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Return-Volatility Spillovers between Malaysian Islamic and Conventional Equity Markets

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Abstract

Introduction to The Problem: Financial volatility spillover effects have also been of keen interest to economic policymakers. The viability of financial institutions and the smooth functioning of financial markets may be disrupted by increasing financial volatility spillover effects. A better understanding across markets is essential for policymakers, investors, and consumers.

Purpose/Objective Study: This paper explores the issue of return-volatility spillovers in a bivariate context between the Malaysian Islamic equity market, Dow-Jones Islamic Market, Malaysian Conventional equity market, and overall US stock market creating four different pairs.

Design/Methodology/Approach: GARCH-M models are estimated using daily data from January 2007 through June 2019.

Findings: In all four cases, there is evidence of weak returns and volatility spillovers from one market to another. They imply relative tranquility between markets, as considered at a time. Islamic equity markets do not seem distinct from conventional equity markets from investors' perspectives. Investors may thus prefer to invest in both Islamic and conventional equities for portfolio diversification.

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INTRODUCTION

Malaysia has become an essential global player in Islamic finance by establishing and popularizing Shariah-compliant equity markets parallel to its conventional equity market. Fully Sharia-compliant equities are rare in reality. To overcome the problem, prohibited elements in Islam are required to go through close screening by the Shariah Advisory board of Islamic Scholars [e.g., Alhabsy (2008); Donia and Marzban (2008b); Obaidullah (2009); Popotte (2009); Sefani (2009); Sengupta (2012)].

Shariah screening is conducted to eliminate stocks believed to be unacceptable for investments. In the early days, the screening process was not in practice mainly because the investment activities were either fully compliant or there were no issues of Shariah compliance since only Muslim investors were involved in trading. Joint ventures or partnerships (shirkah) in the Islamic commercial space occur between Muslim partners and their non-Muslim partners in various business activities.

Before proceeding with such joint ventures, the Muslim partners must ensure that the conduct or partnerships are compatible with Shariah principles (Bakar, 2010). The screening of stocks could be either positive or negative (Obaidullah, 2009; Sefaiani, 2009). Positive screening refers to the investment in companies that provide necessities to society. On the other hand, negative screening applies to companies that have a high concentration on unethical activities.

Shariah non-compliant securities are those issued by companies involved in the following core activities: (i) financial services based on riba (interest); (ii) gambling and gaming; (iii) manufacturing or sales of non-halal products or related products; (iv) conventional insurance; (v) entertainment activities that are non-permissible according to Shariah; (vi) manufacturing or sales of tobacco-based products or related products; (vii) stock brokering or share trading in Shariah non-compliant securities; and (viii) other activities that deem non-permissible according to Shariah principles. The Islamic stock market has been established in Malaysia based on five principal of operations: i) prevention of any practice of usury, ii) risk-sharing, iii) prevention of widespread speculation, iv) compliance of the akad with the stated contract, and v) implementation of activities adhering to legality in the Shariah aspect (Bacha, 2002).

The Kuala Lumpur Shariah Index (KLSI) was launched on April 17, 1999, by the Kuala Lumpur Stock Exchange (now known as Bursa Malaysia). This was the first step in facilitating participation in equity investments compatible with Islamic principles. The KLSI provides a benchmark for investors seeking to make investments based on Shariah principles. This also helps them make better-informed decisions. Later on, Bursa Malaysia, in cooperation with FTSE, introduced a new series of tradable equity indices called FTSE- Bursa Malaysia Emas Shariah Index and FTSE- Bursa Malaysia Hijrah Shariah Index. This development helped

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create more significant opportunities for investors seeking Shariah-compliant investments to benchmark their portfolios and the asset managers to develop new products serving the investor community.

The resilience of Islamic financial assets during 2007-2009 to withstand global financial turmoils has attracted the worldwide attention of academics, investors, and policymakers, as recorded in the Islamic Financial Services Industry Stability Report (IFSB, 2015). Islamic financial assets exhibited an impressive compound annual growth of 17% between 2009 and 2013. This phenomenal growth in Islamic financial assets has inspired researchers to investigate the risk-return characteristics of Islamic financial assets. In addition, the performance of Islamic financial assets vis-à-vis conventional financial assets has attracted much attention worldwide. The main difference between Islamic and conventional financial assets is that Islamic financial assets must comply with certain restrictions derived from the teachings of the Islamic faith. However, from an investor's perspective, it is essential to analyze the transmission of these restrictions on the risk-return characteristics of Islamic financial assets. It is also necessary to analyze how the risk-return factors of Islamic financial assets differ from those of conventional financial assets.

The main differences between Islamic and conventional equity markets arouse curiosity to investigate volatility transmissions between these markets. This is an essential issue for investors for portfolio diversification and hedging purposes. This study investigates the above by implementing the bi-variate GARC-M (I, I) methodology using daily data from January 3, 2007, through June 30, 2019, with a total sample size of 2,491. The relevant data were retrieved from the Wall Street Market Data on July 13, 2017.

Financial market volatility has increased in recent decades due to the ongoing integration of global financial markets [e.g., Abou-Zaid (2011), Futsey (2014), and Baele (2004)]. Different factors have influenced financial volatility, such as increases in inflationary expectations, restrictive monetary policy, removal of interest rate ceilings, interest rate fluctuations, etc. (Becketti and Sellon, 1989).

Significantly, changes in volatility in one country's financial market might be affected by the financial market volatility of other countries, a matter referred to as volatility spillover effects [e.g., Kalemi-Ozcan et al., 2010 Ke et al., 2010]. Volatility spillover effects or transmission of financial volatilities between countries has been changing, with important implications for investors and policymakers. Investment decisions are likely affected by financial volatility spillover effects as well. As a result, investors usually equate higher volatility with greater risk. Furthermore, volatility spillover effects can occur between two distinct markets (Schwert, 1983). Low asset returns correlation implies no significant volatility spillover effects, and portfolios can be diversified

internationally to reduce the risk without affecting the return (Yashushi et el., 1990). However, if there are strong volatility spillovers, countries' financial markets depict a high correlation implying a slight gain from diversification.

Financial volatility spillover effects have also been of keen interest to economic policymakers, as these effects may harm economic performance. According to Becketti and Sellon (1989), policymakers are concerned about the viability of financial institutions and the smooth functioning of financial markets, which may be disrupted by increasing financial volatility spillover effects. Therefore, a better understanding of across markets is essential for policymakers, investors, and consumers.

In light of the above, this paper seeks to study the mean-variance spillovers between Malaysian Islamic and conventional stock market indices using daily data for the sample period, as stated earlier. The remainder of the paper is crafted as follows. Section II reviews the topical literature. Section III outlines the empirical methodology. Section IV reports the results. Section V offers conclusions.

The existing academic literature on this topic is relatively scant and new. However, the current literature on conventional equity markets is vast and evolving [e.g., Natarajan et al., 2014; Desi et al., 2016; Joshi, 2011; Mohammadi and Tan, 2015]. Majdoub and Mansour (2014) find weak volatility transmission between the US and five emerging Islamic equity indices. The results are based on the estimation of BEKK-MGARCH, CCC, and DCC models. Hammoudeh et al. (2014) report a significant dependence structure between the Islamic and conventional equity indices. These inferences are drawn from an estimation of the copula-based GARCH model and traditional indices using the causality-in-variance approach.

Similarly, Nazlioglu et al. (2015) document evidence of volatility transfer between the Islamic and conventional equity indices using the causality-in-variance approach. Rejeb (2017) uses a GARCH model and quantile regression techniques to highlight the existence of solid interdependence between the conventional and the Islamic stock markets. In short, the relatively scant empirical literature on the issue of volatility transmission between the Islamic and conventional equity markets depicts mixed results.

Koutmos and Booth (1995) point out the importance of the quantity (captured by the size of innovation) and the quality (charged by the sign of an innovation) of news in analyzing the transmission mechanism across equity markets. They document the asymmetric effects of past volatility on current volatility in equity markets. Saadaoui and Boujelbene (2015) investigate the transmission of volatility between the Dow Jones stock index and the Dow Jones emerging Islamic stock index using vicariate BEKK-GARCH and DCC-GARCH model and find no evidence of a

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shock spillover effect between them. Dewandaru et al. (2014) assess the co-movements among Islamic equity markets versus their conventional counterparts across different regions (Asia-Pacific, USA, Eurozone, and United Kingdom). They need more market integration with Islamic markets. Using Engle and Granger's (1987) cointegration technique, El Khamlichi et al. (2014) explore the ethical equities' potential for diversification compared to their conventional counterparts. They find an absence of cointegration between the two index families (Dow Jones and Standard & poor's). Highlighting the financialization of commodity markets, Saadaoui and Boujelbene (2015) find that the subprime loans contributed to developing a relationship between conventional and emerging Islamic Dow Jones Indices. Furthermore, higher correlations between them were evidenced during the 2008-2009 financial crisis.

METHODOLOGY

Engle (1982) introduced Autoregressive Conditional Heteroskedasticity (ARCH) model for financial time series that exhibit time-varying conditional variance. A generalized ARCH (GARCH) model extended by Bollerslev (1986) gained popularity for estimating stochastic volatility. These models are widely used in various branches of econometrics, especially in financial time series analysis. With the introduction of ARCH and GARCH models, there have been numerous empirical studies on volatility of financial time series. However, the GARCH cannot account for leverage effect, since they simply account for volatility clustering and leptokurtosis in time series data. This necessitated development of new and extended models over GRACH, such as, GARCH-M.

The GARCH model (Bollerslev, 1986), in a univariate form, allowing the conditional variance to be dependent upon its previous lags, conforms to the conditional variance equation in the simplest form as follows;

Mean equation: $r_t = \mu + \varepsilon_t$ and (1)

Variance equation: $\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2$ (2)

Where, $\omega > o, \alpha \geq o, \beta \geq o, r_t$ is the asset return at time t, μ is the average asset return, and ε_t is the residual return.

The sizes of parameters $\propto$ and β determine the short-run dynamics of the volatility in time series data. If the sum of the coefficients equals unity, then any shock will lead to a permanent change in all future values. Hence, shock to the conditional variance is 'persistent'.

GARCH-in-Mean model (GARCH-M), a variant of GARCH model is used to identify the risk-return relationship (Engle, et al. 1987). In GARCH model, the conditional variance enters the mean equation directly. The return of a security may depend on its volatility. A simple GARCH-M (1,1) model is specified as follows;

Mean equation: $r_t = \mu + \lambda\sigma t_\tau^2 + \varepsilon_t$ and (3)

Variance equation: $\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2$ (4)

The parameter λ in the mean equation is called the risk premium. A positive λ indicates that the return is positively related to its volatility. Thus, a rise in mean return is caused by an increase in conditional variance as a proxy of increased risk.

The idea of volatility spillover was first proposed by Hamao, Masulis, and Ng (1990) to examine the short-run interdependence of price volatility across the New York, Tokyo, and London stock markets. To model the spillover effect of volatility in one market on another, a lagged squared error term from the mean equation of the GARCH model for the former market may be introduced into the GARCH model for the latter market as an explanatory variable in the conditional variance equation. The estimate of the coefficient of the lagged squared error term is then examined. A statistically significant estimate would suggest a spillover effect. The spillover effect from one market to another market may be captured by the following specification;

$$h_t = \propto_0 + \sum_{j=1}^{q} \propto_j \mu_{t-j}^2 + \sum_{i=1}^{p} \beta_i h_{t-i} + \sum_{k=1}^{w} \delta_k \varepsilon(B)_{t-k}^2 \quad (5)$$

Where, $\varepsilon(B)_{t-k}^2$ denotes previous shocks to the former market. Equations (3) and (5) together constitute the GARCH-M spillover model. The coefficients (i.e., the δs) measure the impact of past shocks on the returns of the former market on the conditional volatility of the latter market. This model provides useful insights into how information is transmitted and disseminated across equity markets. In particular, this model examines the precise and separate measures of return and volatility spillovers.

RESULTS AND DISCUSSION

This section is the most important section of your article. The analysis or results of the research should be clear and concise. The results should summarize (scientific) findings rather than providing data in great detail. Please highlight differences between your results or findings and the previous publications by other researchers.

The results are reported in two segments as follows:

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Table 1. GARCH-in-Mean Model Estimations for Dow-Jones Islamic Index (DJIMI) and Dow-Jones Malaysia Conventional Stock Market Index (DWMYT)

Conditional Mean-Equation (A)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{(GARCH)}$	0.055440	0.054758	1.012456	0.3113
ΔLOG(DJIMI)	0.172415	0.010724	16.07807	0.0000
C	0.000282	0.000286	0.986903	0.3237
Conditional Variance-Equation (B)				
C	1.04E-06	2.20E-07	4.748537	0.0000
ε_{t-1}^2	0.113431	0.015332	7.398245	0.0000
GARCH(-1)	0.869378	0.014929	58.23397	0.0000
ΔLOG(DJIMI)	-0.000236	5.34E-05	-4.427004	0.0000

In the conditional mean-equation, a modestly positive GARCH effect is evidenced in Malaysian Dow-Jones Islamic Index returns, transmitted from Malaysian Comprehensive Dow-Jones Index returns. This implies that mean returns swing mildly between these markets.

In the conditional variance-equation, the coefficient of the one-period lagged squares of the residual term (ε_{t-1}^2) is positive and low, indicating mild volatility spillover from the Islamic equity market to the Malaysian conventional equity market, meaning both markets remained relatively calm over the sample period.

Table 2. GARCH-in-Mean Model Estimations for S & P 5000 (S&P5)) and Dow-Jones Malaysia Conventional Stock Market (DWMYT) Returns

Conditional Mean-Equation (A)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{(GARCH)}$	0.063153	0.052676	1.198915	0.2306
ΔLOG(SP5)	0.078183	0.009865	7.925484	0.0000
C	0.000290	0.000280	1.035163	0.3006
Conditional Variance-Equation (B)				
Type equation here.				
C	1.04E-06	2.21E-07	4.713303	0.0000
ε_{t-1}^2	0.116205	0.015532	7.481630	0.0000
GARCH(-1)	0.869595	0.014691	59.19342	0.0000
ΔLOG(SP5)	-0.000252	5.91E-05	-4.260789	0.0000

In the conditional mean-equation, the GARCH-effect is positive and very modest, flowing from S & P 500 index returns to Malaysian Dow-jones Index returns with mild swings. In the conditional variance-equation, positive volatility spillovers are almost identical to that in Table 1 as transmitted from US broad stock market to the Malaysian conventional stock market. This reveals relative tranquility in both markets.

Table 3. GARCH-in-Mean Model: Estimations for Dow-Jones Islamic Index (DJIMI and Dow-Jones Malaysian Islamic Stock Market (FBMKSI) Returns

Conditional Mean-Equation (A)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{(GARCH)}$	0.020286	0.059966	0.338295	0.7351
ΔLOG(DJIMI)	0.172994	0.011230	15.40474	0.0000
C	0.000254	0.000334	0.758256	0.4483
Conditional Variance-Equation (B)				
C	9.93E-07	2.20E-07	4.521027	0.0000
ε^2_{t-1}	0.086401	0.012376	6.981509	0.0000
GARCH(-1)	0.896185	0.012923	69.34555	0.0000
ΔLOG(DJIMI)	-0.000260	5.77E-05	-4.508611	0.0000

The GARCH effect is positive and relatively even more modest in the conditional mean-equation, transmitted from the Dow Jones Islamic equity market to the Malaysian Islamic equity market. Again, the positive volatility spillover is relatively less, as observed in the conditional variance-equation.

Table 4. GARCH-in-Mean Model Estimations for S & P 5000 (S&P5)) and Dow-Jones Malaysia Islamic Stock Market (FBMKSI) Returns

Conditional Mean-Equation (A)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{(GARCH)}$	0.029332	0.057586	0.509353	0.6105
ΔLOG(SP5)	0.077675	0.010393	7.473600	0.0000
C	0.000256	0.000328	0.778958	0.4360
Conditional Variance-Equation (B)				
C	1.03E-06	2.29E-07	4.489245	0.0000
ε^2_{t-1}	0.091648	0.012927	7.089739	0.0000
GARCH(-1)	0.892974	0.013121	68.05513	0.0000
ΔLOG(SP5)	-0.000272	6.40E-05	-4.246728	0.0000

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In the conditional mean-equation, the GARCH effect is positive and relatively less, stemming from the conventional S & P 500 overall stock market returns to the DOW-Jones Malaysian Islamic Equity market returns. In the conditional variance equation, volatility spillover is positive and almost similar in magnitude to other cases.

CONCLUSION

Mean return and volatility spillovers are positive and mild from one stock market to another, regardless of whether one market is for Islamic equities and another is for conventional equities, or both markets are just for Islamic equities. So, two markets considered at a time in all four cases indicate relative calm over this study's sample period. In other words, a negative shock in one market negatively impacts another market and vice-versa through an alleged lead-lag relationship. Furthermore, Islamic equity markets are similar to conventional equity markets. This may be because investors who invest in Islamic stocks also invest in conventional stocks. Another contributory factor to it may be less variability in intra-market economic and financial information flows. Market responses appear near-symmetric to negative or positive shocks. This might make investors indifferent to selecting between Islamic and conventional equities.

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