Spillover Effect of Islamic Stock Markets in Asia

by Zulpahmi Zulpahmi

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Submitted 18/12/18, 1st revision 21/1/19, 2nd revision 11/2/19, accepted 18/3/19

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Abstract:

Purpose: *The aim of this study is to investigate correlation and the spillover effect between the Islamic stock index in Indonesia and other Asian emerging markets including Malaysia, Thailand, India, China and Taiwan.*

Design/Methodology/Approach: *The time series data used is from daily returns from May 13, 2011 to October 17, 2017 with 1395 observations. Using Pearson Correlation, the multivariate VAR model and the Granger Causality test, the study found low correlation across markets.*

Findings: *The fluctuation of the Indonesian Islamic stock index is substantially dominated by local information and creates a spillover effect in all markets in Asia. It also reveals a bidirectional relationship between the Indonesian market and the Thailand, Indian and Taiwanese markets, but only a unidirectional relationship between Indonesian market and Malaysian and Chinese markets.*

Practical Implications: *The research is able to examine the integration of conventional stock markets between Indonesian and Asian markets quite well to investigate the spillover effect in the region.*

Originality/Value: *The Indonesian market creates an essentially dominant spillover effect on all Asian market investigated. Using Islamic stock market, this study complements studies conducted by other researchers.*

Keywords: *Islamic Stock Markets, Asian Emerging Markets, Spillover Effect.*

JEL code: *G21, G29.*

Paper type: *Research article.*

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1. Introduction

As a part of the Islamic financial system, the Islamic equity market has a strategic function both for economic growth and the stability of a financial system of a country. The presence of this market is imperative because it provides an instrument for investors, especially for Moslems, to invest in equity in accordance with Islamic principles and will provide certainty for halal transactions for them. The Islamic stock index launched in the market reflects all the Islamic stocks and the fluctuation of this index can represent all the movement of price, return and volatility of all stocks listed. This index becomes a benchmark for investors, traders, investment managers, financial analysts and academics to assess the risk and return of Islamic investment, optimize Islamic portfolio, manage risk and determine equity pricing.

Globalisation and the development of information technology for stock markets facilitate transactions for international investors to their portfolio allocation. International finance is becoming increasingly integrated and open providing the benefits of economic development (Beji & Xiii, 2007). The arrival of globalisation and the availability of international capital provide benefits for developing countries, such as foreign capital which can help solve many economic and social problems (Balcerzak & Zurek, 2011). However, this integration also creates a spillover effect among stock markets that will affect the risk and the return for international investors.

Emerging markets have become more interesting for international investors than developed markets because this market is considered less integrated with the global economy (Chowdhury & Arefin, 2017). Currently more than 50% of investors in the Indonesian stock market come from foreign investors, as one of emerging markets in Asia. This number shows the interest of international investors in investing in the Indonesian market. According to Auzairy *et al.* (2012), the fluctuation of returns on the conventional stock market of Indonesia is not influenced by changes in world stock market returns.

The Indonesian stock market also has no connection with emerging markets from Southeast either in the short run (Suryanta, 2011) and in the long run (Azman-Saini *et al.,* 2002). Therefore, investing in this market will provide great diversification benefits. The fluctuation of returns on the Islamic stock market of Indonesia is also not influenced by changes in the return of the Islamic stock market in the world (Hussin *et al.,* 2013; Uddin and Won, 2016). However, at the regional level of South East Asia, Rahim *et al.* (2009) and Hussin *et al.* (2013) have examined the integration of the Islamic stock markets and found that the spillover effect only occurs unidirectional from Malaysian market to Indonesian market in the short run. On the other hand, Beik & Fatmawati (2014) found that Malaysian market only provided a small contribution of around 7.67 percent to the variance of Indonesian Islamic Index. However, they did not examine the relationship the other way around.

Based on the above information, this study will answer the following research questions. The first one concerns the correlation among all these markets. The second one is whether there is a spillover effect between the Islamic stock market of Indonesia and other Asian emerging markets in the short run, both in volatility and return. Asian emerging markets, represented by Indonesia, Malaysia, Thailand, India, China and Taiwan have become units of analysis because they are considered to have less integration with the global economy and have the benefit of diversification in portfolio allocation for international investors. Islamic stock markets are different from conventional stock market insofar as they have lower risk (Saadaoui & Boujelbene, 2015). Our investigation of spillover effect will be done by using a multivariate VAR model and the Granger Causality test.

2. Literature Review

The Islamic index is a reflection of all the stock movements that meet the criteria in accordance with Islamic principles and as a benchmark of the performance of Islamic equity mutual funds. Before being specified as an Islamic stock, there are two screenings that must be passed both qualitatively and quantitatively in accordance with Islamic guidelines. Qualitative screening is done through a business activity screening where the issuer may not conduct business activities that are contrary to Islamic principles. Quantitatively, financial ratio screening is done by taking out the issuer whose debt exceeding 45% of his assets in Indonesian, or 33% for some other countries, and whose interest income exceeding 10% limit is formulated by the Sharia advisory council. This kind of screening has made Islamic stock become a less risky investment (Saadaoui & Boujelbene, 2015).

Investing in Islamic stock also has the features of risk and return. The spillover effect is due to the effects of globalisation and the development of information technology will influence the risk and the return of investments and therefore will provide input for investors in decision making. Spillover is defined as a change in return or volatility in one market because of the transmission of information from other markets (Fleming *et al.,* 1998). Information transmission among international markets can occur because stocks react not only to local information but also to information from other markets.

The spillover effect among markets has been extensively studied in recent years. Some studies try to investigate the spillover effect across developed markets (Christopoulos *et al.,* 2014; Budd, 2017; Thalassinos *et al.,* 2015; Thalassinos and Politis 2011). Christopoulos *et al.* (2014) will try to investigate the long-term spillover effect in the European markets represented by Portugal, Italy, Ireland, Greece and Spain. Using the cointegration technique, they found that the Italian market is the most influential index compared to the others, while the Greek index influences the least the other indices. Budd (2017) is interested in examining the spillover effect between U.S. equity markets and Asia-Pacific countries represented by Japan, Australia, China and South Korea. Using Pearson correlation and

multivariate GARCH model, they have revealed a relatively low positive correlation between all equity markets investigated and concluded that there is little evidence of integration, except between South Korea and Japan markets. Australia has the strongest spillover effect on Japan and the weakest spillover is from China to U.S. Thalassinos *et al.* (2015) have examined the credit swaps and their influence in sovereign debt.

Integration between developed and emerging markets has been studied by Abou-Zaid (2011), Suryanta (2011), Auzairy *et al.* (2012), Rejeb & Boughrara (2015) and Yarovaya *et al.* (2016). Abou-Zaid (2011) is interested to explore the spillover effect between U.S. and MENA emerging markets represented by Egypt, Israel and Turkey in the crisis period. Utilising multivariate GARCH techniques he found U.S. stock market has a significant influence on Egypt and Israel but does not have an influence on Turkey.

In the same crisis period, Auzairy *et al.* (2012) examined the integration analysis of the world stock markets and Asian emerging economies, consisting of Malaysia, Thailand, Indonesia and South Korea. They found no long-term integration among the markets investigated. From the short-term investigation using Vector Auto regression (VAR), they found that local information gives dominant contributors to the variation of Asian and world markets. At a regional level, Suryanta (2011) found little evidence of strong relationship between Indonesian market and other markets in South East Asia consisting of the Singaporean, Malaysian, Philippines and Thailand markets. An examination of the volatility relationship in normal times and in crisis period has been performed by Rejeb & Boughrara (2015). They used seven emerging markets and two developed countries, such as United States and Japan. The seven markets consisted of Argentina, Brazil, Chile, South Korea, India, Mexico and Thailand. Based on their study, it confirms that the financial shock will produce a strong spillover effect during periods of financial crisis.

Rahim *et al.* (2009), Hussin *et al.* (2013), Saiti (2015) and Siddiqui & Khan (2017) all studied this effect across emerging markets. The first two studies were interested in exploring the relationship between Islamic stock markets between Indonesia and Malaysia. Rahim *et al.* (2009) investigated the short run transmission and find unidirectional transmission from Malaysia to Indonesian market while, in terms of the long-run relationship, Hussin *et al.* (2013) found that there is no integration between two market investigated. Using more units of analysis, Saiti (2015) then expanded the investigation of the long-run relationship among five ASEAN countries found co-movement among them. Hence, Malaysia has become the leader because it creates a spillover effect in all markets in the long run.

Having looked at all these studies, this research will try to complete the literature review by investigate the relationship of Islamic stock markets in the short run with the larger scope of Asian emerging markets, represented by Indonesia, Malaysia, Thailand, India, China and Taiwan markets. The discussion here is focused on the

Indonesian Islamic stock market position because of the contradictory findings in the relationship between Indonesia and other markets in the conventional and Islamic stock market studies, as we have described on the introduction section.

One method that can be used to look at the spillover effect or information transmission in the short run is to use a multivariate VAR model. The model proposed by Sims (1980) is able to show dynamic interactions between multiple variables. In the VAR model, each variable is considered an endogenous variable whose value is determined by its own past values and those of other variables. Two significant features in the VAR model are the ability to analyse Impulse Response Function (IRF) and Forecast Errors Variance Decompositions (FEVD) to capture short-term relationships between variables. Short-run relationships can also be analysed using the Granger Causality test to check whether the two variables have a bidirectional or unidirectional relationship.

3. Research Methodology

Data in this study obtained from the market data stream is the time series data of daily closing price of Islamic indices in category countries of emerging markets in Asia. The Islamic indices that represent these category countries include Islamic indices listed in Indonesia, Malaysia, Thailand, India, China and Taiwan. In order to maintain the validity of the research results, some Islamic indices in other Asian countries are not included as samples due to the restrictiveness of the data. The period selected is from May 13th 2011 to October 17th 2017 with 1395 observations. The dates covered are the only dates in which all markets are traded.

Data analysis was begun by calculating the daily returns for all Islamic indices using continuously compounded return, which is the logarithmic difference in the daily closing price (Tsay, 2010). These daily returns will be the input variables in this study. The calculation of Islamic return index can be seen in Eq. (1). The analysis will be more focused on the Islamic stock market of Indonesia. A time series plots of returns and descriptive statistics will then be presented and discussed. The next step is the examination of information transmission done through multivariate VAR model and Granger Causality test to analyse the information transmission of Indonesian market towards other Asian emerging market and vice versa.

$$r_t = ln\frac{P_t}{P_{t-1}} \tag{1}$$

The Vector Autoregressive (VAR) developed by Sims (1980) is used to explore the dynamic linkage among the volatility of Islamic index returns. The VAR model specifications are as follows:

$$V_t = A_0 + A_1 V_{t-1} + A_2 V_{t-2} + \cdots + A_i V_{t-i} + e_t \tag{2}$$

Where V_t vector of 6 x 1 for 6 variables, i the length of the VAR lag, A_0 is the intercept vector and A_i is the 6 x 6 parameter for each i, e_t is the error term vector. Two important properties in analysing the multivariate VAR model results are the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD). IRF is used to trace the current response and some future period of each variable due to the shock that occurs in other variables. Information about the contribution of the variance of each variable to the change of other variables can be shown through the FEVD results.

The Granger Causality test is performed to examine further the relationship of the two variables whether there is only a unidirectional or bidirectional relationship. In Granger Causality approach will answer whether variable X Granger causes variable Y. This means how much of the current Y can be explained by the past values of Y and the past values of X as additional information. Thus variable X can help predict variable Y. There will be a bidirectional relationship if X Granger causes Y and Y Granger causes X.

4. Results and Discussion

The return pattern for each Islamic stock index presented in Figure 10 indicates the presence of clustering on its volatility. Prominent volatility clusters on the return of Islamic stock index in Indonesia occurred in 2011, 2013 and after 2015. Visually visible Malaysia's volatility return is lower compared to other Islamic stock returns, while Indonesia's volatility return is in medium position.

Figure 1: *Daily returns for Islamic stock indices in Asian emerging markets from May 13, 2011 to October 17, 2017*
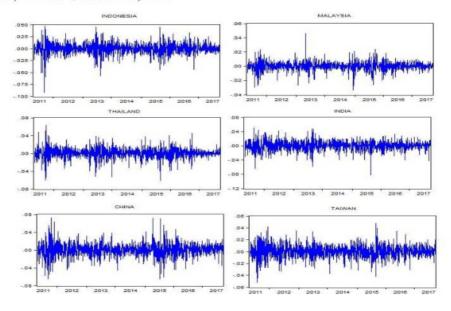
Table 1 shows the descriptive statistics returns for all Islamic stock markets. The mean of all returns shows a relatively equal positive value. However, the highest mean is Indonesian returns followed by returns from Malaysia and Taiwan then the lowest is returns of Thailand, India and China. Based on the volatility measured by standard deviation, China has the highest volatility while Malaysia has the lowest volatility compared to other Islamic stock returns. Indonesia's volatility is in the medium position between Taiwan which has lower volatility, while the volatility of Thailand and India is slightly above it. The last row in Table 1 is the growth value of the Islamic stock price index using the Compound Annual Growth Rate (CAGR). The highest growth was achieved by the Indian market followed by the Taiwan market and Indonesian market, while in the Malaysian market, the growth is relatively lower than the other markets.

All returns series do not follow the normal distribution shown from the negative skewness value and the kurtosis value which is more than 3. The skewness value of each variable, which is the negative value, indicates that all Islamic index returns have a long left tail while high kurtosis value tends to have heavy tails. In other words, all Islamic index returns have a leptokurtic distribution form that has a stronger peak and heavier tail compared to the normal distribution. This conclusion is supported by Jarque-Bera's finding that strongly rejects the hypothesis of normal distribution.

Table 1: *Summary of Descriptive Statistics on Daily Islamic Index Returns in Asian Emerging Markets*

Return of Islamic Stock Indices						
	Indonesia	Malaysia	Thailand	India	China	Taiwan
Mean	0.0003	0.0002	0.0001	0.0001	0.0001	0.0002
Median	0.0007	0.0003	0.0004	0.0000	0.0001	0.0002
Maximum	0.0471	0.0463	0.0627	0.0508	0.0720	0.0478
Minimum	-0.0920	-0.0337	-0.0613	-0.0822	-0.0652	-0.0523
Std. Dev.	0.0115	0.0062	0.0117	0.0130	0.0148	0.0104
Skewness	-0.7587	-0.1761	-0.3078	-0.3244	-0.0121	-0.1830
Kurtosis	8.4365	8.0827	6.5405	5.4786	6.1781	5.0534
Jarque-Bera	1851.78	1508.81	750.63	381.55	587.13	252.86
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ADF t-Statistic	-24.69172	-22.9782	-35.9905	-34.7701	-35.0103	-36.8592
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	1395	1395	1395	1395	1395	1395
CAGR	5.72%	3.25%	3.91%	7.83%	4.53%	5.74%

Time series data is stationary if it does not have a certain pattern or trend or a tendency to approach the average value and does not have too large a variance. Besides, the average value and its variance do not change systematically over time. This study used an Augmented Dickey Fuller (ADF) test developed by Dickey & Fuller (1979) to identify whether the returns have unit roots so that the data becomes non-stationary or vice versa. The test results indicate that the absolute value of the ADF test is greater than the critical value of MacKinnon at a significant level of 5% and is confirmed to be stronger with the probability value rejecting the null hypothesis of having a unit root.

Table 2: *Analysis of simple correlation among Islamic stock index returns in Asian emerging markets*

Correlation of Islamic Stock Index Returns						
	Indonesia	Malaysia	Thailand	India	China	Taiwan
Indonesia	1.0000	0.5041	0.4568	0.4225	0.5125	0.3014
Malaysia		1.0000	0.4005	0.3509	0.4900	0.2683
Thailand			1.0000	0.4149	0.4443	0.2748
India				1.0000	0.4559	0.3340
China					1.0000	0.3360
Taiwan						1.0000

Table 2 presents the Pearson correlation coefficients of all markets. It shows a relatively low correlation among Islamic stock index returns indicating a beneficial diversification by international investors in their Islamic portfolio investment to minimise risk. Almost all correlations show a value below 0.5 except the correlation between the return of Indonesia – Malaysia (0.5041) and the return of Indonesia – China (0,5125) whose value is slightly above it. Interestingly, the combination of the Taiwanese market and the others gives the lowest correlation. The lower the correlation coefficient is, the greater the benefit of diversification will be. The optimal diversification will hence be achieved when the correlation coefficient is negative 1.

An analysis of information transmission is then performed after ensuring all the returns are stationary. The VAR stability conditional check performed gives a modulus value of less than one so that the VAR model with an optimally selected lag has been stable. The stability of this VAR model is essential to generate a valid Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analysis.

The shock effects of volatility occurred in other market returns to Indonesia's returns can be analysed by looking at IRF in Figure 2 in a 10-day period. The shocks occurring from other markets do not have any effect towards Indonesia's return on the first day. These shocks will have an impact on the second day up to the fifth day

and subside on the sixth day. The shock effect from Thailand, India and Taiwan has a positive impact on the Indonesian markets, while the shock effect from Malaysia and China gives negative impact toward Indonesian market. The volatility of the Islamic stock market in Taiwan provides a relatively larger positive impact when compared with the shock effect of other Islamic stock markets. However, the shock from other markets does not last long.
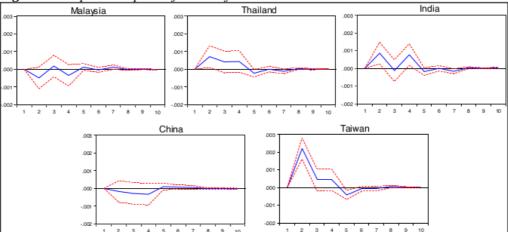
Figure 2: *Impulse response function from other markets to Indonesian return*

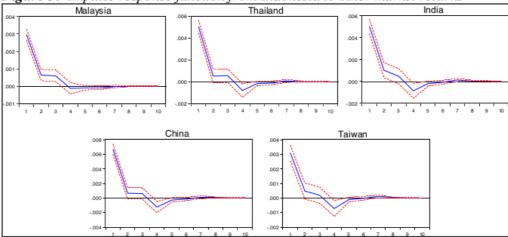**Figure 3:** *Impulse response function from Indonesia to other market returns*

Figure 3 shows the shock effect of the volatility of Indonesia's return on other market returns. The volatility that occurred in Indonesia's return has had a considerable positive impact on all the other Islamic stock market returns since the first day. The shock effect is most felt by China. The Malaysian and Taiwan markets received the smallest response when compared with other Islamic stock market responses. But this shock has a negative impact on the fourth day and will soon subside to the point of stability on the eighth day and beyond.

Table 3: *Variance Decomposition of Islamic Index Returns*

Period	Indonesia	Malaysia	Thailand	India	China	Taiwan
Panel A: Percent of Indonesian Islamic index return variance due to other returns						
1	100	0	0	0	0	0
3	94.75	0.21	0.51	0.57	0.08	3.87
6	93.80	0.30	0.68	1.02	0.17	4.03
10	93.75	0.31	0.69	1.04	0.18	4.03
Average	94.65	0.25	0.56	0.83	0.13	3.57
Panel B: Percent of other return variances due to Indonesian Islamic index return						
		Malaysia	Thailand	India	China	Taiwan
Average		24.52	19.18	15.92	21.48	9.41

Panel A of Table 3 shows the contribution of other Islamic stock markets observed in the 10-day period to the volatility of the Islamic index return in Indonesia. One important source of Islamic stock market volatility in Indonesia is the volatility of the Indonesian market itself with an average value of 94.65%. Another source are the other Islamic stock markets with a very small value not quite reaching 1% except from the Taiwanese market that reached 3.57%. It may then be concluded that the volatility of Islamic stock market in Indonesia is independent. Interestingly, the volatility of Indonesian market contributes to the fluctuation of other markets with a considerable average value, as seen in panel B in Table 4. Volatility in the Indonesian market contributes a considerable influence on the Islamic stock market in Malaysia (24.52%) and China (21.48%) and yet contributes to quite a small amount of only 9.41% for the Islamic stock market in Taiwan.

Table 4 shows the results of the Granger Causality test further examining the relationships of the two markets. Confirming the results obtained by multivariate VAR model, the Indonesian market affects all the markets significantly. A bidirectional relationship takes place between the Indonesian market and Thailand market, between the Indonesian market and the Indian market, and between Indonesian market and Taiwanese market. Meanwhile, the unidirectional relationship only occurs from Indonesian market to the Malaysian market and from the Indonesian market to the Chinese market.

Table 4: *Granger Causality Test Result*

Null Hypothesis:	F-Statistic	P-Value	
Indonesia does not Granger Cause Malaysia	5.4038	0.0011	*
Malaysia does not Granger Cause Indonesia	1.5510	0.1996	
Indonesia does not Granger Cause Thailand	4.5537	0.0035	*

Thailand does not Granger Cause Indonesia	2.6227	0.0492	*
Indonesia does not Granger Cause India	4.4659	0.0040	*
India does not Granger Cause Indonesia	5.1879	0.0014	*
Indonesia does not Granger Cause China	4.6635	0.0030	*
China does not Granger Cause Indonesia	0.1608	0.9227	
Indonesia does not Granger Cause Taiwan	4.0107	0.0074	*
Taiwan does not Granger Cause Indonesia	20.0792	0.0000	*

Note: * Significant at the 5 percent level.

5. Conclusion

The main objective of this study has been to investigate the spillover effect and correlation among Islamic stock indices in Asian emerging markets represented by the Indonesia, Malaysia, Thailand, India, China and Taiwan markets. All the Islamic stock markets in these markets have low correlation, thus providing a beneficial diversification of Islamic portfolio investment for international investors. The fluctuation occurring in the Islamic stock market in Indonesia is substantially dominated by local information, while fluctuations in other Islamic Asian emerging markets are influenced by information coming from the Indonesian market. Therefore, the Indonesian market creates an essentially dominant spillover effect on all Asian market investigated. Using Islamic stock market, this study complements studies conducted by (Roca, Selvanathan, & Shepherd, 1998) and Suryanta (2011) which examine the integration of conventional stock markets between Indonesian and Asian markets.

In the Asian emerging markets, the Islamic stock market of Indonesia is integrated with Asian emerging market and especially with the Thai, Indian and Taiwanese markets due to bidirectional relationship between Indonesian market and those markets. However, the relationship is not strong enough because the volatility that occurred in Indonesia is more due to local information. Rahim *at al.* (2009) use sample data from 2000-2006, while Hussin *et al.* (2013) use sample data from 2007-2013 to find that the volatility of the Islamic stock market of Indonesia was influenced by Malaysian market. Using up-to-date data from 2011 to 2017, this study found that the Indonesian market is no longer influenced by fluctuation from Malaysian market, while even the fluctuation in Indonesian market affect all markets in Asian emerging markets. Thus, international investors should consider the movement of stock prices and volatility that occur in the Indonesian market as additional information in forecasting price movements and volatility in other Asian emerging markets.

This study also examines the benefits of regional diversification in short-term investment in emerging financial markets. This study is limited to investigating the

spillover effect and correlation amongst the markets investigated. For further research, we might look at the best model for each of these Islamic stock indices. The model can be used to forecast the return and volatility that can be advantageous for investors' decision making.

References:

Abou-Zaid, A.S. 2011. Volatility SPillover Effects in Emerging MENA Stock Markets. Review of Applied Economics, 7(1), 107–127.

Auzairy, N.A., Ahmad, R., Ho, C.S.F. & Sapian, R.Z.Z. 2012. Integration of Asian Stock Markets. International Journal of Social, Behavioral, Educational, Economics, Business and Industrial Engineering, 6(12), 3503–3509.

Azman-Saini, W.N.W., Azali, M., Habibullah, M.S. & Matthews, K.G. 2002. Financial integration and the ASEAN-5 equity markets. Applied Economics, 34, 2283–2288.

Balcerzak, A.P. & Zurek, M. 2011. Foreign Direct Investment and Unemployment: VAR Analysis for Poland in the years 1995-2009. European Research Studies Journal, 14(1), 3–14.

Beik, I.S. & Fatmawati, S.W. 2014. Pengaruh Indeks Harga Saham Syariah Internasional Dan Variabel Makro Ekonomi Terhadap Jakarta Islamic Index. Al-Iqtishad: Jurnal Ilmu Ekonomi Syariah, 6(2), 155–178.

Beji, S. & Xiii, P. 2007. Financial Openness and Financial Development in the South Mediterranean Sea Countries: Institutional Approach and Calculation of Development Thresholds. European Research Studies Journal, 11(3–4), 107–127.

Budd, B.Q. 2017. The transmission of international stock market volatilities. Journal of Economics and Finance, 42(1), 155–173.

Chowdhury, A.H. & Arefin, M.K. 2017. Modelling Co-movement of Different Sectors in Dhaka Stock Exchange (DSE) Using Asymmetric BVAR-GARCH Models. Journal of Finance and Economics, 5(3), 105–117.

Christopoulos, A.G., Papathanasiou, S., Kalantonis, P., Chouliaras, A. & Katsikides, S. 2014. An Investigation of Cointegration and Casualty Relationships between the PIIGS' Stock Markets. European Research Studies Journal, 17(2), 109–123.

Dickey, D.A. & Fuller, W.A. 1979. Distribution of the Estimators for Autoregressive Time Series with a Unit Root. Journal of the American Statistical Association, 74(366a), 427–431.

Fleming, J., Kirby, C. & Ostdiek, B. 1998. Information and Volatility Linkages in the Stock, Bond, and Money Markets. Journal of Financial Economics, 49(1), 111–137.

Hussin, M.Y.M., Yusof, Y.A., Muhammad, F., Razak, A.A., Hashim, E. & Marwan, N.F. 2013. The Integration of Islamic Stock Markets: Does a Problem for Investors? Labuan E-Journal of Muamalat and Society, 7, 17–27.

Rahim, F.A., Ahmad, N. & Ahmad, I. 2009. Information Transmission between Islamic Stock Indices in South East Asia. International Journal of Islamic and Middle Eastern Finance and Management, 2(1), 7–19.

Rejeb, A.B. & Boughrara, A. 2015. Financial Integration in Emerging Market Economies : Effects on Volatility Transmission and Contagion. Borsa Istanbul Review, 15(3), 161–179.

Roca, E.D., Selvanathan, E.A. & Shepherd, W.F. 1998. Are the ASEAN equity markets interdependent? ASEAN Economic Bulletin, 15(2), 109–120.

Saadaoui, A. & Boujelbene, Y. 2015. Volatility Transmission between Dow Jones Stock Index and Emerging Islamic Stock Index : Case of Subprime Financial Crises.

Emerging Markets Journal, 5(1), 40–49.

Saiti, B. 2015. Cointegration of Islamic Stock Indices: Evidence from Five ASEAN Countries. International Journal of Scientific & Engineering Research, 6(7), 1392–1405.

Siddiqui, T.A. & Khan, M.F. 2017. Volatility Estimation in Emerging Markets: A Study of India's and China's Stock Markets. Proceedings of International Conference on Strategies in Volatile and Uncertain Environment for Emerging Markets, 695–700.

Sims, C.A. 1980. Macroeconomics and Reality. Econometrica, 48(1), 1–48.

Suryanta, B. 2011. Capital Market Integration in ASEAN Countries: Special Investigation of Indonesian Towards the Big Four. The Asian Journal of Technology Management, 4(2), 109–114.

Thalassinos, I.E., Stamatopoulos, D.T. and Thalassinos, E.P. 2015. The European Sovereign Debt Crisis and the Role of Credit Swaps. Chapter book in The WSPC Handbook of Futures Markets (eds) W.T. Ziemba and A.G. Malliaris, in memory of Late Milton Miller (Nobel 1990) World Scientific Handbook in Financial Economic Series Vol. 5, Chapter 20, pp. 605-639, ISBN: 978-981-4566-91-9, (doi: 10.1142/9789814566926_0020).

Thalassinos, I.E. and Politis, D.E. 2011. International Stock Markets: A Co-integration Analysis. European Research Studies Journal, 14(4), 113-129.

Tsay, R.S. 2010. Analysis of Financial Time Series Third Edition. New Jersey, Canada: John Wiley & Sons.

Uddin, H.Md. and Won. K.A. 2016. Further Test on Stock Liquidity Risk with a Relative Measure. International Journal of Economics & Business Administration, 4(1), 56-69.

Yarovaya, L., Brzeszczynski, J. & Lau, C.K.M. 2016. Intra- and inter-regional return and volatility spillovers across emerging and developed markets: Evidence from stock indices and stock index futures. International Review of Financial Analysis, 43, 96–114.

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