

Is the Volatility of the Islamic Stock Index Lower than the Conventional Stock Index during Covid-19 Pandemic? Empirical Evidence in Indonesia Stock Exchange

Purwanto Widodo

Universitas Pembangunan Nasional Veteran Jakarta
purwanto.widodo@upnvj.ac.id

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Abstract

The Islamic stock index is a composite index of Islamic stocks listed on the Indonesia Stock Exchange (IDX). Therefore, is expected to have low volatility and be resistant to a possible financial crisis. This study aims to see whether the volatility of the Islamic stock index is lower than the conventional stock index during the Covid-19 crisis. The data taken is daily stock closing data for JKSE and JII for the period March 1, 2020, to April 30, 2022, with a total of 532 observations. The model used is ARMA/ ARIMA which is then followed by the ARCH – GARCH volatility model. The results of this study indicate that the appropriate Islamic and conventional stock index volatility model is GARCH (1,1) and there is no problem with the asymmetry effect. The findings of this study are that during the Covid-19 crisis, there was a tendency that the return volatility of the Islamic stock index to be lower than conventional and that the Islamic and conventional stock indexes were relatively low against the financial crisis that occurred.

Keywords: Conventional; Islamic Stock Index; Volatility

Abstrak

Indeks saham syariah adalah indeks komposit saham syariah yang tercatat di Bursa Efek Indonesia (BEI). Karena itu, diharapkan memiliki volatilitas rendah dan tahan terhadap krisis keuangan yang kemungkinan terjadi. Penelitian ini, bertujuan untuk melihat apakah volatilitas indeks saham syariah lebih rendah dibandingkan indeks saham konvensional semasa krisis yaitu Covid-19. Data yang diambil adalah data penutupan saham harian JII dan IHSG periode 1 Maret 2020 sampai dengan periode 30 April 2022, sebanyak 532 pengamatan. Model yang dipergunakan adalah ARMA/ ARIMA yang kemudian dilanjutkan dengan model volatilitas ARCH – GARCH. Hasil penelitian ini menunjukkan bahwa model volatilitas indeks saham syariah maupun konvensional yang sesuai adalah GARCH(1,1) dan tidak terdapat masalah effect asimetri. Temuan penelitian ini adalah selama krisis Covid-19 terdapat kecenderungan bahwa volatilitas return indeks saham syariah lebih rendah dibandingkan konvensional dan indeks saham syariah maupun konvensional relative tidak imum terhadap krisis keuangan yang terjadi.

Kata kunci: Indeks Saham Syariah; Konvensional; Volatilitas

INTRODUCTION

The COVID-19 pandemic has had a major impact on the world's economic conditions, including Indonesia. This can be seen from Indonesia's economic growth in the first quarter of 2020 which fell sharply to 2.79% (yoy) from the initial assumption of 5.3%. Then, in the second and third quarters, economic growth experienced a contraction of -5.32% (yoy) and -3.49% (yoy) which marked the onset of an economic recession. At the end of 2020, Indonesia's economic growth slightly improved and closed at -2.19% (yoy). The domestic economy continued to improve in the second quarter of 2021 with a recorded positive and high growth of 7.07% (yoy), a sharp increase from the contraction in the previous quarter of 0.71% (yoy) (LPI, 2021). Furthermore, LPI (2021) stated that these developments were influenced by high export performance, amid continued improvement in household consumption, investment, and government consumption. Economic growth was also supported by the positive performance of all business fields and increased economic growth throughout Indonesia. Meanwhile, external stability was maintained, supported by Indonesia's Balance of Payments (BOP) which recorded a surplus of USD 3.6 billion in the first semester of 2021. This positive performance was demonstrated by the low current account deficit of 0.38% and 0.68% of GDP and a financial capital account surplus of US\$ 5.7 and 1.6 billion in the first and second quarters of 2021. The Rupiah exchange rate in the first semester of 2021 was relatively under control, supported by stabilization measures by Bank Indonesia and continued inflows of foreign capital into the market domestic money. Internal stability also remains good, as reflected in low inflation, at 1.33% (yoy) in June 2021. In the financial system, stability is maintained, although the banking intermediation function still needs to be improved.

Capital market developments during Covid 19 showed that the JKSE in 2020 decreased from 6298.9 (2019) to 5240.9, contracted by -16.80%. Then, there was an increase in the first quarter of 2021 to 6226.3 (18.80%); the second quarter decreased again to 5981.8 (-3.91%); the third quarter 6092.8 (1.84%) and the fourth quarter 6580.6 (8.01%). On the other hand, Islamic stocks showed a positive performance during the Covid-19 pandemic. This is reflected in the three sharia indices on the exchange which are moving better than before the pandemic. The three indices are the Indonesian Sharia Index (ISSI), the Jakarta Islamic Index 70 (JII70), and the Jakarta Islamic Index (JII) (Kontan, 9 April 2021). The Indonesia Stock Exchange (IDX) noted that since the Covid-19 case in Indonesia was first announced on March 2, 2020, to March 31, 2021, ISSI has strengthened by 13.9%. Meanwhile, JII70 was up 12.3% and JII was up 7.8%. The movement of the three sharia indices was better than the LQ45 and IDX30 which increased by 5.1% and 2.4%, respectively. As a comparison, in the period before the January-February 2020 pandemic, ISSI's performance fell by 16.5%. Meanwhile, JII70 and JII experienced a decline of 18.4% and 19.1%, respectively. This is according to Chiatmi and Ghaiti (2014) because the Islamic financial system has several features that the conventional financial system does not have, so it is

relatively more resilient when facing a crisis. Meanwhile, Siddiqui (2000) argues that the characteristics of low debt, non-financial, and social-ethical investment in Islamic investments are beneficial for fund managers.

Many studies have been conducted to try to compare the performance of Islamic stock price indexes with conventional ones, including Ahmad & Ibrahim (2002), Chiadmi & Ghaiti (2012), Chiatmi & Ghaiti (2014), Rejeb & Arfaoui (2018), Hersugondo et al. . (2020), Widodo & Suryanto (2021) but the results are mixed, where the volatility of the Islamic stock price index in one study can be lower, but in other studies, it is higher than conventional.

These mixed results motivate researchers to model the return of the sharia stock index compared to conventional ones. It is hoped that this research will provide input to investors regarding investment choices. Investors will have considerations in managing conventional and sharia stock portfolios so that maximum returns will be obtained.

This paper combines the Efficient Market Hypothesis (EMH) proposed by Fama (1970) (Widodo & Suryanto, 2021) with volatility to analyze the performance of Islamic stock indices and conventional stock indices, then compare their volatility. EMH stated that stock prices formed in the market were a reflection of existing information or "stock prices reflect all available information". This means that in an efficient capital market, the prices of assets or securities will quickly move according to the information absorbed so that these prices will reflect the available information about these assets or securities. The process of changing the price of the security that causes volatility, the greater the movement occurs, the higher the volatility. Financial economists often interpret that the change in the price of the security is a proof of concept EMH where the stock market is functioning well and investors are getting information efficiently.

Market volatility is related to the level of risk, because volatility is a statistical measure of fluctuations in data over a certain period. Volatility is useful for risk prediction. Low volatility indicates low risk, while high volatility means high risk (Ridha & Wibowo, 2020). High volatility indicates the price can go up high quickly but can also drop suddenly. This condition is a concern for investors because it is related to the existing risks. It is reasonable for investors to be careful in buying and selling their shares if they feel high volatility (Tanjung & Siregar, 2018). Therefore, volatility prediction has an important influence in investment decision making. If the prediction results show high volatility, investors will leave the market or sell assets to minimize risk.

LITERATURE REVIEW

Sharia Stock

Sharia shares are securities that have the concept of equity participation in companies with profit sharing rights that do not conflict with sharia principles. Sharia shares themselves are not much different from conventional shares, the difference

is that issuers or companies that sell their shares to the public must not conflict with Islamic teachings. Sharia shares do not recognize the term usury or interest. So unlike conventional stocks, Islamic stocks use a profit and risk sharing system between investors and issuers through *mushawarah*.

Mushawarah, here means a mutual agreement obtained in a sharia share contract. This profit and risk sharing is agreed upon from the beginning of the contract agreement. Of course, the profit value of Islamic shares will vary depending on the performance of the issuer. This is different from conventional stocks that apply an interest system so that the profits obtained by investors are stable because the issuer's performance has no effect.

In addition, Islamic stock investment does not recognize what is called *gharar* and *maysir*. *Gharar* is giving misleading information, while *maysir* is taking excessive risks. *Gharar* applies to issuers and securities companies that deal with the purchase of shares. They must explain as clearly as possible the ins and outs of the sharia shares being sold. While *maysir* applies to investors themselves, which means investors should not be greedy in other words pursuing profits without caring about risk (Inlistya, 2017). Companies that have been included in the sharia stock index are companies that have met Islamic criteria. These criteria require each index not to include shares of companies whose core activities are related to: banking or other activities related to interest, alcohol, cigarettes, gambling, weapons companies, illegal food companies (pork), and so on. In addition, the company must also pay attention to the total interest-based debt and the total interest income obtained in its activities (Maharani, 2017).

The Jakarta Islamic Index (JII) is one of the sharia stock indexes on the Indonesia Stock Exchange with the provisions that the shares are in accordance with and do not conflict with sharia principles. Starting from the collaboration between PT Danareksa Investment and *PT Bursa Efek Jakarta* (now BEI) on July 3, 2000, which aims to increase investors' confidence in investing in the capital market based on sharia principles and not contradicting what is prohibited in Islam. Of the many sharia shares listed on the Sharia Securities List (*Daftar Efek Syariah*, DES), there are 30 sharia shares listed at JII with additional requirements, namely based on the level of liquidity and a fairly large capitalization value on the Exchange with review (screening) every 6 months. By doing a review, it can be seen which shares are still in accordance with the provisions, it is also possible that there are new shares that were not previously registered in JII or it is very possible that shares previously registered in JII in the next period will no longer be registered in JII (Maharani, 2017).

The development of investment with sharia principles is not only growing and appearing in Muslim-majority countries but also in countries with non-Muslim majority. There are many factors that cause investment with sharia principles to be increasingly in demand, apart from the increasing growth of Muslims, there are also many studies which state that investment assets based on sharia principles provide a better diversification effect than conventional investments (Mubarak & Bisma, 2020).

However, these advantages do not directly make the sharia-based investment instrument risk-free (Robiyanto, Santoso, & Ernayani, 2019). One of the risks in investing, especially stocks, is changes in asset prices (Huber, Palan, & Zeisberger, 2019). This price change can occur due to an increase in the exchange rate, inflation or a decrease in price caused by the sale and purchase of stock instruments in real-time every second in the capital market so that the stock market price will experience price changes that fluctuate every day (Wahyudi & Sani, 2014). Although in the long term, the stock market is a promising place to invest, in the short term, there are changes in stock prices that occur on a daily, weekly, and monthly basis that need to be anticipated (Yildiz, Karan, & Pirgaip, 2017). Stock price volatility that occurs daily, weekly or monthly can be a source of reference for predicting how the stock price will move in the future (Tan, Yan, & Zhu, 2019). The size of stock price volatility shows the risk that the market value is sensitive to changes in stock prices, interest rates, and exchange rates (Mahapatra & Bhaduri, 2019).

Previous Studies

Empirical research on the performance of Islamic stock price index compared to conventional stock price index shows controversial results. Two reasons may be found here; First, according to modern financial theory, it is possible that Islamic stock price indexes can be assumed to be riskier than their conventional counterparts due to their lack of diversification and thus high volatility (Albaity & Ahmad, 2008). Meanwhile, if the volatility is lower than the conventional stock price index, it is possible that this index can be more profitable than the conventional stock price index because they include companies that have passed certain financial criteria (Hussein & Omran, 2005).

Research related to volatility modelling has been carried out on the stock market in China. Lin (2018) found that the SSE Composite Index, has a time-varying and clustering pattern, these results are in line with the findings of Autoregressive Conditional Heteroscedasticity (ARCH) and Generalized Autoregressive Conditional Heteroscedasticity (GARCH) effects on the SSE Composite Index (Lin, 2018). Saiti, Bacha and Masih used the Dynamic Multivariate Generalized Autoregressive Conditional Heteroscedasticity method (Saiti et al., 2014). The researcher finds that shares based on sharia principles have no leverage effect because of the upper limit on the number of debt-based assets issued by the sharia supervisory board.

Jebran, Chen and Tauni's research, using several methods to test the volatility transmission and the relationship between the sharia index and the conventional index, using the Vector Error Correction Model (VECM), the researchers found that there was a significant short-term and long-term relationship between the sharia index and the conventional index, while using the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) models, it is found that an asymmetric two-

way volatility spill over between the sharia index and the conventional index (Jebran et al., 2017).

Ahmad and Ibrahim (2002) used the Kuala Lumpur Sharia Index (KLSI) and Kuala Lumpur Composite index (KLCI) for the period April 1999 to January 2002, then the data were grouped into growing and declining periods. The result is that KLSI does not show any superiority compared to KLCI, both growing and declining. Chiadmi & Ghaiti (2014) use the Standard and Poor's Sharia index (S&P Sharia), the Dow Jones Islamic Market (DJIM) index, The FTSE Islamic index, The MSCI Islamic World as well as their conventional counterparts, respectively, the S&P 500, the Dow Jones Industrial Average (DJIA), the FTSE All world and the MSCI World Indexes, the results show that the performance of the Sharia index was also affected by the global financial crisis, but the Sharia index was able to get out of the crisis faster than the Sharia index with conventional index. Hakim and Rashidian (2004) analysed the returns and risks of the Dow Jones Islamic Stock Market Indexes (DJIM), Wilshire 5000 stock market index from 1999 to 2002. The result is that the returns and risks of DJIM are lower than conventional indexes. Hersugondo et al (2020) compared the volatility of the Jakarta Stock Index (JII) with LQ45 for the period January 1, 2015 to October 10, 2016, giving the result that the volatility of JII is lower than LQ45.

Rejeb & Arfaoui (2018) on DJIM Emerging Markets Index, the DJIM Arab Markets Index, the DJIM Arab Markets excluding Saudi Arabia Index, the DJIM GCC Index, and the DJIM Canada. Index, the DJIM UK Index, the DJIM US Index, the DJIM Europe index, the DJIM Asia-Pacific Index, and the DJIM World Developed Index, January 1, 1996, to January 18, 2016, Islamic stock indexes are more volatile than their conventional counterparts and are not immune to the global financial crisis. Hakim (2020) compared the performance of the Indonesian Sharia Stock Index (ISSI) and the JKSE during the bullish and bearish periods 2016-2019. The findings show that an index with a high volatility value does not always produce a high positive return. In addition, the performance of the two indexes shows the same pattern in both bullish and bearish periods, although there are differences in several conditions and systems. Widodo and Suryanto (2021) modelled the return volatility of the conventional stock price index (JKSE and LQ45) and the sharia stock price index (JII) for the period: before the Covid-19 crisis between January 1 to December 30 2018 and during covid 19 from January 1, 2019, to October 30, 2021, shows that the return volatility of the Sharia stock price index is higher than the conventional stock price index, both before and during the Covid 19 and sharia (JII) crisis.

RESEARCH METHOD

The object of this research is the daily stock price index return volatility which is grouped into Sharia stock price index represented by JII and conventional stock price index represented by JKSE. The data is taken from Yahoo Finance, namely the beginning of Indonesia being hit by Covid-19 on March 1, 2020 until the period of April 30, 2022. The variable in this study is the stock index return obtained from the

closed price of JKSE and JII. Most of the financial series are trendy at level with heavy fluctuations because of this it is implausible to attain valid inferences. It shows that most of the financial series are non-stationary at level with large stochastic variations, to tackle this problem we used log difference. The log reduces the fluctuation at some extent and difference make series stationary or mean reversion. So, the return series are generated with the following formula (Marobhe & Pastory, 2020):

$$R_t = \log\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

where R_t is representing return series, p_t is value of financial time series at the end of time t and p_{t-1} is first lag of financial time series.

To analyze, the authors follow the procedures of Widodo and Suryanto (2021), namely:

1. Time series data has a stationary problem. Stationary data, if the data has a constant mean and variance over time. The data stationarity test used the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) test (Widarjono, 2003).

The ADF Test Formulation is:

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=2}^p \beta_i \Delta Y_{t-i+1} + \varepsilon_t \quad (2)$$

$$\Delta Y_t = a_0 + \gamma Y_{t-1} + \sum_{i=2}^p \beta_i \Delta Y_{t-i+1} + \varepsilon_t \quad (3)$$

$$\Delta Y_t = a_0 + a_1 t + \gamma Y_{t-1} + \sum_{i=2}^p \beta_i \Delta Y_{t-i+1} + \varepsilon_t \quad (4)$$

Where :

Y_t : t-th observation value

Y_{t-1} : t-th observation value t- 1 (previous time)

ΔY_t : $Y_t - Y_{t-1}$

t : Time trend

The procedure for determining whether the data is stationary or not by comparing the ADF statistical value with the critical value of the Mackinnon statistical distribution. The ADF statistic value is the comparison between γ and the standard error of Y_{t-1} . If the absolute value of the ADF statistical value is greater than the absolute value of the critical value of the Mackinnon statistical distribution, it is concluded that the data is stationary.

2. The PP Test Formulation is:

$$\Delta Y_t = \gamma Y_{t-1} + \varepsilon_t \quad (5)$$

$$\Delta Y_t = a_0 + \gamma Y_{t-1} + \varepsilon_t \quad (6)$$

$$\Delta Y_t = a_0 + a_1 t + \gamma Y_{t-1} + \varepsilon_t \quad (7)$$

The PP statistical value does not follow the normal distribution, but follows the PP statistical distribution, with a critical value from the Mackinnon statistical distribution. If the absolute value of the PP statistic is greater than the absolute value of the critical value of the Mackinnon statistical distribution, it is concluded that the data is stationary.

3. If it is stationary at the level, then it is transformed into the form of first difference
4. Stationary data at the level, the next analysis uses the ARMA (Autoregressive Moving Average) model, while the non-stationary data at the level and stationary

at the first difference uses the ARIMA (Autoregressive Integrated Moving Average) model.

Verify the ARMA or ARIMA model with the white noise error term. A time series data

it is white noise if it has an average error term of 0 and a constant variance. White noise test, using Box and Pierce test, where

$$Q = n \sum_{k=1}^m \rho_k^2. \quad (8)$$

Where

$$\rho_i = ACF, \quad (9)$$

n = number of sample and k = length of lag. By using the level of significance 5%, the ARMA/ARIMA model is said to be white noise, if $Q < \chi_{0.05}^2(df=m)$

5. The white noise ARMA/ARIMA model is then tested to find out whether it has an ARCH element. ARCH element testing using Correlogram Squared Residuals. If value $Q < \chi_{0.05}^2(df=m)$ then there is no ARCH element. If there is an ARCH element, then the next analysis is ARCH and GARCH

ARCH (Autoregressive Conditional Heteroscedasticity Model) modelling is a model developed by Engle (1982) to overcome the problem of heteroscedasticity in time series data. The ARCH (p) model is:

$$Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t \quad (10)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 e_{t-1}^2 + \alpha_2 e_{t-2}^2 + \dots + \alpha_p e_{t-p}^2 \quad (11)$$

$$\alpha_0, \alpha_1, \dots, \alpha_p > 0$$

Equation (10) is called the conditional mean, while equation (11) is conditional variance, which captures the heteroscedasticity of the error term. In this case, Engle proxies the error variance with the error term squared. However, in its implementation, the ARCH model requires a long p value, causing problems in interpretation. Therefore, Bollerslev (1986) improved the ARCH model by adding the previous time error variance to the conditional variance, the model is called GARCH (General Autoregressive Conditional Heteroscedasticity) Model. The GARCH (p,q) conditional variance model is:

$$\sigma_t^2 = \alpha_0 + \alpha_1 e_{t-1}^2 + \alpha_2 e_{t-2}^2 + \dots + \alpha_p e_{t-p}^2 + \beta_1 \sigma_{t-1}^2 + \beta_2 \sigma_{t-2}^2 + \dots + \beta_q \sigma_{t-q}^2 \quad (12)$$

$$\alpha_0, \alpha_1, \dots, \alpha_p, \beta_1, \beta_2, \dots, \beta_q > 0.$$

$\alpha_i + \beta_j$ is expected to be less than 1 for the model to be valid. In financial data series analysis, higher values of α_i coefficient imply higher reaction of volatility to market shocks, while higher values of β_j coefficient shows persistence of market shock.

6. The ARCH/GARCH model that is formed is then verified for the following problems: white noise and the presence of the ARCH effect. Brooks and Burke (2010) suggest that the GARCH (1,1) model is sufficient to capture the volatility clustering in financial data. In this paper we follow Brooks and Burke's suggestions and use GARCH (1,1).

7. ARCH/GARCH model after being verified, then tested for the presence of asymmetry. We apply Engle-Ng (1993) test to determine if the series require asymmetric model. To test the asymmetry, the following model is used:

$$\mu_t^2 = \phi_0 + \phi_1 S_{t-1}^- + \phi_2 S_{t-1}^- \mu_{t-1} + \phi_3 S_{t-1}^+ \mu_{t-1} + v_t \quad (13)$$

Where S_{t-1}^- as an indicator dummy that takes the value 1 if and zero otherwise, $S_{t-1}^+ = 1 - S_{t-1}^-$, so that picks out the observations with positive innovations. Significance of ϕ_1 indicates the presence of sign bias, where positive and negative shock have differing impacts upon future volatility. On the other hand, the significance of ϕ_2 or ϕ_3 would suggest the presence of size bias, where not only the sign but the magnitude of the shock is important. A joint test statistics for formulated in the standard fashion by calculating NR^2 from equation (13) which will asymptotically follow a χ^2 distribution with three degrees of freedom under the null hypothesis of no asymmetric effects (Brooks, 2019). Brooks further stated that the curve between the value of lagged shock and the value of conditional variance will be symmetrical, if there is no asymmetric effect, otherwise it will not be symmetric if there is an asymmetric effect. If there is an asymmetric effect, then the next model is the EGARCH and GJR-GARCH model (Alijev, Ajayi & Gasim, 2020).

8. Verify the asymmetry model by looking at the white noise error term and there is no heteroscedasticity problem using the LM test.

RESULTS AND DISCUSSION

The 532 observations in the RIHSG (Return JKSE) series have a mean value of 0.035837 and a sample standard deviation of 1.307459 and RJII (Return JII) series 0.008384 and standard deviation of 1.640157. The mean RIHSG during the study period was higher than the RJII, but the risk seen from the standard deviation of returns was lower than the RJII. Furthermore, the distribution of returns remarkably differs from normality given the excess kurtosis and light right skewness implying some asymmetry. Heavy tailed leptokurtic distribution implies the index has low risk and return in the sample space. Consequently, based on the Jarque-Bera statistics, the null hypothesis of normality for the daily RIHSG and RJII is rejected at the 1% significance level.

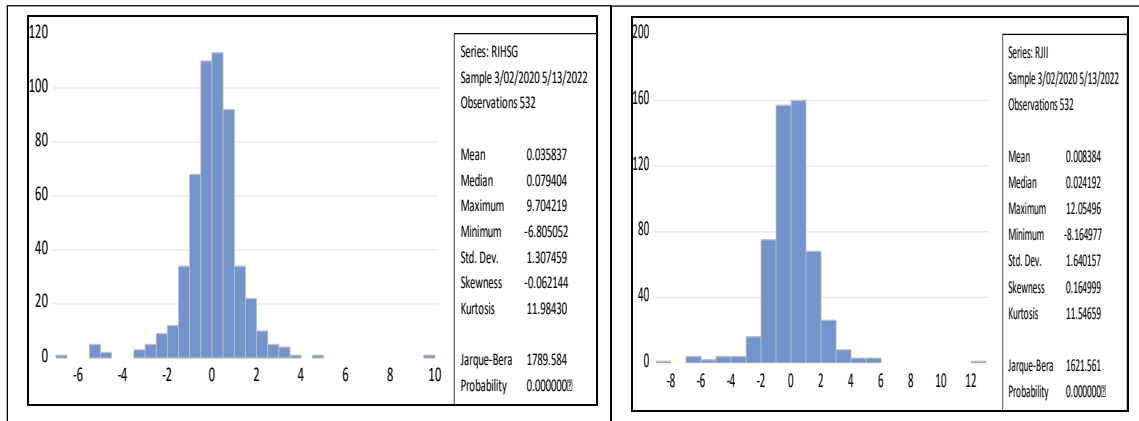


Figure 1. Descriptive statistics

Source: Author, 2022

Stationarity of the series is tested with Augmented Dickey-Fuller (Dickey and Fuller, 1981) and Phillips-Perron (Phillips and Perron, 1988) unit root tests and reported on Table 1. Both test results reject null hypothesis that the return series has a unit root and that means the RIHSG and RJII return series is stationary in the period under study.

Table 1. Unit Root Test

	t-Statistic		Critical value	
	RIHSG	RJII	at 5%	Prob.*
ADF test statistic	-11.317	-11.917	-2.867	0.000
PP test statistic	-22.820	-23.927	-2.867	0.000

Source: Author, 2022

Table 1 shows that the absolute value of the ADF test statistic and PP test statistic from RIHSG and RJII is greater than the critical value of 5%, so it can be concluded that RIHSG and RJII are stationary.

The next step is to model with ARMA, the result of ARMA modelling is

$$\begin{aligned}
 \text{RIHSG} = & 0.2098 \cdot \text{AR}(3) - 0.1311 \cdot \text{MA}(9) - 0.1255 \cdot \text{MA}(13) - 0.096 \cdot \text{MA}(2) + \\
 & 0.1184 \cdot \text{MA}(5) \qquad \qquad \qquad (14) \\
 & (0.0256)^{***} \quad (0.0337)^{***} \quad (0.0334)^{***} \quad (0.030)^{***} \quad (0.051)^{***}
 \end{aligned}$$

Description: in brackets state the standard error

***) significant at 1% level

The white noise test shows that $Q = 38.364$ smaller than $\chi^2_{0.05}(df=36) = 50.998$, so it can be concluded that the ARMA model from RIHSG has white noise. While the Q value of the Correlogram of Residual Squared = 359.00 greater than $\chi^2_{0.05}(df=36)$ so it is concluded that the ARMA results from the RIHSG have heteroscedasticity problems or there is an ARCH effect.

ARMA RJII Model

$$RJII = 0.2104*AR(3) + 0.2045*MA(18) - 0.2092*MA(9) - 0.1255*MA(2) \quad (15)$$

(0.0221)*** (0.0349)*** (0.0285)*** (0.0213)***

Description: in brackets state the standard error

***) significant at 1% level

The white noise test shows that Q = 32.459 smaller than $\chi^2_{0.05(df=36)} = 50.998$, so it can be concluded that the ARMA model from RJII has white noise. While the Q value of the Correlogram of Residual Squared = 707.92 greater than $\chi^2_{0.05(df=36)}$ so it is concluded that the ARMA results from the RJII have heteroscedasticity problems or there is an ARCH effect.

The next step is to model with ARCH/GARCH.

The results of the ARCH/GARCH RIHSG analysis are:

$$RIHSG = 0.091*SQRT(GARCH) + 0.0978*AR(3) - 0.1104*MA(2) \quad (16)$$

(0.043)** (0.048)** (0.044)**

$$\sigma_t^2 = 0.1494 + 0.1983*e_{t-1}^2 + 0.6872*\sigma_{t-1}^2$$

(0.035)*** (0.032)*** (0.055)***

Description: in brackets state the standard error

***) significant at 1% level

**) significant at level 5%

The white noise test shows that Q = 39.765 smaller than $\chi^2_{0.05(df=36)} = 50.998$, so it can be concluded that the ARCH/GARCH model from RIHSG has white noise. While the Q value of the Correlogram of Residual Squared = 11.786 smaller than $\chi^2_{0.05(df=36)}$ so that the ARCH/GARCH RIHSG results do not contain heteroscedasticity problems. While the tests using the LM test are:

Table 2. RIHSG LM Test Results

	Heteroscedasticity Test: ARCH		p-value
F-statistic	0.087449	Prob. F(1,526)	0.7676
Obs*R-squared	0.087767	Prob. Chi-Square(1)	0.7670

Source: Author, 2022

The value of Obs*R-squared is equal to 0.087767 while the probability of Chi-Squared with df = 1 is equal to 0.7670, because this probability is greater than 5%, it can be concluded that there is no problem with the ARCH effect.

While the ARCH-GARCH RJII are:

$$\begin{aligned}
 \text{RJII} &= 0.085 \cdot \text{AR}(18) + 0.456 \cdot \text{AR}(1) + 0.203 \cdot \text{AR}(3) - 0.127 \cdot \text{MA}(2) - 0.612 \cdot \text{MA}(1) \quad (17) \\
 &\quad (0.032)^{***} \quad (0.1191)^{***} \quad (0.050)^{***} \quad (0.057)^{**} \quad (0.127)^{***} \\
 \sigma_t^2 &= 0.0756 + 0.0224 \cdot e_{t-1}^2 + 0.9173 \cdot \sigma_{t-1}^2 \\
 &\quad (0.024)^{***} \quad (0.012)^* \quad (0.024)^{***}
 \end{aligned}$$

Description: in brackets state the standard error

***) significant at 1% level

**) significant at 5% level

*) significant at 10% level

The white noise test shows that $Q = 28.110$ smaller than $\chi_{0.05(df=36)}^2 = 50.998$, so it can be concluded that the ARCH/GARCH model from RJII has white noise. While the Q value of the Correlogram of Residual Squared = 28.619 smaller than $\chi_{0.05(df=36)}^2$ so that the ARCH/GARCH RJII results do not contain heteroscedasticity problems. While the tests using the LM test are:

Table 3. RJII LM Test Results

Heteroscedasticity Test: ARCH			p-value
F-statistic	1.715190	Prob. F(1,511)	0.1909
Obs*R-squared	1.716142	Prob. Chi-Square(1)	0.1902

Source: Author, 2022

The value of Obs*R-squared is equal to 1.716242 while the probability of Chi-Squared with $df = 1$ is equal to 0.1902, because this probability is greater than 5%, it can be concluded that there is no problem with the ARCH effect.

The next test is to see whether there is an asymmetry problem by using the Engle-Ng Sign-Bias Test. The result is shown in Table 4.

Table 4. Ng Sign-Bias Test Results

	t-Statistic		t-Statistic	
	RIHSG	Prob.	RJII	Prob.
Sign-Bias	-0.0665	0.9470	0.6073	0.5439
Negative-Bias	-0.9857	0.3247	-1.0143	0.3109
Positive-Bias	-0.9265	0.3546	0.2587	0.7960
Joint-Bias	3.0849	0.3796	3.2561	0.3548

Source: Author, 2022

The results of the Ng Sign-Bias Test, show that the probability of ϕ_1 , ϕ_2 and ϕ_3 RIHSG and RJII are greater than 5%. Similarly, Joint – Bias RIHSG, the value of $n \cdot R^2$ is equal to 3.0849 which is smaller than $\chi^2_{0.05(df=36)} = 7.8147$, Likewise Joint – Bias RJII, the value $n \cdot R^2$ is equal 3.2561 it can be concluded that there is no asymmetry problem, meaning that the above model will give the same response whether there is good news or bad news. Figure 2 shows the details.

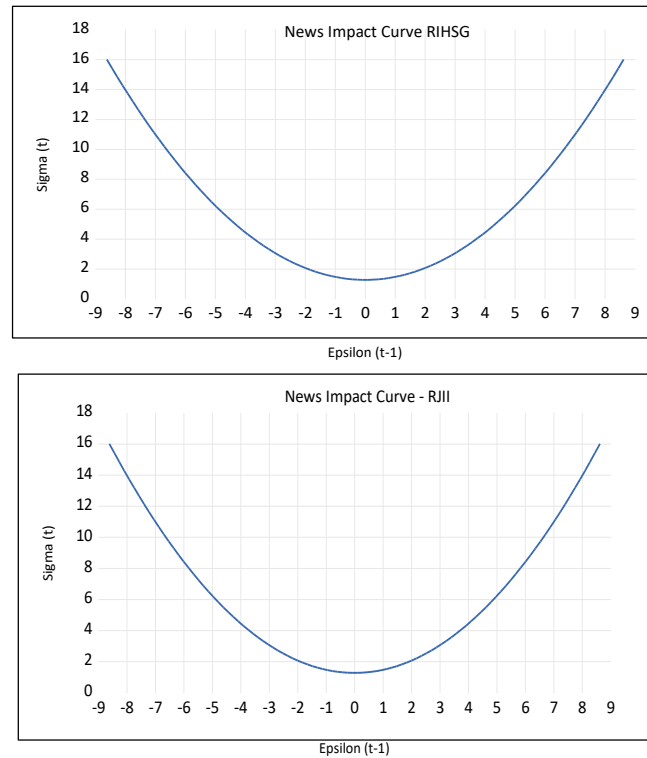


Figure 2. New Impact Curve

Source: Author, 2022

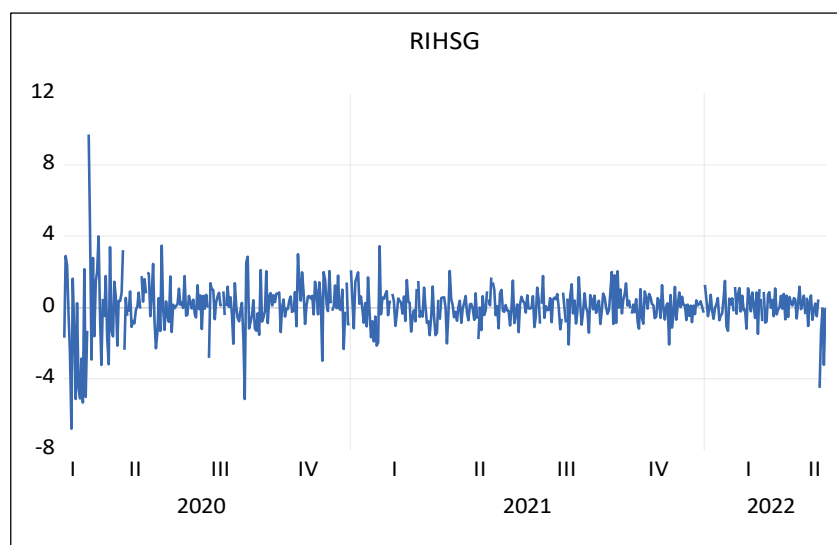
Thus, the model used is ARCH-GARCH without asymmetric effect. The ARCH-GARCH RIHSG model is a GARCH-in-Mean model, in which investors should be rewarded for taking additional risk by obtaining a higher return. Brooks (2019) shows that GARCH-in-Mean where the conditional variance of asset returns enters into the conditional mean equation. Value of $\delta = 0.091$ positive and significance, it's mean then increased risk, given by an increase in the conditional variance, leads to a rise in the mean return. Thus δ can be interpreted as a risk premium. While the model for RJII is GARCH. Both RIHSG and RJII are GARCH(1,1). Based on these results, it can be concluded that the volatility of returns from a stock market is not only influenced by current shocks and volatility, but also by previous shocks and volatility. These results are in accordance with the research of Chiadmi & Ghaiti (2014). Ajayi & Gasim (2020), Widodo & Suryanto (2021). Koy and Ekim (2016).

The results of this study, both for RIHSG and RJII, did not show any asymmetry problems, this is in accordance with Tanjung and Siregar's (2018) research, which is

different from the research of Widodo & Suryanto (2020) which used RIHSG and RJII with a shorter time span, indicating asymmetry problems. , so that it is modelled with EGARCH. Jebran, Chen & Tauni (2017) based on the Karachi Meezan Index there is an asymmetry problem and is modelled with EGARCH. Sari, Achسانی & Sartono (2017) the problem of asymmetry.

The GARCH RIHSG model shows that the value of $\alpha_1 = 0.1983$ and the GARCH RJII model $\alpha_1 = 0.0224$, both positive and significant and this shows the presence of volatility clustering in the series over the period. The estimate of β_1 coefficient GARCH RIHSG is 0.6872 and β_1 coefficient GARCH RJII is 0.9173 indicating a long memory in the variance. This indicates that changes in the current volatility will affect future volatility for a long period or the impact of old news on volatility is long lasting. The sum of ARCH and GARCH on RIHSG terms $\alpha_1 + \beta_1$ is 0.8855 indicating volatility shocks are quite persistent. The test using the Wald Test with $H_0 : \alpha_1 + \beta_1 = 1$ indicates that the t-statistic is equal to -3.002697 with a probability of 0.0028, indicating that for the RIHSG $\alpha_1 + \beta_1 < 1$. The sum of ARCH and GARCH in RJII terms $\alpha_1 + \beta_1$ is 0.9397 indicating volatility shocks are quite persistent. Testing using the Wald Test with $H_0 : \alpha_1 + \beta_1 = 1$ with a t-statistic equal to -3.198854 with a probability of 0.0015, indicating that RJII $\alpha_1 + \beta_1 < 1$. The financial implication of these coefficients for investors is that RIHSG and RJII returns' volatility exhibits clustering, and this permits investors to establish future positions in expectation of this characteristic.

The volatility of the RIHSG is equal to 4.09304278, while the volatility of the RJII is 1.427876209, indicating that in the observation period from March 1, 2020 to April 30, 2022, the volatility of the RJII is lower than the volatility of the RIHSG. Widodo & Suryanto (2021) research using RIHSG, RLQ45 and RJII gave different results, where the volatility of RJII was higher than RIHSG and RLQ45, Rejeb & Arfaoui (2019) also provided evidence that Islamic stock indexes are more volatile than their counterparts and are not totally immune to the global crisis.



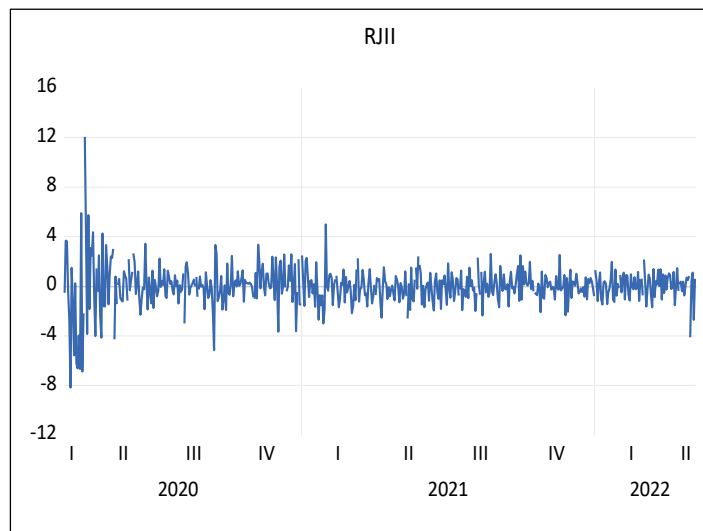


Figure 3. Graph of JII Return and JII Return

Source: Author, 2022

Figure 3 shows that from the beginning of Covid-19 until semester 1 of 2021 the movement of JII Returns and JII Returns was high, but after that, the period of semester II 2021 to semester II 2022 the movement was not too high, tended to be stable, shows an asymmetry effect. Utomo's research (2022) shows that during the Covid 19 pandemic it was proven that the overall performance of Islamic stocks was lower than the market during the Covid 19 crisis. However, liquid and large capitalized Islamic stocks performed better than the market during the Covid 19 crisis.

Islamic financial institutions are not affected by the crisis because Islamic finance is based on a close relationship between financial and productive flows. However, the prolonged duration of the crisis that affects Islamic financial institutions as well as conventional institutions has a negative impact on Islamic finance (Chiadmi & Ghaiti, 2014). Resilience is due to several factors. First, the adherence to Islamic principles has protected Islamic financial institutions against the damaging effects of the crisis. These principles include the requirement of ethical conduct in doing business; the risk-sharing principle; the availability of credit primarily for the purchase of real goods and services; restrictions on the sale of debt, short sales, and excessive uncertainty; and the prohibition to sell assets not owned. Second, the inherent strengths of Islamic finance, including the close link between financial transactions and productive flows and the built-in dimensions of governance and risk management, had contributed to its viability and resilience.

The high volatility of the RIHSG is probably due to the conventional financial sector which is closely connected to the global financial sector, so that even the slightest economic instability in large countries will spread and affect local finances (Lin, 2008). Furthermore, Kameel (2009) states that the conventional financial system is based on compound interest, so that if a crisis occurs, debt interest will grow

exponentially which causes the real productive economic sector to experience difficulties in paying interest. (Chiadmi & Ghaiti, 2014) emphasizes that the usury-based financial system (interest) is the main factor in the occurrence of crises and financial system instability.

CONCLUSION

The Islamic financial system is part of the global financial system, so what happens to the global financial system will also affect the Islamic financial system. However, the impact of the financial crisis that occurred globally, did not result in too deep when compared to the conventional financial system. Perhaps this is because Islamic finance prohibits the use of interest, where interest is used by the conventional financial system for taxes shield. In addition, the Islamic financial system prohibits speculative transactions such as utilizing derivative trading. The principle of risk-sharing is the founding principle of Islamic finance. With the principle of risk-sharing, there will be active transactions between the two parties, through financial instruments such as *mudarabah* (partnership of work and capital) and *musharakah* (joint venture) contracts. This approach promotes participation in the risk-reward and financial results or outcome of such businesses. This risk sharing requires the Institutions offering Islamic financial services undertake the appropriate due diligence on the viability of business proposals. On the other hand, the conventional financial system uses risk to gain profit.

The conclusion is that Covid 19 which then caused a global financial crisis, raises the question of whether the conventional financial system that has been implemented so far has been appropriate. Because the Islamic financial system based on the risk-sharing principle is more capable of getting out of the crisis more quickly, it can be seen from the movement of the Islamic financial index that the movement of the Islamic financial index experienced a relatively better movement when compared to conventional financial indexes during Covid-19. However, the main challenge of Islamic finance is the harmonization of opinions among scholars, so that the Islamic financial system between one country and another has the same legal basis (Chiadmi & Ghaiti, 2014).

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