

CAUSAL RELATIONSHIP BETWEEN ISLAMIC STOCKS AND STAPLE FOOD COMMODITIES OF LARGEST MUSLIM ON SOUTH EAST ASIAN COUNTRIES

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Abstract

With many adherents of Islam, it is appropriate for the Muslim-dominant countries such as Indonesian and Malaysia capital markets to accommodate the investment needs of the community in line with sharia principles. Staple food commodity is one of the crucial commodities which can affect the mobility of stock prices. The correlation between Islamic financial instruments and specific commodities, such as staple foods, has only been partially studied in the past. The lack of contextual relationships between country-specific on dominant-Muslim countries of Islamic stocks is attributed for the study. This paper examines the relationship between staple food commodities and Islamic capital markets. Using MGARCH and robustness VAR technique analysis and monthly data from 2017-2021, the empirical evidence suggests that getting information about the dynamic correlation between them is vital. The main findings from this study are that there are relationships among them in the long run and they have positive and negative correlations. Investors who place a high value on sharia compliance should be mindful that the price of rice, a staple food, is more unpredictable than other staple food commodities (cooking oil), which will have an impact on Islamic Stocks Instrument. The main limitation was the short sample time employed for study, which prevented in-depth consideration of issues such various national and cultural contexts or other exogenous factors that might have varied the linkage between the countries.

Keywords: *Shariah Instruments, Islamic Stock Indices, Staple Food Commodities, MGARCH, South East Asian.*

1. INTRODUCTION

The public's view of sharia-based investment instruments is proliferating in line with investor demand for the need for financial instruments that are safe, flexible and not less competitive with other conventional financial products. Islamic investment abilities hope to maintain the fund in a stable frame as the business nowadays becomes uncertain and very volatile, and loss of confidence leads to uneven wealth and immoral practices.

Islamic financial products, on the other hand, cannot be carelessly developed by a business in any industry. No ethically dubious enterprises allowed (e.g., arms manufacturing or alcohol production). All Shariah-compliant tools must be supported by the three tenets of justice, fairness, and morality, which forbid riba (usury), gharar (deception), and allow risk sharing. Shari'ah-compliant investments must relate returns to risks and are based on the exchange of ownership in tangible goods or services, with money operating as the payment instrument to effect the transfer of ownership.

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Although Islamic finance became a global system because of its resilience to crises such as at Global Financial Crises in 2008, two main factors are hindering the ability of the Islamic capital market to deliver such products. The first was that the conventional financial markets were developing with tremendous speed and in many different directions. The second factor slowing the pace of Islamic capital market development was the conflict surrounding the interpretation of what constitutes Shari'ah compliance (Iqbal & Tsubota, 2006).

Challenged to match investors' preferred investment products, Islamic financial instruments, including Islamic financial markets, are struggling to maintain a competitive pace. Investors who choose the principle of compliance with sharia law also want to choose financial instruments that reduce losses due to adverse market conditions. Therefore, it is necessary to know the factors affecting the movement relationship between certain commodities and Islamic Stock Markets. Have equity and commodities reached a "financialized market of one"? Is this connection resilient? Do the benefits of diversifying still apply? The fundamental driver for this study is the evidence that these inquiries have produced, which provides crucial insights for decision-makers including governments, traders, and investors. This study present evidence on how returns in the commodity and Islamic equities markets move in lockstep in the time and frequency domains in order to evaluate the potential of commodities as an alternative asset class for investors in Islamic equity.

In recent years, much literature and research bestow insight and argument into connectedness among Islamic financial markets and asset classes such as stocks, bonds and commodities. Nevertheless, most of it focused on studying Islamic bonds (Sukuk) rather than Islamic stocks. Furthermore, macroeconomic conditions such as commodities often discussed are oil, gas, and mining (gold and silver). For instance, in the period between 2003 and 2021, inconsistent findings still emerge referring to commodities and financial instruments. They might link stock and commodity markets through their economic activity, then initiate the linkage, which directly shows which commodity group is the most influential and can affect the stability of stock price and returns.

Two Southeast Asian nations, Indonesia and Malaysia, are ranked top and second, respectively, in the Islamic Finance Country Index for 2021. This demonstrated that, when compared to other nations, Indonesia and Malaysia continue to lead the world in the development of the Islamic financial sector. Although they compete, Malaysia and Indonesia have different traits and development trends in the Islamic financial markets. For instance, Indonesia adopted a bottom-up approach while Malaysia adopted a top-down approach to the emerging sharia economy. Indonesia does not immediately rise to the top. Due to Indonesia being one of the few nations to change its financial industry in order to position it as a worldwide Islamic finance powerhouse, they require time in the previous five years (Juhro et al., 2020). This possibility will result in any changes in how the Islamic finance industry is developed and how it is connected to other products like commodities.

Under such background circumstances above, this paper is meant to narrow the literature gap in the seeking of relation that determines the significance between shariah compliance financial instrument to macro-economic variables, including commodities. I intend to focus on staple food commodities that have not been extensively explored and in limited literature. Using emerging markets in Southeast Asia, this research takes the case study at one of the largest Muslim-dominant countries such as Indonesia and Malaysia. This choice is related to the fact that almost the past research took dominantly Muslim countries such as Gulf Cooperation Council (GCC)

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MEA regions and even non-Muslim countries such as Asian Pacific. With the paper's primary objective to examine the causal relationship between staple food commodities and Islamic stock, I would also like to find the lead-lag relationship between them, enhancing the existing literature. The paper's original contribution is to incorporate staple food commodities that none of the research has been found besides comparing big emerging markets like Indonesia and Malaysia. The findings reveal that the stock prices and commodity prices have a long-run relationship and there is a theoretical relationship between them. Malaysian Islamic stock markets have a tendency to stabilize when it comes to commodities compared to Indonesia Islamic stock markets.

Hence, the following sections of the paper are organized: Section 2 reviews the relevant literature related to staple food commodities price and stock market index in time-varying and scale dependence and briefly reviews the theoretical foundations of this paper. Section 3 details the methodologies to be employed. Section 5 contains the data analysis and empirical results and discusses the results obtained from the previous section using probable explanations and past findings in the literature. Section 6 will summarize the paper regarding literature until the conclusion, thus implications for academics and practitioners. References are attached at the end of this paper.

2. LITERATURE STUDY

Islamic Financial Instruments and Commodities in Emerging Markets

Carried out research about studying price movements in financial instruments continues to expand more until reaching a specific area such as Islamic finance. The dynamic causal linkage between the stock market and macroeconomic variables has been conducted deeply in the past literature. However, when we compare the link, the nature of commodity prices such as oil, gold, and staple food is not attained deep analysis, which do not reveal the objective very much, although those factors are pretty impactful for Islamic equity.

Research options related to a particular market area, such as emerging markets as the majority of the research used. Among the earliest study on dynamic return and volatility, research done by Bahloul and Khemakhem (2021) aimed to examine the connectedness between commodities and Islamic stock market indices that introduced techniques using a connected index stated in S&P GSCI commodities and their sub-indices based on the forecast error variance decomposition from the VAR framework. They found that the commodity market exhibited the highest source of shocks to the Islamic stock market; whatever the period, the degree of connectedness among them varies over time. Especially after the covid-19 pandemic, the commodity market is the net transmitter of return and volatility shocks to the Islamic stock market. However, they stated that the Islamic stock market is a net recipient of return and volatility spill overs rather than a transmitter. More focused on regional areas in emerging markets such as Southeast Asian countries conducted by Abdullah et al. (2015) aims to test the time-varying, time scale-dependent volatilities correlation between Islamic stock indices and crude oil price as commodities. Exciting findings from their research identify that Malaysia and Thailand Islamic stock indices, crude oil, corn and gold prices would respond to the Singapore, Philippine and Indonesia Islamic stock indices. Unlike previous research, they acquired some contemporary techniques, such as maximum overlap discrete wavelet transformation (MODWT), continuous Wavelet transformation (CWT) and Multivariate GARCH, for finding the dynamic conditional correlation. From that, we can see that time-series data requires recent techniques for econometric research, which can help them identify the research objectives more clearly. Additionally, we

might claim that emerging market nations are linked to other emerging nations in a consent.

Correlation of Shariah Instruments and Commodities

From a traditional economic perspective, commodities are considered good portfolio diversified and coherent inversely with stock markets. Islamic stocks are proven strongly exposed to commodity price evolutions and suggest that such correlations reduce the potential substitutability of such investments in portfolios (Chebbi & Derbali, 2015). Widad and Hadjer (2018) attempt to find the correlation between commodities such as oil and precious metals in the Islamic bond market. They conclude that only precious metal has insignificant responses towards Islamic bonds (Sukuk), although they have substantial negative relation. On another Islamic instrument and selected commodities such as stock and selected commodities (crude oil, gold and corn) as employed by Rithuan et al. (2014), in the long run, these variables tend to move together and minimize the diversification benefits. Different from others, Yahya et al. (2013) conclude that among oil and gold prices, only oil's price will affect the Islamic stock return in the time-varying short-run in Malaysia. Interesting study conducted by Ait-Youcef (2019) by including agricultural commodities contains grains sector (corn, oat, soybean and wheat prices) and soft sector (cocoa, coffee and sugar prices). He found that trading by holders of commodity indexes may serve as a conduit for the integration of the equities and agricultural commodities markets, leading to the financialization of the agricultural markets. On the other hand, considering in food commodities is a field that hasn't gotten enough consideration from modern Muslim academics and Shariah standard-setting organizations. Despite the fact that it includes essential foods for any community and Muslim countries in particular, the entire food commodities market received little attention in comparison to the banking and insurance sectors (Kalimullina and Orlov, 2020). Contrarily, the Tuna and Tuna study (2019) asserts that Islamic stock markets are safe havens for all commodity classes, including industrial metals, energy, precious metals, agriculture, and soft commodities. So it's fascinating to investigate whether or if commodities like basic foods also exhibit safe haven and even risk aversion qualities.

3. RESEARCH METHODOLOGY

To answer the research question regarding what is the impact of oil and other staple food commodities on Shariah-compliant instruments' prices and returns, the data methodology that is being used is panel data because it consists of monthly data on the prices of two commodities (oil and rice) and Islamic stock indices of Indonesia (Jakarta Islamic Index) and Malaysia (FTSE Sharia Bursa Malaysia Hijrah Shariah) as the representative of biggest Muslim dominant countries on Southeast Asian from 1 January 2017 until 31 December 2021. All the data was obtained from Yahoo Finance and Investing.com public resources for the stock price indices, the Ministry of Trade's website for commodity price, and Bank Indonesia for currency rate ringgit (MYR) to rupiah (IDR). I choose rice as another staple food commodity because both countries have rice as their primary staple food. This study employs time series techniques namely the multivariate GARCH model.

The multivariate GARCH-DCC model was first introduced by Engle (2002). The DCC approach allows time series to have periods of positive, negative, or zero correlation, and the strength of the correlation can also be observed in the directions. This approach has been used to assess the volatility and correlation between commodities and Islamic equities in some studies (Abdullah et al., 2016; Chebbi & Derbali, 2015; Rithuan et al., 2014; Nagayev et al., 2016). Multivariate Generalized Autoregressive Conditional Heteroscedastic (MGARCH) has been used in this study because variations in correlations and volatilities in higher frequency levels are richer

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and sequentially calculated for large time-varying covariance matrices (Filis et al., 2011). MGARCH model can be conducted following the first steps to test for both normal and t distributions to determine which model is more appropriate in our case. Results of unconditional correlation coefficients could suffice to provide empirical evidence. However, I require the computation of conditional cross-asset correlations to address the fourth objective more fully by using DCC-MGARCH computation as:

$$\bar{\rho}_{ij,t-1}(\phi) = \frac{q_{ij,t-1}}{\sqrt{q_{ii,t-1} q_{jj,t-1}}}$$

Where $q_{ij,t-1}$ are given by:

$$q_{ij,t-1} = \bar{\rho}_{ij}(1 - \phi_1 - \phi_2) + \phi_1 q_{ij,t-2} + \phi_2 \tilde{r}_{i,t-1} \tilde{r}_{j,t-1}$$

In the above, ρ_{ij} is the (i,j)th unconditional correlation, ϕ_1 and ϕ_2 are parameters such that $\phi_1 + \phi_2 < 1$, and $r_{i,t-1}$ are the standardized asset returns. We also test whether the computed volatility is mean-reverting by estimating $(1 + \lambda_1 - \lambda_2)$. Some diagnostic tests are conducted to substantiate the validity of our models. For more detail regarding this model, it can be found in Pesaran and Pesaran (2010).

For robustness test, I will use VAR model because it is one of the most flexible and easy to use models for the analysis of multivariate time series beside MGARCH model. The VAR model has proven to be especially useful for describing the dynamic behavior of economic and financial time series and for forecasting (Metadger & Boulila, 2018). Following, Metadger & Boulila (2018), I will examine the stationary of variables using ADF and PP unit root test to know if we have a unit root or any seasonal movements. Then, we will use Johanson co-integration test to figure out if we have long run relationship or not. After that, we must define lag for VAR by using Akaike and Schwarz Information criteria (AIC and SC) to estimate VAR model. Finally, we will investigate on impulse responses of each variable to another, and study the causal relationship between our variables.

4. RESULT AND DISCUSSION

Descriptive Statistics

I outline the key statistical characteristics for the conditional correlation series across the given time. Table 1 shows that there are significant differences between the mean correlation values for different commodity categories, stock prices, and stock return rates. In sum, these figures show that the Islamic stock market in Malaysia is significantly more associated with oil than it is with rice, but that relationship is reversed in Indonesia.

Table 1. Descriptive Statistics

	Obs	Mean	Min	Max	Std.Dev	Skewness	Kurtosis	Jarque-Berra
OILINA	60	4.117	4.156	4.296	0.023	3.254	15.202	478.1661

OILMLY	60	4.054	3,881	4.410	0.144	0.938	2.826	8.885
RICEINA	60	4.023	4.011	4.041	0.006	0.400	3.695	2.814
RICEMLY	60	3,802	3.712	4.059	0.061	1.572	6.382	53.322
RETURNINA	60	-0,002	-0.156	0.138	0.047	-0.310	5.062	11.59
RETURNMLY	60	0.002	-0.085	0.129	0.041	1.096	4.835	20.449
STCKINA	60	2.808	2.677	2.896	0.053	-0.449	2.056	4.240
STCKMLY	60	7.670	7.610	7.736	0.036	0.493	2.717	2.63

Source: EViews output results

When utilizing the M-GARCH model and using VAR as the robustness, I apply the Johanson-cointegration test to determine whether or not there is a long-term relationship between the variables. The findings shown in Table shows that there are some co-integrations at the 0.05 levels, indicating that the oil price and stock prices have a long-term link but not the price of rice. Additionally, it shows that because the variables under consideration have a tendency to move in the same direction, the long-term benefits of diversity are diminished.

Table 2. Results of Johanson Co-Integration Test Statistics

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob
None	0.760499	217.3241	159.5297	0.0000
At most 1	0.542238	134.4305	125.6154	0.0130
At most 2	0.427612	89.10903	95.73566	0.1313
At most 3	0.371171	56.74859	69.81889	0.3485
At most 4	0.212301	29.84266	47.85613	0.7269
At most 5	0.172427	16.00158	29.79707	0.7122
At most 6	0.078292	5.0204603	15.49471	0.8062
At most 7	0.005091	0.296059	3.841466	0.5864

Source: EViews output results

The unit root test of all variables in the heteroskedasticity test found that the probability of chi-square is below the significance level at 95%, which means we can apply the DCC guards to the model and move to the next steps. Besides, it is concluded that a long run relationship exists among the variables.

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Table 3. Heteroskedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	82.54220	Prob. F	0.0000
Obs* R-squared	34.89976	Prob. Chi-Square	0.0000

Source: EViews output results

According to Figures 1 and 2, we can observe that primary food staples like rice have positive correlations that are highlighted and are extremely volatile in Islamic stocks in Indonesia but not in Islamic stocks in Malaysia. This comparison suggests that the market fundamentals are not the primary factor in explaining commodity price behavior. As previously noted, the price of a particular commodity is determined by taking into account a variety of financial considerations as well as investor activity in derivative markets, such as stock markets. These numbers also show the disparities between Indonesia and Malaysia in the strong association between rice and stock price and return. As a result, it is verified that the Islamic stock indices impact rice prices in Indonesia. The outcome had substantial implications for the relationship, specifically the effect of staple food commodities prices on returns on Islamic stocks, which showed that the Islamic stock market was exposed to external macroeconomic variables in both nations, particularly Indonesia.

Furthermore, Indonesian Islamic stocks' stock returns are significantly impacted by Malaysia's commodities rice production. It's interesting to note that, unlike Indonesia, Malaysia's returns on Islamic stocks are harmed by the price of rice. Additionally, concur with Bahloul (2021) that commodities consistently rank as the primary source of shocks for the Islamic stock market. We can observe that Indonesia's stock indices and rice prices are more volatile in the first quarter of 2018; this suggests that rice prices are rising due to inflation, while the stock indices continue to decline with poor performance throughout the year. Additionally, Malaysia had consistency throughout the sample period and only displayed one instance of significant volatility in the middle of 2017. Through these outcomes, commodity volatility has proven to be crucial for both countries, despite differences in how repercussions on stock indices are handled

Figure 1. Dynamic Conditional Correlation between Rice and Jakarta Islamic Index (JII)

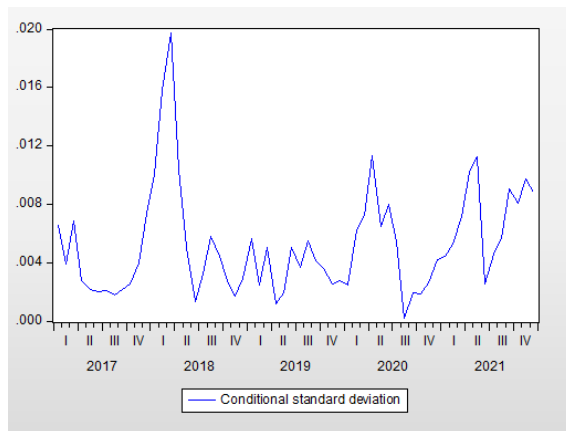


Table 4. Estimation Result of Dynamic Conditional Correlation GARCH of Rice Price in Indonesia

Variable	Coefficient
C	3.703847
STCKINA	0.002774
STCKMLY	0.040471
RETURNINA	0.009290
RETURN MLY	0.006641
Variance Equation	
C	3.73E-06
Resid (-1)^2	1.298481
GARCH (-1)	-0.138154

Figure 2. Dynamic Conditional Correlation between Rice and FTSE Shariah Bursa Malaysia Hijrah Shariah Indices

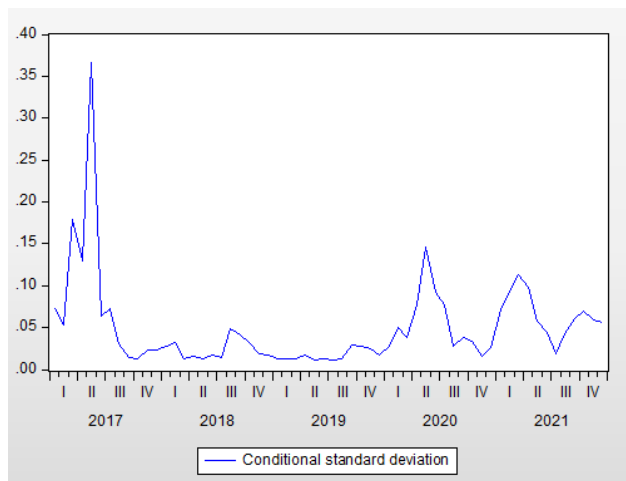


Table 5. Estimation Result of Dynamic Conditional Correlation GARCH of Rice Price in Malaysia

Variable	Coefficient
C	1.864054
STCKINA	-0.464557

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STCKMLY	0.420633
RETURNINA	0.114877
RETURN MLY	-0.094486
Variance Equation	
C	0.000125
Resid (-1)^2	1.526108
GARCH (-1)	0.027962

Source: EViews output results

Figures 3 and 4, which discuss the price of oil and stock shariah instruments, show that oil is less volatile than rice even though it is a primary element in staple foods. However, they frequently exhibit volatility near the beginning or conclusion of the data observations. Unlike rice, oil prices made clear negative associations. Assert the findings of Tuna et al. (2019) that combining particular commodity groupings, such as staple foods, will aid in removing the unanticipated financial stress scenarios they encountered. According to the findings, there is a significant negative association between the stock values in both countries and oil prices.

In Indonesia and Malaysia, the oil prices of their countries have a negative relationship with both of their stocks. Meanwhile, the oil prices in Malaysia did not have a relationship, nor did not affect changes in the Islamic stock return of Indonesia and Malaysia. The findings do not align with Yahya et al. (2013) stated that oil price is the most significant variable contributing to the Islamic stock return volatility. The findings have a significant consequence: investors should diversify their portfolios and use Islamic stock instruments instead of focusing on commodities like oil for hedging. However, compared to the most recent period of 2021, both countries are experiencing high oil prices because of the Russia-Ukraine war, which is causing the oil supply in the global market to decline significantly. As a result, investors prefer to invest in Indonesia because Malaysia's oil price volatility is not as fluctuating.

Figure 3. Dynamic Conditional Correlation between Oil and Jakarta Islamic Index (JII)

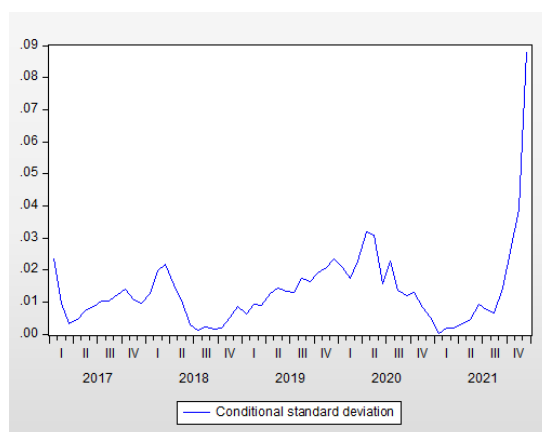


Table 6. Estimation Result of Dynamic Conditional Correlation GARCH of Oil Price in Indonesia

Variable	Coefficient
C	5.726023
STCKINA	-0.144215
STCKMLY	-0.149148
RETURNINA	0.035042
RETURN MLY	0.028675
Variance Equation	
C	3.73E-06
Resid (-1)^2	1.389408
GARCH (-1)	-0.222173

Source: EViews output results

Figure 4. Dynamic Conditional Correlation between Oil and FTSE Shariah Bursa Malaysia Hijrah Shariah Indices

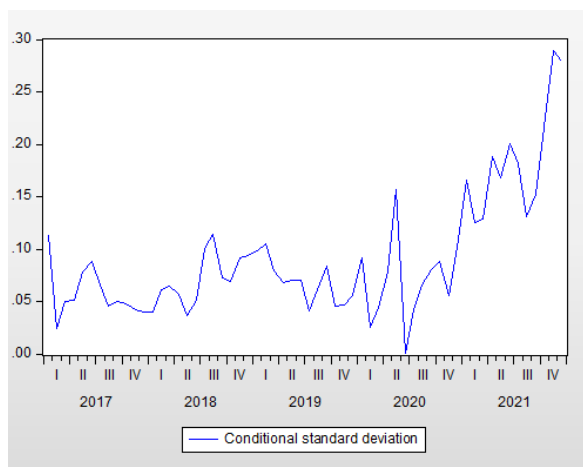


Table 7. Estimation Result of Dynamic Conditional Correlation GARCH of Oil Price in Malaysia

Variable	Coefficient
C	10.79261
STCKINA	-1.258974

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STCKMLY	-0.422187
RETURNINA	0.578132
RETURN MLY	0.098928
Variance Equation	
C	0.001784
Resid (-1)^2	1.048509
GARCH (-1)	-0.149536

Source: EViews output results

Robustness Test

The authors measure the reliability of the findings using the histogram results, stationery test, and competition for the impact of a certain time period in both countries. Figure 5 below illustrates the price changes from January 1, 2017, to December 31, 2021. As we can see, there have been some rapid changes on the histogram chart, and the price and return of both stocks have varied quite a little. The pandemic COVID-19 condition follows the irregular movements in 2020.

Figure 5. Dynamic Conditional Correlation between Oil and FTSE Shariah Bursa Malaysia Hijrah Shariah Indices

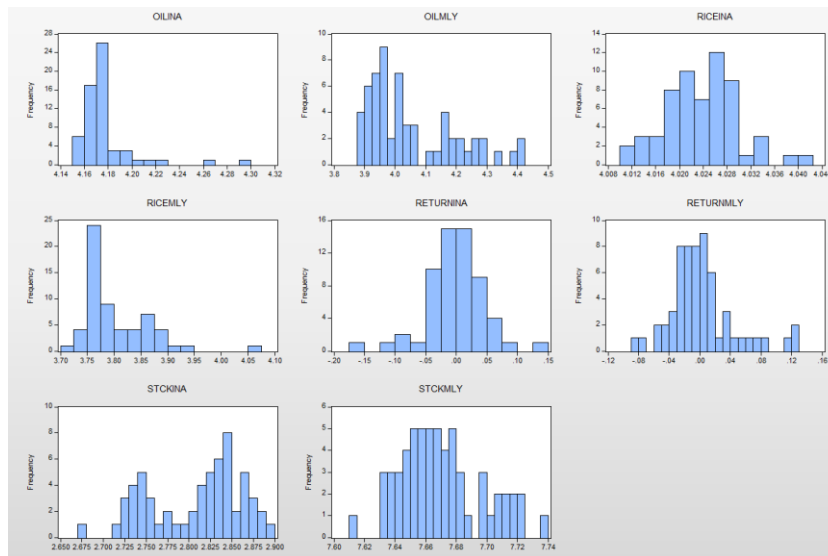


Table 8. Stationary Test

Variables	ADF Stationarity Test	Results
OILINA	0.0000	Stationary at second difference
OILMLY	0.0000	Stationary at first difference
RICEINA	0.0000	Stationary at first difference
RICEMLY	0.0000	Stationary at first difference
RETURNINA	0.0000	Stationary at first difference
RETURNMLY	0.0000	Stationary at first difference
STCKINA	0.0000	Stationary at first difference
STCKMLY	0.0000	Stationary at first difference

Source: EViews output results

Since all variables' probabilities are larger than the critical value, Table 8 above shows that none of them are stationary and all have unit roots, however after the first difference, all variables became stationary. According to earlier discoveries that the data are not stationary and have a long-term relationship.

5. CONCLUSION

This study offers empirical evidence linking staple food commodities with stock markets in countries with a Muslim majority, including Indonesia and Malaysia. The variables are theoretically related to one another and have a long-term relationship with one another, as was previously demonstrated. In conclusion, compared to Indonesia's Islamic stock markets, Malaysia's Islamic stock markets tend to stabilize when it comes to commodities. The return and stock price among these countries on each other's commodities will be impacted by their dependence and interconnection. The paper discusses the implications of how investors and investment managers could incorporate time-varying dimensions into their rebalancing activities in both passive and active investment approaches, allowing risk and return to be managed appropriately by following investors' specific goals.

Our findings provide information about combining passive and active investment strategies in a multi-asset portfolio of commodities and Islamic stocks. Long-term high correlations between some commodity-equity series may not always indicate the existence of perfect financialized markets. The study's primary flaw was the short sample time, which prohibited a thorough analysis of topics like different national and cultural contexts or other exogenous influences that would have altered the relationship between the nations. With the help of the analytical data, I advise investors to consider hedging against the risk of staple foods and combining it with commodities that have minimal volatility, like metals (gold). Given that the supply of commodities is generally rigid over the near term, it is likely that correlations with equity are frequently transient. Future studies should link Islamic equities return stocks and bonds' co-movements with agricultural and staple food commodities.

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