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The Impact of the Russia-Ukraine Conflict on Market Volatility: Stability of Islamic Cryptocurrency

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Abstract

Purpose - This research investigates how the Russia-Ukraine conflict affects the volatility of cryptocurrencies, with a specific focus on the comparative stability of Islamic gold-backed cryptocurrencies versus conventional cryptocurrencies such as Bitcoin.

Method - Utilizing the GARCH model, this study examines the risk factors and volatility transmission among cryptocurrencies (Bitcoin and Tether-Gold), traditional financial markets (gold, stock markets), and their interrelationships during the conflict period. The study employs daily closing prices of Bitcoin, Tether-Gold, gold, the S&P 500, and the Dow Jones Islamic Market Index from February 7, 2020, to November 30, 2023.

Result - Bitcoin experienced significant volatility during the conflict, while Tether-Gold remained more stable. Islamic gold-backed cryptocurrencies proved to be more stable than conventional ones during geopolitical crises.

Implication - The findings offer valuable insights for investors seeking safe-haven assets during periods of economic uncertainty. Gold-backed cryptocurrencies present a more stable investment option compared to conventional cryptocurrencies, especially for investors adhering to Shariah principles

Originality - This research highlights the stability of Islamic gold-backed cryptocurrencies during geopolitical events, contributing to the understanding of safe-haven assets and offering practical implications for portfolio diversification and risk management.

Keywords: Cryptocurrency, Volatility, Geopolitics, Bitcoin, Tether Gold

JEL Classification: G15, G32, F51, E44

Introduction

The Russia and Ukraine conflict has had substantial adverse effects on the global economy by generating financial instability for both businesses and consumers (Karagiannopoulou et al., 2023; Pereira et al., 2022). The war in the financial market has had repercussions on stock market returns (Boubaker et al., 2022; Boungou & Yatié, 2022), commodities market (Appiah-Otoo, 2023a), and corporate decision-making (Tosun & Eshraghi, 2022). The war exerted a significa influence on the cryptocurrency market (Appiah-Otoo, 2023b; Kayral et al., 2023; Khalfaoui et al., 2023; Le et al., 2023; Theiri et al., 2022). On the first day of the invasion, on February 24, 2022, the price of bitcoin fell by 7.26% within 24 hours of the attack on Ukraine. This condition changed the investment behavior of many people, as those who previously took high risks due to the conflict have now shifted to playing the market with investments in safe havens (Kayral et al., 2023; Widjaja et al., 2023).

Moreover, there is compelling evidence that the transmis on of volatility increases rapidly during periods of crises (Adekoya & Oliyide, 2022; Akhtaruzzaman et al., 2021; Corbet et al., 2020; Karagiannopoulou et al., 2023). Given the current economic climate, it is crucial for investors to identify assets that function as safe havens or exhibit hedging behavior to diversify their portfolios. The objective of this diversification strategy is to reduce risk and strengthen the resilience of the portfolio during times of market volatility or economic uncertainty. Understanding the dynamic interplay between asset classes and identifying those that exhibit countercyclical tendencies is paramount for investors seeking to preserve pital and navigate challenging economic landscapes (Conlon et al., 2020; Ji et al., 2020; Shehzad et al., 2021).

The ongoing discussion on whether cryptocurrencies can be classified as a secure and reliable investment option persists. According to several analysts, cryptocurrencies do not possess the necessary stability to be categorized as safe-haven investments, unlike gold. The high volatility and lack of direct intervention in cryptocurrency prices are cited as reasons for this classification (Kayral et al., 2023; P. Wang et al., 2019). Bitcoin and ethereum, for instance, do not serve as a secure

refuge for most of the foreign stock markets analyzed. In fact, including them in a portfolio increases the potential for negative outcomes (Conlon et al., 2020). Futhermore, Sifat (2021) and J. Wang & Wang (2021) has been determined that the COVID-19 pandemic does not affect the volatility of cryptocurrencies.

Recent studies by Mokni et al. (2020) have shown that bitcoin can serve as a hedge against economic volatility. Additionally, Kalyvas et al. (2020) have found that bitcoin can be utilized as a safe haven across different currencies. Under specific market conditions, it can also serve as a hedge (Cheng & Yen, 2020). Moreover, incorporating bitcoin into investing portfolios has been shown to yield substantial profits and enhance risk-adjusted results (Brière et al., 2015). Cryptocurrencies are more effective as hedging assets compared to equities and the U.S. dollar, as shown by several studies (Corbet et al., 2020; Dyhrberg, 2016; Ghorbel et al., 2022; Kayral et al., 2023; Widjaja et al., 2023). Conversely, gold is widely seen as a secure refuge (Baur & McDermott, 2010; Kayral et al., 2023). Bitcoin, the leading digital cryptocurrency, is often referred to as digital gold (Disli et al., 2021; Koutmos et al., 2021). Cryptocurrencies have comparable hedging and safe haven attributes to gold (Antonakakis et al., 2019; Shahzad et al., 2019).

In addition, Salisu & Ogbonna (2022) did a study examining the performance of cryptocurrencies during crises, discovered that news driven by fear had a substantial impact on increasing the volatility of cryptocurrencies, beyond levels observed before the pandemic. Conlon et al., (2020) substantiated the inherent volatility of bitcoin over this period. In contrast, Goodell & Goutte, (2021) determined that bitcoin prices experienced an increase throughout the pandemic period, while Corbet et al., (2020) proposed that major cryptocurrencies served as a means of preserving value during this time. Interestingly, islamic cryptocurrencies which is often represented by gold-backed cryptocurrency (Alshater et al., 2022; Bahloul et al., 2022; Emna & Anis, 2020; Garcia-Ramos Lucena, 2020; Mnif et al., 2023; Wasiuzzaman et al., 2022), have been studied in the context of crises such as the COVID-19 pandemic were found to be resilient to crises like COVID-19 shocks and Federal Reserve policy. The study also found that Islamic cryptocurrencies were not vulnerable to FOMC announcements, unlike traditional cryptocurrencies (Mnif & Jarboui, 2022). Using a time-

varying parameter vector autoregression (TVP-VAR) model, Ha & Nham, (2022) discovered that the health disruptions generated by COVID-19 appeared to impact the evolving relationships between crude oil, gold, stocks, and the cryptocurrency market.

Several studies indicate that Islamic stocks may not function as a safe haven asset in times of financial turmoil (Hassan et al., 2023). Contrarily, other research has indicated that Islamic stocks have proven to be a resilient and secure investment option for G7 stock markets amidst the pandemic crisis (Arif et al., 2022). Moreover, empirical research has shown that Islamic financial assets, specifically sukuk, exhibited robustness throughout the pandemic crisis. It is noteworthy that Islamic stock markets saw a lesser impact from the initial wave of the pandemic compared to traditional stock markets. However, they were more severely affected by the second wave (Hasan et al., 2022). The resilience of Islamic stock markets during crises and their performance in comparison to conventional stock markets continue to be areas of research and analysis (Alamgir & Cheng, 2023).

The Russia-Ukrain conflict is regarded as a highly unpredictable and rare event, known as a black swan event. Therefore, it is worthwhile to examine how major financial markets responded to and bounced back from this crisis. This study seeks to enhance the scientific community's understanding by analyzing the instability of cryptocurrencies amidst the economic crisis caused by the Russia-Ukraine conflict. Furthermore, it seeks to examine the correlation between cryptocurrencies and traditional financial markets, such as gold and stock markets, during this specific timeframe. This study aims to address the lack of research on the transmission of volatility between bitcoin and other financial assets. To do so, it utilizes bitcoin (BTC) as a representative traditional cryptocurrency, tether-gold (XAUT) as a cryptocurrency backed by gold, gold prices as a commodity, and divides the stock market into conventional stock markets represented by the S&P 500 and Islamic stock markets represented by the Dow Jones Islamic Market Index (DJIMI) (Mnif & Jarboui, 2022; Yousaf & Yarovaya, 2022). Through the implementation of the GARCH approach, it is anticipated that the analysis will reveal the risk factors manifested in the volatility of cryptocurrencies, suspected to originate from investor sentiment regarding the Russia-Ukraine conflict.

Literature Review

Investor sentiment

Investor sentiment theory, a concept in behavioral finance, pertains to the outlook of investors regarding future stock market activity and the formation of their beliefs (Baker & Wurgler, 2007; López-Cabarcos et al., 2020). Various authors have suggested diverse methodologies for quantifying investor sentiment, including the use of proxies such as trading behavior and portfolio dynamics of retail investors, as well as sentiment indices. According to the hypothesis, investor attitude has the potential to impact stock prices, leading to certain outcomes on portfolio performance and investment choices (Baker & Wurgler, 2007; Mehrani et al., 2016).

The bottom-up strategy is employed to assess investor sentiment by examining biases in individual investor psychology, including overconfidence, representativeness, and conservatism. This methodology seeks to understand how these biases influence individual investors' reactions to historical returns or fundamentals, leading to either underreaction or overreaction. An alternative method is the top-down approach, which considers the genesis of investor sentiment as external and concentrates on its observed consequences. This study showcases the viability of measuring investor sentiment and emphasizes the substantial and consistent influence of sentiment waves on both individual firms and the broader stock market (Baker & Wurgler, 2007; López-Cabarcos et al., 2020; Mehrani et al., 2016; P H & Rishad, 2020).

Empirical studies have demonstrated that investor attitude has a significant impact on stock prices and investment returns, including those related to cryptocurrencies. Consequently, this has unavoidable consequences on the performance of one's investment portfolio and the choices made in investing. Research has additionally discovered a connection between the instability of the stock market and the instability of the cryptocurrency market, as well as the impact of investor sentiment on returns, whether it is positive or negative. The presence of high-frequency data has enabled the development of investors' feelings and the identification of sentiment predictability as a

systematic risk factor (Dincă et al., 2023; López-Cabarcos et al., 2020; Mehrani et al., 2016; P H & Rishad, 2020).

Market Volatility

The concept of market volatility in the financial market reflects the degree of fluctuations in the value of an instrument within a specific period (Dyhrberg, 2016; Karagiannopoulou et al., 2023). This volatility introduces risks and uncertainties for market participants, leading to unstable investment interest and impacting the global financial market. In statistical science, volatility is interpreted as a change in fluctuations against the average financial time series of the securities return (Salisu & Ogbonna, 2022). The standard deviation is the simplest estimation tool for measuring volatility, providing uniform observation weights. However, it has two weaknesses: it is symmetrical and constant. High return volatility indicates significant fluctuations in the securities' value, while low return volatility suggests a stable movement in the securities' value (Karagiannopoulou et al., 2023; Umar & Gubareva, 2021).

The existence of volatility in asset prices is considered one of the most puzzling phenomena in financial economics, posing a significant challenge for investors to fully understand volatility. A comprehensive survey of existing literature on stock market volatility and return analysis highlights the crucial need to comprehend the theoretical and literary relevance of volatility in assessing the favorable progress of the stock market. The study also emphasizes the significance of literature reviews as a basis for advancing knowledge, delivering guidance for planning and implementation, and providing a basis for determining impact (Bhowmik & Wang, 2020).

An investigation has been conducted to examine the correlation between stock indices and cryptocurrencies during the Russia-Ukraine war. The objective was to comprehend the effects of the war on the relationship between the US and China stock markets, as well as the interdependence between cryptocurrencies and stock indices. The intricate and vehement battle between Russia and Ukraine, specifically during the 2022 invasion, has resulted in substantial market responses and compelled numerous Western authorities to promptly respond. This situation has also influenced the decisions of Western companies

operating in Russia, impacting stock market volatility (Dincă et al., 2023).

Russia-Ukraine War and Impact on Stock Market and Cryptocurrencies

The ramifications of the Russia-Ukraine war on stock markets have been a subject of substantial investigation and examination. Multiple studies have demonstrated that the conflict has caused significant reactions in stock market indexes, especially over the duration of the conflict. The conflict has demonstrated its adverse effects on stock markets through monetary, financial and political channels. A prior investigation analyzed the response of G20+ stock markets to the black-swan occurrence of the Russia-Ukraine conflict, emphasizing the interdependence between stock indices and cryptocurrencies during this geopolitical event (Choi, 2023; Ullah et al., 2023).

The study conducted by Anastasiou et al. (2021) investigated the influence of crisis sentiment on the risk of price crashes in cryptocurrencies. The findings indicated a positive correlation between crisis sentiment and the risk profile of cryptocurrencies, suggesting a potential connection between geopolitical events, like the Russia-Ukraine conflict, and the likelihood of price crashes in cryptocurrencies. The study conducted by Boungou & Yatié (2022) examines the influence of the Russia-Ukraine conflict on the trading volume of cryptocurrencies. The data suggest that the ongoing conflict between Russia and Ukraine has a detrimental impact on the volume of bitcoin trading. It then examines the relationship between the trading volume of bitcoin and the time period before and after the invasion. The study determines that the impact of the fighting on bitcoin trading volume is particularly evident in the period following the invasion. Moreover, a thorough investigation carried out in prior studies demonstrated that gold functions as a robust refuge, but bitcoin and ethereum exhibit limited refuge characteristics when compared to traditional stock indexes (Będowska-Sójka & Kliber, 2021). Disli et al. (2021) conducted a study on gold and bitcoin in relation to Islamic equity indices. The findings indicate that neither gold nor bitcoin exhibit safe-haven characteristics.

Furthermore, the study has examined the robustness of Islamic financial markets in the face of the COVID-19 pandemic. The research discovered that the pandemic had an impact on Islamic financial markets, which encompass Islamic gold-backed cryptocurrencies and Islamic stock markets. However, these markets shown greater resilience compared to conventional financial markets (Hasan et al., 2022). It is worth noting that there is a lack of research on investments that are based on Islamic faith. However, this particular study has garnered attention from experts, especially amid a subprime crisis (Umar & Gubareva, 2021). The ethical and socially responsible elements of this investment have attracted significant attention from investors, including both conventional and faith-based ones (Umar et al., 2022).

The war has demonstrated its impact on stock market indices, commodity markets, and the risk characteristics of cryptocurrencies. The interconnectedness of stock indices and cryptocurrencies during this geopolitical event has also been a subject of investigation, providing valuable insights for investors, policymakers, and financial market participants. Understanding the multifaceted impact of geopolitical events on stock market dynamics is essential for informed decision-making and risk management in the global financial landscape.

Efficient Market Hypotesis on Russia-Ukraine Conflict

The Efficient Market Hypothesis (EMH) is a prevalent theory in finance that posits financial markets are efficient and accurately incorporate all accessible information. According to the hypothesis, in a market that operates efficiently, it is not feasible to use previous information to forecast future prices. As a result, investors face challenges in achieving abnormal returns (Gaio et al., 2022; Shubham Kakran Arpit Sidhu & Dagar, 2023). The relationship between the Russia-Ukraine war and the Efficient Market Hypothesis (EMH) can be seen in the possible impact of the war on market efficiency, as shown by disparities in stock prices, anomalous returns, and trading volume.

Several studies have been conducted to examine the impact of the Russia-Ukraine conflict on stock markets and modal prices in various countries. Kamal et al. (2023) examines the impact of the Russia-Ukraine crisis on the Australian stock market by employing the event research approach. They discover a substantial decrease in anomalous

returns on the day of the event. Additionally, it was discovered that small and medium-sized enterprises experienced negative consequences both before and after the event. A study by Sari et al. (2023) determined that the IDX demonstrates a degree of semi-strong form market efficiency, indicating that stock prices incorporate all publicly accessible information, such as news and events. Consequently, investors have challenges in achieving extraordinary returns by utilizing this information. Nevertheless, the study also revealed that the degree of market efficiency fluctuates based on the specific event and sector. Stock price in the energy sector had consistent and pronounced responses during all three Russia-Ukraine war episodes, as indicated by substantial fluctuations (Sari et al., 2023).

This suggests that the Russia-Ukraine war has the potential to influence market reactions, and the market efficiency level varies depending on the event and the sector. The evidence from various studies suggests that the market efficiency hypothesis is rejected in the context of the Russia-Ukraine conflict, indicating the predictability of asset prices in times of instability and global financial crisis (Gaio et al., 2022; Shubham Kakran Arpit Sidhu & Dagar, 2023). The correlation between the Russia-Ukraine war and the Efficient Market Hypothesis (EMH) can be found in the possible impact of the war on market efficiency, as seen by variations in stock prices, abnormal returns, and trade volume activity. The findings from multiple studies indicate that the market efficiency theory is disproven in the context of the Russia-Ukraine conflict. This shows that asset prices can be predicted during times of instability and global financial crises.

Research Methods

Data Source

The scope of this research is to investigate the volatility of cryptocurrencies, specifically bitcoin as a representation of traditional cryptocurrency, and tether-gold (XAUT) as a representation of gold-backed cryptocurrency, concerning gold prices and both conventional and Islamic stock markets during the Russia-Ukraine war period. Consequently, the daily closing prices of bitcoin, tether-gold, gold prices, S&P 500, and the Dow Jones Islamic Market Index were utilized for the period from February 7, 2020, to November 30, 2023. A war dummy variable was employed as an indicator of

the occurrence of the Russia-Ukraine war, which commenced on February 24, 2022.

TABLE 1. Variable

Variable	Formula	Source
Crypto Return	$R\_BTC = \frac{BTC_t - BTC_{t-1}}{BTC_{t-1}}$ $R\_XAUT = \frac{XAUT_t - XAUT_{t-1}}{XAUT_{t-1}}$	Yahoo Finance and Coinmarketcap
Gold Price Return	$R\_GOLDP = \frac{GOLDP_t - GOLDP_{t-1}}{GOLDP_{t-1}}$	Investing.com
S&P500 Return	$R\_S\&P500 = \frac{S\&P500_t - S\&P500_{t-1}}{S\&P500_{t-1}}$	Yahoo Finance
DJIMI Return	$R\_DJIMI = \frac{DJIMI_t - DJIMI_{t-1}}{DJIMI_{t-1}}$	Yahoo Finance
War Dummy	Conflict 0 = Before 1 = After	

Volatility Estimation Utilizing the GARCH Model

The analytical framework employed in this research is the GARCH model, initially formulated by (Bollerslev, 1986) as an extension of the ARCH model. The GARCH model incorporates lagged conditional variance terms in an autoregressive fashion to address a limitation observed in the ARCH model, which exhibited a semblance to a moving average specification (Asteriou & Hall, 2021). In the GARCH model, a conditional variant is maintained as autoregressive. Specifically, the conditional residual variance (h_t) in the GARCH model is influenced by both the residual from the previous period and the conditional residual variance from the previous period.

This study adopts the GARCH (1,1) model as a basis for estimating the return volatility of cryptocurrency (bitcoin and tether-gold). The mean equation return model utilized is outlined as follows:

$$R\_BTC_t = \alpha + \beta_1 GOLDP_t + \beta_2 S\&P500_t + \beta_3 DJIMI_t + u_t \quad (1)$$

$$R\_XAUT_t = \alpha + \beta_1 GOLDP_t + \beta_2 S\&P500_t + \beta_3 DJIMI_t + u_t \quad (2)$$

The residual (u_t) was assumed identically independently normally distributed (iid) with a zero mean and a constant variance (σ^2).

Meanwhile, the variance model used for the cryptocurrency return volatility is as follows:

$$h_t = \gamma_0 + \sum_{i=1}^{p} \gamma_1 u_{t-1}^2 + \sum_{i=1}^{q} \delta_1 h_{t-i} + WAR\ DUMMY \quad (3)$$

Results and Discussion

Descriptif Statistic

The observation period began on February 7, 2020 and ended on December 13, 2023, with daily data (5 day week), resulting in 1004 observations. This is because Tether USD (XAUT) began historical data on that date. Table 2 shows the descriptive statistical measures of the variables.

TABLE 2. Statistic Descriptive

	RBTC	RXAUT	BTC	XAUT
Mean	0,00237	0,000294	29247,73	1833,843
Median	0,000968	0,000370	27525,34	1831,314
Maximum	0,211097	0,079293	67566,83	2068,834
Minimum	-0,371695	-0,065480	4970,788	1466,927
Std. Dev.	0,041809	0,009473	14952,71	104,9963
Skewness	-0,643951	0,063156	0,418918	-0,290686
Kurtosis	12,33780	11,49095	2,330752	2,764714
	GOLD	S&P500	DJIM	WAR
Mean	1832,799	3976.337	7977,019	0.468127
Median	1830,200	4089.615	8088,400	0.000000
Maximum	2071,000	4796.560	9945,320	1.000000
Minimum	1477,300	2237.400	4339,230	0.000000
Std. Dev.	104,5993	514.2226	1114,020	0.499232
Skewness	-0,300751	-0.872137	-0,694460	0.127750
Kurtosis	2,842914	3.235261	3,156112	1.016320

Source: Data Processed (2023)

Throughout the observed period, the bitcoin (BTC) market exhibited a upward trend, as evidenced by the average positive return of 0.0023. This bullish sentiment was further supported by relatively volatil in market activity during observed, captured by a return standard deviation of 0.0418. Futhermore, the tether-gold (XAUT) market exhibited a upward trend like a bitcoin market, as evidenced by the average positive return of 0.0002. The relatively volatile, characterized by a return standard deviation of 0.0418, instilled further confidence in the market and fueled the bullish sentiment. Based on

these results, it is evident that gold-backed (theter-gold) cryptocurrencies have lower volatility than conventional cryptocurrencies such as bitcoin.

Gold prices, S&P500 and DJIM show high volatility at 104.5993, 414.2226 and 1114.020 standard deviations compared to the average value of 1831.799, 3976.337 and 7977.019, respectively. The dummy variable of war (Russia-Ukraine conflict) was assigned for 470 observations, which covered the period from 24 February 2022 to 13 December 2024 allows for further analysis of its impact on market behavior. Figure 1 highlights that both bitcoin and tether-gold returns exhibit considerable volatility, with both assets displaying a strong comovement at the onset of the observation period. Nevertheless, the fluctuations in tether-gold are typically lower than those of bitcoin, as indicated by the broader range of the bitcoin price graph.

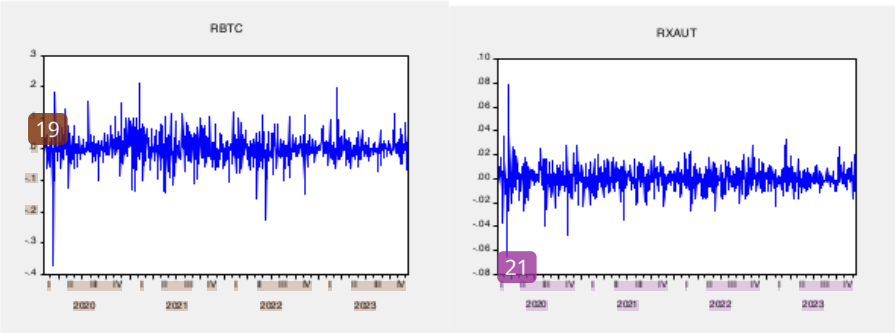

FIGURE 1. Return Fluctuation

Unit Root Test

The results of the breakpoint unit root test are displayed in Table 3. At a significance level of 1%, the null hypothesis can be rejected, indicating that none of the variables have unit roots with structural breakdowns.

TABLE 3. ADF-Test

Variables	level		1st Different	
	t-statistic	prob.	t-statistic	prob.
BTC	-1.609768	0.4772	-32.25255	0.0000
XAUT	-2.799024	0.0587	-30.61045	0.0000
GOLD	-3.228564	0.0187	-32.33811	0.0000
S&P500	-1.273107	0.6439	-35.55387	0.0000
DJIM	-1.431370	0.5680	-34.66998	0.0000

Source: Data Processed (2023)

GARCH (1,1) Volatility Modelling

Table 3 shows the regression results of the GARCH (1,1) model for modelling the cryptocurrency return volatility.

TABLE 4. Bitcoin, GARCH (1,1) Test Result

	Coefficient	Std. Error	Prob.
Mean Equation			
C	0.001343	0.001106	0.2247
GOLD	0.110772	0.097901	0.2579
S&P500	1.235380	0.062413	0.0000
DJIM	0.028963	0.080645	0.7195
Variance Equation			
γ_0	0.001343	2.97E-05	0.0000
ARCH(γ_1)	0.073102	0.014319	0.0000
GARCH(δ_1)	0.852131	0.024528	0.0000
WAR	0.852131	0.024528	0.0001

Source: Data Processed (2023)

The mean equation shows that the gold has a insignificant effect on the return of the bitcoin at a 1% significance level. The study conducted by Siauwijaya & Sanjung (2022) employed the GARCH methodology to examine the impact of bitcoin and ethereum returns on gold, stock, and the dollar index. The analysis concluded that there is no substantial impact of the gold price on bitcoin returns. Furthermore, several studies have examined the responsiveness of bitcoin returns to fluctuations in gold price returns and have discovered a negative correlation between gold prices and bitcoin returns (Jia et al., 2023). According to previous research, the gold price may not have a significant effect on bitcoin or ethereum for several reasons. Bitcoin and cryptocurrencies, in general, have their own unique market dynamics, which may not be directly influenced by gold prices.

The relationship between gold and cryptocurrencies is still not fully understood, and the correlation between their prices may not be as strong as some researchers initially thought (Shariati & Sjölander, 2022; Wijaya & Ulpah, 2022). Cryptocurrencies like bitcoin and ethereum have higher volatility compared to traditional assets like gold. This high volatility may overshadow the impact of gold prices on cryptocurrency returns, making it difficult to observe a significant relationship between the two assets (Wijaya & Ulpah, 2022). The returns of cryptocurrencies are impacted by multiple factors, including market sentiment, legislative advancements, and global economic circumstances. These factors may have a stronger impact on cryptocurrency prices than gold prices, gold is given greater priority as a safe haven asset (Conlon et al., 2020; Duc Huynh et al., 2020; Wijaya & Ulpah, 2022).

The statistical model clearly shows that the impact of the S&P 500 on bitcoin returns is not statistically significant at a significance threshold of one percent. However, the Dow Jones Islamic Market Index (DJIMI) produces a different and contrasting result. Research has demonstrated that in times of heightened uncertainty, such as the COVID-19 pandemic, the performance of the S&P 500 has a substantial impact on the returns of bitcoin. The S&P 500 is a composite index including 500 prominent corporations in the United States, commonly regarded as a barometer of the overall economic well-being of the nation. Fluctuations in the S&P 500 can have a substantial impact on the general outlook and trust of investors. In the event of a robust performance of the US stock market, investors may display a greater propensity to pursue high-risk assets, like as bitcoin, in order to attain elevated profits. Conversely, when the S&P 500 declines, investors may seek value preservation assets such as bitcoin (Bouri et al., 2022).

The influence of the S&P 500 on bitcoin can be ascribed to heightened correlation during times of elevated uncertainty, transmission effects between the stock market and bitcoin, and a fundamental shift in the connection between these two assets. During the COVID-19 pandemic, the returns of the S&P 500 had a substantial impact on the returns of bitcoin, suggesting a robust correlation between the two assets during periods of market turmoil. Moreover, studies have demonstrated the existence of spillover effects between the

stock market and bitcoin. Specifically, fluctuations in the S&P 500 have an impact on investor sentiment towards bitcoin, resulting in alterations in bitcoin returns. This suggests that during times of market stress, investors may view bitcoin as a safe-haven asset, leading to a positive correlation between the two assets. Research has also found that there are spillover effects between the stock market and bitcoin, with sentiment in one market being transmitted to the other in a nontrivial way (Nguyen, 2022).

Previous research found that bitcoin not be affected by the Islamic market, such as the Dow Jones Islamic Market Index (DJIMI), for several reasons. Firstly, studies have demonstrated that precious metals exert a favorable influence on Islamic stocks, particularly in times of economic turmoil (Ashraf et al., 2023). Bitcoin, being a novel and distinct investment option, may not exhibit the same correlation with precious metals as Islamic stocks. Secondly, research has shown that bitcoin's downside lagged volatility has positive effects on returns across the Islamic market, particularly for emerging markets (Jusoh et al., 2023). This suggests that bitcoin may have a different relationship with the Islamic market compared to traditional assets like stocks and precious metals. Thirdly, some studies have found that cryptocurrencies, including bitcoin, are not considered halal in Islam due to their potential negative impact on the economy and government budget (Ashraf et al., 2023; Yunita, 2022). This may limit the adoption of bitcoin in the Islamic market and reduce its sensitivity to changes in the Dow Jones Islamic Market. The unique features and behavior of bitcoin, as well as its potential non-halal status in Islam, may contribute to its limited sensitivity to the Islamic market, such as the Dow Jones Islamic Market.

TABLE 5. Tether-Gold, GARCH (1,1) Test Result

	Coefficient	Std. Error	Prob.
Mean Equation			
C	0.000154	0.000187	0.4087
GOLD	0.490510	0.018299	0.0000
S&P500	0.086818	0.017261	0.0000
DJIM	-0.006366	0.014293	0.6561
Variance Equation			
γ_0	4.66E-06	1.25E-06	0.0002
ARCH(γ_1)	0.250609	0.032279	0.0000
GARCH(δ_1)	0.723052	0.032591	0.0000

WAR	-1.46E-06	9.34E-07	0.1185

Source: Data Processed (2023)

The second mean equation shows that the gold prices has a significant effect on the return of the tether-gold at a 1% significance level. This study found that gold-backed cryptocurrencies are affected by gold prices due to their intrinsic correlation with the value of gold. These digital coins or tokens are issued with their value directly linked to physical assets such as gold, providing them with extra stability compared to other cryptocurrencies (Trichilli & Boujelbéne, 2022). The value of gold-backed cryptocurrencies is influenced by the price movements of gold, making them less volatile than traditional cryptocurrencies and allowing them to serve as a reliable store of value for investors (Wasiuzzaman et al., 2022). As the value of gold rises, the value of gold-backed cryptocurrencies also tends to increase, reflecting the stability and strength of the underlying asset.

Conversely, a decrease in gold prices can impact the value of gold-backed cryptocurrencies, highlighting their direct dependence on the price of gold. Therefore, the value of gold-backed cryptocurrencies is closely tied to the performance of gold, making them an attractive investment option for individuals seeking exposure to the precious metal market through digital assets (Trichilli & Boujelbéne, 2022; Yousaf & Yarovaya, 2022). Gold-backed assets, including gold ETFs and gold-backed cryptocurrency, provided diversification and safe haven properties during the COVID-19 pandemic, with co-movement of gold bullion, gold futures, and gold volatility index (Madhavan & Sreejith, 2022). Nevertheless, gold-backed stablecoins were less volatile than bitcoin during the COVID-19 pandemic, but did not show the same persistence to the shock as gold, their underlying asset (Jalan et al., 2021).

Research has shown that there are spillover effects between the stock market and bitcoin, with changes in the S&P 500 affecting investor sentiment towards bitcoin, leading to changes in bitcoin returns (Ahmed et al., 2023; Irfan et al., 2023). As gold-backed cryptocurrencies are linked to bitcoin, they may also be affected by changes in the S&P 500. The S&P 500 is often considered a reflection of the US economy's health. When the S&P 500 experiences a significant increase or decrease, it can influence overall investor sentiment and confidence. If the US stock

market strengthens, investors may be more inclined to seek risk assets, including bitcoin and gold-backed cryptocurrencies, to achieve higher returns. Conversely, when the S&P 500 declines, investors may seek value preservation assets such as bitcoin and gold-backed cryptocurrencies Studies have found asymmetric connectedness among the S&P 500, crude oil, gold, and bitcoin (Irfan et al., 2023). This suggests that the relationship between the S&P 500 and gold-backed cryptocurrencies may not be symmetrical, with changes in the S&P 500 affecting gold-backed cryptocurrencies differently depending on market conditions.

In the Islamic financial market, for instance, research findings indicate that the relationship between Islamic market stocks and gold-backed cryptocurrencies is limited and not significant. The findings from Ali et al. (2022), with investigation employing the DCCs model indicate a weak and negative correlation between the halal chain and Islamic gold-backed cryptocurrencies, as well as the returns of DJIMI, in both bullish and bearish market conditions. Additionally, the outcomes suggest that within the bearish market regime, the correlations between the halal chain and Islamic gold-backed cryptocurrencies, as well as the halal chain and DJIM, exhibit temporal variability. Furthermore, the average correlation across all variables is determined to be negative during this bearish regime. Furthermore, there is no correlation between Islamic asset classes and cryptocurrencies, as well as between Islamic SRI and cryptocurrencies. Additionally, both investment categories demonstrate dynamic correlation during the COVID-19 crisis period. However, this correlation diminishes when conducting estimations that include controls for global market risk and investor sentiments (Anwer, 2023). Islamic cryptocurrencies, except for Hello Gold, show no significant reaction to FOMC announcements during the COVID-19 pandemic, while bitcoin and ethereum markets experience short-lived bubbles (Emna & Anis, 2020; Mnif & Jarboui, 2022).

Based on the variance equation section in table 4 and table 5, the GARCH (1,1) volatility model can be written as follows:

$$\text{BTC}: h_t = 0.001343 + 0.073102\, u_{t-1}^2 + 0.852131\, h_{t-1} - 0.852131\ \text{Dummy} \quad (4)$$

$$\text{XAUT}: h_t = 0.000005 + 0.250609\, u_{t-1}^2 + 0.723052\, h_{t-1} - 0.000002\ \text{Dummy} \quad (5)$$

The coefficient (α1) in the ARCH model reflects the influence of volatility information from the preceding period, while the (β1) coefficient in the GARCH model assesses the impact of the conditional variance from the previous period (Irwaningtyas et al., 2023). Both ARCH and GARCH coefficients exhibit statistical significance at the 1% levels, respectively. It means large changes in stock returns seem to be followed by further large changes, and vice versa. The observation suggests a pattern of volatility clustering in the market, wherein the anticipated magnitude of disturbance terms may be higher (indicating higher volatility) during riskier periods compared to other periods characterized by lower risk (lower volatility).

A significant finding in this study is that the return volatility of gold-backed cryptocurrency is not influenced by the Russia-Ukraine war conditions. Meanwhile, traditional cryptocurrencies, on the contrary, exhibit a different trend where WAR dummy significantly affects the volatility of cryptocurrency returns at the 99 per cent confidence level. These results align with the findings Wasiuzzaman et al. (2022) that bold-backed cryptocurrencies experienced increased volatility during the COVID-19 crisis and bear market, but this increase was insignificant. Gold-backed stablecoins were less volatile than Bitcoin during the COVID-19 pandemic, but did not show the same persistence to the shock as gold, their underlying asset (Jalan et al., 2021). Gold-backed assets, such as gold ETFs and gold-backed cryptocurrency, offered diversification and served as a secure investment option during the COVID-19 epidemic. They exhibited a simultaneous movement with gold bullion, gold futures, and the gold volatility index (Madhavan & Sreejith, 2022).

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Effect onf Russia-Ukraine War on Cryptocurrency Return Volatility

This study also found that the Russia-Ukraine war coefficient has a significant effect, which means that Russia-Ukraine war caused shocks to the cryptomarket. Interestingly, in the case of bitcoin, a positive influence was observed, wherein periods of conflict were associated with an increase in volatility. However, this phenomenon did not occur with tether-gold, which exhibited the opposite effect. This implies that gold-backed cryptocurrencies have an advantage during crises and can serve as a potential safe-haven asset (Trichilli & Boujelbéne, 2022; Wasiuzzaman et al., 2022; Yousaf & Yarovaya, 2022).

Figure 2 shows the bitcoin return volatility during research observation. The impact of the COVID-19 pandemic began to appear in cryptomarket in early 2020. The negative cryptomarket response occurred in early 2020, which can be expected to be related to the announcement of the case of COVID-19 by World Health Organization (WHO) in end of December 2019 with novel coronavirus 2019 (2019-nCoV). Furthermore, the volatility of bitcoin also increased following the Russia-Ukraine war, with the initial attack occurring on February 24, 2022. This is evident in Figure 2, which illustrates an upward movement at the beginning of the second quarter. The stock market responded to the Russia-Ukraine war case as a negative signal, giving rise to negative investor sentiments, which was indicated by high bitcoin return volatility. It could be due to investors' concerns about companies' performance during the Russia-Ukraine war. They would look for companies whose performance is less affected by the conflict. An war outbreak could result in irrational market responses, for example, stock selling, panic and the negative impact of uncertainty on the stock market (Appiah-Otoo, 2023b; Irwaningtyas et al., 2023; Karagiannopoulou et al., 2023; Mgadmi, 2023; Mgadmi et al., 2023).

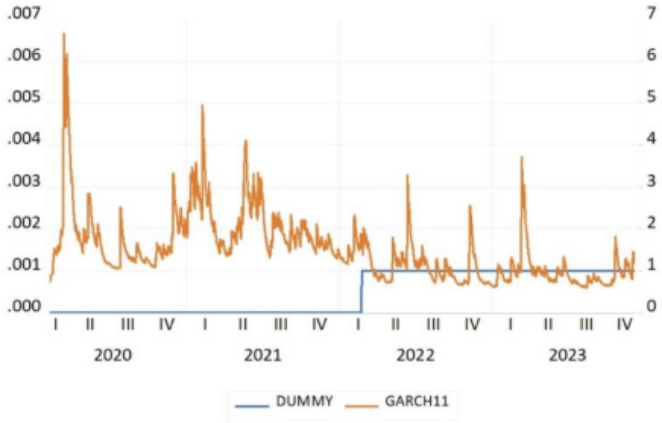

FIGURE 2. Bitcoin Conditional Variance and Dummy War

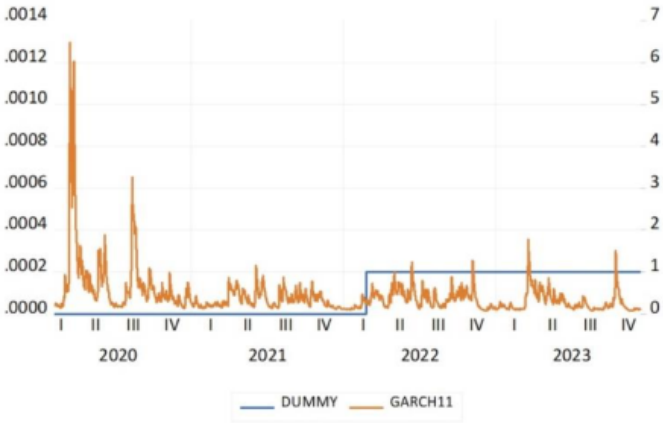

FIGURE 3. Tether-Gold Conditional Variance and Dummy War

Nevertheless, this contrasts with gold-backed cryptocurrencies represented by tether-gold. Despite a similarity in the phenomenon, where the onset of the pandemic also witnessed a sharp increase in return volatility, a subsequent rise in volatility occurred during the impact of the Russia-Ukraine war, albeit not reaching the levels seen during the pandemic. However, the fluctuations that ensued were relatively low. Gold-backed cryptocurrencies experienced increased

volatility during the crises and bear market, but this increase was insignificant (Wasiuzzaman et al., 2022). This emphasizes that tether-gold is more stable compared to bitcoin during periods of uncertainty. During crises or uncertainty like pandemics or war, investors should prefer liquid and stable assets like US Treasuries, Swiss Franc, and tether over gold, as gold failed to protect wealth during COVID-19 (Cheema et al., 2022). Gold-backed assets, including gold ETFs and gold-backed cryptocurrency, provided diversification and safe haven properties during the uncertainty like COVID-19 pandemic, with co-movement of gold bullion, gold futures, and gold volatility index (Madhavan & Sreejith, 2022).

Discussion and Finding

Islamic cryptocurrencies, such as Tether-Gold, which are backed by physical gold, exhibit higher stability compared to conventional cryptocurrencies like Bitcoin. The primary reason for this stability is the direct linkage of Tether-Gold's value to gold, a commodity known for its low volatility and status as a safe-haven asset. During crises, investors tend to seek assets that can preserve their value, and gold has historically fulfilled this role (Baur & McDermott, 2010). Research indicates that gold has the ability to hedge against inflation and market fluctuations, making it an ideal base for stablecoins. Gold not only maintains value but also shows negative or low correlation with other assets, meaning that when other markets decline, gold tends to retain or increase its value (Shahzad et al., 2019). This provides an additional advantage for Tether-Gold during volatile market conditions.

Islamic cryptocurrencies backed by gold also offer compliance with Shariah principles, which emphasize investment in real assets and reject excessive speculation. This makes them attractive to investors seeking Shariah-compliant investments, as well as those looking for lower-risk assets with more controlled volatility (Alshater et al., 2022). Previous studies have shown that gold-backed stablecoins have lower volatility compared to conventional cryptocurrencies. Jalan et al. (2021) found that gold-backed stablecoins were less volatile during the COVID-19 pandemic than Bitcoin and did not exhibit the same shock persistence as physical gold. Another study by Wasiuzzaman et al. (2022) confirmed that gold-backed stablecoins provide diversification and safe-haven

properties during periods of uncertainty like the COVID-19 pandemic. Research by Madhavan & Sreejith (2022) demonstrated that gold-backed assets, including gold ETFs and gold-backed stablecoins, offer diversification and safe-haven properties during the COVID-19 pandemic. They found that these assets co-moved with physical gold, gold futures, and the gold volatility index, reaffirming their role in reducing portfolio risk.

The significance of this research lies in its timely examination of the impact of the Russia-Ukraine conflict on the volatility of financial markets, particularly cryptocurrencies. The conflict has created substantial economic uncertainty, affecting global financial stability. Understanding how different asset classes, including conventional and Islamic cryptocurrencies, respond to such geopolitical events is crucial for investors, policymakers, and financial analysts. This research provides critical insights into the behavior of these assets under extreme conditions, highlighting the stability of gold-backed cryptocurrencies compared to their conventional counterparts (Baur & McDermott, 2010; Shahzad et al., 2019). This study introduces a novel perspective by specifically focusing on the comparative analysis between conventional cryptocurrencies like Bitcoin and Islamic cryptocurrencies backed by gold, such as Tether-Gold, during a significant geopolitical crisis. Previous studies have explored the safe-haven properties of gold and cryptocurrencies independently, but this research uniquely combines these aspects to examine their interplay during the Russia-Ukraine conflict. Furthermore, the use of the GARCH model to analyze volatility transmission between these asset classes provides a robust methodological framework that enhances the understanding of their behavior under stress conditions (Jalan et al., 2021; Wasiuzzaman et al., 2022).

This research makes several key contributions to the existing literature on financial market volatility and investment strategies:

- Empirical Evidence on Stability: The study empirically demonstrates that Islamic cryptocurrencies backed by gold exhibit greater stability compared to conventional cryptocurrencies like Bitcoin during periods of geopolitical uncertainty. This finding supports the argument that gold-backed assets are preferable

during crises due to their intrinsic value stability (Baur & McDermott, 2010).

- Enhanced Understanding of Safe-Haven Assets: By analyzing the performance of Tether-Gold and Bitcoin, the research provides a deeper understanding of the dynamics between different types of cryptocurrencies and their potential as safe-haven assets. This contribution is particularly relevant for investors looking to diversify their portfolios and mitigate risks during volatile periods (Shahzad et al., 2019).
- Implications for Shariah-Compliant Investing: The study highlights the advantages of Islamic cryptocurrencies, which adhere to Shariah principles, offering an attractive investment alternative for Muslim investors. This adds to the growing body of knowledge on Islamic finance and its application in contemporary financial markets (Alshater et al., 2022).
- Policy Recommendations: The findings offer valuable insights for policymakers and regulatory bodies in developing strategies to enhance market stability and protect investors during geopolitical crises. The demonstrated stability of gold-backed cryptocurrencies suggests potential avenues for regulatory support and promotion of these assets (Madhavan & Sreejith, 2022).

In summary, this research provides significant empirical evidence and theoretical insights into the stability of gold-backed Islamic cryptocurrencies during geopolitical crises. It adds novel contributions to the literature on safe-haven assets and offers practical implications for investors and policymakers aiming to navigate the complexities of financial markets during periods of heightened uncertainty (Baur & McDermott, 2010; Shahzad et al., 2019; Jalan et al., 2021; Wasiuzzaman et al., 2022; Madhavan & Sreejith, 2022; Alshater et al., 2022).

Conclusion

The study conclusively demonstrates the significant impact of the Russia-Ukraine conflict on the volatility of both cryptocurrency and traditional financial markets. Notably, Bitcoin, a conventional cryptocurrency, exhibited substantial volatility increases during the conflict period. In contrast, gold-backed cryptocurrencies, such as Tether-Gold, displayed a higher degree of stability, underscoring their

potential as safe-haven assets during crises. Additionally, Islamic cryptocurrencies backed by gold were found to outperform conventional cryptocurrencies like Bitcoin in terms of maintaining value and reducing volatility during periods of economic uncertainty.

This research makes a crucial contribution by providing insights into how major geopolitical events, such as the Russia-Ukraine conflict, affect the volatility of cryptocurrency and traditional financial markets. By employing the GARCH model, the study reveals the complex dynamics between different asset classes during times of economic uncertainty. These findings are invaluable for investors and policymakers in understanding the risks and opportunities present in the market during crisis periods. Moreover, the study offers an in-depth understanding of the advantages of Islamic gold-backed cryptocurrencies over conventional ones.

Based on the findings, the study recommends that investors diversify their portfolios by including gold-backed assets, which have shown greater stability during geopolitical uncertainties. Specifically, for investors in markets adhering to Shariah principles, Islamic gold-backed cryptocurrencies should be considered a more stable investment option compared to conventional cryptocurrencies. Continuous monitoring of global geopolitical events is essential for investors and policymakers due to their significant impact on market volatility. Additionally, financial authorities should develop policies that take into account the effects of geopolitical events on cryptocurrency markets to protect investors and maintain market stability.

Future research should explore the long-term impacts of geopolitical conflicts on global financial and cryptocurrency markets to understand sustained volatility patterns. Comparative studies on the effects of other geopolitical events, such as trade wars or regional financial crises, on market volatility can help identify both common and unique characteristics of each event. Furthermore, the role of other asset classes, such as commodities and government bonds, as safe-haven assets during geopolitical uncertainties, should be investigated. Additionally, the influence of global monetary policies, like interest rate decisions by the Federal Reserve, on the volatility of cryptocurrencies and financial markets during geopolitical conflicts warrants further

amination. Lastly, in-depth studies on the stability and advantages of Islamic gold-backed cryptocurrencies compared to conventional cryptocurrencies in various market conditions and geopolitical events would be beneficial.

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References

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