

# The Effect of the Commodity Price on Sharia Stock Markets Volatility in Developed and Developing Countries

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**Abstract**—This research examines the effect of commodity price on Sharia stock markets volatility in both the developed and developing countries. The current study explores the time series as analysis of economic variables and Sharia stock markets by applying the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model. The commodity price include world oil price and gold price. For representation of Sharia stock markets are Indonesia Sharia Index (ISSI), FTSE Bursa Malaysia *Hijrah* Sharia Index (FBMHS Index), S&P Japan 500 Sharia Index (SHJ Index), and S&P 500 Sharia Index (SHX Index). The daily data of the variables for the time period from 1st July 2011 to 31th May 2016 is used for the current study analysis. The ADF test is used to check the stationary in the data respectively. The results show that commodity price have substantial influence on the stock prices volatility. The commodity price on Sharia stock markets volatility in developed and developing countries and are consider as the best indicators for future prediction of the market and economy as well. The movement of commodity prices in the market can affect the movement of stock prices in the capital market.

**Keywords**—the world oil price; the gold price; Sharia stock markets; volatility

## I. INTRODUCTION

Sharia stock have a greater potential to attract a global portfolio and can serve as a safe haven. The Islamic stock index is considered more resilient to the financial crisis and a better position due to the unique characteristics of the Sharia stock market i.e. ethical investing, ratio screening, limit the intensive structured based financial products such as derivatives and low tolerance towards interest based leverage [1]. The characteristics of Sharia stocks that are less risky and the growth of the spectacular index of Sharia increases investor demand and is considered one of the major innovations in the financial community. Investments shift from actively managed funds into passive index-based investment (Sharia) as global Sharia finance provides investment opportunities to investors around the world [2]. Furthermore, Sharia-based portfolios show different performance compared to conventional market portfolios. Sharia investment becomes more attractive to all classes of investors, such as Muslims and non-Muslims due to ethical business practices, fiscal conservatives, a sense of social

responsibility and rapid growth. The constraints of Sharia investment that can differentiate the Sharia market with conventional markets are limited by prohibited elements and unethical investment activities that the Sharia stock index is different from conventional especially on the extreme market decline [3-5]. The performance of Sharia and conventional stock exchanges, for the three major economies, namely the United States, Europe and the results recommend that the Sharia index as a better investment alternative [6].

Furthermore, one can argue that stock market volatility is a major factor affecting economic growth in both developed and developing countries [7]. Volatility was measured from the difference between the current asset price and the asset's price in the past [8-10]. Volatility is the standard deviation or variance of stock returns, which measure from the distribution of returns from the average. If price fluctuations are within a short span of time, then the volatility is high and volatility is low if prices move slowly. There is much debate that financial markets play an important role in economic growth and development by encouraging capital accumulation and acting as a channel for efficient allocation of capital. Therefore, stock market volatility can jeopardize the smoothness of the financial system that may adversely affect performance and economic growth [11,12].

However, there are questions about the factors that affect volatility of stock market. The factors can affect the stock Index, among others the state of global economy, the movement of world oil prices, the movement of gold prices, the political stability of a country and others [13]. Today, the movement of commodity prices in the market can affect the movement of stock prices in the capital market. Investments made by investors on various assets also create a link between the commodity market and the capital market [14].

Crude oil is one of the most important commodities in the current global world. Over the past decade, the greater instability in energy markets and the persistence of oil prices at higher levels are largely responsible of the slowing world economic growth [15,16]. An empirical study was conducted to assess the effect of changes in world oil prices on the capital market has been done by several researchers. That changes in

oil prices did not affect on the stock market in Japan [17]. This is supported by research that shows that no impact from changes in world oil prices on the S&P 500 index [18]. Research examining the effects of changes in world oil prices on the stock market in Pakistan [19]. In contrast, many studies have found that there is a significant correlation between changes in world oil prices and stock market [20-25].

Gold price rises when there is a bearish outlook of the economy or some uncertainty over the future [26]. Gold is ancient, precious, highly liquid, financial instrument, and it categorizes in very important asset class. It has both features of commodity and currency, but storage cost or safe keeping of gold makes it different from the paper and electronic currency. The stable value of gold against current macro conditions such as fluctuations in the rupiah exchange rate, the fiscal crisis in Europe, international terrorism and geopolitical turmoil in the Middle East make gold considered the safe place to keep money in conditions of uncertainty [27]. Gold as a hedge or safe haven for stocks and explains that gold is the most appropriate to use as a hedge for stock average and safe haven for the stock market during the turmoil in the market [28].

Gold has been documented as a hedge and a safe haven for the stock market, in this context many studies with different results. Some research results are similar to these characteristics and some have the opposite result of the role of gold in different market conditions. For example, the research found a positive relationship between gold and stock market returns [29]. While gold has the characteristics, hedge and safe haven for the stock market of developed countries [30,31]. Gold is a weak safe haven against stock market declines rather than silver and index volatility [32,33]. Further, nonlinear causality relationship between conventional and Sharia stock markets and the reaction to global economy and finance. The results show the Islamic stock markets is not isolated from various types of external shocks and the Islamic financial system is a weak protection against financial shocks that affect the conventional stock market and lacks portfolio diversification [34].

## II. METHOD

### A. Data and Sample

In this study, we use daily data the West Texas Intermediate (WTI) crude oil price is chosen as a representative of world oil price. The original WTI crude oil spot price (quoted in US dollar per barrel) is acquired from the U.S. Energy Information Administration (EIA). Over the time period studied, West Texas Intermediate crude oil is widely seen as a benchmark for world oil markets. While the gold price data come from the global insight and are based on the London Bullion Market Association, which are also spot price and quoted in U.S. dollars per troy ounce. And then data is a Sharia stock index consisting of Indonesia Sharia Index (ISSI), FTSE Bursa Malaysia *Hijrah* Sharia Index (FBMHS Index), S&P Japan 500 Sharia Index (SHJ Index), and S&P 500 Sharia Index (SHX Index) from Bloomberg database. The sample period is from 1<sup>st</sup> July 2011 to 31<sup>th</sup> May 2016.

### B. Methodology

Econometric expert who first analyzed the problem of heteroscedasticity of residual variation in time series data [35]. The varying residual variety occurs because this residual variety is not only a function of the independent variable but also depends on how much residual it has in the past [35].

Engle developed a model in which the mean and variety of time series data are modeled simultaneously. The model is known as the Autoregressive Conditional Heteroscedasticity (ARCH) model. The residual variation depends not only on the residuals of the last period but also the residual variations of the past period [36]. Based on that, Bollerslev then developed the ARCH model by incorporating residual elements of the past period and residual variety. This model is known as the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model. The equation used is as follows:

$$SM_t = \alpha_0 + \alpha_1 WTI_t + \alpha_2 GOLD_t + \epsilon_t \quad (1)$$

With

$$\begin{aligned} \epsilon_t &= \epsilon_{t-1} + \dots + \epsilon_{t-p} + \epsilon_t \\ \epsilon_t^2 &= \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \dots + \alpha_p \epsilon_{t-p}^2 + \alpha_1 \epsilon_{t-1}^2 + \dots + \alpha_q \epsilon_{t-q}^2 \end{aligned} \quad (2)$$

and  $\epsilon_t$  is independent and identical distributed  $N(0,1)$  and does not depend on the past state of  $\epsilon_{t-p}$ .

$SM_t$  = The Sharia capital markets studied in the period  $t$

$WTI_t$  = The WTI crude oil in the period  $t$

$GOLD_t$  = The Gold in the period  $t$

Prior to GARCH analysis, the stationary test was first done by using the Augmented Dickey-Fuller Test (ADF) [37,38].

## III. RESULTS AND DISCUSSION

### A. Unit Root Test

A time series is stationary or not or include unit root for which Augmented Dickey-Fuller (ADF) test method has been used in the study. ADF test considered as an appropriate tool to check the stationary of time series data [39-42]. The time series is non-stationary if the critical value is lower than the calculated value, subsequently null hypothesis is rejected and series is decided to be stationary. The stationary test results can be seen in table 1.

TABLE I. UNIT ROOT

Variables	Level	1st difference
D(WTI Oil)	-2.079000	-20.15871*
GOLD	-6.984637*	-24.88972
ISSI	-11.91405*	-17.42327
FHSI	-5.191805*	-18.20673
D(S&P Japan 500)	-1.822960	-15.70601*
S&P 500 US	-3.017216*	-15.47229

Note: \*Significant at the level of significance 1%, Source: Author's own calculation

Based on table 1, all data used in this study has a different stationary data at ADF level and first difference, but with a 1% level of significant. The stationary data are Gold, ISSI, FHSI, and S&P 500 US at the level. D (WTI Oil) and D(S&P Japan 500) are the stationary data at the first difference. And then, this research used GARCH (1,1) is a proper analysis tool to use.

#### B. Analysis GARCH (1,1)

The results analysis of the GARCH (1,1) show that some capital market follow the GARCH process which is shows through the significant of variance equation. Hence the models proposed in this study were appropriated, also supported by the ADF test statistics. This section discussed the results of GARCH (1,1) analysis which can be seen in table 2.

TABLE II. RESULT GARCH (1,1)

D(WTI Oil)				
Variables	Coefficient	Std. Error	z-Statistic	Prob.
ISSI	250.7758	19.59522	12.79780	0.0000
FHSI	0.000600	6.20E-05	9.681686	0.0000
D(S&P Japan 500)	0.041033	0.000336	122.1563	0.0000
S&P 500 US	0.004876	0.000252	19.37319	0.0000
C	-13.99897	0.677413	-20.66534	0.0000
Variance Equation				
C	35.76068	0.627183	57.01798	0.0000
RESID (-1)^2	2.206386	0.215110	10.25702	0.0000
GARCH (-1)	-0.005221	0.000975	-5.355732	0.0000

Source: Author's own calculation.

Based on table 2, D(WTI OIL) have a significant influence on some stock markets such as ISSI, FHSI, D(S&P Japan 500), and S&P 500 US, the coefficient of D(WTI OIL) are positive effect on ISSI, FHSI, D(S&P Japan 500) and S&P 500 US. Furthermore, the results of this study are in line with the research conducted [20-23]. This indicates that the increase in oil prices will affect the increase of stock markets in some countries, especially in the energy sector that have a strongest relationship compared with other sectors.

TABLE III. RESULT GARCH (1,1)

GOLD				
Variables	Coefficient	Std. Error	z-Statistic	Prob.
ISSI	23892.62	1126.609	21.20756	0.0000
FHSI	-0.019090	0.003839	-4.972098	0.0000
D(S&P Japan 500)	0.284974	0.014464	19.70241	0.0000
S&P 500 US	-0.375599	0.018489	-20.31444	0.0000
C	1660.292	34.07428	48.72568	0.0000
Variance Equation				
C	38893.73	1131.607	34.37036	0.0000
RESID (-1)^2	0.485510	0.055039	8.821117	0.0000
GARCH (-1)	0.184482	0.016572	11.13184	0.0000

Source: Author's own calculation.

Based on Table 3, that GOLD has significant influence on some stock markets such as ISSI, FHSI, D(S&P Japan 500), and S&P 500 US, the coefficient of GOLD a positive effect on ISSI and D(S&P Japan 500). This shows that the higher the level of the gold price change, the more the increase in ISSI and D(S&P Japan 500) stock markets, this is supported by research conducted [29]. In contrast, the coefficient of GOLD is negative on FHSI and S&P 500 US.

#### IV. CONCLUSION

The world oil price have a significant impact on Indonesia Sharia Index (ISSI), FTSE Bursa Malaysia *Hijrah* Sharia Index (FBMHS Index), S&P Japan 500 Sharia Index (SHJ Index), and S&P 500 Sharia Index (SHX Index) with a positive effect. The gold price have a significant impact on Indonesia Sharia Index (ISSI), FTSE Bursa Malaysia *Hijrah* Sharia Index (FBMHS Index), S&P Japan 500 Sharia Index (SHJ Index), and S&P 500 Sharia Index (SHX Index) but the coefficient of GOLD is positive effect on ISSI and SHJ Index. The coefficient of GOLD is negative effect on FHSI and SHX Index.

Recommendations, this implies that the provide opportunity for the potential benefits from international portfolio diversification that can be earned by investors because the characteristics of Sharia stocks that are less risky and the growth of the spectacular index of Sharia increases investor demand and is considered one of the major innovations in the financial community. Since there is a time difference due to the geographical, investor need to pay attention to the changes in commodity prices in their stock investment, such as the world oil price and the gold price. Today, the movement of commodity prices in the market can affect the movement of stock prices in the capital market.

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