



Islamic and conventional stocks: Impact of Russia-Ukraine saga on global commodities

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Abstract

Purpose – This study intends to scrutinize the relationship between oil and gold prices on Indonesia's Islamic stock market before and during the war between Russia and Ukraine, and compare the nature of sharia and conventional stock during the period of study.

Methodology – This study uses daily price data of oil price, gold, Islamic index, and LQ45 index. The period spans from 2020 to 2022, which is split into two sub-periods: pre-war and during the war period. Structural vector autoregression (SVAR) was used for data analysis.

Findings – This study provided three main findings. First, the Islamic index was found to be more exogenous than conventional stock, implying the safe haven properties of Islamic stock. Second, oil prices have a negative and significant impact on both conventional and Islamic stocks. However, Islamic stocks are less affected by oil price shocks than conventional stocks. Lastly, Gold is a safe haven asset for both Islamic and conventional stocks.

Implications – This study is expected to be beneficial for Islamic investors making investment decisions, particularly in the war period, which is still ongoing and more specific for taking advantage of diversification opportunities.

Originality – Despite a huge number of studies that investigate the Islamic stock – oil price nexus, this study uncovers the impact of the most recent geopolitical tension during the Russia-Ukraine War.

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Introduction

Since several episodes of economic crises in various parts of the world, such as the global financial crisis in 2008, the European debt crisis in 2011, Brexit 2016, and the Covid-19 pandemic, investors have been very interested in knowing the main effects of fluctuations in world oil prices on the global financial market, especially on stock prices (Ferrer et al., 2018; Burdekin and Siklos, 2022). The rationalization of the effect of oil prices on stock prices is the direct influence of oil prices on a company's earnings and cash flow (Akkoç et al., 2021; El Khamlichi et al., 2014). Crude oil is of significant relevance in production processes because it serves as the major input. This is mostly because of its scarcity and strategic nature. Rising oil prices will lead to higher operational expenses, which will directly influence the company's income or valuation.

From an economic viewpoint, shocks to oil prices are commonly triggered by three main factors: demand shocks, supply shocks, and geopolitical risks (Bourghelle et al., 2021; Jawadi, 2014). Changes in the production capacity of each country, along with geopolitical conflicts that sometimes hit, are factors that shape the trend in world oil prices. The most recent conflict between Russia and Ukraine, which began in February 2022, has an impact on the availability of crude oil because Russia is the second-largest oil producer and natural gas exporter. On March 7, 2022, the WTI crude oil futures price surged to 133.460 US dollars per barrel, while the Brent crude oil futures price soared to 139.130 US dollars per barrel, marking the highest price since July 2008. From October 1, 2021, to August 25, 2022, the conflict and its subsequent events led to a significant spike in West Texas intermediate (WTI) crude oil prices, rising by \$37.14, representing a jump of 52.33%. Similarly, the Brent crude oil price experienced a rise of \$41.49, reflecting a 56.33% increase. Within the specified time period, the conflict between Russia and Ukraine can explain 70.72% and 73.62% of the changes in the WTI and Brent crude oil prices, respectively (Zhang et al., 2023; Zhang et al., 2024). To date, geopolitical tensions between the West and Russia have occurred, and global growth forecasts have been reduced because of uncertainty about the effects of conflict on global supply chains (Ozili, 2022).

According to Mensi et al. (2017), a negative relationship exists between fluctuations in global oil prices and the performance of the economy and stock markets. However, some studies reveal that the impact is distinctive between oil-exporting and oil-importing countries. For oil-exporting countries, the increase in global oil prices indicates a transfer of welfare from oil-importing countries to oil-exporting countries. Otherwise, it would contradict oil-importing countries. This shows that oil prices can affect a country's economy; thus, oil prices reflect changes in economic conditions and the stock market. In this case, the organization of the Petroleum Exporting Countries (OPEC) holds an important position as a cartel that plays a role in influences the supply side of world oil trade.

Since joining the OPEC in 1962, Indonesia has been recorded as one of the world's largest exporters of crude oil. However, with the growth of the national industry, domestic demand increased and was accompanied by a decrease in production, and Indonesia began to import more crude oil, especially since 2000. This makes Indonesia as an importer and exporter oil country at the same time. The ongoing war between Russia and Ukraine has both positive and negative effects on Indonesia. On the one hand, rising world oil prices increased Indonesia's revenue in this sector. However, this also increased the production factor in Indonesia, which caused the company's revenue to decline, accompanied by a decrease in the value and stock price. Indonesia stock exchange noted that some shares were under pressure and as many as 183 shares weakened, the Indonesia Composite Index (Indek harga saham gabungan, IHSG, 2022) recorded a 1.48% weakening to a level of 6.817 on Thursday 24 February 2022, including 11 indices on the Indonesian Stock Exchange. The highest falls occurred at an energy index of -1.24% and raw materials sector index of -1.38%. As investors tend to be sensitive to information, Russian-Ukrainian war events become negative signals for stock market players (Assaf, 2023; Martins, 2023).

On the other hand, Islamic stocks have emerged as an alternative form of conventional stocks that propose different financial products that are sharia-compliant and are, therefore, associated with moderate low risk. This moderately low risk naturally relies on specific rules and norms, such as the prohibition of speculation and short selling, leading to the strict control or regulation of risk-taking positions. As a results, in line with growing literature on the Islamic stock market, it was exhibited that Islamic stock market show relative resilience to its conventional counterpart. This implies that including Islamic stock in portfolios seems to protect investors from losses during crises (Hassan, et al., 2021; Agustini, 2021). However, another study in Indonesia posits that Islamic stocks do not consistently outperform conventional stocks (Susilo & Najah, 2018).

In the current market turbulence due to war, investors must maintain the risk and return composition of their portfolios. Modern portfolio theory suggests that investors construct portfolios by selecting assets with a low correlation (Markowitz, 1991). As a result, investors seek cross-balanced effects to maintain portfolio optimization (Fisher, 1975). The existence of capital flows between financial assets and commodities results in financial asset integration, leading to

movements following the same pattern (Hudson & Urquhart, 2014; Hung, 2022). This will be an obstacle for investors to diversify their portfolio assets, which tend to be highly correlated.

Gold is a commodity asset known as a safe haven asset. Safe Haven Asset offers protection during a market downturn (Baur & Lucey, 2010; Baur & McDermott, 2010). Gold has historically been valued over time and serves as a form of insurance against adverse economic events. When a negative event occurs, investors may decide to shift their funds to gold, which is expected to drive portfolio optimization (Maghyereh & Abdoh, 2021; Naeem et al., 2021; Shahzad et al., 2017). Therefore, gold price volatility attracts investors and scholars to verify the existence of safe haven property on gold during war.

In light of the above explanation, this study uniquely contributes to the recent literature in three ways. First, despite focusing on the oil price influence, we included gold as another prominent commodity to gain a clearer picture of portfolio diversification strategies. Second, we compare the nature of shariah and conventional stocks, in regards of the distinct properties of these types of stocks. Lastly, while many other studies on Indonesia examine the response of the stock market during the war period (Listyaningsih et al, 2024; Behera, 2023), this study scrutinizes how the connectedness between the Indonesian stock market, oil Price and Gold compare its nature on the different periods, namely pre-Russia and during the Russia – Ukraine war. By comparing the nature before and during the war, this study provides a clearer picture of investors' asset selections, particularly between these two distinctive periods. To deal with the time-series model, this study employed structural vector autoregressive (SVAR), which is a useful tool for analyzing the dynamics of a model by subjecting it to an unexpected shock. The results of this study are expected to guide investors in applying diversification opportunities across the stock, gold, and oil markets during market turbulence or economic downturns caused by geopolitical tensions.

Literature Review

Modern portfolio theory

Modern portfolio theory, initiated by Markowitz (1991), provides a framework for constructing and selecting portfolios based on investors' expected performance of the investments⁹¹ and risk appetite. MPT, also commonly referred to as mean-variance analysis, introduced a new terminology that has now become the norm in the area of investment management. The MPT introduces the concept of an efficient frontier, which represents a set of portfolios that offer the highest expected return for a given level of risk or a lower risk for a given level of expected return. The MPT provides mathematical frameworks for optimizing portfolios, considering the correlation between assets, risk, and return. This suggests that assets with low or negative correlations can be combined to reduce the overall portfolio risk. First, it helps mitigate risk since different assets tend to have different risk performance characteristics. Second, it can help the risk-return trade-off, which potentially achieves a higher return for a given level of risk or reduces risk for a desired level of return.

While the concept of modern portfolio theory (MPT) is simple, its execution can become intricate. According to the theory, by using estimates of the returns, volatilities, and correlations of a group of investments, along with constraints on investment choices (such as maximum exposure and turnover constraints), it is possible to conduct an optimization that produces the risk/return or mean-variance efficient frontier (Francis & Kim, 2013).

The time varying relationship among financial assets and commodities might related to efficient market hypothesis (EMH) by Fama (1970). EMH defines an efficient market as one that provides perfect stock price information for investors. The existence of geopolitical tension has further strengthened systematic risk, leading investors to become risk-averse (Yang et al., 2021). Yang et al. (2017) argued that information about the reaction of stocks in times of crisis by reputable media serves as a valid signal for investors when evaluating the quality of a company.

The Connectedness between oil price and Islamic stock market

Theoretical frameworks have been developed to elucidate the relationship between fluctuations in oil prices and their subsequent impact on stock market returns. These frameworks propose various

transmission channels through which this relationship operates. The initial channel, known as the stock valuation channel, incorporates crude oil as a fundamental input into the production process (Adam et al., 2015; Hamilton, 1983; Sadorsky, 1999). Stock valuation methodologies indicate that prevailing stock prices reflect the anticipated future cash flows of a specific stock that has been discounted. Consequently, an increase in oil prices leads to a decrease in stock prices because of a reduction in anticipated cash flows (Jones et al., 2004; Apergis & Miller, 2009; Degiannakis et al., 2014). The second channel pertains to the pass-through effect of oil price on inflation. An increase in oil prices leads to a contraction in market liquidity and a decline in stock returns (Miller & Ratti, 2009). The central bank can modify the interest rate as a third channel in response to the inflationary impact resulting from the rise in oil prices. This adjustment has implications for the current value of a firm's anticipated cash flows. An upward adjustment in the interest rate leads to a decrease in the present value of anticipated cash flow, resulting in a partial devaluation of equities.

Hamilton (1983) stated in his seminal work that at that time, seven out of eight postwar US recessions had been preceded by a sharp increase in crude petroleum. Since the crash of oil prices in 1970, many studies have been conducted to analyze the effect of oil prices on real economic variables. In sharp contrast to the number of studies investigating the nexus between oil prices and macroeconomic activities, Sadorsky (1999) provides an initial finding on the link between oil prices and financial markets, particularly stock returns. Using the VAR method, their study showed that oil prices have a significant negative impact on stock prices. This is in line with the notion that positive shocks to oil affect the earnings of companies for which oil is a cost of production. However, it should also be noted that this effect is likely to depend on market efficiency. If the stock market is efficient, the increase in oil prices will immediately decrease the stock price. Otherwise, an increase in oil prices brings about a lagged decline in the stock market.

On the other hand, Islamic finance is a distinct type of finance that offers various financial products that adhere to Sharia law, resulting in a minimal amount of risk. Examples of such products include Murabahha and Musharakka. The moderate risk associated with Islamic finance sets it apart from traditional finance, making it a morally, ethically, responsibly, and fairly sound investment option. It inherently depends on precise rules and norms that rigorously govern and regulate positions involving risk taking (Arouri et al., 2013; Jawadi et al., 2014). Investment in Islamic finance has experienced significant growth in the past few decades, surpassing US\$ 1000 billion across approximately 60 countries (Jawadi et al., 2014), including both developed and non-Muslim nations.

Recent empirical studies have demonstrated an interest in the nexus between the oil and Islamic stock markets. This direction is crucial in research on the relationship between the oil and stock markets for two specific reasons. First, oil-exporting countries are mostly Islamic countries that rely on Islamic finance principles. Thus, the interdependence between oil price and Islamic finance is undoubtedly significant. Second, as sustainability issues emerge, Islamic stocks as part of Islamic finance stand as a sustainable market that is believed to be more resilient than its conventional counterparts. Furthermore, while certain investors are motivated by ideological beliefs regarding faith-based investments, others view them as a means of hedging and diversifying their portfolios, particularly during times of instability in traditional markets.

Under the portfolio diversification framework, the current body of studies has primarily concentrated on examining spillover effects and the strong interdependence between oil markets and Islamic stock markets. Nagayev et al. (2016) examined the dynamic connection between a group of commodities and Islamic equities, and confirmed the enduring impact of oil prices on Islamic stocks. While Mensi et al. (2017) discovered evidence of fluctuating risk transmission between oil and Islamic equity, Hassan et al. (2021) discovered that volatility is mostly influenced by long-term components. Another strand of similar studies demonstrates that Islamic indices exhibit distinct responses to changes in oil price. The diverse reactions of Islamic stocks to fluctuations in oil prices have been verified across several time intervals (Ftiti and Hadhri, 2019; Mishra et al., 2019) and across sectors (Hassan et al., 2019; Badeeb & Lean., 2018; Chang et al. 2020; Shahzad et al., 2019). These studies verified the presence of a noteworthy association and transmission of market instability between Islamic equities and oil. This connection intensified

during the global crisis period but remained relatively lower than that of conventional stocks. conducted research on the dynamic correlation between oil price and

However, over the last two decades, the oil industry, which serves as the primary financial support for Islamic finance in various oil-exporting nations, has faced significant challenges, including the Second Gulf War in 2003, the global financial crisis of 2008-2009, the shale revolution in 2014, the Covid-19 pandemic, and the most recent Russia-Ukraine conflict in 2022. The latter phenomenon has attracted many scholars worldwide to examine its impact on stock market indices. [Boungou and Yatié \(2022\)](#) provide the first empirical evidence of how this conflict affects the global stock market. Using a sample of 94 countries, their study highlighted that oil prices have a negative and significant effect on global stock market returns. However, the nexus between these assets differs between the neutral and condemning countries. It has been noted that the impact was greater for the condemned countries than countries that remained neutral. Moreover, [Adekoya et al. \(2022\)](#) found that the relationship between oil and stock is stronger during the war than before. These findings support previous studies that revealed that war has changed the level of connectedness between oil prices and the stock market ([Ahmed et al., 2022](#); [Alam et al., 2022](#); [Arouri & Nguyen, 2010](#); [Danielle et al., 2022](#); [Goel et al., 2017](#); [Hudson & Urquhart, 2014](#); [Liu et al., 2023](#)).

In light of the explanation above, it can be implied that the relationship between Islamic stock and oil is mixed and inconclusive, depending on several factors, and might differ during the recent war. Hence, the first hypothesis of this study is as follows:

H₁: Oil price has negative and significant influence on Indonesia Stock market.

The connectedness between gold and stock market

Along with globalization and the acceleration of information, changes in world oil prices not only have an impact on stock prices but also on other commodities, including gold. Gold is known as a safe haven asset or immutable investment during crises that can compensate for losses caused by the decline in the value of other assets in the market ([Maghyreh & Abdoh, 2021](#); [Naeem et al., 2021](#); [Shahzad et al., 2017](#)). [Baur and Lucey \(2010\)](#) and [Baur and McDermott \(2010\)](#) present a theoretical framework to elucidate the nexus between gold and various financial assets, specifically focusing on hedge, diversification, and safe-haven hypotheses. Investors and investment managers commonly enhance their portfolios by incorporating diversifiers or hedging assets that have no discernible positive or negative correlations with other assets under typical market conditions. According to the hedging hypothesis, assets within a portfolio are expected to exhibit a negative correlation or even no correlation with other assets during typical market conditions. Furthermore, [Baur and Kuck \(2020\)](#) stated that analyzing the role of gold as a hedge, diversifier, or safe-haven in normal and extreme market conditions will contribute to the decision-making of investors and investment managers in building their portfolios. Various studies have analyzed the relationship between gold and conventional stocks and show a strong correlation among assets ([Baig et al., 2020](#); [Hasan et al., 2021](#)). Other studies have highlighted that gold and stocks have weak and even negative correlations ([Beckmann et al., 2015](#); [Benlagha & Omari, 2022](#); [Caporale & Gil-Alana, 2023](#); [Dai et al., 2022](#); [Mensi et al., 2022](#)).

As Islamic financial assets grow significantly at about 15-20% ([Abdul Aziz, 2020](#)), Islamic stock markets also show remarkable growth in emerging markets ([Narayan et al., 2016](#)). These studies indicate that the efficiencies of Islamic and conventional stock markets cannot be equal because of their distinct characteristics. Islamic dynamics encompass principles such as ethical investing, evaluation of financial ratios, prohibition of interest (riba), and avoidance of derivative products ([Saiti et al., 2014](#)). This disparity in volatility and efficiency between Islamic and conventional stock markets creates an ideal environment for academic research, as [Hassan et al. \(2021\)](#).

Islamic securities are considered safe havens because of their low correlation with other securities in a portfolio during times of market turmoil ([Salisu et al., 2019](#)). The somewhat lower risk associated with security features in Islamic stocks has attracted investors to take advantage of and optimize the benefits of appropriate diversification in portfolio investment ([Saiti et al., 2014](#)).

Other studies have attempted to resolve the conflicting evidence about gold's potential as a safe haven for Islamic equity investors (Naeem et al., 2021; Kumar & Kumar, 2023), thus combining Islamic stock and gold to build well-diversified portfolios (Alkhazali & Zoubi, 2020; Maghyereh & Abdoh, 2021). Further, Shahzad et al. (2019) elaborate that Islamic stock indices are more robust to the volatility of stock markets and can serve as the best safe-haven in the financial crisis period due to rigorous regulation.

In summary, these results support the hypothesis that gold can be an efficient hedge and overcome investment risks. Therefore, the second hypothesis is as follows.

H₂: Gold Price has negative and significant influence on Indonesia Stock market.

Our focus is on the dynamic relationship between oil and gold prices and Indonesia's Islamic and conventional stock indices. The analysis was conducted within the framework of cointegration, structural vector autoregressive (SVAR), variance decomposition, and impulse response functions.

Research Methods

Data

This study uses daily price data for four variables: oil price, gold, Jakarta Islamic index (JII), and LQ45. The period spans from 2020 to 2022, which is split into two sub-periods: January 2nd 2020 – February 23rd 2020 (Pre-War, 525 observations) and February 24th, 2022 – October 28th, 2022 (during the War, 164 observations). All daily asset prices are sourced from the Revinitif Thompson Reuters database.

Method

While most other studies employed the VAR method as the main analysis, our study uses the SVAR model following Degiannakis et al. (2014), Akkoc and Civeir (2019), and Anand and Paul (2021). Using the SVAR model, we can assume that Indonesia is a small economy that cannot influence global activities. Thus, we block the endogeneity of Indonesia's stock prices because it is impossible for the Indonesian stock market to affect the movement of oil prices and gold.

The main objective of SVAR estimation is to obtain a nonrecursive orthogonalization error term for impulse response analysis. Meanwhile, alternative recursive orthogonalization by Cholesky requires the inclusion of sufficient restrictions to identify the orthogonal error term components.

For the following VAR(p) model with k endogen variables $y_t = (y_{1t}, \dots, y_{kt})$:

$$Ay_t = A_0 + \sum_{i=1}^p A_i y_{t-i} + e_t$$

where e_t is a white noise process with k dimensions and a time-invariant positive definite matrix; thus, the residual covariance matrix is $\Sigma = [e_t e_t']$. Hence, the SVAR model can be estimated as follows:

$$Ae_t = Bu_t$$

e_t and u_t are k-length vectors, e_t is the observed residual, and u_t is unobserved structural innovation. A and B are the $k \times k$ matrices that will be estimated. Innovation structure u_t has an identity covariance matrix, $E[u_t u_t'] = I$. Innovation u_t includes restriksi restriction identifications towards A and B as $A \Sigma A' = BB'$. Matrix A is a lower triangular matrix, whereas B is a diagonal matrix. Restriction identification in equation (12) generally shows short-term restrictions (Pfaff, 2008). Furthermore, Pfaff (2008) asserted that the identification of a structural model from VAR estimation requires $k^2 - ((k^2 - k)/2)$ restrictions.

The specification of the SVAR model for this data is as follows:

Islamic Index Model:

$$\varepsilon_t^{oil} = C_1 u_1^{oil} \quad (1)$$

$$\varepsilon_t^{Gold} = C_2\varepsilon_t^{Oil} + C_3\varepsilon_t^{Gold} \quad (2)$$

$$\varepsilon_t^{Islamic} = C_4\varepsilon_t^{Oil} + C_5\varepsilon_t^{Gold} + C_6u_t^{islamic} \quad (3)$$

Model LQ45

$$\varepsilon_t^{Oil} = C_1u_1^{oil} \quad (4)$$

$$\varepsilon_t^{Gold} = C_2\varepsilon_t^{Oil} + C_3\varepsilon_t^{Gold} \quad (5)$$

$$\varepsilon_t^{LQ45} = C_4\varepsilon_t^{Oil} + C_5\varepsilon_t^{Gold} + C_6u_t^{LQ45} \quad (6)$$

Results and Discussion

Based on [Table 1](#), it can be seen that there was an increase in the average of all the research variables in the pre-war period compared to the during-war period. In addition to the stock indices that experienced a rise in performance, oil and gold prices also showed an average price rise. Reviewed from the variation of data, surprisingly, the coefficient of variation refers to a decrease in the value in both periods. During the war period, the four variables experienced a decline in the variation coefficients, indicating a reduction in risk and volatility. In the pre-war period, gold had the highest rate of variation compared to other variables, followed by Oil Price, LQ45, and Islamic Stock. This CV result implies that Islamic stocks have lower volatility than LQ45, which represents conventional stocks. This also indicates that Islamic stocks tend to be less volatile than their counterparts are. In the post-war period, oil prices showed the highest variation compared to the other variables, implying the highest risk.

Table 1. Descriptive statistics

	Pre war				During war			
	Islamic stock	LQ45	Oil price	Gold	Islamic stock	LQ45	Oil price	Gold
Mean	571.4154	872.3902	54.6665	1790.518	598.6738	995.0791	88.25467	1806.588
Maximum	699.4500	1032.320	92.6500	2058.4	631.9900	1085.440	117.6100	2046.300
Minimum	393.8600	566.8300	35.8000	1479.4	557.2000	894.9500	71.5000	1628.200
Std. Dev.	48.8569	93.27764	12.0096	103.0729	16.93438	37.42717	8.5795	97.6404
C.V	0.0860	0.1070	0.2200	0.0580	0.0280	0.0380	0.0970	0.0540
Skewness	0.279940	-0.6596	0.5135	-0.5888	-0.2803	-0.5489	0.4520	0.1554
Kurtosis	3.8309	2.7516	2.2461	3.4567	2.2199	2.7151	3.2194	2.0873

Source: Data processing

Reviewed from skewness values, Islamic stock has experienced changes in its data distribution. In the pre-war period, the data spread tended to bend to the left, whereas in the war period, the data tended to bend to the right. The LQ45 stock index indicates that the data tended to bend to the right in both periods. However, during the war period, the data distribution was closer to normal. Oil Price had a sloping trend to the left in both periods, but in the war period, it was closer to the normal spread. The gold data spread underwent changes in data tilt, which in the pre-war period slid to the right and tended to slide to the left in the war period. The kurtosis of the whole variable shows a positive value, indicating that the data runs and tends to be homogeneous.

Diagnostic test

Before analyzing impulse response functions (IRFs) and forecast error variance decompositions (FEVDs), diagnostic tests were conducted through stationarity tests, determination of optimal lag lengths, variable sequence tests, and VAR/SVAR system stability tests. The stationarity test revealed that all research variables were stationary on the first difference (see [Table 2](#)).

Table 2. ADF stationary statistics test

	Pre war				During war			
	Islamic stock	LQ45	Oil price	Gold	Islamic stock	LQ45	Oil price	Gold
	Level							
T statistics	-1.945	1.796	0.363	-2.841	-2.5984	-1.7299	-2.0058	-1.3488
Probability	0.054	0.382	0.981	0.053	0.0947	0.4148	0.2843	0.6068
	1 st Difference							
T statistics	-2.954	-11.795	-21.604	-22.854	-16.9209	-17.3704	-13.9382	-16.9133
Probability	0.0390*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*

Note: * represent significance at the 5% levels

Source: Data processing

To examine data stationarity, the augmented Dickey–Fuller (ADF) test for unit roots was applied at the 5% significance level. Based on [Table 2](#), it can be seen that not all variables are stationary at the level because the probability values are greater than 0.05. However, all variables are stationary at 1st difference. This means that all the variables are integrated in the order of 1 or I (1). Next, we performed the optimum lag test, as listed in [Table 3](#).

Table 3. Optimum lag length criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
<u>Pre-War</u>						
0	-7087.082	NA	1.73e+08	27.48094	27.50563	27.49061
1	-5714.226	2724.427	874183.2	22.19468	22.29342*	22.23337*
2	-5704.781	18.63490	872678.3	22.19295	22.36576	22.26067
3	-5692.584	23.92096	861940.0	22.18056	22.42742	22.27730
4	-5671.912	21.52584*	853098.5*	22.17020*	22.56519	22.32498
<u>During War</u>						
0	-8199.199	NA	3.68e+10	38.51736	38.56495*	38.53616*
1	-8165.556	66.33784	3.53e+10*	38.47679*	38.76231	38.58958
2	-8143.404	43.15962	3.58e+10	38.49016	39.01362	38.69694
3	-8122.832	39.59835*	3.65e+10	38.51095	39.27235	38.81172
4	-8112.234	20.15143	3.91e+10	38.57856	39.57790	38.97332

Note: *represents the lowest value of lag length criteria among others

Source: Data processing

The next step is to determine the optimal lag, which is useful for eliminating autocorrelation. The optimal lag in this study was determined based on the goodness criteria of the Akaike Information Criteria (AIC) model. Determining the optimal lag is useful for producing the best VAR model. Optimal lag assessment was based on the smallest AIC value. [Table 3](#) shows that the optimal lag is lag 4 during the pre-War period. Meanwhile, during the War, the optimum lag was 1. A VAR system is declared stable if all the roots have a modulus of less than 1. Based on the VAR stability test results in [Table 4](#), the modulus values for Islamic Stock, LQ45, Oil Price and Gold are less than 1. This implies that the VAR system was stable for both the periods before and during the war. This finding provides an alternative to the restricted VAR analysis method using structural VAR.

Table 4. VAR stability test Results

Pre War	Modulus Range: 0.222 - 0.407
During War	Modulus Range: 0.343 - 0.360

Source: Data processing

The result of SVAR estimation

The estimate of the SVAR model was aimed at examining the direction of the relationship between the variables studied. The results of SVAR estimates are not the primary tool for VAR model analysis, as the main analyses used are impulse response function (IRFs) analysis and forecast error variance decomposition (FEVDs). Furthermore, the results of the estimates cannot be translated directly because it is a reduced-form equation, so only the direction of the relationship can be seen.

Table 5. Structural VAR estimation result

Innovation	Pre war Period		War period	
	Coefficient	Probability	Coefficient	Probability
Islamic Index				
C1	0.094230	0.3737	0.754792	0.0006
C2	0.031140	0.0003	0.042612	0.3112
C3	0.001804	0.6135	0.031432	0.0113
C4	-8.521436	0.0000	-5.224492	0.0000
C5	-20.60338	0.0000	-17.27859	0.0000
C6	1.679010	0.0000	3.228924	0.0000
Conventional index (LQ45)				
C1	0.061142	0.3623	0.282501	0.0192
C2	0.019090	0.0005	0.002578	0.9088
C3	0.002161	0.5459	0.033378	0.0064
C4	-13.41281	0.0000	-9.647329	0.0000
C5	-20.54761	0.0000	-17.53771	0.0000
C6	1.678075	0.0000	3.233045	0.0000

Source: Data processing

The SVAR model specifications were sorted according to the level of endogeneity of each variable. Equations (1) and (4) describe the relationship between global oil price and its historical price. Equations (2) and (5) describe the relationship between gold and global oil price and the historical price of gold, respectively. Equation (3) shows the relationship between the Islamic index and global oil price, gold, and the historical price of the Islamic index. Based on Table 5, almost all coefficients show a significant relationship. The SVAR estimation results reveal that the global oil price tends to be exogenous before the war and becomes more predictable during the war. In contrast, equations (2) and (5) show that gold tended to be endogenous in the pre-war period but was significantly influenced by its historical price during the war.

Meanwhile, C4 revealed the relationship between Islamic and conventional stocks and oil prices. The significance of all p-values for both types of stock implies that oil is the net transmitter for the Indonesian stock market during both pre war and war periods. This finding is consistent with the characteristics of stock indices in small economies, whose movements tend to be endogenous or influenced by global commodities. However, the influence of oil prices on Islamic stocks decreased during wartime. However, oil prices appear to have a greater influence on conventional stocks than Islamic stocks. This shows that conventional stocks are more sensitive to changes in oil prices than Islamic stocks are. In addition, the C4 coefficient indicates that the influence of oil prices was greater in the pre-war period than in the war period.

Further, the significance value of coefficient C5 implies that both Islamic and conventional stocks are negatively influenced by gold price movement. This confirms the existence of the safe haven hypothesis by Baur and Lucey (2010). The Stock – gold nexus shows a coefficient decrease in war time compared to the pre-war period. Judging from its magnitude, both Islamic and conventional stocks were less affected by the movement of gold during the war. Overall, there are no significant differences in the nexus between financial assets before and during the war. The distinctive relationship only shown on the nexus between gold and oil, as gold tended to be less affected by oil prices during the war.

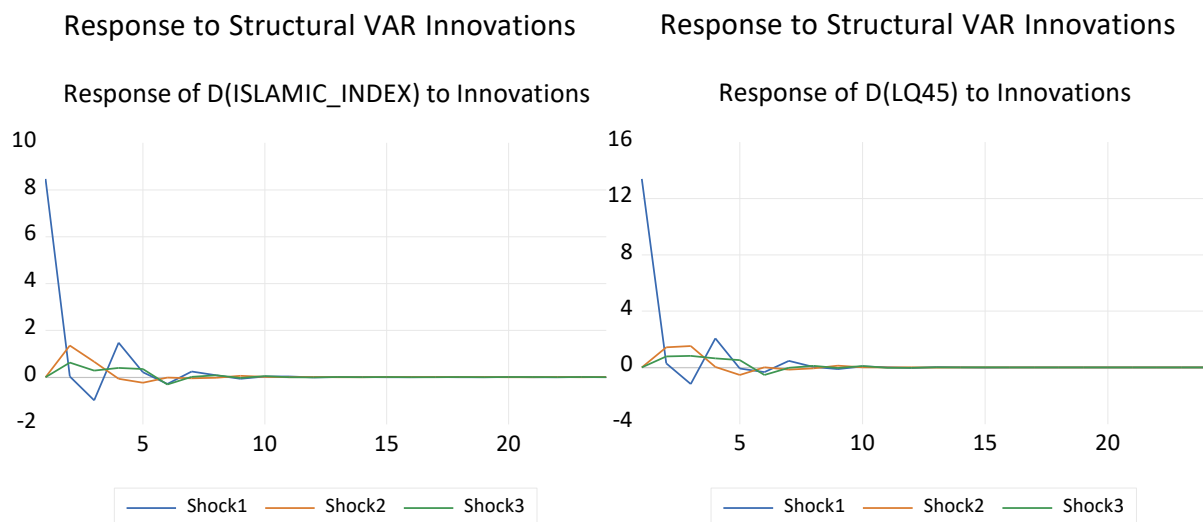


Figure 1. Impulse response function (IRF) in the pre-war period
Source: Data processing

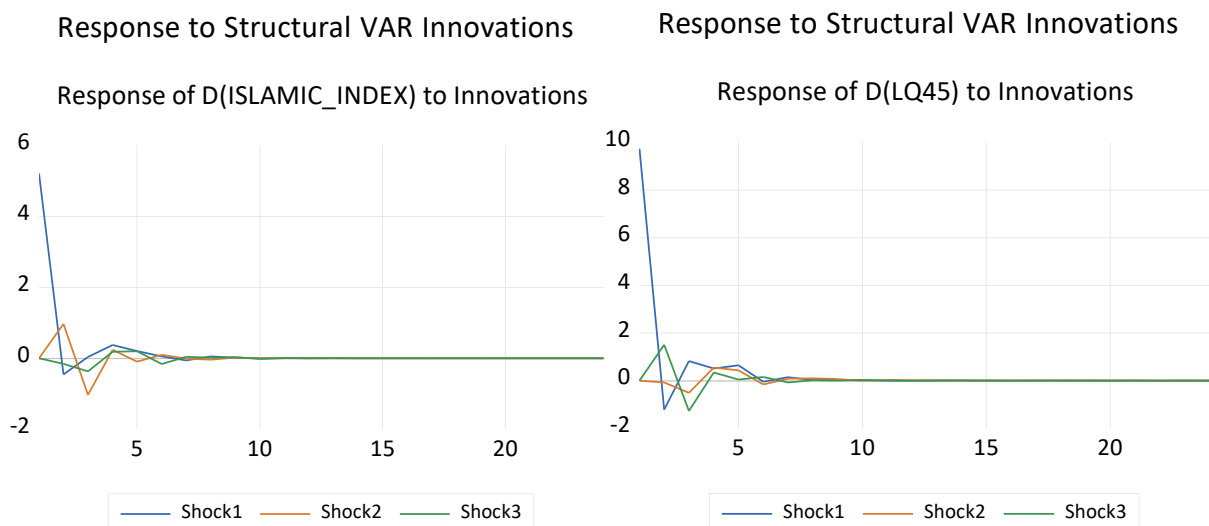


Figure 2. Impulse response function (IRF) during - war period
Source: Data processing

Figure 1 shows the responses of both the stock indices to the three shocks. Shock 1 represents the shock to the stock market, shock 2 represents the oil price shock, and shock 3 represents the gold price. According to the results of the Impulse Response (IRF) function, it is seen that in the pre-war period, any rise in the global oil price will respond negatively to the Islamic index. The same applies to the LQ45 stock index, which posits that this index responded more deeply, implying that the LQ45 stock index was more sensitive to the shocks that occurred in oil prices. Both stocks tend to respond similarly to changes in gold prices. However, the impulse response also showed that the Islamic stock index was slower back to the equilibrium point, that is, in the 13th period, whereas the LQ45 stock index tended to return to the equilibrium point in the 11th period. This means that the reaction of the Indonesian stock market to the increasing oil price shock will disappear so that the shock does not leave a permanent influence.

As shown in Figure 2, both stock indices show the same response to every oil price shock during the war period. However, compared to the pre-war period, the Islamic index did not correct too deeply, and reached the equilibrium point even faster in the 10th period. The lq45 stock index responds less than to the conditions of the pre-war period. Again, these results support previous studies, which state that the Islamic index tends to be more stable in times of turbulence. The role

of the Islamic index as a safe haven asset, an asset that tends to be more stable in times of turbulence.

Table 6. Forecast error variance decomposition (FEVD) in the pre-war period

Period	Variance decomposition of D(LQ45):			Variance decomposition of D(ISLAMIC_INDEX):		
	LQ45	Oil Price	Gold	Islamic	Oil Price	Gold
1	100.0000	0.000000	0.000000	100.0000	0.000000	0.000000
6	95.96639	2.967549	1.066063	96.40919	2.418647	1.172162
12	95.95090	2.972171	1.076928	96.37879	2.437925	1.183288
18	95.95082	2.972201	1.076979	96.37862	2.438024	1.183359
24	95.95082	2.972201	1.076979	96.37862	2.438024	1.183360

Source: Data processing

Table 7. Forecast error variance decomposition (FEVD) during-war period

Period	Variance decomposition of D(LQ45):			Variance decomposition of D(ISLAMIC_INDEX):		
	LQ45	Oil Price	Gold	Islamic	Oil Price	Gold
1	100.0000	0.000000	0.000000	100.0000	0.000000	0.000000
6	92.14714	6.979197	0.873662	95.31778	4.066028	0.616188
12	92.13178	6.984190	0.884028	95.29234	4.069278	0.638387
18	92.13177	6.984189	0.884046	95.29224	4.069285	0.638472
24	92.13177	6.984189	0.884046	95.29224	4.069285	0.638472

Source: Data processing

The next analysis is forecast error variance decomposition (FEVD) (see [Table 6](#) and [Table 7](#)), which is used to answer this research problem, in which the transmission channels are the most dominant and the strength of each transmission channel. Both in the pre-war period and during the war period, an important source of variation in the Islamic index and the LQ45 index was a surprise to the self-movement of each index. with the largest value among the other variables (more than 90%). In the pre-war period, it was seen that the Islamic index and LQ45 could explain a fairly large percentage of 95-96% up to the 24th period. However, the Islamic index is more exogenous than the LQ45. The second factor that explains the variation in the two indices is the world oil price, which can explain the Islamic index and LQ45, respectively, at 96.38% and 95.95% in the 24th period. During the war period, both stock indices were more endogenous, especially for LQ45. The LQ45 stock index is more sensitive to global oil price shocks. The Islamic Index did not experience significant changes compared to the time before the war. This again confirms that the Islamic index tends to be more dominantly influenced by self-movement than by conventional stocks.

Discussion

Based on these results, there were generally three findings in this study. First, the influence of oil prices on Indonesian stocks was confirmed to be negative and significant, which supports prior studies but experienced a decrease in influence during the war. This can be explained by the role of Indonesia as an importer and exporter of oil. According to [Civcir and Akkoc \(2021\)](#), changes in world oil prices can affect stock prices through three channels. First, based on the theory of valuation, it is clear that crude oil is the main factor of production, whereas oil prices affect the marginal cost of production and the company's revenue. The second channel is inflation. Rising oil prices have led to rising domestic prices and tightening market liquidity, thereby lowering share returns. In the third channel, central banks respond to changes in world oil prices by adjusting their interest rates. Rising oil prices, accompanied by rising bank interest rates, will increase the current value of the company's expected cash flow. This results in a decrease in the value and price of the company's shares.

According to the results, the oil price shock that occurred during the Russian-Ukrainian war affected the performance of the Indonesian stock market. This result is in line with those of previous studies (Ferrer et al., 2018; Fu et al., 2022; Kumar et al., 2023; Ozili, 2022; Yang et al., 2017). However, Indonesia has managed to suppress the inflation rate in accordance with the set target, which ranges from 2 to 4%. This was accompanied by tightening interest rates by not more than 5.5% during the war. This has been shown to effectively manage the investment atmosphere of the capital market in Indonesia and reduce the impact of changes in world oil prices on stock prices, both conventional and Islamic.

The second finding is beneficial from the investor perspective. It can be seen that the Islamic index is less affected by oil shock especially in times of market turbulence. The impulse response analysis results confirmed that the Islamic index was faster to return to equilibrium after a shock. This suggests that the Islamic index can be an alternative to safe-haven assets. Screening criteria on the Islamic index are in line with the principle of sustainable investment, among other things, support for the use of renewable energy. From a financial point of view, the Sharia-compliant firm has a better foundation based on its leverage level.

Both Islamic and conventional stock indices have a negative and significant correlation with changes in gold prices, suggesting that stock investors can take advantage of diversification by investing in gold (Benlagha & Omari, 2022; Caporale & Gil-Alana, 2023; Dai et al., 2022; Mensi et al., 2022). This correlation did not change significantly before or during the war. This is because before the war began, Indonesia and the world experienced a Covid-19 pandemic that can be categorized as market turbulence. Thus, property gold as a safe haven has been in place since the war began. Overall, the connectedness among the stock market, oil price, and gold showed a similar direction both before and during the war. A particularly important distinction is that gold and oil prices are less connected during the war period, providing evidence that these two assets can be cheap hedging tools during the rising global oil prices.

Conclusion

We examine the relationship between oil price, gold price, and the stock market in the period before and during Russian-Ukraine saga. This study uses two types of stock indices in Indonesia, the LQ45 stock index and the Islamic index, as proxies for the Indonesian stock market. The findings confirm that oil prices have a negative impact on Indonesian stock prices, while the Islamic Index is less affected by oil price shocks than conventional stocks. In addition, the role of gold as a safe haven asset against Indonesian stocks was confirmed.

This study is expected to be beneficial for investors making investment decisions, particularly in the war period, which is still ongoing and more specific for taking advantage of diversification opportunities. The Islamic Index is more exogenous; therefore, it can be a diversifier option for conventional stocks. Gold still has safe haven properties for the stock market, so it is expected to optimize the risk and return on the portfolio. In addition, investors still need to pay attention to oil price fluctuations, since they proved to be negatively correlated with stock prices. Furthermore, a negative correlation between stock prices and oil prices could be the basis for government policymaking, including full support for renewable energy, an emphasis on inflation rates, and interest rate control. These three factors are expected to minimize the fall in Indonesia's stock prices in the face of global oil price pressures.

However, the conflict between the two countries is still ongoing; thus, we used relatively short timeframe data. Since this phenomenon will continue and trigger various global responses, it will also affect the interconnectedness between financial assets. Further studies need to be conducted in more detail using longer time span data to produce a better time-series analysis.

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