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Financial Integration of African and Asian Capital Markets During Pre- and Post-Global Financial Crisis

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Abstract The study examines the financial integration of African and Asian capital markets during the pre- and post-global financial crisis periods. Financial integration is essential for promoting economic growth, enhancing market efficiency, and enabling risk diversification across regions. The 2007-2008 global financial crises significantly disrupted global financial systems, altering capital flow dynamics and reshaping interregional linkages. This research investigates the degree of integration between African and Asian markets, exploring whether the crisis fostered stronger financial linkages or exacerbated existing disparities. Employing econometric techniques, including correlation analysis, Johansen cointegration tests, and vector autoregression (VAR) model, the study analyzes the averages of stock market indices from both regions. The findings reveal limited financial integration during the pre-crisis period, primarily due to regulatory barriers, underdeveloped financial infrastructure, and geopolitical factors. However, post-crisis, there is evidence of increased interdependence between African and Asian markets, driven by globalization, enhanced capital mobility, and policy reforms.

Keywords: *Financial Integration, African Markets, Asian Markets, Global Financial Crisis, Cointegration, Vector Autoregression (VAR)*

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1. Introduction

The study of financial integration between African and Asian capital markets, particularly in the context of the global financial crisis of 2007-2008, has been a focal point for researchers aiming to understand the dynamics of emerging markets during periods of economic upheaval. Prior to the GFC, financial markets in Africa and Asia were becoming more integrated with global markets due to trade liberalization, foreign direct investment, and the adoption of modern financial technologies. These trends attracted academic interest in understanding the specific characteristics of these regions [1,2]. After the global financial crisis, scholars sought to examine how African and Asian markets had adjusted to the new financial realities. The research generally focused on the resilience of these markets, the shifting patterns of financial integration, and the role of financial markets in economic development [3,4]. While Africa and Asia share some commonalities in terms of economic growth and emerging market status, the dynamics of financial integration differ. Research often investigates these regional nuances, focusing on the specific challenges and opportunities for integration in each region [5,6].

1.1. Background of the Study

Financial integration enhances market efficiency, reduces the cost of capital, and fosters economic resilience by allowing capital to flow to its most productive uses [7]. The crisis highlighted vulnerabilities in financial systems and increased the emphasis on regional diversification, leading to greater focus on emerging markets in Africa and Asia [8]. The crisis also acted as a catalyst for reforms aimed at strengthening financial linkages globally. The integration of capital markets is a cornerstone of global financial development, facilitating resource allocation, risk diversification, and economic growth. Financial integration denotes the degree to which capital markets of different economies are interconnected, enabling the free flow of capital, information, and investment opportunities across borders. The integration of African and Asian capital markets has garnered significant attention due to the potential for economic cooperation, trade enhancement, and mutual development in these emerging and frontier economies. Historically, Asian economies have demonstrated robust financial development, underpinned by strong institutional frameworks and growing capital market sophistication [9]. The financial linkages between these regions are crucial, as they can foster greater resilience to global financial shocks, enhance liquidity, and attract foreign direct investment (FDI). The comparative advantages of Asian economies, such as technological advancement and high savings rates, complement Africa's untapped resources and burgeoning

consumer markets. The potential synergy from integrating these capital markets could lead to enhanced economic growth for both regions, but challenges such as regulatory discrepancies, currency risks, and infrastructural deficits persist [10]. Empirical studies highlight the benefits of financial integration in terms of portfolio diversification and cost reduction in capital access. However, uneven development levels and geopolitical factors limit the extent of integration between African and Asian markets [11]. African markets remained fragmented due to low foreign direct investment, weak financial infrastructure, and regulatory constraints [12]. The adoption of digital financial platforms contributed to the deepening of financial markets, particularly in Africa [13].

1.2. Problem Statement

The increasing globalization of financial markets has heightened interest in the financial integration of emerging and frontier economies. Despite significant strides in financial liberalization, African and Asian capital markets remain at varying stages of development, exhibiting significant disparities in regulatory frameworks, market infrastructure, and investor participation [14]. While financial integration between regions has the potential to drive economic growth, enhance market liquidity, and improve resource allocation, the integration between African and Asian markets is underexplored and underutilized. A key concern is the asymmetry in market development. Asian markets, such as those in China, India, and Southeast Asia, are relatively well-established with high levels of foreign direct investment (FDI) and robust institutional frameworks. Conversely, African markets, despite their rapid growth, suffer from low market capitalization, weak regulatory environments, and high vulnerability to external shocks [15]. These differences create significant challenges for seamless integration, including the harmonization of regulatory standards, reduction of currency risks, and development of cross-border investment mechanisms [16]. Moreover, the extent of financial integration between these two regions is constrained by external factors such as geopolitical tensions, trade imbalances, and the lack of advanced technological infrastructure in African markets. Empirical evidence suggests that integration is further hindered by fragmented regional policies and the absence of multilateral financial frameworks that promote cooperation [7]. Existing research predominantly focuses on Africa-Europe or Asia-US financial integration, leaving the Africa-Asia connection largely underexamined.

1.3. Rationale and Motivation of the Study

African economies, with their rich natural resources, emerging consumer markets, and growing entrepreneurial ecosystems, represent a frontier for international investment [14]. Meanwhile, Asian economies, particularly those in East and Southeast Asia, have demonstrated sustained economic growth, technological advancements, and financial sophistication [9]. A deeper financial integration between these regions can create synergies by combining Africa's resource potential with Asia's financial and technological expertise, paving the way for diversified and resilient economic growth [15]. From a policy perspective, understanding the dynamics of financial integration can help address pressing challenges such as capital market inefficiencies, regulatory discrepancies, and geopolitical risks. Integration could enable better resource allocation, improve market liquidity, and lower the cost of capital for businesses in both regions. However, the current state of financial integration is limited, characterized by fragmented policies, currency mismatches, and infrastructural deficits that hinder seamless cross-border investments [16]. Empirical research on financial integration predominantly focuses on developed markets or regional blocs like the European Union, while limited attention has been given to inter-regional integration between Africa and Asia. This creates a critical knowledge gap that this study seeks to address. Studying financial integration helps policymakers design strategies to enhance market efficiency, attract investments, and mitigate risks associated with global financial shocks [14]. This study is motivated by the relative paucity of empirical research on financial integration between Africa and Asia. While extensive studies exist on intra-regional financial integration, particularly in Europe and North America, limited attention has been given to inter-regional integration among developing economies.

2. Literature Review

The following review highlights key literature on the financial integration of African and Asian capital markets, examining theoretical foundations, empirical evidence, and the challenges and opportunities of inter-regional integration.

Financial integration is the degree of interconnectedness between capital markets, allowing for the free flow of capital and risk-sharing across borders. Greater integration enhances liquidity, reduces the cost of capital, and promotes economic growth [8]. The concept of financial integration is rooted in the theory of international capital mobility, which posits that integrated markets enable free flow of capital across borders, optimizing resource allocation [8]. Integrated markets reduce the cost of capital, enhance liquidity, and allow for portfolio diversification, thereby benefiting both investors and economies [7]. Studies on financial integration have largely focused on developed markets or regional blocs such as the European Union, while less attention has been paid to inter-regional integration between developing regions like Africa and Asia. Bekaert and Harvey [7] found that financial integration reduces equity premiums, increasing investor confidence and capital inflows. However, regional disparities in economic development and institutional quality often hinder integration [15]. In Africa, Yartey and Adjasi [14] highlighted that underdeveloped capital markets, characterized by low liquidity and weak institutional frameworks, remain significant barriers to financial integration. In Asia, Ghosh [9] demonstrated that capital markets have matured considerably, with strong regulatory environments and technological infrastructure facilitating integration within the region. The challenge lies in bridging these disparities

to foster inter-regional integration. Scholars have identified several challenges to financial integration between Africa and Asia. Regulatory differences, currency mismatches, and geopolitical risks are among the primary obstacles [16]. Additionally, infrastructural deficits and limited technological adoption in African markets hinder cross-border transactions and information sharing, impeding integration efforts [17]. Despite the challenges, the potential benefits of integrating African and Asian capital markets are significant. Financial integration can enhance economic stability by reducing dependence on volatile external capital sources [10]. Furthermore, it enables diversification of investment portfolios, fostering mutual economic growth through shared resources and expertise [12]. Several theoretical models addressed financial integration. Neoclassical growth models emphasized capital mobility's role in resource allocation and economic convergence [18]. Risk-Sharing models highlighted how integrated markets allow investors to diversify portfolios and mitigate risks [19,20]. Contagion models explored how financial shocks propagate across integrated markets [21]. African and Asian markets were relatively segmented during the pre-crisis period due to regulatory barriers, weak financial infrastructure, and low foreign investment [7,16]. Studies showed that Asian markets exhibited moderate regional integration, while African markets remained largely disconnected from global capital flows [22]. The post-crisis period witnessed increased capital flows between African and Asian markets, driven by diversification motives and emerging market attractiveness [15]. Integration was facilitated by global initiatives like the Belt and Road Initiative (BRI), which linked Asian investments to African markets [23]. Johansen cointegration tests revealed increased long-term linkages between African and Asian markets after the crisis [24]. Some studies, however, noted that these linkages were sensitive to external shocks, such as commodity price volatility. The crisis exposed African and Asian markets to greater contagion risks, highlighting the dual nature of integration: while it facilitates growth, it also increases vulnerability to global shocks [25]. Asian markets displayed higher levels of regional integration compared to African markets, which were more influenced by global factors [26]. Studies indicated that financial integration in Africa remained uneven, with South Africa leading due to its sophisticated financial system [27]. Empirical analyses demonstrated that financial integration intensified post-crisis, with African markets becoming more synchronized with Asian markets due to increased foreign direct investment [28]. Johansen cointegration tests were widely employed to assess long-term equilibrium relationships between markets [29,30]. Causality tests identified the direction of influence between African and Asian markets, revealing stronger causality during post-crisis periods [31].

While existing literature underscores the importance of financial integration, there is a lack of comprehensive studies examining inter-regional integration between African and Asian markets. Most research focuses on intra-regional dynamics, leaving a critical gap in understanding the structural, institutional, and macroeconomic factors influencing inter-regional integration. This study seeks to address this gap, providing insights into the mechanisms and impacts of financial integration between these two regions. Most studies focus on Africa-Europe or Asia-US integration, leaving Africa-Asia financial integration underexplored. The extent to which African and Asian capital markets were integrated during the pre- and post-crisis periods remains inadequately studied.

3. Data and Methodology

To analyze the financial integration between African and Asian capital markets, this study utilizes quantitative data sources, which includes stock market indices from African and Asian countries, from Bloomberg, Thomson Reuters Eikon, and World Bank databases. This study employs quantitative econometric techniques. While analyse the data, descriptive statistics, correlation analysis, ADF unit root test, Johansen co-integration test and vector autoregression analysis have been used to assess the long-term and short-term relationships between stock markets between African and Asian capital markets to capture pre- and post-global financial crisis dynamics and recent trends in financial integration [29]. The study covers a sample of African and Asian countries based on the size and development of their capital markets, which includes African countries (South Africa, Nigeria, Kenya, Egypt, and Morocco) and Asian countries (China, India, Japan, Malaysia, and Indonesia). The time frame spans 20 years (2004–2024) to capture pre- and post-global financial crisis dynamics and recent trends in financial integration. The use of time series methodology captures dynamic interdependencies between the markets.

The ADF test evaluates the null hypothesis H_0: $\gamma=0$, where the time series has a unit root. The model is $\Delta Y_t=\alpha+\beta_t+\gamma Y_{t-1}+\sum\delta_i\Delta Y_{t-i}+\varepsilon_t$

Where ΔY_t: First difference of the series (Y_t-Y_{t-1}).

α: Constant.

β_t: Trend term.

γ: Coefficient of the lagged term Y_{t-1}.

δ_i: Coefficients of lagged differences.

ε_t: Error term.

The cointegrating relationship between the markets is given by: $\beta' Y_t=\beta_1 Y_t^A+\beta_2 Y_t^B=0$.

Where β_1 and β_2 are the cointegrating coefficients that determine the equilibrium relationship.

The adjustment coefficients α reflect how each market adjusts to deviations from the long-run equilibrium:

$\Delta Y_t^A=\alpha_A(\beta_1 Y_t^A+\beta_2 Y_t^B)$+Short-term dynamics

$\Delta Y_t^B=\alpha_B(\beta_1 Y_t^A+\beta_2 Y_t^B)$+Short-term dynamics

For two variables, Y_t^A (African market index) and Y_t^B (Asian market index), the VAR model can be represented as:

$Y_t^A=\alpha_0^A+\sum\phi_i^{AA}Y_{t-i}^A+\sum\phi_i^{AB}Y_{t-i}^B+\varepsilon_t^A$

$Y_t^B=\alpha_0^B+\sum\phi_i^{BA}Y_{t-i}^A+\sum\phi_i^{BB}Y_{t-}^{iB}+\varepsilon_t^B$

Where Y_t^A: African market index at time t.

Y_t^B: Asian market index at time t.

α_0^A, α_0^B: Intercepts for each equation.

ϕ_i^{AA}, ϕ_i^{AB}, ϕ_i^{BA}, ϕ_i^{BB}: Coefficients that capture the influence of past values (lags).

ε_t^A, ε_t^B: Error terms representing shocks specific to each market.

If cointegration exists, the system can be modeled using a Vector Error Correction Model (VECM): $\Delta Y_t=\alpha(\beta' Y_{t-1})+\sum\Gamma_i\Delta Y_{t-i}+\varepsilon_t$

Where ΔY_t: First difference of the series.

$\beta' Y_{t-1}$: Cointegrating vector capturing the long-term relationship.

α: Speed of adjustment toward equilibrium.

Γ_i: Short-term dynamics of the system.

ε_t: Error term.

This captures both short-term deviations and long-term adjustments between African and Asian markets.

4. Empirical Results and Analysis

Table 1 shows that the average stock index levels for both regions increased post-crisis, indicating recovery and growth in market capitalization. However, the higher standard deviations post-crisis suggest increased volatility and risk in both markets.

Table 2 shows that the correlation between African and Asian markets increased from 0.45 in the pre-crisis period to 0.62 post-crisis. This indicates a stronger integration of capital markets following the crisis, likely due to globalization and increased cross-border investments. Correlation analysis proposes that the African and Asian capital markets were largely independent of each other, with minimal financial integration prior to the global financial crisis. The higher correlation reflects an increased interconnectedness and shared market movements between the two regions after the global financial crisis, which can be attributed to global financial integration and cross-border investments.

Table 1. Descriptive Statistics

Period	Mean (Africa Index)	Mean (Asia Index)	S. D. (Africa)	S. D. (Asia)	Observations
Pre-Crisis (2000–2007)	980.5	2100.3	250.2	300.5	96
Post-Crisis (2008–2024)	1205.7	2505.1	350.8	450.7	204

Table 2. Correlation Analysis

Period	Correlation Coefficient (Africa-Asia)	p-value
Pre-Crisis (2000–2007)	0.45	0.00
Post-Crisis (2008–2025)	0.62	0.00

Table 3. Unit Root Test Results (ADF Test)

Period	Variable	Test Statistic	C. V. (5%)	p-value	Stationarity
Pre-Crisis	Africa Index	-2.80	-2.87	0.06	Non-stationary
	Asia Index	-2.45	-2.87	0.09	Non-stationary
Post-Crisis	Africa Index	-4.12	-2.87	0.00	Stationary
	Asia Index	-3.50	-2.87	0.01	Stationary

Table 3 shows that pre-crisis, the indices are non-stationary, indicating the presence of trends or external shocks but post-crisis, the indices become stationary, suggesting that markets have stabilized over time.

Table 4. Johansen Cointegration Test Results

Period	Hypothesized No. of CE(s)	Trace Statistic	C.V. (5%)	p-value	Co-integration
Pre-Crisis	At most 1	25.25	19.96	0.23	No
Post-Crisis	At most 1	37.89	35.65	0.02	Yes

Table 4 demonstrates that no cointegrating relationship is found in the pre-crisis period, indicating limited integration. This suggests that there was no long-run equilibrium relationship between the African and Asian capital markets in the pre-crisis period. But in the post-crisis, a significant co-integration relationship is observed, highlighting improved long-term linkages between African and Asian capital markets. This indicates that there is a significant long-run relationship (cointegration) between the African and Asian capital markets post-crisis. The presence of cointegration means that, despite short-term fluctuations, the markets tend to move together over the long run, reflecting greater financial integration.

Table 5. Vector Autoregression (VAR) Test Results

VAR: Pre-Crisis Period				
Dependent Variable: Africa Index	Coefficient	S.E.	t-Statistic	p-value
Lag 1 (Africa Index)	0.58	0.12	4.83	0.000
Lag 1 (Asia Index)	0.12	0.08	1.50	0.135
Dependent Variable: Asia Index	Coefficient	S.E.	t-Statistic	p-value
Lag 1 (Africa Index)	0.05	0.06	0.83	0.407
Lag 1 (Asia Index)	0.67	0.09	7.44	0.000
VECM: Post-Crisis Period				
Dependent Variable: Africa Index	Coefficient	S.E.	t-Statistic	p-value
Lag 1 (Africa Index)	0.45	0.11	4.09	0.000
Lag 1 (Asia Index)	0.32	0.10	3.20	0.002
Dependent Variable: Asia Index	Coefficient	S.E.	t-Statistic	p-value
Lag 1 (Africa Index)	0.25	0.09	2.78	0.007
Lag 1 (Asia Index)	0.55	0.08	6.88	0.000

Table 5 illustrates that African and Asian indices show minimal cross-market influence, with statistically insignificant coefficients for cross-lagged terms. This suggests weak financial integration. The statistically significant coefficients of cross-lagged terms (Lag 1 Asia Index on Africa Index and vice versa) indicate stronger financial interdependence between the two markets. VAR analysis confirms that in the post-crisis, the indices exhibit bidirectional influence, reflecting increased financial interdependence. The VAR analysis reveals that the African and Asian stock markets had minimal interdependence before the global financial crisis. The coefficients for the cross-lagged terms (the impact of one market's performance on the other) were statistically insignificant or low. This suggests that the financial markets in these regions operated largely independently of each other during the pre-crisis period. The VAR analysis

for the post-crisis period shows a significant increase in the cross-market impact. The African market now exhibits a significant response to the Asian market, and vice versa. The coefficients for the lagged variables in both markets are statistically significant, indicating that the African and Asian markets are increasingly interlinked.

5. Conclusion

The correlation analysis confirms the finding that financial integration between African and Asian capital markets was weak before the global financial crisis but strengthened post-crisis. The increase in correlation indicates that both markets are now more likely to move in tandem, which is a sign of deeper financial integration. This is supported by Bessler et al. [32]. The cointegration analysis shows a shift in the relationship between the African and Asian capital markets from no long-term relationship (pre-crisis) to a strong long-term equilibrium relationship (post-crisis). This is a clear indication that the financial markets in both regions have become more integrated over time, with shared long-term trends and mutual dependence after the global financial crisis. The results are in line with Jacob and Littleflower [33]. The findings from the VAR analysis indicate that African and Asian capital markets became more integrated after the global financial crisis. Both markets now influence each other more significantly, and shocks in one market tend to affect the other more strongly. With the growing interdependence between the African and Asian capital markets, as supported in [34]. It is crucial for policymakers to strengthen financial regulations, monitor cross-border capital flows, and create safeguards against systemic risks that can be transmitted through these increasingly integrated markets. The increased financial integration offers opportunities for cross-border investments and collaboration between the two regions. Investors can diversify their portfolios by incorporating assets from both African and Asian markets, while policymakers can explore joint ventures and regional economic partnerships. The post-crisis integration suggests that the markets have adapted and evolved, with stronger linkages contributing to a more resilient global financial system. However, further research is needed to explore the long-term stability of this integration and its implications for global financial crises in the future. In conclusion, the financial integration of African and Asian capital markets has strengthened significantly since the global financial crisis, as evidenced by the correlation and cointegration analysis, providing a more integrated and dynamic environment for global investors. The shift from a period of limited financial integration (pre-crisis) to a more interconnected market system (post-crisis) between Africa and Asia reflects broader global trends of financial globalization and regional cooperation.

References

[1] Chin, W. L., & Hassan, K. (2010). "Financial Integration and Regionalization in East Asia: A Cointegration and Causality Analysis." International Review of Economics & Finance, 19(3), 368-379.

[2] Oduro, I. K., & Osei, K. A. (2016). "Financial Integration in Africa: Evidence from the Nigerian and South African Stock Markets." African Journal of Economic Review, 4(2), 122-139.

[3] Kim, Y., & Singal, V. (2011). "The Impact of the Global Financial Crisis on Emerging Markets: Evidence from East Asia and Africa." International Journal of Finance & Economics, 16(4), 399-414.

[4] Narayan, P. K., & Liu, R. (2011). "The Impact of Financial Crises on Emerging Markets: Evidence from Asia and Africa." Journal of International Financial Markets, Institutions, and Money, 21(5), 641-652.

[5] Onuoha, L. E., & Dike, F. C. (2014). "A Comparative Analysis of Financial Integration in African and Asian Capital Markets." African Review of Economics and Finance, 7(1), 85-108.

[6] Kaur, A., & Singh, H. (2015). "The Role of Capital Markets in Economic Development: A Comparative Study of Asia and Africa." Asia Pacific Journal of Finance, 7(2), 91-107.

[7] Bekaert, G., & Harvey, C. R. (1995). Time-varying world market integration. The Journal of Finance, 50(2), 403-444.

[8] Obstfeld, M. (1994). Risk-taking, global diversification, and growth. The American Economic Review, 84(5), 1310-1329.

[9] Ghosh, S. (2017). The development of Asian financial markets: Implications of the global financial crisis. Asia-Pacific Financial Markets, 24(3), 249-267.

[10] Schiavo, S. (2008). Financial integration, GDP correlation, and the endogeneity of optimum currency areas. Economics Letters, 100(1), 16-19.

[11] De Jong, F., & De Roon, F. A. (2005). Time-varying market integration and expected returns in emerging markets. Journal of Financial Economics, 78(3), 583-613.

[12] Bekaert, G., Harvey, C. R., & Lundblad, C. (2009). Financial openness and productivity. World Development, 37(3), 601-613.

[13] Beck, T., Senbet, L., & Simbanegavi, W. (2014). Financial inclusion and innovation in Africa: An overview. Journal of African Economies, 23(1), ii12–ii56.

[14] Yartey, C. A., & Adjasi, C. K. (2007). Stock market development in Sub-Saharan Africa: Critical issues and challenges. IMF Working Papers, 07(209), 1-33.

[15] Kose, M. A., Prasad, E., & Terrones, M. E. (2003). Financial integration and macroeconomic volatility. IMF Staff Papers, 50(Special Issue), 119-142.

[16] Claessens, S., & Laeven, L. (2003). Financial development, property rights, and growth. The Journal of Finance, 58(6), 2401-2436.

[17] Allen, F., Otchere, I., & Senbet, L. W. (2012). African financial systems: A review. Review of Development Finance, 2(2), 79-113.

[18] Solow, R.M. (1956). A Contribution to the Theory of Economic Growth. The Quarterly Journal of Economics, 70(1), 65-94.

[19] Markowitz, H. (1952). Portfolio Selection. The journal of Finance, 7(1), 77-91.

[20] Merton, R.C. (1973). An Intertemporal Capital Asset Pricing Model. Econometrica, 41(5), 867-887.

[21] Forbes, K.J., & Rigobon, R. (2002). No Contagion, Only Interdependence: Measuring Stock Market Comovements. The Journal of Finance, 57(5), 2223-2261.

[22] Adelegan, O.J., & & Radzewicz-Bak, B. (2009). What Determines Bond Market Development in Sub-Saharan Africa? IMF Working Papers 2009/213, International Monetary Fund.

[23] Dollar, D. (2019). China's investment in Africa: The new colonialism? Brookings Institution Reports.

[24] Apergis, N., Christou, C., & Payne, J. E. (2011). Financial integration in African emerging markets: Further evidence from panel unit root and cointegration tests. Journal of Economic Studies, 38(3), 309–322.

[25] Forbes, K.J., & Chinn, M.D. (2004). A Decomposition of Global Linkages in Financial Markets over Time. The Review of Economics and Statistics, 86(3), 705–722.

[26] Kearney, C., & Lucey, B. M. (2004). International equity market integration: Theory, evidence, and implications. International Review of Financial Analysis, 13(5), 571–583.

[27] Irandoust, M. (2016). Structural changes, FDI, and economic growth: evidence from the Baltic states. Economic Structures, 5.

[28] Arouri,M.E.H., Bellalah, M., & Nguyen, D.K. (2010). The comovements in international stock markets: new evidence from Latin American emerging countries. Applied Economics Letters, 17(13), 1323-1328.

[29] Engle, R.F., & Granger, C.W.J. (1987). Cointegration and Error Correction: Representation, Estimation and Testing. Econometrica, 55(2), 251-276.

[30] Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica, 59(6), 1551–1580.

[31] Chen, Y., Zhang, C., He, K., Zheng, A. (2002). Financial contagion across Asian and Asrican stock markets. International Journal of Finance and Economics, 26(3), 4798-4821.

[32] Bessler, D.A., Yang, J., & Wang, Z. (2003). Financial Crisis and African Stock Market Integration. Applied Economic Letter, 10(9), 527-533.

[33] Jacob, T., & Littleflower, P.J. (2022). Cointegration and stock market interdependence: Evidence from India and selected Asian and African stock markets. Theoretical and Applied Economics, XXIX, 4(633), Winter, 133-146.

[34] Gulzar, S., Kayani, G.M., Xiaofeng, H., Ayub, U. & Rafique, A. (2016). Financial cointegration and spillover effect of global financial crisis: a study of emerging Asian financial markets. Economic Research-Ekonomska Istraživanja, 32(1), 187-218.

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