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# REVISITING FINANCIAL VOLATILITY IN THE INDONESIAN ISLAMIC STOCK MARKET: GARCH – MIDAS APPROACH

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**ABSTRACT**

**Introduction/main objectives**: The aim of this research is to study the impact of macroeconomic variables on the Indonesian Islamic stock market's volatility. **Background issues**: To predict the stock market's volatility, daily or high-frequency data has been applied to the model's explanatory variables with the same data frequency. However, when it comes to the macroeconomic variables as volatility drivers, the data is low-frequency, such as weekly, monthly, or quarterly. The current study uses a model which treats the data equally. **Novelty**: This study employs the mixed data sampling (MIDAS) model, which allows data from multiple frequencies to be included in the same model. This model can combine daily stock returns' data with monthly or quarterly macro-economic data. Hence, this is the first paper to study the determinants of the volatility of Indonesia's Islamic stock index using GARCH-MIDAS. **Research Methods**: The Generalized Autoregressive Conditional Heteroscedasticity GARCH-MIDAS model captures the short-run from the long-term element of volatility; the findings show the asymmetry effect for the short-term element's result. **Finding/Results**: Inflation does not influence long-term market volatility. Moreover, after the 2008 crisis, the study shows that inflation and short-term interest rates positively influenced market volatility. **Conclusion**: The positive effect of inflation suggests that stocks can function as inflation hedges for stock investors in the long run. Further, the positive impact of interest rates implies that Muslim investors use the conventional short-term interest rates as a benchmark for investment in Shari'ah-compliant instruments.

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## INTRODUCTION

Capital investment, consumption, and economic activity are influenced by financial volatility. Fornari and Mele (2013) suggested that 30% of US post-war economic activity was predicted by financial volatility, while aggregate stock market volatility contributed to 55% of real growth during the Great Moderation. The correlation between stock prices, interest rates and inflation has received much consideration in the literature. Early work by Fama (1981) stated a negative association between inflation and the returns of the stock market, which eventually positively affects stock returns due to the fundamental variables. Many researchers have come up with the same result; for example, Alexakis and Apergis (1996) suggest a negative relationship between inflation uncertainty and stock prices, especially in emerging markets.

As we understand it, to forecast the stock market's volatility, daily or high-frequency data has to be been applied to a model's explanatory variables with the same data frequency. However, when it comes to the macroeconomic variables as volatility drivers, the data is low-frequency, such as weekly, monthly, or quarterly. Ghysels, Santa-Clara, and Valkanov (2006)proposed the mixed data sampling (MIDAS) model, which allows data from multiple frequencies to be included in the same model. This model can unify daily stock returns' data with monthly or quarterly macroeconomic data. Due to the clustering volatility that exists in the stock market, the model is combined with generalised autoregressive conditional heteros-cedasticity (GARCH). Then, some researchers, such as Engle, Ghysels, and Sohn (2013), Conrad, Loch, and Rittler (2014), and Fang, Lee, and Su (2020), have employed the GARCH-MIDAS model to investigate the correlation between financial volatility and macroeconomic data. Further, Demirer et al., (2023) combine macroeconomic variables and financial vulnerability to predict aggregate volatility, which results in more powerful forecasting.

From the description above, however, studies on the impact of macroeconomic data – inflation and interest rates – on an Islamic stock index have not yet been conducted. Due to the growth of Shari'ah finance, the Islamic stock index (Jakarta Islamic Index) was created. Islamic finance is structured to prohibit interest rates since they are *riba*. Islam forbids not just *riba* but also *gharar* and *maysir*. According to Muslim jurists, the term "*maysir*" refers to any kind of gambling or game of chance. Mean-while, *gharar* is a transaction that entails excessive risk taking and uncertainty. The profit and loss sharing system outperforms the interest system with regard to fairness, justice, efficiency and stability. As a result, the optimal synergy in the dual financial/banking system can be achieved when monetary policy in the conventional system benchmarks its policy rate to the profit and loss sharing market's return in the Islamic financial market, ensuring optimum market efficiency that maximises distributive social welfare and justice (Ascarya, 2009). By studying the determinants of Islamic stock volatility, we want to discover if the elements that generate volatility in the Islamic and conventional stock indices are the same. Indonesia has not adopted an Islamic economic system,thus, the question is whether the inflation and interest rates(nominal) affect the volatility of an Islamic stock index, especially in an emerging market such as Indonesia. Analysing the impact of interest rates and inflation on the volatility of the Islamic stock index is crucial. This research has practical value for various stakeholders, such as investors, and fund managers, to make investment selections, including their portfolio diversification and risk management techniques. As for the regulators

and policymakers, their Monetary policy will have an immediate and indirect influence on the stock market. Interest rate levels and trends have a direct impact while forecasts of future inflation have an indirect impact.In addition, this study uses the GARCH-MIDAS method. This method distinguishes the short-run from the long-run component of volatility, which is influenced by low-frequency macroeconomic variables, namely inflation and short-term interest rates. We choose the Jakarta Islamic Index as a sample of the study. Further, Indonesia is selected as the sample of the country since Indonesia is the largest economy in ASEAN, which develops Islamic finance instruments rigorously.

By doing so, we provide a fresh insight and improve the body of literature by providing evidence that the GARCH-MIDAS method captures the short-run from the long-run component of volatility. The outcomes show evidence of the leverage effect for the short-term component's result. However, inflation does not influence long-term market volatility. Further, after the improvement of the authority's monetary policy framework (after the 2008 crisis), the study shows that both inflation and the short-term interest rate positively influence the volatility of the Indonesian Islamic stock market for investment in Shari'ah-compliant instruments, which is contrary to the existing literature.

The rest of the paper is organized as follows. Section 2 describes the literature review.We present the study's data and methods in Section 3. The discussion and recommendations based on the data's analysis are elaborated in Section 4. The conclusion, which highlights the applicability of our findings, is presented in Section 5.

## LITERATURE REVIEW

The correlation between stock prices, inflation, and interest rates has attracted a great deal of attention in the literature. Fama's (1981)early study showed an adverse association between the returns of the stock market and inflation, which eventually positively affects stock returns due to the fundamental variables. Schwert (1989) also stated that economic health is related to stock market volatility. Thus, the macroeconomic variables' fluctuations impact the future cash flow forecasting of companies and the discount rates, contributing to stock volatility. Moreover, financial leverage and the interest rate affect stock volatility substantially. It is consistent with the fact that a firm's value is an inverse function of the interest rate. Campbell (1987) adds insight into the literature by investigating the association between the returns of the stock market and the yield spread. He claims that the same qualities that indicate the term 'structure excess returns' also predict excess stock returns; therefore, examining the returns on bills, bonds, and stocks at the same time should be helpful. To this end, more researchers have come up with the same result; for example, Alexakis and Apergis (1996); and Alam, Gazi, and Uddin (2009). They suggest that a negative relationship exists in several emerging and developed markets. When inflation increases, it will induce the upward movement of the discount rate, reducing the optimal rate of real growth. On the other hand, Sokpo et al. (2017) revealed that inflation is not an essential variable in explaining the Nigerian stock market returns' volatility.

The literature finds that the interest rate has a detrimental effect on stock returns, much as the inflation mentioned above has. Due to the reduced rates of return and increased savings, an increase in interest rates will deter investors from investing money in the stock market. As a result of greater expected rates of return, a reduction in interest rates will, on the other hand, stimulate capital to flow into the stock market.

Additionally, because the long-term interest rate affects the discount rate, its impact on stock prices is directly related to the present value model.

We acknowledge that not only the stock market, but the money market and foreign exchange market also have essential roles in ensuring a country's economic health. Looking at the relationship between those markets, Abbas et al., (2017) suggested that there is evidence of market cointegration between the money market and foreign exchange market in Pakistan. As a result, while predicting, planning, and formulating policy, it is critical to recognize the relevance of the political governance structure when evaluating cointegration across the financial markets and making the necessary amendments. Further, the relationship between the stock and foreign exchange markets suggests mixed results. For instance, the evidence of a short-term linkage between these markets is reported by Nieh & Lee, (2001); and Smyth & Nandha, (2003); and a long-term relationship between the markets is argued by Hasan & Javed, (2009). In addition, some studies found a negative association between the markets (Kim, 2003; Moore & Wang, 2014), while others discovered a positive correlation (Hasan & Javed, 2009; Ratanapakorn & Sharma, 2007).The correlation is not only between the stock market and foreign exchange market, but also among stock markets in emerging countries, especially during the Asian financial crisis and the subprime mortgage crisis in Asia Pacific, as suggested by Kusumah et al., (2022).

Moving on to a new approach using GARCH-MIDAS, Fang, Lee, and Su (2020) predict long-term financial volatility by including 14 items of macroeconomic data and six items of financial data regarding long-term volatility components.The outcomeshows that realised volatility is the most significant component. A similar result is shown by Conrad and Loch (2015) and Conrad and Kleen (2020). The variables with the highest forecasting ability for long-term volatility of the stock market are the unemployment rate, corporate profits, housing starts and term spreads, with the last two variables as the leading variables.

However, Engle, Ghysels, and Sohn's (2013) findings reported a different result. The authors suggest that the contribution of industrial production, at a level model, is greater than 15% of the volatility during the post-World War II era, and the combination of the industrial production level and the variance model contributes more than 25% in several subsample periods. Moreover, inflation contributes more than 35% to the volatility during the 1953 to 1984 subsample because of the long-run inflation-driven component; furthermore, by using the GARCH-MIDAS method with a principal component analysis as a tool to integrate the data contained in various variables, Asgharian, Hou, and Javed (2013) investigate the roles of the macroeconomic variables, such as the interest rate, unemployment, industrial production, inflation and the exchange rate, in predicting the volatility of the US stock market's returns. They discovered that the first principle component added to the GARCH-MIDAS model outperformed all the other specifications, proving that the constructed principal component is a good indicator for the economic cycle.

Using a different approach, by adding financial vulnerability to the macroeconomic variables, Demirer et al., (2023) argue that the forecasting power of the macroeconomic variables – for example, output growth, interest rate, and inflation – on the stock market's volatility becomes more potent in the Indian and Chinese markets. The authors define financial vulnerability into three alternative measures: the risk of domestic price; domestic price and

external stress and risk of domestic price, external stress and credit market tightness. Based on the findings, they suggest that portfolio managers should add financial vulnerability to the given macroeconomic variables when forecasting a stock's return volatility for the portfolio selection and the derivative securities pricing proposed.

Following the above study, Pan and Liu (2018) showed that by using an asymmetric GARCH-MIDAS method, the prediction capacity of GARCH-MIDAS is greatly enhanced after accounting for the asymmetric (leverage) impact. The leverage impact is more evident for the short-term than long-term volatility elements. Instead of using macroeconomic fundamentals, Ndako, Salisu, and Ogunsiji (2021) have geopolitical risk as a predictive factor for the volatility of Islamic stock returns in the Indonesian and Malaysian markets. They argued that both countries' Islamic stock volatility is sensitive to geopolitical risks. In addition, in terms of forecasting, the geopolitical risk-based GARCH-MIDAS model outperforms the alternative model for the out-of-the-sample forecast.

Similarly, Yu, Huang, and Xiao (2021) expand the GARCH-MIDAS model (also known as the GARCH-MIDAS-RV+GPU model) to examine the effects of global economic policy uncertainty (GEPU) on stock volatility in developing nations. The authors further assess the expanded model's statistical out-of-sample forecasting performance using the Diebold and Mariano (DM) and Superior Predictive Ability (SPA) tests. The fluctuation test assesses how well the forecasting performance varies over time, in the sight of possible instability. The in-sample estimate findings clearly show how GEPU has an influence on volatility. Additionally, the results of the out-of-sample prediction show that the GEPU-based model may increase the stock volatility's predictability performance, particularly in unstable conditions. The explication above leads us to the conclusion that the GARCH-MIDAS model is superior for forecasting stock volatility. Table 1 below shows the list of several studies) using the GARCH-MIDAS model.

**Table 1.** GARCH-MIDAS Research

| Author (s) | Research |
|---|---|
| Fang, Lee, and Su (2020) | Predicting the long-term stock market volatility: A GARCH-MIDAS model with variable selection |
| Conrad and Loch (2015) | The variance risk premium and fundamental uncertainty |
| Conrad and Kleen (2020) | Two are better than one: volatility forecasting using multiplicative component GARCH-MIDAS models |
| Engle, Ghysels, and Sohn's (2013) | Stock market volatility and macroeconomic fundamentals |
| Asgharian, Hou, and Javed (2013) | The importance of the macroeconomic variables in forecasting stock return variance: a GARCH-MIDAS approach |
| Demirer et al., (2023) | A note on financial vulnerability and volatility in emerging stock markets: evidence from GARCH-MIDAS models |
| Pan and Liu (2018) | Forecasting stock return volatility: a comparison between the roles of short-term and long-term leverage effects |
| Ndako, Salisu, and Ogunsiji (2021) | Geopolitical risk and the return volatility of Islamic stocks in Indonesia and Malaysia: a GARCH-MIDAS approach |
| Yu, Huang, and Xiao (2021) | Global economic policy uncertainty and stock volatility: evidence from emerging economies |
| Amendola et al., (2017) | On the influence of US monetary policy on crude oil price volatility |

## METHODS

We used the daily data from the Jakarta Islamic Index (JII) for the empirical investigation from the 4th of July 2000 to the 30th of July 2021. The monthly short-term interest rate (Bank Indonesia) and Consumer Price Index (CPI)were from July 2000 to July 2021. JII were obtained from Yahoo Finance, and the interest rate and inflation data were retrieved from Bank Indonesia's database.The return of JII was calculated as $100*\ln(P_t/P_{-1})$.

Engle, Ghysels, and Sohn (2013) and Conrad and Loch (2015)all suggest the GARCH-MIDAS model. The model has both short-term and long-term elements.The short-term component is driven by a GARCH process for high-frequency data, while a MIDAS process is used for low-frequency data,which captures any long-term volatility components. The model specifies the return on high-frequency *i* (day) in low-frequency *t* (e.g., week, month, quarter) below. Assume the return of the stock market at day *i* in month *t*was represented by the following process:

$$r_{i,t} = \mu + \sqrt{\tau_i} g_{i,t} e_{i,t}, \ \forall \mathrm{i} = 1, \dots, N_t \qquad (1)$$
$$e_{i,t} | \phi_{i-1,t} \sim N(0,1)$$

The short-term volatility component followed a mean-reverting asymmetric GARCH (1,1) process:

$$g_{i,t} = \left(1 - \alpha - \beta - \frac{\gamma}{2}\right) + \left(\alpha + \gamma . 1_{\{r_{i-1,,t} - \mu < 0\}}\right) . \frac{(r_{i-1,t} - \mu)^2}{\tau_t} + \beta g_{i-1,t} \qquad (2)$$

With α>0, β>0, and α+β+γ/2 < 1. The γ was the asymmetry information.

The long-term components were as follows:

$$\tau_t = m + \theta \sum_{k=1}^{k} \vartheta_k(w_1, w_2) X_{j,t-k} \qquad (3)$$

Where j was the number of explanatory variables (j=2 in this paper) and$\theta_j$measured the impact of the variables on the long-term volatility of the stock market.

$$\vartheta(w_1, w_2) = \frac{(k/(K+1))^{w_1 - 1} . (1 - k/(K+1))^{w_2 - 1}}{\sum_{l=1}^{K} (l/(K+1))^{w_1 - 1} . (1 - l/(K+1))^{w_2 - 1}} \qquad (4)$$

The Beta weighting schemes could produce decaying, hump-shaped, or U-shaped weights (Ghysels et al., 2007).

## RESULT AND DISCUSSIONS

### Descriptive statistics

The descriptive data for the JII, short-term interest rates and inflation are displayed in Table 1. The mean values for the JII and the interest rates were positive and not far from zero, while the value for inflation was also close to zero, but negative. The highest standard deviation belonged to JII; meanwhile, the standard deviations of the interest rate and inflation were below one. The minimum to maximum range of all the variables was more than double. The series' skewness indicated that it deviated from the normal distribution curve. Only the JII series was substantially symmetrical in skewness, suggesting that the distribution of the index's returns was more centred on the average value. However, the inflation series was negatively skewed, meaning higher inflationhad a higher value than the average. In contrast, the interest rate series was highly positively skewed, so a higher interest rate had a smaller value than the average.

Furthermore, kurtosis demonstrated that JII and inflation had significant outliers (leptokurtic). The leptokurtic distribution indicated that an investor would undergo more significant variations (e.g., above three standard deviations from the mean), resulting in a higher return risk. However, the interest rate variable lacked outliers, i.e., platykurtic.

**Table 2.** Descriptive Statistics

| Variables | JII | Inflation | Interest rate |
|---|---|---|---|
| Mean | 0.036888 | -0.00086263 | 0.084182 |
| Minimum | -15.379 | -0.61648 | 0.040000 |
| Maximum | 8.7545 | 0.087026 | 0.18000 |
| SD | 1.5829 | 0.050848 | 0.033297 |
| Skewness | -0.59112 | -9.0311 | 1.2716 |
| Kurtosis | 7.0660 | 92.526 | 0.89464 |

Figure 1 below reports the volatility of the JII returns which exhibited clustering volatility. Nevertheless, the level of volatility slowly dropped towards the end of the sample (July 2021). Figure 2 shows the volatility of both inflation and interest rates. It was observed that the inflation and interest rate level dropped significantly before 2005. Inflation slowly climbed until the year 2008, then dropped again significantly. The phenomenon kept continuing until the end of our sample. In addition, interest rates showed the opposite movement of inflation, especially from 2006 to 2013.

Figure 1. JII return

**Figure 1** shows the clustering volatility of the index.

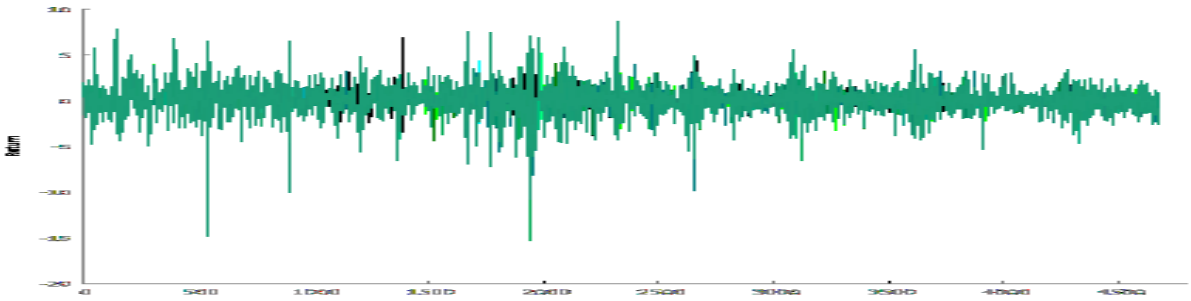

**Figure 2.** Inflation and interest rate

Figure 2 shows the fluctuation of inflation and interest rates. The opposite movements of both inflation and interest rates were captured, especially from 2006 to 2016.

**Macroeconomics Variables on JII returns**

Our investigation revealed that the short-term result showed an evident leverage effect, as γwas positive and significant. In other words, the size of the influence of sentiment on the index varied, depending on whether the news was positive or negative; bad news had more effect on the volatility than good news did. This finding was supported by the research of Uygur and Taş (2014), Dhaoui (2015), and Danila et al.(2021). Nevertheless, the results of the long-term element reported that only short-term interest rates significantly predicted the long-term market volatility for the whole sample period. This finding is supported by Sokpo et al. (2017),Conrad and Loch (2015); Conrad and Kleen (2020), and Fang, Lee, and Su (2020), who all reported that inflation was not among the essential macroeconomic variables for forecasting the long-run volatility of the stock market.

The monetary policy framework of Bank Indonesia has been improved.The BI rate was substituted with the BI7DRR (seven-day reverse repurchase agreement rate) as the first improvement in 2016. The new policy rate indicated the monetary policy posture to be an instrument for landing economic participants' inflation expectations. Simultaneously, the BI7DRR serves as a reference rate for transactions in the financial market, influencing the market and banking interest rates. A further improvement is that Bank Indonesia launched the Indonesia Overnight Index Average and intensified the JIBOR to shape a reliable yield curve for the short-term money market. By providing several benchmark rates, market players then had choices to determine interest rate loans (Damayanti et al., 2020). In addition, Yunanto & Medyawati, (2015) suggested that Indonesia's monetary policy was more effective than its fiscal policy. Motivated by the policy-led initiatives of authorities for improving the financial market after the crisis, we investigated the effect of both the macroeconomic components on the Islamic index during the specified period. The short-term result was similar for all the sample periods, i.e., the existence of the leverage effect. Furthermore, the long-term component reported that both the short-run interest rate and CPI positively influenced the long-runmarket’s volatility forecasting after the 2008 crisis.In other words, improving the authority's monetary policy framework impacted the Islamic stock index. Nevertheless, the impact was positive instead of negative, which contradicted the existing theory. This finding was supported by previous research outcomes, such as by Mukherjee and Naka (1995), Cooper Maysami and Sim Koh (2000), Majid and Yusof (2009) and Gu, Zhu, and Wang (2021).

The positive impact of inflation on stock returns was in accordance with the Irving Fisher hypothesis, which stated that real asset returns should change in the direction of the predicted inflation rate. Hence, the rise of nominal stock returns due to inflation was a hedge by investors against inflation. Joubert (2021) suggested the same argumentation that stocks can function as inflation hedges for stock investors over a long period of time. The stock value could increase throughout the inflation period; hence real wealth remains stable regardless of higher prices.

**Table 3.** Result for all period estimations

| GARCH parameters and constant estimates | | | | |
|---|---|---|---|---|
| μ | α | β | γ | m |
| 0.0268 | 0.0374 | 0.8682 | 0.1023 | -0.2471 |
| (0.1452) | (0.0089)*** | (0.0000)*** | (0.0000)*** | (0.1506) |
| Long-term component parameters | | | | |
| $\theta^{inf}$ | $\theta^{int}$ | | | |
| -5.5975 | 11.97 | | | |
| (0.2096) | (0.0000)*** | | | |

Sig-values are in parentheses. *10%, ** 5% and *** 1% levels of significance.Short-term components: α, β, γ are the ARCH, GARCH and an asymmetric effect, respectively. Long-term volatility components: $\theta^{inf}$ and $\theta^{int}$ are the coefficients of inflation and the interest rate, respectively. The numbers in parentheses are the p-values with the robust standard errors.

**Table 4.** Results for after the 2008 crisis estimations

| GARCH parameters and constant estimates | | | | |
|---|---|---|---|---|
| μ | α | β | γ | m |
| -0.0086 | 0.0101 | 0.8902 | 0.1168 | -1.0029 |
| (0.6919) | (0.5231) | (0.0000)** | (0.0000)** | (0.0380)** |
| Long-term component parameters | | | | |
| $\theta^{inf}$ | $\theta^{int}$ | | | |
| 22.99 | 21.1579 | | | |
| (0.0305)** | (0.0036)*** | | | |

Sig-values are in parentheses. *10%, ** 5% and *** 1% levels of significance. Short-term components:α, β, γ are the ARCH, GARCH and an asymmetric effect, respectively. Long-term volatility components: $\theta^{inf}$ and $\theta^{int}$ are the coefficients of inflation and the interest rate, respectively.The numbers in parentheses arethe p-values with the robust standard errors. We perform a Chow test to investigate for structural change. There is evidence of structural change, i.e., the p-value is 0.0852, significant at the 10% level. The Chow test results are provided upon request due to the limited space.

Islamic investing is not supposed to be influenced by interest rates. Muslims agree to invest their money solely in interest-free assets, without regard for the interest rates. Thus, the stock price and interest rate relationship are independent. This is consistent with an Islamic concept that holds that interest rates are not a key determinant in explaining stock performance. However, our result shows the contrary – there is a significant association between the variables. The positive relations between the interest rate and stock returns might be explained as follows. A better representative of a discount rate in the stock valuation model is a long-term interest rate instead of a short-term interest rate (Cooper Maysami & Sim Koh, 2000; Mukherjee & Naka, 1995). The receptiveness of the interest rate is at a low degree in the market, which brings the consequence of more extended time in transmission from the interest rate policy's formulation to the market's ultimate adjustment (Gu et al., 2021). Alternatively, in Indonesia, the rate of returns in Islamic banks is always lower than that from their counterparts. Thus, the rise in interest rates encourages Muslim investors to invest more in Islamic finance instruments, rather than saving money in conventional banks (Majid & Yusof, 2009). In addition, it might be the case that the Islamic stock rate of returns is a benchmark against the conventional interest rate, similar to the Malaysian market.

## CONCLUSION

The Shari'ahstock index was formed due to the complete growth of Shari'ahfinance. It is critical to examine the influence of inflation and interest rates on the volatility of the Islamic stock index, as interest is prohibited in Islamic finance. This research has practical consequences for numerous stakeholders, such as investors and portfolio managers when making investment decisions, such as portfolio diversification and risk management strategies. As for the regulators and policymakers, the government plays a critical role in enhancing the policy for economic stability.

Regarding stock volatility, the prediction of volatility involves using the same data frequency. Nevertheless, the data frequency is not similar when we use macroeconomic variables as volatility drivers. GARCH-MIDAS makes it possible to unify daily stock returns' data with monthly or quarterly macroeconomic data, which distinguishes the short-run from the long-run volatility component. This study investigates the effect of macroeconomic variables on the volatility of the Jakarta Islamic Index (JII), namely inflation and the short-term interest rate. The findings show evidence of an asymmetric effect for the short-term result, in other words, good news will have less effect on the volatility than bad news does. However, only the short-term interest rate influences long-term market volatility. In addition, looking at a different sample period (after the 2008 crisis), we have a similar result for the short-term components, i.e., leverage effects.

Further, the study shows that both inflation and the short-term interest rate positively affect long-term market volatility forecasting for the long-term component. In other words, improving the authority's monetary policy framework influences the Islamic stock index. Nevertheless, the impact is positive instead of negative, which contradicts the existing theory. It implies that Muslim investors use the conventional short-term interest rates as a benchmark for investment in Shari'ah-compliant instruments.

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