al., (2022), and Tambunan et al., (2023) , who conducted research similar to the Russia-Ukraine war event, there is a substantial divergence in TVA before and after the conflict. Similarly, based on research on other events, Listyaningsih et al., (2020) concluded that the Indonesian presidential and legislative elections influenced TVA, characterized by a divergence before and after the event. Likewise, Rooroh & Dewi (2024) concluded that there is a difference before and after the announcement of company layoffs. However, in contrast to these findings, Nugraha et al., (2024), Emelia et al., (2022), Aulia & Fikri, (2024), and Andriansyah & Irwandi (2023) stated that the Russia-Ukraine conflict did not affect TVA, as indicated by the absence of divergence in TVA before and after the conflict. Similarly, Ridwan & Barokah (2022) found no divergence in TVA before and after the announcement of Sukuk issuance. Furthermore, Apriyanti & Sidanti (2016) found no divergence in TVA before and after announcing the 2014 award winners.

$H_2$= The empirical results indicate a substantial divergence in trading volume activity for mining subsector stocks listed on the IDX before and after the Rusia-Ukraine conflict.

The final variable used to measure stock market reactions is security return variability (SRV). SRV is a parameter of the variability of stock returns used to identify the market's reaction to an event's information content (Indriani & Mariana, 2021). When returns change due to information, security return variability is used to justify the overall market assessment of whether the information is informative or not (Husen et al., 2021). According to previous research, Puspita & Yunita (2022) stated a substantial divergence in security return variability before and after merger and acquisition events during 2015-2019. Similarly, Indriani & Mariana (2021) argued that security return variability changed before and after the ratification of the Job Creation Law. Likewise, Rosman & Yudanto (2022) found that security return variability changed before and after the first COVID-19 case in Indonesia. However, in contrast to these findings, Trisnadewi & Pradipa (2023), and Al Fathi (2023) concluded that SRV did not show any changes before and after the Russian invasion of Ukraine. Similarly, Diantriasih et al., (2018) stated no divergence in SRV before and after the simultaneous regional elections in 2018.

$H_3$= Empirical evidence indicates a notable difference in the volatility of stock

returns for mining companies listed on the Indonesia Stock Exchange before and after the Russia-Ukraine conflict.

Actual returns are used to evaluate stock performance. These are the realized returns derived from historical stock price data. Actual returns are a foundation for projecting future expected returns (Hartono, 2017). Prior research on actual returns about specific events, particularly the Russia-Ukraine conflict, is limited. While Regitasari & Ernandi (2021) found a divergence in actual returns before and after Right Issue announcements, Puspita & Yunita (2022) observed no significant differences in actual returns surrounding merger and acquisition announcements in Indonesian listed companies from 2015 to 2019. Similarly, Darmayanti et al., (2021) reported no divergence in actual returns around the initial announcement of COVID-19 cases in Indonesia. Qomaria et al., (2021) concluded that actual returns remained relatively stable before and after the publication of Unqualified Opinions.

$H_4$= Empirically, actual returns in mining subsector stocks listed on the IDX diverged before and after the Russia-Ukraine conflict.

Due to the inconsistent results from prior research and the lack of event study investigations concerning the Russia-Ukraine conflict with four specific variables, this study is considered unique. The author seeks to revisit this topic to assess how the Russia-Ukraine war has impacted the market response and stock performance of mining companies listed on the IDX.

## RESEARCH METHOD

This study focuses on the mining subsector, employing an event study method to analyze the market reaction and stock performance influenced by the Russia-Ukraine war event. As published through announcements, information related to this event becomes the object of this study. A quantitative research method is used, with secondary data in the form of daily closing stock prices and the closing price of the Jakarta Composite Index (JCI), obtained from Yahoo Finance and the Indonesia Stock Exchange (www.idx.co.id). The sample used in this study consists of mining subsector companies listed on the Indonesia Stock Exchange (IDX), as this subsector is one of the most affected by the Russia-Ukraine war. The impact is evident in declining import values of iron and steel commodities and rising coal prices. The data collection technique used is documentation or archives, a method of collecting secondary data from articles, journals, and internet sources used as supporting references for the research. The sampling technique used is non-probability sampling with a purposive sampling approach. A total of 29 companies that meet the sample criteria were used in this study. The sample criteria include energy sector companies that are included in the mining subsector, mining companies listed on the IDX during the observation period, and mining companies that actively trade their shares during the observation period.

The market reaction in this study is measured using several variables, namely abnormal return, trading volume activity, security return variability, and stock performance measured by actual return within an event window of 10 days before and after the Russia-Ukraine war, which started on February 10, 2024, until

March 14, 2024. Market reaction is a response shown by the market to published information (Qomaria et al., 2021). Abnormal return is the abnormal rate of return calculated by subtracting the actual return from the expected return (Purnayasa & Sisdyani, 2021). TVA is one of many indicators used to measure the market's response to information through the parameter of trading volume in the capital market (Amin, 2020). Meanwhile, SRV is one of the variabilities of the stock return rate used to identify the market's response to the information content of an ongoing conflict (Indriani & Mariana, 2021). The calculation of abnormal return, trading volume activity, and security return variability can be done using the following formula.

$A.R_{i,t} = R_{i,t} - E(R_{i,t})$ ..... (1)

Description:

$AR_{i,t}$ = Abnormal return of the i stock in period t

$R_{i,t}$ = Actual return of the i stock in period t

$E(R_{i,t})$ = Expected return of the i stock in period t

$TVA_{i,t} = \frac{V_{i,t}}{V_{m,t}}$ ..... (2)

Description:

$TVA_{i,t}$ = *Trading volume activity* for the i stock during period t

$V_{i,t}$ = Total trading volume of company i shares in period t

$V_{m,t}$ = Volume of the company's shares outstanding in period t

$SRV_{i,t} = \frac{AR_{i,t^2}}{V(AR_i)}$ ..... (3)

The formula for calculating V(ARi) can be described as follows:

$V(AR_i) = \frac{(AR_{i,t} - Average\ AR_{i,t})^2}{(n-1)}$ ..... (4)

Description:

$SRV_{i,t}$ = *Security return variablity* of i stock in period t

$AR_{i,t^2}$ = Abnormal return of i stock in period t

$V(AR_i)$ = Volume of the company's shares outstanding in period t

N = Number of days observed

Stock performance is a critical metric that reflects the management of a company's shares and can indicate the overall health of the company. It can be measured by actual return, which is the realized level of return based on historical data (Saraswati et al., 2023). The actual return can be calculated using the following formula:

$R_{i,t} = \frac{P_{i,t} - P_{t-1}}{P_{t-1}}$ ..... (5)

Description:

$R_{i,t}$ = Actual return of the i stock in period t

$P_{i,t}$ = Price of the i stock in period t

$P_{t-1}$ = Price of the i stock in period t-1

This research utilizes several data analysis methods, including descriptive analysis, normality tests, and hypothesis testing. Descriptive analysis uses two datasets: mean data and daily data. The Kolmogorov-Smirnov test is employed to assess the normality of the data at a 5% significance level. Researchers use the

paired sample t-test to test hypotheses for normally distributed data while they apply the non-parametric Wilcoxon test to analyze non-normally distributed data. Both techniques evaluate the differences between two related numerical data sets. Analysts widely regard these methods as suitable for examining market reactions and stock performance in response to specific events.

## RESULTS AND DISCUSSION

This descriptive statistical assessment utilizes mean data. The analysis results for the variables of abnormal return, trading volume activity, security return variability, and actual return are as follows:

**Table 1. Descriptive Statistics of Daily and Average AR Before and After the Event**

| Descriptive Statistics of Abnormal Return | | | |
|---|---|---|---|
| | Min | Max | Mean |
| t-10 | -0.068 | 0.065 | -0.012 |
| t-9 | -0.023 | 0.105 | 0.017 |
| t-8 | -0.056 | 0,066 | 0.022 |
| t-7 | -0.077 | 0068 | -0.011 |
| t-6 | -0.046 | 0.087 | -0.000 |
| t-5 | -0.049 | 0.234 | -0.005 |
| t-4 | -0.049 | 0.035 | -0.007 |
| t-3 | -0.064 | 0.148 | -0.000 |
| t-2 | -0.041 | 0112 | 0.008 |
| t-1 | -0.052 | 0.240 | 0.010 |
| t0 | -0.052 | 0272 | 0.033 |
| t+1 | -0.078 | 0.086 | -0.014 |
| t+2 | -0.073 | 0.138 | 0.015 |
| t+3 | -0.062 | 0.248 | 0.026 |
| t+4 | -0.078 | 0.240 | 0.030 |
| t+5 | -0.060 | 0.346 | 0.033 |
| t+6 | -0.061 | 0.098 | -0.014 |
| t+7 | -0.077 | 0.059 | -0.023 |
| t+8 | -0.076 | 0.042 | -0.022 |
| t+9 | -0.066 | 0.121 | 0.008 |
| t+10 | -0.074 | 0.097 | -0.023 |
| AAR Before | -0.011 | 0.021 | 0.002 |
| AAR After | -0.023 | 0.034 | 0.002 |

Source: Data processed 2024

The descriptive statistics of abnormal returns in Table 1 show that the lowest value occurred seven days (t-7) before the conflict at PT Akbar Indo Makmur Stimec Tbk (AIMS), reaching -0,077. Then, the highest value occurred one day (t-1) before the event at PT Golden Eagle Energy Tbk (SMMT) with a value of 0,240. Meanwhile, after the event, the lowest value fell on PT Borneo Olah Sarana Sukses Tbk (BOSS) with a value of -0,078, which occurred one day (t+1) after the conflict. Then, the highest value after the conflict occurred at PT. MNC Energy Investments TBK (IATA) with a value of 0,346, which occurred five days after the conflict (t+5).

The pre-event AAR shows an average of 0,002. Meanwhile, the post-event AAR shows an average of 0,002. Both values have a positive sign, indicating that

the market responded optimistically to the event in the 10 days before and after the conflict. Thus, investors had anticipated something positive to happen, which led them to buy shares, pushing up stock prices. The AAR values exhibited a noticeable decline before and after the conflict. The lowest AAR value, which decreased from -0,011 before the conflict to -0,023 after the conflict, indicates that the average stock loss at its lowest point became more significant after the conflict occurred. On the other hand, the highest AAR value, which increased from 0,021 to 0,034, shows that the average stock gain at its highest point also became larger post-conflict. This indicates that the conflict has dramatically affected market volatility, resulting in more pronounced fluctuations in both negative and positive directions. This change may indicate higher investor uncertainty, thus increasing extreme market reactions to the event.

**Table 2. Descriptive Statistics of Daily and Average TVA Before and After the Event**

| Descriptive Statistics of TVA | | | |
|---|---|---|---|
| | Min | Max | Mean |
| t-10 | 0.000 | 0.175 | 0.011 |
| t-9 | 0.000 | 0.077 | 0.010 |
| t-8 | 0.000 | 0.090 | 0.010 |
| t-7 | 0.000 | 0.103 | 0.011 |
| t-6 | 0.000 | 0.046 | 0.008 |
| t-5 | 0.000 | 0.175 | 0.011 |
| t-4 | 0.000 | 0.089 | 0.007 |
| t-3 | 0.000 | 0.150 | 0.009 |
| t-2 | 0.000 | 0.066 | 0.009 |
| t-1 | 0.000 | 0.122 | 0.016 |
| t0 | 0.000 | 0.436 | 0.029 |
| t+1 | 0.000 | 0.490 | 0.025 |
| t+2 | 0.000 | 0.150 | 0.019 |
| t+3 | 0.000 | 0.084 | 0.015 |
| t+4 | 0.000 | 0.177 | 0.022 |
| t+5 | 0.000 | 0.164 | 0.018 |
| t+6 | 0.000 | 0.087 | 0.015 |
| t+7 | 0.000 | 0.071 | 0.012 |
| t+8 | 0.000 | 0.050 | 0.010 |
| t+9 | 0.000 | 0.092 | 0.011 |
| t+10 | 0.000 | 0.049 | 0.008 |
| AAR Before | 0.007 | 0.016 | 0.010 |
| AAR After | 0.008 | 0.025 | 0.016 |

Source: Data processed 2024

The descriptive statistics of trading volume activity in Table 2 show that before the event, the lowest value was at PT. MNC Energy Investments TBK (IATA) occurred two days (t-2) before the conflict with a value of 0,000. Then, the highest value before the conflict occurred five days (t-5) and ten days (t-10) before the event at PT. MNC Energy Investments TBK (IATA) has a value of 0,175. Meanwhile, the lowest value after the conflict occurred at PT Golden Eagle Energy Tbk (SMMT) on the ninth day after the conflict (t+9) and PT Adaro Minerals

Indonesia Tbk on the tenth day after the conflict (t+10), both with a value of 0,000. Then, the highest value occurred one day after the conflict (t+1) at PT Borneo Olah Sarana Sukses Tbk (BOSS) with a value of 0,490.

The ATVA value before the conflict was 0,010 and increased to 0,016 after the conflict, indicating increased trading activity. This increase suggests that the conflict event influenced investor interest, making them more active in trading shares. In addition, the positive sign on both values indicates that the average trading volume remained higher than the average trading activity value in normal conditions (baseline) both before and after the conflict, reflecting greater market attention to the related stocks due to the influence of the conflict. Meanwhile, the lowest ATVA value before the conflict of 0,007 increased to 0,008 after the conflict, while the highest ATVA value before the conflict of 0,016 also increased to 0,025 after the conflict. This change indicates a more active market reaction, possibly influenced by increased investor attention to the uncertainty or opportunities arising from the conflict.

**Table 3. Descriptive Statistics of Daily and Average SRVs Before and After the Event**

| Descriptive Statistics of SRV | | | |
|---|---|---|---|
| | Min | Max | Mean |
| t-10 | 0.315 | 5905.508 | 232.982 |
| t-9 | 0.059 | 12430.49 | 564.936 |
| t-8 | 0.010 | 521.396 | 41.739 |
| t-7 | 0.313 | 65026.4 | 2311.075 |
| t-6 | 0.704 | 14523.95 | 547.104 |
| t-5 | 0.652 | 142881.7 | 5190.962 |
| t-4 | 0.054 | 399.491 | 54.122 |
| t-3 | 0.152 | 78.179 | 19.495 |
| t-2 | 1.335 | 4510.818 | 443.022 |
| t-1 | 0.717 | 157.796 | 32.967 |
| t0 | 1.378 | 808.961 | 60.720 |
| t+1 | 0.013 | 137.265 | 30.242 |
| t+2 | 0.068 | 556.963 | 48.969 |
| t+3 | 0.526 | 946.564 | 63.995 |
| t+4 | 1.125 | 5586.423 | 255.033 |
| t+5 | 0.217 | 8406.637 | 322.542 |
| t+6 | 0.046 | 340.235 | 37.581 |
| t+7 | 1.701 | 1256.266 | 131.067 |
| t+8 | 0.001 | 782.911 | 69.232 |
| t+9 | 0.001 | 47.440 | 16.416 |
| t+10 | 0.658 | 80.507 | 19.087 |
| AAR Before | 19.49 | 5190.96 | 943.84 |
| AAR After | 16.41 | 322.54 | 99.42 |

Source: Data processed 2024

The following descriptive statistic is security Return Variability. It can be seen in Table 3 that before the event, the lowest value was 0,010, which occurred eight days (t-8) before the conflict at PT TBS Energi Utama Tbk (TOBA). Then, the highest value before the conflict occurred was at PT Transcoal Pacific Tbk (TCPI),

with a value of 142881,7 which occurred five days (t-5) before the conflict. Meanwhile, the lowest value after the conflict occurred nine days (t+9) after the conflict, with a value of 0,001 at PT Golden Eagle Energy Tbk (SMMT). Then, the highest value after the event occurred at Batulicin Nusantara Maritim Tbk, with a value of 8406,6, which occurred five days (t+5) after the conflict.

The ASRV value before the event was 943,84 and decreased to 99,42, indicating a significant decrease in the average return variability of stocks after the conflict. Both positive vales indicate fluctuations in stock returns before and after the conflict. However, the level of uncertainty or volatility of stock returns was higher in the period before the conflict. This decrease may indicate that the market began to stabilize after the conflict event, with investors who may have adjusted their expectations and strategies to the impact of the conflict. Data shows that the lowest and highest Average Security Return Variability (ASRV) values before the conflict were 19,49 and 5190,96, respectively. At the same time, after the conflict, the lowest and highest ASRV values became 16,41 and 322,54, respectively. The significant decrease in both values indicates a reduction in fluctuations or volatility of stock returns after the conflict. This indicates that the market experienced decreased uncertainty and extreme movements after the event, with more stable stock returns. The decrease in the lowest value indicates that minor fluctuations in stock prices decreased. In contrast, the decrease in the highest value indicates that extreme movements in the market decreased after the conflict occurred.

Based on Table 4 above, which is the descriptive statistics of actual return, before the event, the lowest value fell to -0,070, which occurred ten days before (t-10) the conflict at PT Harum Energy Tbk (HRUM). Then, the highest value before the event was 0,249 at PT Golden Eagle Energy Tbk (SMMT), which occurred one day (t-1) before the event. Then, the lowest value after the conflict occurred at PT Adaro Energy Indonesia Tbk, with a value of -0,070, which occurred ten days (t+10) after the conflict. Then, the highest value after the event occurred five days (t+5) after the conflict, with a value of 0,337 at PT. MNC Energy Investments Tbk (IATA).

The AACR (Average Actual Return) value before the event was 0,003 and increased to 0,004 after the event, indicating a slight increase in actual return after the conflict. Both positive values mean that the stocks analyzed still provided positive returns in the 10 days before and after the conflict, although there was a slight increase after the event. This may indicate that despite the conflict event, the market still recorded slightly higher profits after the event, which may reflect optimism or positive adjustments by investors to post-conflict conditions. The lowest and highest values of Average Actual Return (AAcR) before the conflict were -0,013 and 0,018, respectively, while after the conflict, the lowest and highest AAcR values became -0.022 and 0.037, respectively. The decrease in the lowest value from -0,013 to -0,022 indicates that stocks' losses at their lowest point became more significant after the conflict, indicating increased uncertainty or adverse market reactions. However, the increase in the highest value from 0,018 to 0,040 shows that the potential for profit at the highest point also increased after the

conflict, reflecting opportunities for investors to gain greater profits. Thus, although losses were increased at the lowest point, the market experienced higher potential profits at the highest point post-conflict.

**Table 4. Descriptive Statistics of Daily and Average R Before and After the Event**

| Descriptive Statistics of R | | | |
|---|---|---|---|
| | Min | Max | Mean |
| t-10 | -0.070 | 0.064 | -0.013 |
| t-9 | -0.024 | 0.104 | 0.016 |
| t-8 | -0.070 | 0.054 | 0.010 |
| t-7 | -0.067 | 0.079 | -0.001 |
| t-6 | -0.041 | 0.094 | 0.006 |
| t-5 | -0.051 | 0.232 | -0.007 |
| t-4 | -0.041 | 0.043 | 0.001 |
| t-3 | -0.063 | 0.150 | 0.001 |
| t-2 | -0.047 | 0.106 | 0.003 |
| t-1 | -0.044 | 0.249 | 0.018 |
| t0 | -0.067 | 0.257 | 0.019 |
| t+1 | -0.067 | 0.096 | -0.004 |
| t+2 | -0.070 | 0.143 | 0.020 |
| t+3 | -0.070 | 0.241 | 0.017 |
| t+4 | -0.070 | 0.250 | 0.037 |
| t+5 | -0.069 | 0.337 | 0.026 |
| t+6 | -0.069 | 0.090 | -0.022 |
| t+7 | -0.070 | 0.067 | -0.016 |
| t+8 | -0.068 | 0.051 | -0.013 |
| t+9 | -0.067 | 0.121 | 0.008 |
| t+10 | -0.070 | 0.102 | -0.019 |
| AAR Before | -0.013 | 0.018 | 0.003 |
| AAR After | -0.022 | 0.040 | 0.004 |

Source: Data processed 2024

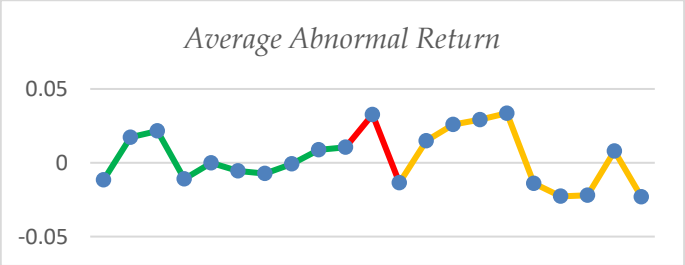


**Figure 2 Movement of Average Abnormal Return**

Source: Data processed 2024

Figure 2 shows the movement of AAR, indicating fluctuations from t-10 to t+10, suggesting that stability was disrupted before and after the conflict. At t-10, the average value was -0,0115 and increased to 0,0215 at t-8, possibly due to initial speculation caused by the influence of this conflict. Initially, the market may have responded positively, as indicated by the increase, but uncertainty emerged, causing fluctuations. After this, it decreased at t-7 to -0,01099, then experienced small fluctuations until t-4 and experienced a slight increase until t-1. The increase in the last two days before the conflict may reflect positive anticipation from

investors who are hopeful that commodity prices in the energy sector, especially mining, will soar, thus benefiting companies, especially mining companies.

During the conflict (t0), the average was 0,03268. At this moment, the AR jumped significantly, likely due to the market's reaction to the conflict's outbreak, which benefited mining companies. However, at t+1, it decreased to -0,0136 as investors began to recognize the negative impacts of the conflict, such as disruptions to the global supply chain, especially for countries reliant on commodities imported from Russia. The average then rose to 0,0336 at t+5, marking the highest increase in this event period. This surge reflected expectations that geopolitical pressures would disrupt the global supply chain and increase mining commodity prices. However, the AAR movement fluctuated again, dipping to -0,0227 at t+7, as the market acknowledged additional significant risks for the mining sector, including rising operational costs, declining demand from affected countries, and political uncertainty. Finally, slight fluctuations continued until t+10, where the average dropped to -0,0231, the lowest decline observed in this event period.

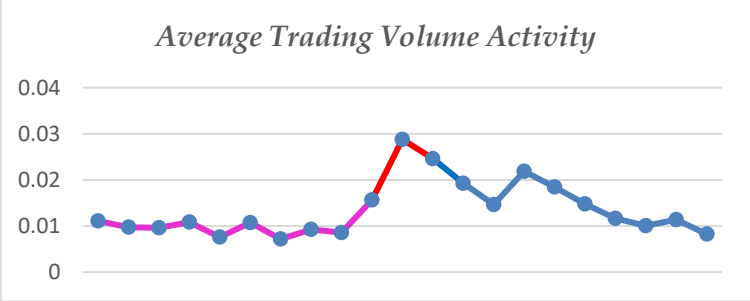


**Figure 3. Movement of ATVA**

Source: Data processed 2024

Figure 3 illustrates the movement of ATVA. Before the conflict, observed from t-10 to t-2, ATVA remained relatively stable with only minor fluctuations. This suggests that trading activities appeared normal, and investors had not significantly reacted to the news regarding the conflict. As a result, investors were moderate in their trading actions. However, TVA rose before the conflict, as evidenced by the increase from t-1 to 0,0156. This denotes a rise in trading activity in anticipation of the conflict. At t0, TVA experienced a dramatic surge, reaching a value of 0,0288, marking the highest point during this observation period. This also represents the peak trading activity prompted by the market's response to the onset of the Russia-Ukraine conflict. Consequently, investors hurried to buy or sell their stocks in reaction to the news of this conflict. Following this, there was a notable drop from t+1 (0,0246) to t+3 (0,0185). Although TVA remained high after the surgeon the event day, it gradually declined. This indicates that most reactive trading choices had already been executed, and the market may have begun transitioning into a stabilization phase. A slight increase was observed at t+4 (0,0218), followed by a decline from t+5 to t+10. TVA reverted to normal levels during this timeframe, as seen before the event. This decline signifies that the market began to settle after the initial reaction. Nevertheless, there remains some

uncertainty. However, the market's response has diminished, and trading activities have returned to a stable state.

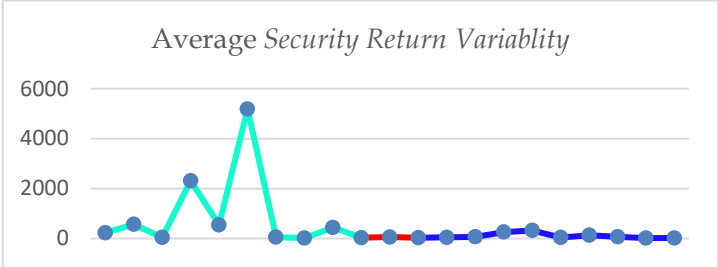


**Figure 4. Security Return Variability Movement**

Source: Data processed 2024

Figure 4 depicts the movement of Average Security Return Variability (ASRV). Between periods t-10 and t-6, SRV experienced significant fluctuations, particularly at data points t-8 (41,73), t-7 (2311,07), and t-6 (547,1). These sharp spikes indicate a very high level of market volatility, most likely caused by increasing geopolitical uncertainty related to the impending conflict. At period t-5, SRV dramatically increased to 5190,96. This extreme surge indicates an event that triggered highly high market volatility. It suggests that investors reacted very sensitively to the imminent threat of conflict, leading to intense buying and selling activities, especially in the mining subsector, which was significantly affected by geopolitical dynamics. After reaching its peak, SRV began to decline sharply at period t-4 to 5190,92 and remained relatively stable until t0 (the day of the conflict). In the period after the conflict (t0 to t+10), SRV also showed stability with relatively minor fluctuations. This indicates that investors may have adapted to the new conflict situation and reduced speculative activities, thereby reducing market volatility overall.

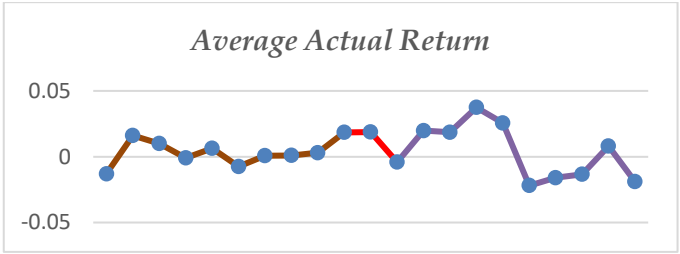


**Figure 5. Movement of Average Actual Return**

Source: Data processed 2024

Figure 5 shows the movement of AacR. Before the conflict, there was an increase from t-10 (-0,0128) to t-9 (0,01609), followed by small fluctuations until t-1 (0,01844). This indicates that the market was unstable, with returns increasing on some days and decreasing on others. This reflects uncertainty about the ongoing conflict and concerns about its impact on commodity prices, causing stock returns to fluctuate unpredictably. Then, on the day of the event (t0), returns increased slightly to 0,01871. This means that the impact of the war was not as bad as expected or that the market had already anticipated the negative impacts. However, it then decreased at t+1 (-0,00416) and fluctuated until t+5 (0,02562).

Investors may have felt optimistic that commodity prices would rise due to the conflict, as stock returns remained positive during these periods. Then, at t+6 (-0,0219), there was a drastic decline, indicating that the market was starting to face the reality of the long-term impacts of the war, and investors had to start being cautious. After that, there was an increase from t+7 (-0,0159) to t+9 (0,008036). This indicates a return of optimism in the market after several days of decline. Investors may also have felt that the previous decline had already reflected the sufficient impact of the conflict. Moreover, there was a drastic decline at t+10 (-0,1895), indicating that the previous optimism did not last long. This may be due to additional information that triggered further concerns. Therefore, this decline reflects a market correction, where previously optimistic investors may have taken profits and sold their shares, causing a price decline.

**Table 5. Normality Test**

| *One Sample Kolmogorov Smirnov-Test* | | | | | |
|---|---|---|---|---|---|
| Variable | *Average Abnormal Return* | Average *Trading Volume Activity* | *Average Security Return Variability* | *Average Actual Return* | |
| N | 29 | 29 | 29 | 29 | *Asymp Sig (2-tailed)* |
| Before | 0.200 | 0.158 | 0.000 | 0.200 | |
| After | 0.092 | 0.200 | 0.007 | 0.200 | |
| *Description* | *paired sample t-test* | *paired sample t-test* | *wilcoxon sample t-test* | *paired sample t-test* | |

Source: Data processed 2024

Table 5 presents the results of the One-Sample Kolmogorov-Smirnov test for normality. It shows that the significance values for AAR before and after the event are 0,200 and 0,092, respectively; for TVA before and after the event are 0,158 and 0,200, respectively; and for AAcR before and after the event are 0,200. Therefore, the data for AAR, TVA, and AAcR before and after the Russia-Ukraine war event are considered to be normally distributed (asymp sig > 0.05). Thus, the statistical test used in hypothesis testing is the paired sample t-test. Meanwhile, the significance value for ASRV before and after the conflict is 0,000 and 0,007, respectively. Therefore, it can be concluded that the data for ASRV before and after the Russia-Ukraine conflict is considered to be not normally distributed (asymp sig < 0,05). Therefore, the hypothesis test will use the Wilcoxon signed-rank test.

**Table 6. Hypothesis Test Results**

| *Event Periode* | Variable | t | df | Asymp. Sig (2-tailed) | Description |
|---|---|---|---|---|---|
| *AAR* Before & After | *Abnormal Return* | 0.079 | 9 | 0.939 | There is no divergence |
| *ATVA* Before & After | *Trading Volume Activity* | -2.829 | 9 | 0.020 | There is divergence |
| *ASRV* Before & After | *Security Return Variability* | -1.886 | 9 | 0.059 | There is no divergence |
| *AAcR* Before & After | *Actual Return* | -0.12 | 9 | 0.991 | There is no divergence |

Source: Data processed 2024

Table 6 presents the results of the paired sample t-test for abnormal return, trading volume activity, security return variability, and average actual return. The asymptotic significance value (2-tailed) for abnormal return is 0,939 more significant than the significance level α (5%). This means there is no substantial change in the abnormal return of mining sub-sector stocks listed on the Indonesian Stock Exchange before and after the Russia-Ukraine conflict. This suggests that the Russia-Ukraine conflict did not affect companies' stock prices in the mining sub-sector, as indicated by the similar levels of abnormal return before and after the event. This finding is in line with previous research by Nugraha et al., (2024), Priyambodo & Yunita, (2023), Kuron et al., (2023), Nida et al., (2023), Masruroh & Hariyanto (2024), Nugraha & Suroto (2019), and Rahmawati & Pandansari (2016) which indicates that there is no significant divergence in abnormal returns before and after the conflict. In other words, statistically, this shows that the information about the Russia-Ukraine war does not contain solid information. Therefore, the market or investors did not substantially absorb this information.

As seen in Figure 2, the average abnormal return fluctuates, indicating that investors reacted to the war. However, based on the results of the paired sample t-test, there is no significant difference before and after the conflict. This means that although there are statistical graphical fluctuations (paired sample t-test), the difference may not be large or consistent enough to be considered significant. However, this aligns with the theory proposed by Fama (1991) , which suggests that investors are likely to earn abnormal returns only around the time of publication. Additionally, using the event study approach, this study tests market efficiency in the semi-strong form in terms of information (informationally efficient market). This method analyzes how a market reacts to an event by looking at changes in stock prices that reflect public information related to that event. Therefore, it can be concluded from the test results that the Indonesian capital market has achieved semi-strong form efficiency regarding information related to the Russia-Ukraine conflict. This is indicated by the rapid market reaction to the event, as seen in the price fluctuations during the 10 days before and after the event.

Then, for the trading volume activity variable, the obtained asymptotic significance value (2-tailed) is 0,020, less than α (5%). This means there is a substantial divergence in the trading volume activity of mining sub-sector stocks listed on the Indonesian Stock Exchange before and after the Russia-Ukraine war. This result is in line with research by Priyambodo & Yunita (2023), Muaya et al., (2023), Bakhri et al., (2022), Tambunan et al., (2023), Listyaningsih et al., (2020), and Rooroh & Dewi (2024) that there is a difference before and after the conflict. Thus, the war event significantly impacts the volatility of trading volume during the conflict period. This means that investors believe that the war conflict can influence the trading activity of mining company stocks.

Furthermore, for the security return variability variable, the obtained asymptotic significance value (2-tailed) is 0,059, more significant than α (5%). This means there is no substantial divergence in the security return variability of

mining sub-sector stocks listed on the Indonesian Stock Exchange before and after the Russia-Ukraine conflict. This result aligns with research by Trisnadewi & Pradipa (2023), Al Fathi (2023), and Diantriasih et al., (2018) , which indicates no divergence before and after the conflict. The uncertainty or uneven distribution of information causes the lack of difference. This condition indicates that not all investors have adequate access to make profitable decisions regarding the event. In addition, the lack of necessary information also makes it difficult for investors to make investment decisions supported by sufficient information distribution. Furthermore, this result means that the war event is not informative for the market. Thus, investors do not consider this event to have an impact that could result in positive stock returns for companies.

Lastly, the obtained asymptotic significance value (2-tailed) for the actual return variable is 0,991, which is greater than α (5%). This means there is no substantial divergence in the actual return of mining sub-sector stocks listed on the Indonesian Stock Exchange before and after the Russia-Ukraine conflict. This result aligns with research by Puspita & Yunita (2022) and Darmayanti et al., (2021) which indicates no substantial divergence in actual return before and after the conflict. This implies that investors do not perceive the Russia-Ukraine war to impact the stock prices of mining companies.

Based on the results of the graphical test and the hypothesis test of the 10-day event window before and after the Russia-Ukraine war, which started from February 10, 2024, to March 14, 2024, it is sufficient to capture the potential impact of the event on the analyzed variables. This is evidenced by the validity of the semi-strong form market efficiency theory that applies to developing countries, including Indonesia. The theory states that the market reaction to an event (such as the Russia-Ukraine conflict) will be quickly reflected in stock prices and related variables within a relatively short period after the event occurs. Then, based on the graph, there is significant fluctuation in the 10 days before and after the event. Although no substantial statistical changes were found in some variables, such as abnormal return, security return variability, and actual return, the price fluctuations detected graphically indicate that the market is actively responding to the event. This indicates that although there is no significant difference in some statistical tests, the market still responds to the information received during the event window period. Therefore, the 10-day event window before and after the event may be sufficient to capture most of the impact revealed in the market.

## CONCLUSION

Based on the results and discussion above, this research aims to empirically prove whether or not there is a 10-day divergence before and after the Russia-Ukraine confrontation that affects the market reaction and stock performance of the mining sub-sector listed on the IDX. The conclusion obtained from the results and discussion above is that empirically, there is no substantial 10-day divergence before and after the Russia-Ukraine confrontation on abnormal return, security return variability, and actual return in the mining sub-sector listed on the IDX. However, it differs from the trading volume activity variable, which indicates a substantial divergence in the mining sub-sector listed on the IDX before and after

the Russia-Ukraine confrontation. This research contributes to expanding the literature on the impact of geopolitical conflicts on the Indonesian capital market, especially in the mining sub-sector. These findings can also guide investors and potential investors in making investment decisions by considering trading volume as one of the indicators amid geopolitical uncertainty.

However, this research has some limitations, such as the observation period, which only covers 10 days before and after the event, so it does not reflect the long-term impact of the Russia-Ukraine confrontation. In addition, this research is limited to the mining sub-sector, so the results cannot be generalized to other sectors. Based on the research results, the following suggestions are provided. It can be used for future researchers to compare research in the same field. Then, future researchers can use other variables that can measure market reaction and stock performance. Future researchers can also use different research object sectors that may be impacted by the Russia-Ukraine war and extend the observation period to analyze the long-term impact. In addition, cross-country analysis methods can be used to compare the impact of the Russia-Ukraine geopolitical conflict in various international stock markets. Meanwhile, for investors and potential investors, this research is expected to be one of the parameters in investment decision-making, especially in mining companies.

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