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Return Autocorrelations and Volatilities of Kuala Lumpur Shariah Compliance That Coincide with Big News in Malaysia

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ABSTRAK

Artikel ini menguji perilaku pengembalian jangka panjang dari Kuala Lumpur Shariah Compliance. Studi ini mengandalkan dua teknik investigasi deret waktu utama, yaitu Ekonometrika Pemodelan pengembalian; Model Autoregressive, Assumption of Linearity, Volatility Modeling GARCH dan ekstensinya. Proses statistik dari model linieritas dan volatilitas, prediksi return saham dan integrasi kepatuhan Shariah dengan menggunakan spesifikasi model GARCH menunjukkan bahwa dalam hal perilaku pengembalian khususnya volatilitas kepatuhan Shariah di Malaysia rentan terhadap peristiwa dan berita yang terjadi di Malaysia.

ABSTRACT

This paper investigates the long term return behyavior of Kuala Lumpur Shariah Compliance. This studies relies on two major time series investigation techniques, namely Econometric Modeling of returns; The Autoregressive model, Assumption of Linearity, Volatility Modeling of GARCH and its extension. The statistical process from linearity and volatility modeling, stock return predictability and Shari'ah compliance integration by using GARCH model specification showed that in term of return behaviour particularly volatility of Shari'ah compliances in Malaysia are vulnerable towards events and news that happened in Malaysia.

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INTRODUCTION

In the implementation of trading system, the fundamental differences between *Shari'ah* compliance and conventional capital market is that *Shari'ah* compliance following the *Shari'ah* law trading system where is the trading system support and establish a free market where stock prices are not only determined by forces of demand and supply, but also by the availability and flow of information. Any attempts to influence stock prices by creating artificial shortage of supply (*ihtikar*) or to bid up prices by creating artificial demand is considered unethical according to the *Shari'ah* law or Islamic code of ethics.

The subprime mortgage crisis in 2008 followed by the instability of political and social economic condition has forced capital market industry particularly investor to seek stable platform of portfolio (Ho & Cheung, 1991). The stability toward financial crisis can be found in the portfolio of investment that offer less shocking volatility toward news and events that happened in one country. Financial crisis that hit the world in 1997 and 2008 has proven a setback for asset gatherers of all kinds in all marketplaces, but it is possible for *Shari'ah* compliance to derive a long-term benefit because of the capability to serve as an optional investment that is more prone to crisis (Hoffman, 2012).

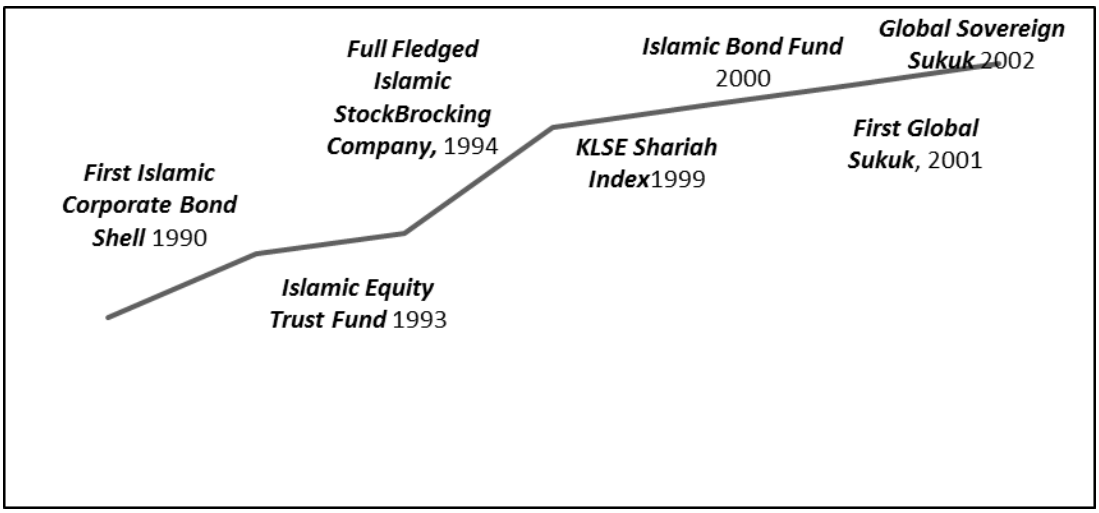

Figure 1

Milestone of Malaysia *Shari'ah* Capital Market Development

Source: Bursa Malaysia Annual Report, 2019

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Malaysia *Shari'ah* compliances started at the early 1990, the *Shari'ah* compliances started at the early 1997 in Indonesia. For Bursa Malaysia, the forming of KLSE *Shari'ah* compliance started in 1997.

Currently, there are only few studies that focus on *Shari'ah* compliance in Malaysia: (Ismail & Isa, 2008; Tuyon & Ahmad, 2016; Wasiuzzaman, 2010; Wong et al., 1990; Yusof, 2007). Limited studies about *Shari'ah* compliance are ironically contradictory to the fact that Malaysia is a the biggest *Shariah* financial market in the world.

The measurement of volatilities is very important in *Shari'ah* compliance. In terms of market price, the stock price of classified company in *Shari'ah* compliance should reflect the real condition of the company which issues a stock. Meanwhile, the efficiency of *Shari'ah* compliance is believed to be the main factor that can be used in answering the market price problem in *Shari'ah* compliance. The efficiency of *Shari'ah* compliance refers to the condition where the price of stock fully reflects all available information. The process of creating market efficiency in *Shari'ah* compliance begins with screening process, fair trading system and transparent information to all investor that invest their fund in *Shari'ah* compliance companies.

This research is very important to conduct since it will provide special treatment for the *Shari'ah* compliance in one side and realize the core concepts of *Shari'ah* compliance regulation and decide what the best concept for *Shari'ah* compliance in the future in order to achieve efficient market in term of fairness, transparency, protection to investor and reducing systematic risk. The similarity of concept between EMH and *Shari'ah* principle makes these two concepts are hand in hand to examine. Investors who invest in *Shari'ah* compliance seek for investment that provides stability, transparency and fairness, while investor tends not to have the same information at the same time because information are dynamics and move randomly. On the other hand, EMH concept also seeks to provide information that available to investor free and transparent by testing return predictability and stock price that moved randomly**.**

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The literature about stock market return toward information in term of news and events are voluminous and wide. This literature is limited to the discussion in the scope of Malaysia stock exchange. (Gupta & Modise, 2013) examine the overreaction hypothesis in manufacturing company at Malaysia Stock Exchange (JSX). One of the

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implications of the EMH is that the phenomenon of overreaction showed that market is not efficient, since the stock price can be predicted from past price. The result indicated that overreaction occurs separate in certain move and response depends on the how rapid the changing of news and events, where loser portfolio tends to outperform the winner portfolio. The overreaction moves in short term but very constant. Furthermore, this study cannot capture the overreaction since the selected sample was only from manufacturing companies, while the most volatile sector in Indonesia stock exchange are came from financial industry.

According to (Bley, 2002), the differences in LQ 45 abnormal return in, before and after the legislative general election in Malaysia due to general assumption that this index is very stable toward shocks in internal and external environment. General election in Malaysia is considered the biggest political events occurred once in four years. The result showed that the average abnormal return is significant before and after the legislative general election events. Two days before the general election, domestic investor implementing speculation activity, while many foreign investors also have to hold and postpone their buying and selling position and implementing the “wait and see” strategy to observed the situation after the election day.

Other than news events, rumors also can influence the volatility of return behaviour. (Al Rjoub, 2011), testing the changing of volatility pattern during circulation of rumors. Volatility pattern indicate that there are changes and response during the circulation of rumors. The strategy of “sell on rumors, buy on news” often implemented by irrational investor, where every information that related with stocks, whether it is news or rumors that will affect irrational investor decision. In Indonesia stock exchange, certain rumors have the capability to influence investor particularly rumors about financial report performance, bond launching, right issue and information about corporate action such as merger or acquisition. The result confirms that the transformation of volatility during rumor circulation is different depends on type of stock. Furthermore, from risk preferences perception, the activity of decision making based on rumors will be riskier compared to the one that based on information.

(Zhang et al., 2020) conducted a research on short run stock over reaction in Bursa Malaysia and found that stocks in Bursa Malaysia response to economic crisis and extraordinary political events through volatility of stock price. The study also showed that significant overreaction behavior existed in this market upon announcement of the

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removal of the deputy prime minister and announcement of the resignation of the prime minister. Political events in Malaysia also considered as influencing events for stock market. The similarity of political pattern in Indonesia and Malaysia brings investor in both countries closely observed political event and news. These studies should also focus on the long run stock over reaction in Bursa Malaysia, particularly focusing in certain periods where most of extraordinary events occurred (Verma & Verma, 2007).

RESEARCH METHOD

Data

The data obtained from Thomson Reuters data stream. The sample is collected on basis of the daily closing prices for weekdays (Mondays to Fridays). The span of period in sampling of data was restricted due to the availability of data. The data consist of daily closing price of Kuala Lumpur *Shari'ah* compliances from the year of 2011 to 2020.

The Autoregressive Model

Remembering the characteristics of Malaysia's *Shari'ah* compliances data. Data generating mechanism is not imposing. The methodology is consisting of; fitting an AR(p) to the return series and check the whiteness of the residuals, and following a finding of no further residual autocorrelation, continue with subject the residuals of the AR(p) to a battery of test to ensure that the residuals are independently and identically distributed (ii). If the result fails to explain the behavior of the data and there is evidence against *iid*, then the process continues with looking beyond the linear model to explain the remaining structure of the series. After the assumption of linearity is fulfilled number of possible ways of modeling a time series increases dramatically, covering such classes as chaotic dynamics (Shibata, 1976). Let Δ log Pt be stock returns: the AR (p) model is the

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$$\phi_p(L)\Delta \log P_t = \varepsilon_t$$

Where the AR polynomial in L of order ρ is

$$\phi_p(L) = 1 - \phi_1 L - \ldots - \phi_p L^p$$

And *εt* satisfies the white noise properties

$$E[\varepsilon_1] = 0, E[\varepsilon_1^2] = \sigma^2 \text{and } E[\varepsilon_t \varepsilon_n] = 0 \; \forall s \neq t$$

According to (Timmermann & Granger, 2004) and (Yen & Lee, 2008), the creation of efficient market is based on the three-following condition that need to be fulfilled; large number of rational investor, irrational investor cannot influence other investor in term of earning abnormal return and information is costless and widely available to market participants. The implementation of the three conditions in stock market would be in trading environment, rational investor acting as risk averse and unbiased in responding to price sensitive information. While, for *Shari'ah* compliance with the objective to creates and ensures fair, efficient and transparent trading system of *Shari'ah* compliance, the chances of gaining abnormal return should be minimal since *Shari'ah* principle prohibits investor to gain abnormal return, while Malaysia *Shari'ah* market where the system are still integrated with conventional trading the chances of gaining abnormal return is still high. According to (Dockery & Kavussanos, 1996) in order to creates fair, efficient and transparent trading system in *Shari'ah* compliance the successfulness of information delivery to investor is major key in creating efficient market besides lowering the cost of transaction and secure trading system. The assumption of EMH is that information should all be available to market participants.

If above assumption transforms into econometric modeling, the validity and return generating process is using nonlinear and a linear model is to test efficiency, then the hypothesis of independence of successive price changes is received wrongly (Dockery & Kavussanos, 1996) stated that standard tests of efficiency, such as autocorrelation and random walk tests are incapable of capturing non-linearity and therefore inferences drawn of

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such tests may be inappropriate. In *Shari'ah* compliance that integrated with the conventional trading system, non-linearity seldom occurs due to the interaction of noise and arbitrage traded stock. Failure to consider *Shari'ah* compliances trading system lead to wrong inference regarding efficiency. Since, non-linearity is existed because of market psychology where markets over-react to bad news and under-react to good news (Beaver, 1981).

Testing the Assumption of linearity

The indication of large movement in stock market in term of capital has triggered unanticipated decision toward news and events particularly news and events with a huge shock and impact to stock market. As a form to challenging EMH and forecasting stock price movements, chaos and non-linearity observed the chaotic toward a large movement of stock price due to response of "bad or good" news. However, the assumption of non-linearity is limited in financial time series, (particularly in term of autocorrelation-based procedures in testing the weak-form EMH). According to (Patterson & Ashley, 2000), 'Successful non-linear time series modeling will improve forecasts and produce a richer notion of business cycle dynamics than linear time series models allow. For this to happen, two conditions are necessary. First, economic time series must contain non-linearity. Second, reliable statistical methods to summaries and understand the non-linearity that is suitable for time series of the typical macroeconomic length. (Hinich & Patterson, 1989) stated that several early researchers failed to assume the observed time series that is generated from Gaussian process and testing for white noise using correlation structure, thus making the ignoring possible non-linear relationships between consecutive price changes. Independent and identically distributed (i.i.d.) increments areas of white noise (i.e. serially uncorrelated), but the converse is not true unless the series is normally distributed. From a statistical perspective, the distinction between white noise and pure white noise is nontrivial when non-linear dependence is present.

There are number of studies that focus on non-linearity in emerging markets. (Buguk & Brorsen, 2003; Khan et al., 2011) find evidence that stock market returns follow a non-linear dynamic system particularly in term of the relation with macroeconomic variables and financial variables due to the movement of small and large returns. Harrison and Moore (2012) found similar evidence that emerging market move with the same pattern of volatility, thin trading and low liquidity followed a nonlinear dynamic system. In the

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implementation, nonlinearity occurs in many statistical form, the five statistically test are; (Bollerslev et al., 1994; McLeod & Li, 1983).

Volatility Modeling

Modeling and forecasting stock return volatility is central to modern finance because risk volatility increased due to market uncertainty and the attempt from market participant to manage asset pricing, asset allocation and risk management. Two approaches generally used are the GARCH and stochastic volatility (SV) models. In their standard forms, the ensuing volatility processes are stationary and weakly dependent with autocorrelations that decrease exponentially (Lu & Perron, 2010).

Arguably, volatility, as measured by standard deviation or variance of returns where there is a dispersion of returns for a given security or market index. Volatility clustering and leptokurtosis are commonly observed in financial time series (Mandelbrot, 1963). The idea of explicitly modeling time variation in second or higher order moments began only in the early 1980s; The autoregressive conditional hetersocedastic ARCH and generalized ARCH, GARCH.

Wild bootstrapped automatic variance ratio (WBAVR) test

Let Yt be an asset return at time t, where $t = 1,2,...,T$. AVR test statistic takes the following form:

$$VR(k) = 1 + 2\sum_{i-1}^{T-1} m(i/k)\hat{\rho}(i)$$

where $\hat{\rho}(i)$ is the sample autocorrelation of order I. These estimations follow and use the quadratic spectral kernel for the weighting function so that

$$m(x) = \frac{25}{12\pi^2 x^2}\left[\frac{\sin(6\pi x/5)}{6\pi x/5} - \cos(6\pi x/5)\right]$$

According to, $VR(k)$ is a consistent estimator for the normalized spectral density for Yt at zero frequency. Under the null hypothesis that Yt is serially uncorrelated, shows that:

$$AVR(k) = \sqrt{T/k}\left[VR(k) - 1\right]/\sqrt{2} \xrightarrow{d} N(0,1)$$

as $k \to \infty$, $T \to \infty$, $T\,k \to \infty$,

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when *Yt* is generated from a martingale difference sequence with proper moment conditions. In order to choose the value of lag truncation point (or holding period) *k* optimally. The automatic variance ratio test statistic with the optimally chosen lag truncation point is denoted as $AVR(\hat{k})$.

To complement the $AVR(\hat{k})$ test, the normal critical values are used at 2.576 and -2.576 for 1% level of significance. This is based on the asymptotic approximation using the limiting distribution given in. However, this approximation can be inadequate in small samples, especially when *Yt* is subject to conditional heteroskedasticity. Following Kim (2006), the wild bootstrap for $AVR(\hat{k})$ is conducted in three stages as below:

i. Form a bootstrap sample of *T* observations $Y_t^* = \eta_t Y_t \ (t = 1,\ldots,T)$ where η_t is a random sequence with $(\ ) = E(\eta_t) = 0$ and $E(\eta_t^2) = 1$;

ii. Calculate $AVR^*(\hat{k}^*)$, the AVR statistic obtained from $\{Y_t^*\}_{t-1}^T$; and

iii. Repeat (i) and (ii) *B* times to form a bootstrap distribution . $\{AVR^*(k^*; j)\}_{j=1}^B$

The two-tailed *p*-value of the test is obtained as the proportion of the absolute values of $\{AVR^*(k^*; j)\}_{j=1}^B$ greater than the absolute value of $AVR(\hat{k})$. The $100(1-2\alpha)\%$ confidence interval for the test can be obtained as the interval $[AVR^*(x),\ AVR^*(1-x)]$, where $AVR^*(x)$ represents the α th percentile of $\{AVR^*(k^*; j)\}_{j=1}^B$. If the test statistic $AVR(\hat{k})$ lies outside this interval, the null hypothesis is rejected at the $(1-2\alpha)$ level of significance.

RESULT AND DISCUSSION

Total number of observations used in this research is 10 years, the daily average return of Malaysia is higher showed by the value of mean in Kuala Lumpur *Shari'ah* compliance around 3 percent. The most volatile *Shari'ah* compliance is in Malaysia, showed by the value of standard deviation. Highest volatility in Kuala Lumpur *Shari'ah* compliance refers to the vulnerability

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towards the changing of their stock market environment. The volatility of stock price in Malaysia *Shari'ah* compliances showed that *Shari'ah* stock price volatility depends on several factors including the availability of information to investor, whether the information is in form of past, public or private information.

Table 1
Descriptive Statistic (Logarithmic Returns) Malaysia *Shari'ah* Compliances

Item	Malaysia
Mean	0.3872
Median	0.3700
Maximum	0.4800
Minimum	0.3300
Standard Deviation	0.9224
Skewness	0.8608
Kurtosis	3.0325
Jarque-Bera	1.3592
Probability	0.5068
Sum	2626
Sum Sq. Dev.	0.0182
Observations	11

Notes: number of observation is 11 years while data for statistical process is using daily data.

Kuala Lumpur *Shari'ah* compliance based on standard deviation offer highest volatility but also offer highest daily average return. The distributional properties of returns appear to show extreme observations. The highest kurtosis in the sample occurs in Malaysia. However, if kurtosis in one country exceeds the threshold of 3, implying that the returns have fatter tails than would be expected from a normally distributed variable. The Jarque-Bera (JB) is 1.359244 for Malaysia.

Deviations from normality can be decrease in part by temporal dependencies in returns, especially second moment temporal dependence, an indication that assuming a linear process for returns may leave important features of the data unexplained. The presence of second moment dependence is reinforced by Ljung-Box (LB) statistics calculated for 12 lags. The hypothesis that all autocorrelations up to the 12th lag are jointly zero is rejected. A possible reason for autocorrelation in the returns is non-synchronous trading.

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Preliminary Evidence: AR (p) Model

An AR (*p*) model was fitted to the returns of Malaysia *Shari'ah* compliances to ensure the pre-whiten residual before testing the evidence of non-linearity. Stock market returns are of the modeled as autoregressive time series with random disturbances having conditional heteroscedastic variances, particularly with GARCH type processes. This research is analyzing two data sets of stock prices, fitting an AR (*p*) model to the series by ordinary least squares regression yielded the results in Table 2.

Table 2
AR (p) Pre-Whitening MODEL (Kuala Lumpur *Shari'ah* Compliances)

	Malaysia
μ	0.197(68)
$\phi 1$	0.835553
$\phi 2$	0.053332
$\phi 3$	0.550776
$\phi 4$	0.055294
$\phi 5$	0.592207
$\phi 7$	0.522513
$\phi 8$	0.05294
$\phi 10$	0.056241
DW	1.765597
B.G(5)	0.25[1.641]
LBQ(12)	3.16[0.531]
LBQ(24)	12.033[0.261]

Notes: *, **, and *** indicates significance at 10%, 5% and 1% levels respectively, μ is the constant. ϕ indicate the AR coefficients. B.G. is Breusch-Godfrey test for higher order serial correlation.

Malaysia following the low order autoregressive with general assumption that follows the AR (1) process. Having fitted an AR (*p*) model, it is now necessary to examine an adequate and useful functional form for the data generating process. To eliminate of spurious autocorrelation, AR (*p*) also has a function to investigate and examine whether the nonlinear dynamics are localized in time. In the case of *Shari'ah* stock price in Malaysia, the dynamics volatility of the stock price can be

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minimized by taking an integrated screening process to the listed company, as precautions steps toward volatility.

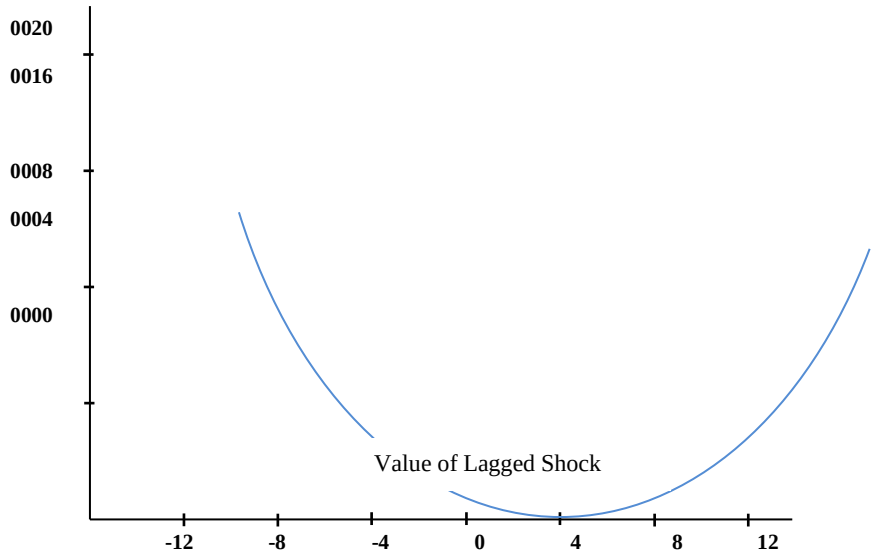

Figure 2

News Impact Curves for Kuala Lumpur and Indonesia *Shari'ah* compliances

Table 3
Significant Return Autocorrelations of Kuala Lumpur *Shari'ah* compliance that Coincide with Big News in Malaysia

Date	AVR-1	Market-moving News Events
07/08/2011	2.083684	Malaysia's export trade suffer as major segments of the global economy flirt with recession.
07/02/2012	1.32290	Annual Chinese New Year rally (SC)
22/02/2012	11.15489	Launch of the capital market master plan (SC)
02/05/2012	3.70186	Abolition of the 10% exit levy (SC)
22/06/2013	3.589474	Malaysia General Election
25/06/2014	4.49707	Moody's places Malaysia on review for possible upgrade (BNM)
25/07/2015	1.88461	Oil prices entered into period of sustained rally (London Brent Crude futures from approximately US$36–US$45 per barrel) (SC)

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23/10/2016	1.27857	Crude oil prices breached US$50 per barrel (SC)
06/01/2017	1.359886	Market consolidation following Q4 2004 gains and higher oil prices (SC)
18/03/2018	3.84132	Concerns over extensive hedge fund losses and prospects of aggressive monetary tightening also led to a general loss in investor risk appetite (SC)
02/09/2018	1.25806	Markets rebounded as oil prices stabilized (SC).
23/08/2018	2.45389	The increasing of national oil prices in Malaysia
06/06/2018	1.38877	Malaysia shelves construction of controversial bridge to Singapore, some 60,000 displaced by flooding in the south (SC)
05/01/2019	2.21538	The issue of two Bear Sterns hedge funds (SC)
08/07/2019	2.971933	Malaysia inflation rate hit 26-year high (8.5%) (BNM)
18/11/2020	9.42227	Global stock markets fell to record lows followed with unprecedented co-ordinate interest rate cuts (US, Europe and Asia) (SC)
26/03/2020	7.18940	KLCI falls 9.5% followed with the increasing price of CPO RM4,486 per ton (SC)
11/09/2020	1.293857	The implementation of Central Bank Act of Malaysia (BNM)
03/03/2020	4.02404	Statement from Federal Reserve Bank to maintain obligation buying funding during Covid-19 Pandemic (BNM)

Notes: AVR-1 refers to the automatic variance ratio statistic minus one. Entries in parentheses denote the sources of the news events, (1) SC (Securities Commission) (2) BNG (Bank Negara Malaysia)

In Kuala Lumpur *Shari'ah* compliance, investor needs more than 2 minutes to adjust with news events that happened in Malaysia during the period of observation. The most influential news and events in Malaysia are political and economic news, these types of news and events can have categorized as news and events that has major impact to investor behavior since investor only needs several minutes to digest with news events particularly the one that will give huge impact to the economic growth and condition.

Kuala Lumpur *Shari'ah* compliance market incorporated with political news events in Malaysia only need 2 minutes until 3 minutes to fully adjust with the news events, while another major economic news in Malaysia such as increasing of oil prices that

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happened in 2006, markets only need less than 3 minutes to fully incorporated and adapting with the news since the news can be categorized as policy that will affect the whole sector of economy in Malaysia. For instance, (Karmakar, 2007) conducting research about overreaction in Bursa Malaysia by using short term period toward dramatic events that happened in Malaysia. The findings reveal that Kuala Lumpur *Shari'ah* compliance overreacts to economic crisis and extraordinary political events, which explain the same behavior on this research whereas market tends to overreact toward specific events that will impact to the economic growth.

CONCLUSIONS

Stability toward news and events is important since it is related with the response of classified company in *Shari'ah* compliance. Volatile *Shari'ah* stock price is against the nature of *Shari'ah* principle in the first place, where one of the principle is to create price stability to achieve fair and transparent *Shari'ah* compliance condition to investor. In certain seasonal anomalies, investor proves to obtained abnormal return during seasonal anomalies in Malaysia *Shari'ah* compliance. The existence of seasonal anomalies proves that *Shari'ah* compliances in Malaysia are not purely efficient, since investor able to earn benefit of certain time for securing abnormal profit. *Shari'ah* compliance prohibited the act of speculation and gambling or the action to take benefit from unfair situation or during specific period of time. This activity is considered as taking opportunity towards other party who do not have the advantages in information.

Chances of portfolio diversification in Kuala Lumpur *Shari'ah* compliances is very low since foreign investor cannot diversify their portfolio to Malaysia *Shari'ah* compliances due volatilities. Based on the result, policy recommendations are government should remove trading barriers between countries along with the establishment of socialization process about *Shari'ah* compliance not only for domestic but also for foreign investor. Maintaining macroeconomic stabilization will also creates strong integration in Malaysia *Shari'ah* compliances with selected *Shari'ah* compliances in the world and for Indonesian stock exchange particularly, where the technical trading system makes differences between investor codes for foreign and domestic investor should be removed since it can caused decision making based on following other investor decision.

Further empirical scrutiny is warranted of Malaysia *Shari'ah* compliances as Malaysia make their transition from developing to emerging markets and from

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emerging to developed markets, making *Shari'ah* compliances evolve into the biggest funding accumulation beside conventional stock market. The transition requires significant adjustments and realignments toward the individual companies that classified in *Shari'ah* compliances. Thus, further research should focusing on researching individual companies that classified in Malaysia *Shari'ah* compliance to further gain more specific information about EMH and return behaviour for Malaysia *Shari'ah* compliances.

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