Jurnal Penelitian Ilmu Ekonomi dan Keuangan Syariah
Volume. 4, Nomor. 4, November 2026
e-ISSN :2988-134X ; p-ISSN :2988-148X; Hal. 95-108
DOI: https://doi.org/10.59059/jupiekes.v4i4.3532
Tersedia: https://journal.staiypiqbaubau.ac.id/index.php/jupiekes

Integration of Islamic Stock Markets in Asia: Evidence from a VAR, Granger Causality, IRF, and FEVD Approach

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Abstract. Using the Islamic stock indices of Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar from May 2013 to June 2026, this study attempts to examine the integration of Islamic capital markets in Asia. The research used a Vector Autoregression (VAR) method with monthly data. The Augmented Dickey-Fuller (ADF) stationarity test, finding the ideal lag, model stability test, Johansen cointegration test, Granger causality test, Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD) are among the stages of study. The study's findings show that the Islamic stock markets under investigation do not have a long-term multivariate cointegration relationship. Only Indonesia and Thailand, according to the robustness check results, have a bilateral cointegration relationship. The Granger causality test indicates that the Thai Islamic stock index has an influence on the Indonesian Islamic stock index. IRF result show that the response to external shocks is temporary and returns to equilibrium. Meanwhile, the FEVD results show that in the long term, the largest contribution to the variation of the Indonesian sharia stock index comes from India and Qatar. These findings indicate that the integration of Islamic stock markets in Asia is still partial, so that international diversification opportunities for Islamic investors are still open.

Keywords: Cointegration; Integration of Islamic Capital Markets; IRF; Islamic Stocks;VAR.

1. BACKGROUND

Globalization and financial market liberalization have intensified cross-border capital flows, resulting in greater interconnectedness among capital markets worldwide (Bekaert et al., 2009; Blouin et al., 2024; Chuli´a et al., 2026) . The development of information technology and increasing international capital flows have caused a country's capital market movements to be increasingly influenced by global financial market conditions (Liao et al., 2022) . This phenomenon occurs not only in conventional capital markets but also in Islamic capital markets, which have experienced rapid growth in recent decades (Supriani et al., 2024) .

Islamic capital markets have become a crucial component of the global Islamic financial system (Damayanti, 2025) . These market indices have been created as Sharia-compliant investment vehicles by a number of Asian nations, including Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar (Haryono & Atika, 2023) . The steady rise in market capitalization and rising investor involvement highlight the strategic function of Islamic capita markets in fostering the growth of the international Islamic financial sector (Judijanto et al., 2025; Supriani et al., 2024) . However, the increasing interconnectedness of Sharia complaint equity markets may diminish the benefits of international portfolio diversification, a key strategy for minimizing investment risk (Bugan et al., 2021) .Theoritically, long-term

Naskah Masuk: 15 Agustus 2026; Revisi: 10 September 2026; Diterima: 07 Oktober 2026; Terbit: 01 November 2026

connections and information sharing between financial markets are indicated by capital market integration (Bekaert & Harvey, 1995; Forbes & Rigobon, 1999) . High levels of integration cause asset price movements in one country to be increasingly influenced by those of other countries, thus limiting diversification opportunities (Amized et al., 2017) . Conversely, markets that are not yet fully integrated still provide opportunities for investors to benefit from international diversification (Conlon et al., 2024) .

The results of earlier research on the integration of the Islamic stock market have been inconsistent. While some studies revealed a partial association, others identified a strong integration relationship between Islamic stock markets (Bossman et al., 2022; Phiri & Anyikwa, 2025a) . These differing results indicate that the level of integration in Islamic stock markets can change with global economic developments, geopolitical conditions, and the characteristics of individual countries (Phiri & Anyikwa, 2025b) .

Although numerous studies have examined Islamic stock market integration, most have focused on ASEAN or GCC countries using relatively limited observation periods (Qizam et al., 2020; Sahabuddin et al., 2022) . Empirical evidence that simultaneously examining Indonesia, Malaysia, Thailand, Japan, India, Kuwait, Qatar using recent data remains scarce. Furthermore, previous studies have generally emphasized cointegration or connectedness analysis without integrating dynamic response analysis through Granger causality, IRF, FEVD, and bilateral robustness checks.

There are three ways in which this study adds to the literature. First, compared to earlier research, it use monthly data from May 2013 to June 2026. In order to provide a more comprehensive picture of Asian Islamic capital markets, it also concurrently looks at the integration of Islamic stock indices from Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar. Third, this study provides a more thorough understanding of market integration by incorporating Granger causality, Impulse Response Function (IRF), Forecast Error Variance Decomposition (FEVD), and bilateral cointegration robustness check in addition to estimating the VAR model. Using the Islamic stock indices of Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar for the period of May 2013 to June 2026, this study examines the integration of Islamic capital markets in Asia ousing the Vectoe Autoregression (VAR) approach through the Granger causality test, Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD). The result are anticipated to contribute to the body of knowledge on Islamic capital market development.

2. THEORETICAL REVIEW

Theory of Capital Market Integration

Capital market integration describes the level of interconnectedness between financial markets that allows asset price movements in one country to be influenced by market movements in other countries. (Bekaert & Hodrick, 2004a) . The benefits of foreign portfolio diversification are limited by market integration theory, which states that the more integrated markets are, the more information and shocks are transmitted between them. On the other hand, investors can still profit from diversification to lower investment risk if capital markets are not fully connected (Bekaert & Hodrick, 2004b) .

Integration in the context of Islamic capital markets indicates the presence of both short-term and long-term connections between Islamic index markets in various nations.A high level of integration can increase market efficiency, but at the same time, it also increases the potential for risk to spread across countries (Hassan & Mahlknecht, 2011) .

Sharia Capital Market

The Islamic capital market is a component of the sharia-based Islamic financial system (Arshad, 2017) . Riba, gharar, and maysir shall not be present in instruments traded on the Islamic capital market(Miharja, 2023) . Many Islamic stock indices have emerged in a number of nations, including Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar, as a result of the fast growth of the Islamic capital market(Arshad, 2017) . The Islamic stock market between nations may becoe more integrated as a result of the rise in international financial flows and investment activity, allowing changes in one nation's stock index to have an impact on another (Budiandru & Nuryadin, 2022) .

Previous Research

The integration of Islamic stock markets has been the subject of extensive research, although the findings are still inconsitent (Mutmainah, 2023) . Some studies have found a strong integration relationship between Islamic stock markets, while others indicate that the integration is still partial (Budiandru & Nuryadin, 2022) . A long-term correlation between Islamic stock markets in the ASEAN area was discovered by B & A (2020) , suggesting growing regional Islamic capital market integration. Siswara et al. (2021) reported similar result, stating that the relationship between Islamic stock markets in different countries has been strengthened by financial globalization and rising international capital flows. However, several studies have shown different results (Agustin & Chan, 2024) . Lan et al., (2023) demonstrated the dynamic nature of the interaction between Islamic stock markets, which tends to shift in response to market instability and worldwide economic situations. Furthermore,

research that was done by Zheng et al. (2026) demonstrates that the sensitivity of Islamic stock markets in emerging nations to exogenous shocks varies (Akbar & Hidayat, 2023) . These results indicate that the influence of one market on another does not always reflect a strong long-term relationship. Although research on Islamic stock market integration has grown, most previous studies have focused on specific regions, such as ASEAN or the Middle East, with relatively limited observation periods. Furthermore, studies specifically focusing on Indonesia as the center of analysis, involving Islamic stock indices from Malaysia, Thailand, Japan, India, Kuwait, and Qatar, are still relatively few. Most studies also use only cointegration and causality approaches without incorporating dynamic response analysis using Forecast Error Variance Decomposition (FEVD) and Impulse Response Function (IRF).

Thus, by examining the integration of Islamic financial markets in Asia using monthly data from May 2013 to June 2026, this paper aims to close the research gap. The Vector Autoregression (VAR) approach is used in this study using Indonesia as the center of analysis. Granger causality tests, Impulse Response Function (IRF), Forecast Error Variance Decomposition (FEVD), and robustness checks of bilateral cointegration are used to supplement the analysis.

Hypothesis Development

H1: The Indonesian sharia stock index and the sharia stock indexes of Malaysia, Thailand, Japan, India, Kuwait, and Qatar are long-term integrated. This theory is predicated on the idea of capital market integration, which holds that growing international capital flows and financial globalization would promote connections between Islamic stock markets across different nations. H2: The Indonesian sharia stock index and the sharia stock indices of Malaysia, Thailand, Japan, India, Kuwait, and Qatar are causally related.The causal relationship shows the transmission of information and the influence of price movements between Islamic stock markets which can be either one-way or two-way.

H3: Shocks originating from the sharia stock indexes of Malaysia, Thailand, Japan, India, Kuwait, and Qatar provide responses and contributions to variations in the sharia stock index in Indonesia. This theory is predicated on the idea that Islamic stock markets have a dynamic relationship that can be examined using the Forecast Error Variance Decomposition (FEVD) and Impulse response Function (IRF).

3. RESEARCH METOD

Data and Variables

Using secondary monthly data from May 2013 to June 20266, this study used a quantitative research methodology. Islamic stock indices from Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar made up dataset. S&P Global, Investing.com, and the official websites of each stock exchange provided the monthly statistics. The study included seven endogenous variables representing the Islamic stock indices of Indonesia (LIDN), Malaysia (LMYS), Thailand (LTHA), Japan (LJPN), India (LIND), Kuwait (LKWT), and Qatar (LQAT). All variables were transformed into natural logarithms to stabilize variance and mitigate potential heteroskedasticity.

Empirical Strategy

The empirical analysis was conducted in a step-by-step manner. Initially, each variable's stationarity was assessed using the Augmented Dickey-Fuller (ADF) test. Second, prior to performing the Johansen cointegration test, the ideal lag length and VAR stability were established. The first-differenced series was used to estimate the Vector (VAR) model if no long-run cointegration connection was found. On the other hand, the Vector Error Correction Model (VECM) would have been used if cointegration had been found. Lastly, Granger causality, Impulse Response Function (IRF), Forecast Error Variance Decomposition (FEVD), and bilateral cointegration robustness tests were used to examine the dynamic interactions between the Islamic stock markets.

The dynamic interactions between the Islamic stock indices of Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar are examined in this study using the Vector Autoregression (VAR) model (Cao, 2022; Sims, 1980) . Unit root tests (Dickey & Fuller, 1979) , optimal lag selection, stability tests, and the Johansen cointegration test (Johansen, 1988) are performed before the VAR model is estimated. Granger causality, Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD) are then used to analyse dynamic relationships. The VAR model used in this investigation is expressed as follows :$Y_t = c + A_1 Y_{t-1} + A_2 Y_{t-2} + ... + A_p Y_{t-p} + \varepsilon_t$. Where:$Y_t$ = represents the endogenous variable vector (LIDN, LMYS, LTHA, LJPN, LIND, LKWT, and LQAT), $A_{1=}$ represents the coefficient matrix, c = denotes the intercept vector, $_{p =}$ Indicates the ideal lag time, $\varepsilon_{t =}$ Symbolises the vector of white-noise errors. The empirical study proceeded using the VAR model in first differences instead of tge VECM specification since the Johansen cointegration test revealed no long-run equilibrium relationship among the variables.

4. RESULTS AND DISCUSSION

Characteristic Statistics

The descriptive statistics of the Islamic stock indices for Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar from May 2013 to June 202 are shown in Table 1. Overall, all variables exhibit positive average values, reflecting the upward trend in Islamic stock market indices during the observation period. Among the sampled markets, Malaysia recorded the highest average index value (9 .4956), while Indonesia reported the lowest average value (5.2199). India exhibited the highest standard deviation (0 .2881), indicating greater price volatility compared with the other markets. In contrast, Malaysia showed the lowest standard deviation (0 .0770), suggesting relatively more stable market movements throughout the sample period.

Table 1. Research Variable Descriptive Statistics.

Variables	Average	Maximum	Minimum	Std. Deviation
LIDN	5.2199	5,7321	4,8978	0.1670
LMYS	9,4956	9,6563	9,2918	0.0770
LTHA	7.0847	7,2811	6,7609	0.1068
LJPN	7,5047	7.9835	7.0109	0.2355
LIND	8.2068	8,7988	7.6455	0.2881
TRUCK	6.6884	7,0172	6,3502	0.1555
LQAT	8,3456	8,6381	7,9180	0.1632

Source: EViews 12 output, processed

Preliminary Analysis

The Augmented Dickey-Fuller (ADF) unit root test results are shown in table 2. The results show that at their level form, none of the Islamic stock indices are stationary. All variables, however, are confirmed to be integrated of orde one, I (1), following the initial differencing. The ideal lag length, according to the Akaike Infromation Criterion (AIC), is one, meaning that a VAR (1) specification offers the best compromise between model fit and parsimony. With the maximum modulud of 0.963714, the stability test that follows verifies that all characteristic roots are inside the unit circle. This finding shows that the calculated VAR model meets the stability requirement, enabling additional dynamic analysis using FEVD and IRF. Additionally, there is no indication of a long-term equilibrium relationship between the Islamic stock indices according to the Johansen cointegration test. The empirical analysis uses the VAR model calculated in first differences instead of the Vector Error Correction Model (VECM) since the Trace Statistics and Maximum Eigenvalue Statistics are unable to reject the null hypothesis of no cointegration.

Table 2. Results of the Stationarity Test (ADF).

Level of Variables	Degree(Prob.)	The First Distinction (Prob.)	Integration Order
LIDN	0.0830	0.0000	I(1)
LMYS	0.0985	0.0000	I(1)
LTHA	0.0665	0.0000	I(1)
LJPN	0.5821	0.0000	I(1)
LIND	0.6471	0.0000	I(1)
TRUCK	0.6831	0.0000	I(1)
LQAT	0.0844	0.0000	I(1)

Source: EViews 12 output, processed

Table 3. Results of the Optimal Lag Test.

Lag	LR	PFE	AIC	SC	HQ
0	-	5.26E-14	-10.71101	-10.57052	-10.65394
1	2181.028	2.16E-20	-25.41703	-24.29306	-24.96040
2	67.75789	2.52E-20	-25.26561	-23.15816	-24.40942
3	81.17798	2.60E-20	-25.24648	-22.15556	-23.99074
4	55.85000	3.21E-20	-25.05471	-20.98032	-23.39942
5	54.75182	3.94E-20	-24.88166	-19.82379	-22.82681
6	55.93503	4.72E-20	-24.75108	-18.70974	-22.29668
7	50.96276	5.84E-20	-24.60738	-17.58256	-21.75342
8	66.76349	6.02E-20	-24.67193	-16.66364	-21.41842

Source: EViews 12 output, processed by the author

Table 4. Test of VAR Stability.

Criteria	Results
Maximum Modulus	0.963714
Root outside the unit circle	There isn't any
VAR Conditions	Stable

Source: EViews 12 output, processed by the author

Table 5. Johansen Cointegration Test Result (Trace Test).

Hypothesis	Trace Statistics	0.05 Critical Value	Prob.
None	102.9489	125.6154	0.5081
At Most 1	68.16260	95.75366	0.7807
At Most 2	46.35226	69.81889	0.7849
At Most 3	31.26215	47.85613	0.6524
At Most 4	18.96949	29.79707	0.4951
At Most 5	8.969695	15.49471	0.3682
At Most 6	1.761335	3.841465	0.1845

Source: EViews 12 output, processed by the author

The lack of a long-run equilibrium relationship implies that over the observation period, the Islamic stock markets in the studied nations only partially integrated. Consequently, the interaction between these markets is dominated by short-run dynamic rather than long-run equilibrium linkages.

Analysis of Granger Causality

The Granger causality test result between the chosen Islamic stock markets and the Indonesian Islamic stock market (IDX Sharia) are displayed in Table 6. Only the Thia Islamic stock market has a statistically significant causal effect on Indonesia, according to the result (p=0.0026). On the other hand, there is no statistically significant causal association between

the Indonesian market and the Islamic stock markets of Malaysia, Japan, India, Kuwait, and Qatar. The strong causal link between Thailand and Indonesia implies that short-term fluctuations in the Indonesian Islamic stock market can be predicted from changes in the Thai Islamic stock market. The Indonesian Islamic stock market is comparatively less sensitive to short-term information coming from those markets, as evidenced by the lack of major causality from the other nations. This result suggests that there is still little short-term information sharing among the Islamic stock markets that were sampled. These findings are in line with the idea of partial financial market integration, which postulates that despite growing globalization and capital mobility, international financial markets may display uneven patterns of information transmission. The results also corroborate earlier research by Qizam et al., (2020) and Sahabuddin et al., (2022) , which found that options for international portfolio diversification are preserved since Islamic stock market integration across Asian nations is still incomplete.

Table 6. Granger Causality Test Results for Indonesia.

Variable	Probability	Decision
LMYS → LIDN	0.5440	Not Significant
LTHA → LIDN	0.0026	Significant
LJPN → LIDN	0.4604	Not Significant
LIND → LIDN	0.3069	Not Significant
LKWT → LIDN	0.7394	Not Significant
LQAT → LIDN	0.9376	Not Significant

Source: EViews 12 output, processed by the author

The significant influence of Thailand may reflect the relatively close regional economic linkages within Southeast Asia, where trade, investment flows, and investor sentiment facilitate faster information transmission across financial markets.

Function of Impulse Response (IRF)

Over a 60-month period, Figure 1 shows the Impulse Response Function (IRF) of the Indonesian Islamic stock market (LIDN) in response to shocks from both internal and external Islamic stock markets. The findings demonstrate that the Indonesian Islamic stock markets responded favourably to their own innovations in the early going before gradually declining toward the long-run equilibrium. This pattern suggests that the Indonesian Islamic stock market is more affected in the short term by local shocks. In contrast, shock originating from Malaysia, Thailand, Japan , India, Kuwait , and Qatar generated relatively small and temporary responses. Most responses converge toward zero after several periods, suggesting that external shocks are absorbed relatively quickly and do not create persistent effects regarding the Islamic stock market in Indonesia. These findings imply it's the Indonesia Islamic stock market demonstrates a relatively high degree of resilience to external disturbances during the observation period.

The results are consistent with the absence of long-run cointegration identified by the Johansen test and the limited causal relationship revealed bt the Granger causality analysis. They also support the view that Islamic stock markets in Asia remain only partially integrated, allowing domestic factors to play a more dominant role than external market shock. Similar results have been documented by (Qizam et al., 2020) and (Sahabuddin et al., 2022) , who documented that information transmission across Islamic stock markets is heterogeneous and that diversification opportunities among Asian Islamic equity markets remain available.

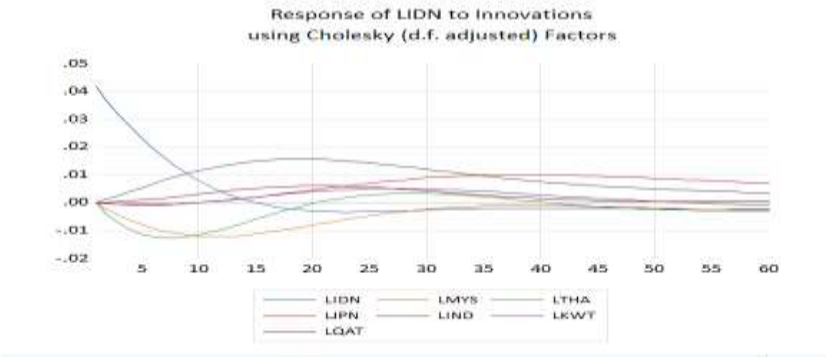


Figure 1. Impulse Response Function (IRF) Results.

Source: EViews 12 output, processed by the author (2026)

Decomposition of Forecast Error Variance (FEVD)

The Forecast Error variance Decomposition (FEVD) of the Indonesian Islamic stock market during a 60-month forecast period is shown in Figure 2. The findings show that the market's own innovations initially dominate forecast error variance, suggesting that domestic variables play a major role in explaining short term swings in the Indonesian Islamic stock market.

The contribution of external markets progressively becomes more significant as the prediction horizon lengthens. The biggest proportion of forecast error variance among the examined nations is contributed by India, followed by Qatar;Malaysia, Thailand, Japan, and Kuwait have comparatively small contributions. These result indicate that throughout the medium and long term, the shock emanating from India and Qatar gradually gained increasing influence in Asia. The FEVD analysis suppots the idea of partial market integration, in which cross-market interactions exist but remain heterogeneous across countries. As a result, opportunities for international portfolio diversification among Islamic equity markets continue to exist despite growing regional financial interconnectedness. While the lack of long-run cointegration and the limited Granger causality indicate weak short-run integration, the FEVD analysis shows that India and Qatar still exert meaningful influences of the dynamics of the Indonesian Islamic stock market over longer horizons.

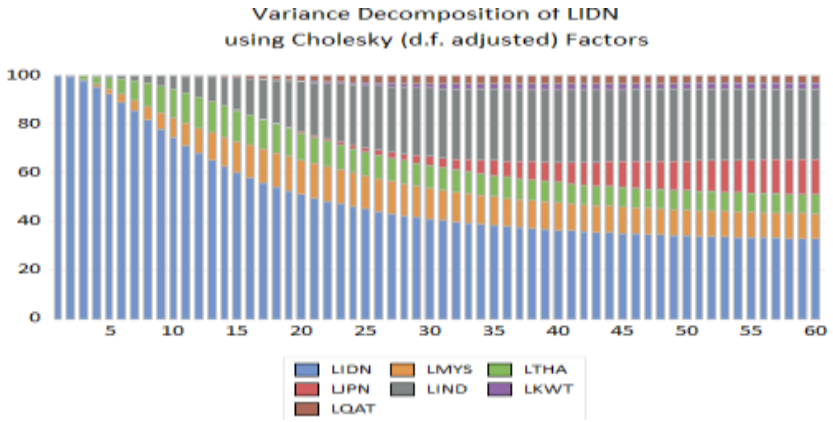


Figure 2. Forecast Error Variance Decomposition (FEVD).

Source: Eviews 12 output, processed by the author (2026)

Robustness Check

To strengthen the research findings, a robustness check was conducted using bilateral cointegration tests between Indonesia and each country. The results showed that only the Indonesia-Thailand pair exhibited a long-term cointegration relationship, while the pairs of Indonesia with Malaysia, Japan, India, Kuwait, and Qatar did not.This result demonstrates that Asias Islamic stock markets are still only partially integrated.

Table 7. Results of the Indonesia-Thailand Bilateral Johansen Test.

Estimated number of CE(s)	Self-esteem	Trace Statistics	0.05 Critical Value	Prob.**
None*	0.106759	21.93596	15.49471	0.0047
At most 1 *	0.027336	4.323713	3.841465	0.0376

Source: EViews 12 output, processed by the author

Discussion

The empirical result repeatedly show that Asia's Islamic stock markets are still only partially interconnected. The Islamic stock indices of Indonesia, Malaysia, Thailand, Japan, India, Kuwait, and Qatar do not have a long-term equilibrium relationship, according to the Johansen cointegration test. For examining the dynamic interactions between these markets, the VAR model in first differences is therefore more suitable than the VECM formulation. The Granger causality conclusion further shows that, in the short term, only the Thai Islamic stock market has a major impact on the Indonesian Islamic stock market.This finding suggest that regional information transmission exists but remains limited, implying that most sampled Islamic stock markets donnot exert direct predictive effects on Indonesia. The IRF analysis shows that shock originating from foreign Islamic stock markets are generally temporary and gradually converge toward equilibrium. Meanwhile, FEVD reveals that although Indonesia's own innovations dominate forecast error variance in the short run, the contributions of India

anad Qatar increase over longer horizons. These result imply that while domestic variables continue to be the main cause of fluctuations in the Indonesian Islamic stock arket, global markets are rapidly becoming more significant. The idea of partial market integration where cross market connections exist but vary between nations is generally supported by the empirical data.This condition implies that international portfolio divesification among Islamic equity markets remains feasible despite increasing financial globalization.

5. CONCLUSIONS

This study shows that during the observation period, Islamic stock markets in Asia were not completely integrated. Although Thailand exhibits short-run causal effects on Indonesia, India, and Qatar contribute more substantially to the forecast error variance over longer horizons. These findings indicate that domestic factors remain dominant while cross-market interactions are heterogeneous across countries. Consequently, opportunities for internationl diversification among Islamic equity markets remain available. The findings contribute to the growing literature in Islamic capital market integration by providing update empirical evidence using recent data and a comprehensive VAR framework incorporating Granger causality, IRF, FEVD, and bilateral robustness checks. From a practical perspective, investors may still obtain diversification benefits across Islamic stock markets, while policymakers should continue strengthening regional cooperation to enhance market efficiency and resilience.

Theoretical Implications. By showing that the relationship between Islamic stocks in Asia is still not fully integrated, this study contributes to the body of knowledge on Islamic capital market integrated.These findings support the view that integration between Islamic stock markets is dynamic and not always comprehensive. Practical Implications. For Islamic investors, this study's findings demonstrate that international diversification opportunities in Asian Islamic stock markets remain open, as interconnectedness between markets is not yet fully established. In order to support the growth of the Islamic financial sector, regulators may take the result into account when improving international collaboration and integration of Islamic capital markets. Policy Implications, The findings on this study can be taken into account by capital market authorities in order to promote more collaboration and integration of Islamic financial markets among Asian nations. Research Limitations. There are a number of limitations to this study. First, the study’s description of the integration of the world’s Islamic stock markets is incomplete because it only included seven nations. Second, changes in time-varying integration relationships cannot yet be captured because the study employs a VAR technique. Third, macroeconomis variables including interest rates, Inflation, oin prices, and

exchange rates were not taken into account; instead, the study just used the sharia stock index variable. Suggestions for Further Research. It is advised that more international Islamic stock markets be included in order to increase the country coverage. To get a more dynamic picture of market integration, future studies may also include Time-Varying Parameter VAR (TVP-VAR), Wavelet Coherence, or Dynamic Conditional Correlation (DCC-GARCH). A more thorough knowledge of the elements driving Islamic capital market integration may also be obtained by including macroeconomic variables like inflation, exchange rates, and world oil prices.

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