Volatility Diagnostics for Stock Price of Sharia-Compliant Companies listed in Malaysia Composite Index

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Abstract—The objective of this study is to evaluate the volatility of sharia-compliant companies that listed on Malaysia Stock Exchange. Data of return for each of the companies are collected from Thomson Reuters Datastream. The number of selected companies is 19 that selected from 30 companies composing Kuala Lumpur Composite Index (KLCI). This study calculated average monthly return and volatility rate for each of the companies. Next, normality statistical test is performed using Shapiro-Wilk normality test. Result indicates the mean value of average monthly return is 0.442 % with standard deviation 1.28%. Then, the mean value for volatility rate is 4.85% and standard deviation is 2.23%. Result from Shapiro-Wilk normality test indicates data distribution for average monthly return and volatility follow normal data distribution. The significant of these findings is it will help investors to understand the behavior of stock price in Malaysia Stock Exchange particularly sharia-compliant companies in Kuala Lumpur Composite Index. In addition, the findings of this study will help investors to develop investment portfolio that can maximize return and reducing loss.

Keywords—Volatility, Sharia-compliant companies, Malaysia Stock Exchange, Kuala Lumpur Composite Index, Islamic Finance.

I. INTRODUCTION

There has been an increasing body of literature on sharia-complaint companies' performance worldwide (Abu Bakar and Rosbi, 2018a; Che Azmi, et al., 2016). The main objective of sharia compliant companies is to provide Islamic investment that free from any prohibited elements in Islamic rules. Islamic-based investments are obligated to follow sharia rules, which means that they must not only be free from elements of riba' (interest) and gharar (uncertainty) but also from activities related to maysir (gambling), alcohol, tobacco, drugs or any form of activity that could pose potential harm to the society or nation (Abu Bakar and Rosbi, 2017(a); Che Azmi, et al., 2016; Ullah et al., 2014; Abdul Rahim and Yong, 2010).

Lusyana and Sherif, (2017) explained that Islamic investment principles emphasize ethical investing that comply with the principles of sharia, which is the Islamic law that governs every facet of each Muslim's life. While, Che Azmi et al., (2016) emphasize that investors are not only concerned with environmental, social, governance issues (Hamza, 2013) and ethical issues as a part of their investment decisions but they also must monitor their activities in order to achieve the motivations and objectives of the social responsibility investing.

Bursa Malaysia has authority in select top 30 largest listed companies. The main function in selecting top 30 largest listed company is to enhance trading and appreciation of the Malaysian market. Out of 19 companies from 30 largest companies listed on Bursa Malaysia was sharia compliant company that was composing the Malaysian composite index. This number shows that sharia-compliant companies were attracting not only Muslim investors but also non-Muslim investors who are interested in investing in Islamic investment. Thus, top 30 largest companies must have a good performance in term of operation and financial. However, with the current economic condition in Malaysia is always change, sharia-compliant companies must monitor their performance especially on the volatility of shares prices in order to be positive, stable and maintain listed as the top 30 largest listed companies of Bursa Malaysia. Therefore, forecasting volatility of shares price plays important roles in investment market (Abu Bakar and Rosbi, 2017b).

Stock market is one of the most important indicators on how the economic are moving up. Positive increment of dynamic movement for the share price indicates good performance of stock market in Malaysia (Abu Bakar, et al., 2018b).Thus, this study was evaluating the volatility of sharia-compliant companies that listed on Malaysia Stock Exchange. The number of selected companies is 19 that selected from 30 companies composing Kuala Lumpur Composite Index (KLCI).

II.   LITERATURE REVIEW

Companies that are classified under the sharia-compliant category in Malaysia increased rapidly since the inception of this classification in 1999 in the Malaysian market (Ahmed Haji and Mohd Ghazali, 2013; Ousama and Fatima, 2010). As reported by Securities Commission of Malaysia out of 689 companies from 902 companies are sharia compliant companies (Securities Commission of Malaysia, 2018).

Therefore sharia compliant companies are looking as a good platform in promoting Islamic capital market. Study by Wan Ismail, et al., (2015) regarding quality of earnings in sharia-compliant companies finds robust evidence that sharia-compliant companies have significantly higher earnings quality compared to other firms. The results also provide that sharia-compliant companies supply a higher quality of reported earnings to attract foreign investment, have greater demand for high-quality financial reporting because of their sharia status and are subject to greater scrutiny by regulators and institutional investors. Therefore sharia-compliant companies must show a good reputation in promoting Islamic capital market.

Hence, study that focus on the volatility of the share price found varies findings. For example, Sankaran et al., (2012) investigate the extreme returns in a variety of financial markets found the correlation positive extreme returns within overlapping clusters significantly increases with volatility between Dow Jones Industrial Average and S&P 500. Then Kongsilp and Mateus, (2017) investigate the role of volatility risk on stock return found a clear and robust empirical evidence. Fowowe (2017) examine the return and volatility spillovers between oil and the stock markets of Nigeria and South Africa. The results for volatility spillovers show independence of volatilities between Nigeria stock markets and oil markets, while weak bi-directional spillovers were found between South African equity volatilities and oil volatilities.

Lee (2009) examines the housing price volatility for eight capital cities in Australia. The volatility clustering effects were found in many Australian capital cities. Coskun, et al., (2016) analyze volatility properties of the house price returns of Turkey, Istanbul, Ankara and Izmir. Empirical findings suggest several points. The important finding are; the city/country-level house price return volatility series display volatility clustering pattern and therefore volatilities in house price returns are time varying; house price return volatilities differ across geographic areas, volatility series may show some co-movement pattern. Thus, volatility is important to investigate in order to monitor the performance of share prices.

III.   RESEARCH METHODOLOGY

This study analyzed the stock prices of 19 sharia-compliant companies to detect volatility rate. Therefore,

this study implemented mathematical calculation to find return rate including volatility rate. The data distribution evaluation for both variables is performed using Shapiro-Wilk normality test.

3.1 Data selection and return calculation

This study collected daily stock prices from Thomson Reuters Datastream. Table 1 shows selected 19 sharia-compliant companies listed on Malaysia Stock Exchange. These companies are selected among 30 companies that composing Kuala Lumpur Composite Index (KLCI).

Table.1: List of companies

No.	Company Name
1	Axiata Group Berhad
2	Dialog Group Berhad
3	DiGi.Com Berhad
4	Hartalega Holdings Berhad
5	IHH Healthcare Berhad
6	IOI Corporation Berhad
7	Kuala Lumpur Kepong Berhad
8	Maxis Berhad
9	MISC Behad
10	Nestle (Malaysia) Berhad
11	Petronas Chemicals Group Berhad
12	Petronas Dagangan Bhd
13	Petronas Gas Berhad
14	PPB Group Berhad
15	Press Metal Aluminium Holdings Berhad
16	Sime Darby Berhad
17	Sime Darby Plantation Berhad
18	Tenaga Nasional Berhad
19	Top Glove Corporation Berhad

Then, the stock prices are averaged to find monthly stock price. Next, this study calculated the return rate using using Equation (1).

$$\text{Re}_{i,t} = \left(\frac{P_t - P_{t-1}}{P_{t-1}} \right) \times 100\% \quad \dots\dots\dots\dots\dots\dots\dots \quad (1)$$

In Equation (1), the parameters are described as below:

$\text{Re}_{i,t}$: Return rate for company *i* at monthly observation period *t*,

P_t : Stock prices of company *i* at monthly observation period *t*, and

P_{t-1} : Stock prices of company *i* at monthly observation period *t-1*.

Next, the volatility rate is measured using standard deviation of data distribution. Therefore, the volatility is described using Equation (2).

$$\sigma_i = \sqrt{\frac{(r_{i,t} - \overline{r_i})}{n-1}} \quad \text{..} \quad (2)$$

In Equation (2), the parameters are described as follows:

σ_i : Volatility rate for company i,

$r_{i,t}$: Observed variable for return of company i at monthly period t,

$\overline{r_i}$: Mean value of return for company i, and

n : Number of observation.

3.2 Shapiro-Wilk normality test

An assessment of the normality of data is a prerequisite for many statistical tests because normal data is an underlying assumption in parametric testing. In this study, Shapiro-Wilk normality test is selected for data distribution analysis. The Shapiro-Wilk normality test is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000.

Suppose that a random variable X is observed and this study interested in testing the hypothesis of normality of data distribution. The null-hypothesis of Shapiro-Wilk test is that the population is normally distributed.

$$H_0 : X \approx N(\mu, \sigma^2)$$

Shapiro-Wilk normality testing is represented by W-statistics. The *W*-test statistics is indicated by Equation (3).

$$W = \frac{\left(\sum_{i=1}^{n} a_i X_{(i)}\right)^2}{\sum_{i=1}^{n} (X_i - \overline{X})^2} \quad \text{...................................}(3)$$

where $X_{(1)} \le X_{(2)} \le ... \le X_{(n)}$ are the ordered values of a sample of $X_1, X_2, ..., X_n$. A lower tail of W indicates non-normality. The tabulated coefficients a_i are described as Equation (4).

$$(a_1, a_2, ..., a_n) = \frac{m^{\mathrm{T}} V^{-1}}{C} \quad \text{...........................}(4)$$

In Equation (4), the parameters are described as follows:

C : Vector norm is a function that assigns a strictly positive length or size to each vector in a vector space,

$$C = \left\| V^{-1}m \right\| = \sqrt{(m^{\mathrm{T}} V^{-1} V^{-1} m)}$$

m : Vector m is made of the expected values of the order statistics of independent and identically distributed random variables sampled from the standard normal distribution.

$$m = (m_1, m_2, ..., m_n)^{\mathrm{T}}$$

V : Covariance matrix for normal order statistics.

Next, assume the expected value of mean μ is known as μ_0. Therefore, the null hypothesis of Shapiro-Wilk normality test can be expressed as below.

$$H_0 : X \approx N(\mu_0, \sigma^2)$$

Next, the W-test statistics can be re-arranged as below:

$$W_0 = \frac{\left(\sum_{i=1}^{n} a_i X_{(i)}\right)^2}{\sum_{i=1}^{n} (X_i - \mu_0)^2} \quad \text{...............................} \quad (5)$$

The null hypothesis is rejected at condition of $W_0 < W_0(\alpha, n)$. The parameter $W_0(\alpha, n)$ is critical value at significant level α .

The statistics W_0 has identical properties to W statistics. The parameter W_0 is scale invariant and maximum value of W_0 is set to one. Meanwhile, the minimum value of W is decided with value in below equation.

$$\varepsilon = \frac{na_1^2}{n-1} \quad \text{...} \quad (6)$$

IV. RESULT AND DISCUSSION

The objective of this study is to evaluate level of volatility among sharia-compliant companies listed on Malaysia Stock Exchange. The selected 19 companies are listed as companies in FTSE Bursa Malaysia KLCI. This study evaluated the data distribution for return rate and volatility rate to examine financial environment in Malaysia Stock Exchange.

4.1 Data analysis for return rate

This section describes data distribution for return rate of 19 companies of sharia-compliant companies that selected among 30 companies for Kuala Lumpur Composite Index (KLCI). Figure 1 shows the return rate distribution for 19 companies. The maximum value of average monthly return is 3.16% for Nestle (Malaysia) Berhad (Company No. is 10). Meanwhile, the minimum value of average monthly return is -2.01 % for Axiata Group Berhad (Company No. is 1).

Next, this study performed normality analysis for data distribution of return rate. Figure 2 indicates data distribution of average monthly return rate using normal

Q-Q (quantile-quantile) plot. Figure 2 concluded the distribution of average return rate is follow normal distribution because all of data is close to normal distribution line (red line). The average value for return is 0.442 % and standard deviation is 1.285%.

After that, the graphical finding is validated using statistical test of normal distribution. This study selected Shapiro-Wilk normality for data distribution analysis. This statistical test is selected because number of observation is less than 2000. Table 1 shows Shapiro-Wilk normality test for return rate. Table 1 indicates the probability value (p-value) is 0.497 that is larger than 0.05. Therefore, data distribution of return rate is follows normal distribution.
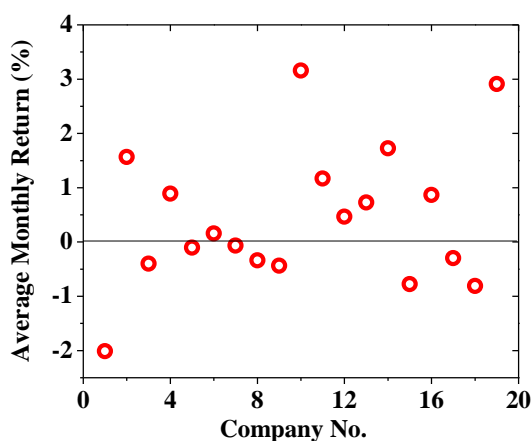

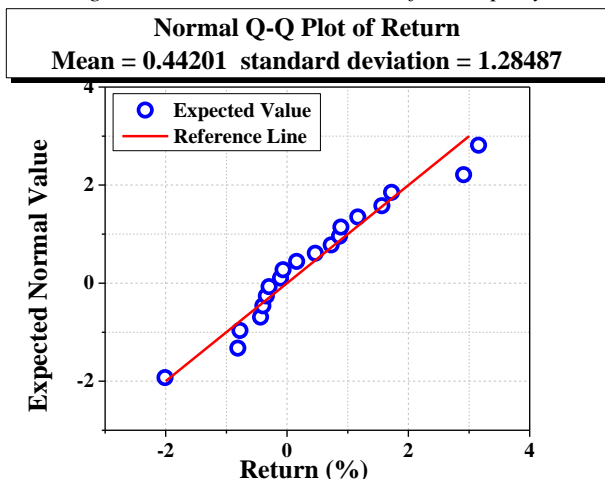*Fig. 1: Return rate distribution for company*

Fig. 2: Normal Q-Q plot for return rate

Table.1: Normality test for return rate

Shapiro-Wilk normality test		
Statistics	Degree of freedom, df	Probability value (p-value)
0.956	19	0.497

4.2 Data analysis for volatility rate

This study analyzed rate of volatility for 19 companies listed in Malaysia Stock Exchange that selected in 30

companies of Kuala Lumpur Composite Index (KLCI). Figure 3 shows the volatility rate distribution for 19 companies. The maximum value of volatility rate is 9.00 % for Top Glove Corporation Berhad (Company No. is 19). Meanwhile, the minimum value of volatility rate is 1.47 % for Kuala Lumpur Kepong Berhad (Company No. is 7)

Next, this study performed normality analysis for data distribution of return rate. Figure 4 indicates data distribution of volatility rate using normal Q-Q (quantile-quantile) plot. Figure 4 concluded the distribution of volatility rate is follow normal distribution because all of data is close to normal distribution line (red line). The average value for volatility is 4.85 % and standard deviation is 2.23%.

After that, the graphical finding is validated using statistical test of normal distribution. This study selected Shapiro-Wilk normality for data distribution analysis. This statistical test is selected because number of observation is less than 2000. Table 2 shows Shapiro-Wilk normality test for volatility rate. Table 2 indicates the probability value (p-value) is 0.562 that is larger than 0.05. Therefore, data distribution of return rate is follows normal distribution.
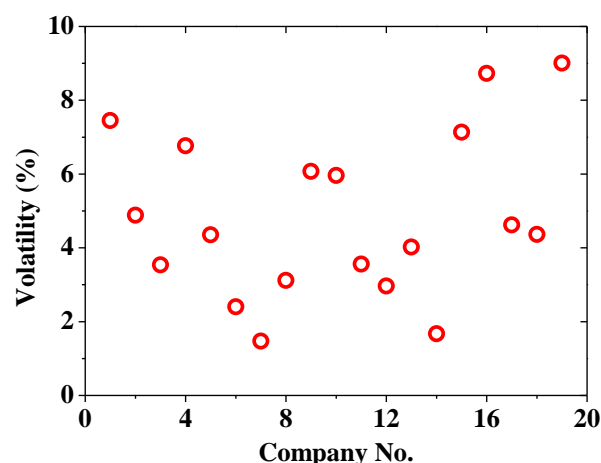

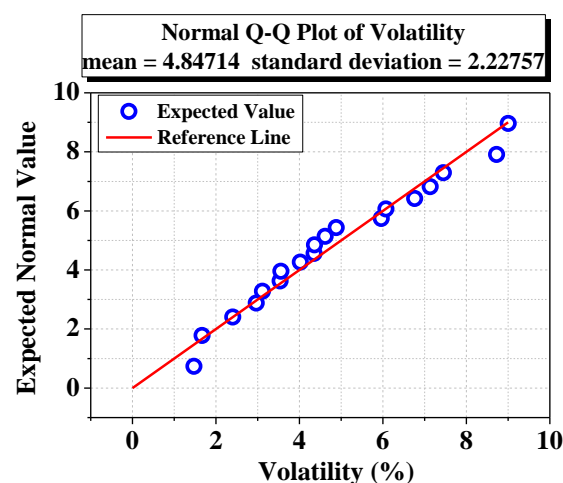*Fig. 3: Volatility rate for company*

Fig. 4: Normal Q-Q plot for volatility rate

Table.2: Normality test for volatility rate

Shapiro-Wilk normality test		
Statistics	Degree of freedom, df	Probability value (p-value)
0.959	19	0.562

V. CONCLUSION

Main purpose of this study is to evaluate the volatility rate for companies listed on Malaysia Stock Exchange. The companies selected in this analysis are 19 companies that sharia-compliant. The selected companies are categorized in 30 companies that determine Kuala Lumpur Composite Index (KLCI).

Main findings of this study are:

(a) The distribution of average return rate is follow normal distribution because all of data is close to normal distribution line. The average value for return is 0.442 % and standard deviation is 1.285%.

(b) Shapiro-Wilk normality test for return rate indicates the probability value (p-value) is 0.497 that is larger than 0.05. Therefore, data distribution of return rate is follows normal distribution.

(c) The maximum value of average monthly return is 3.16% for Nestle (Malaysia) Berhad. Meanwhile, the minimum value of average monthly return is -2.01 % for Axiata Group Berhad.

(d) The distribution of volatility rate is follow normal distribution because all of data is close to normal distribution line. The average value for volatility is 4.85 % and standard deviation is 2.23%.

(e) Shapiro-Wilk normality test for volatility rate. Table 2 indicates the probability value (p-value) is 0.562 that is larger than 0.05. Therefore, data distribution of return rate is follows normal distribution.

(f) The maximum value of volatility rate is 9.00 % for Top Glove Corporation Berhad. Meanwhile, the minimum value of volatility rate is 1.47 % for Kuala Lumpur Kepong Berhad.

The significant of these findings is it will help investors to understand the behavior of stock price in Malaysia Stock Exchange particularly sharia-compliant companies in Kuala Lumpur Composite Index. In addition, the findings of this study will help investors to develop investment portfolio that can maximize return and reducing loss.

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