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Dynamics of South Asian Stock Exchanges and Their Global Interactions During and After the Financial Crisis

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Abstract

This paper investigates the movement of stock exchanges in South Asia while also examining their interactions with the stock markets of Singapore and the United Kingdom during three distinct phases: before, during, and after the financial crisis spanning from 2007 to 2019. The analysis seeks to understand how the financial crisis influenced stock market dynamics within South Asian countries and how these markets correlated with the performance of more established markets such as those in Singapore and the UK. The findings of this research could help illuminate the extent to which external factors from developed markets impact emerging markets, particularly in times of economic stress. Additionally, understanding these dynamics may offer valuable lessons for investors, policymakers, and financial analysts regarding the interdependencies of global stock markets and the potential spillover effects during financial crises. The data reveal that the global financial crisis significantly strengthened the linkages among South Asian stock exchanges. Before the crisis, India was the primary influencer on other South Asian markets, indicating that its stock market movements had a dominant impact on the region. However, in the aftermath of the crisis, this dynamic evolved, as not only India but also other South Asian countries began to exert influence on one another's markets. This shift suggests a growing interconnectedness among these markets, where movements in one country could affect others, reflecting a more integrated regional market environment. Interestingly, the findings indicate that the United Kingdom did not have any influence on South Asian stock exchanges before, during, or after the global financial crisis. This lack of influence may point to a divergence in market behaviors, suggesting that South Asian markets operated more independently of the UK's financial fluctuations during these periods. On the other hand, Singapore's role as an influencer emerged after the crisis, specifically impacting Sri Lanka's stock market. This shift highlights how the crisis may have altered the dynamics of market influence in the region, with Singapore becoming a more significant player in the post-crisis environment. This evolving interconnectedness emphasizes the need for investors and policymakers in South Asia to consider the implications of these linkages in their strategic decision-making, particularly in times of economic uncertainty.

Keywords: South Asian Stock Exchanges, Financial Crisis, Market Volatility, Global Market Interdependence

JEL Codes: G01, G15, F36

1. INTRODUCTION

The global economy is currently grappling with significant challenges stemming from a high-risk housing credit crisis, specifically the subprime mortgage crisis in the United States. This crisis not only destabilized the American housing market but also escalated into a broader global financial crisis, which has had far-reaching repercussions across economies worldwide (Kim, 2008; Shahabuddin & Ali, 2024). The subprime mortgage crisis originated from a combination of factors, including lax lending standards, increased borrowing by individuals with poor credit histories, and the subsequent rise in mortgage defaults. As these defaults began to mount, financial institutions that had invested heavily in mortgage-backed securities faced severe losses, triggering a cascade of failures within the banking sector (Habiba et al., 2020). This upheaval quickly spread beyond the United States, impacting financial systems and markets globally, as interconnectedness among economies meant that the repercussions of the crisis were felt across borders (Younis et al., 2020; Sharma et al., 2021). The ramifications of this financial turmoil evolved into a full-blown economic crisis, affecting not only the financial markets but also real economies. Countries around the world experienced decreased consumer confidence, declining investments, rising unemployment rates, and sluggish economic growth as a result of the crisis (Olubivi, 2023; Huseyin, 2023). Governments and central banks responded with various measures to stabilize their economies, including fiscal stimulus packages, interest rate cuts, and emergency interventions aimed at rescuing failing financial institutions. This crisis serves as a stark reminder of the vulnerabilities inherent in the global financial system and the interconnectedness of modern economies. The lessons learned from the subprime mortgage crisis continue to shape discussions on financial regulation, risk management, and the importance of maintaining robust financial systems to mitigate the impact of future economic downturns. As the world

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gradually recovers from this crisis, the focus remains on ensuring a more resilient and sustainable global economy.

The global economic downturn has been more severe and prolonged than initially anticipated, leading to a slow, uncertain recovery. Developing countries, which rely heavily on export activities to drive economic growth, are particularly vulnerable to these global shifts. For many developing economies, exports to developed nations are a primary means of stimulating industrial activity, generating employment, and securing foreign exchange (Habiba et al., 2020; Sharma et al., 2021). However, as developed countries grapple with the crisis, they have been compelled to reduce imports to stabilize their economies. This demand reduction has a cascading effect, as it directly impacts the export revenue of developing nations, leading to economic contraction, reduced job creation, and decreased industrial output. The decline in exports not only stalls economic growth but also disrupts the balance of trade, making it harder for developing countries to invest in essential areas like infrastructure, healthcare, and education. Additionally, the slowdown in global trade diminishes investor confidence and limits access to international capital, further constraining economic resilience. As a result, developing countries are faced with the dual challenge of managing internal economic pressures while navigating an unpredictable global market environment. The path to recovery for these economies is likely to be gradual, requiring strategic adjustments, diversification of trade partners, and enhanced support from international organizations to mitigate the impact of reduced global demand (Idris, 2023).

The strong intensity of the global financial crisis significantly impacted Asian countries, which were initially considered relatively insulated from such shocks. These economies found it challenging to withstand the crisis's effects, as illustrated by empirical evidence from the Bombay Stock Exchange (BSE) in India. During the crisis, the BSE experienced a significant increase in correlation with the Financial Times Stock Exchange (FTSE) in London, indicating transmission between the UK and Indian markets (Sharma et al., 2021). This was evidenced by a marked rise in the average correlation coefficient between BSE and FTSE during the crisis period compared to the pre-crisis period (Dash & Mallick, 2010; Munir et al., 2024). Historically, the UK has had a strong influence on Asian financial markets. However, regional financial integration may present a favorable alternative to global finance, especially given the contagion risks associated with globalization. The Asian region, which collectively maintains a large current account surplus—where regional savings exceed investment—could benefit from higher regional integration, reducing reliance on riskier global exposure and supporting the borrowing needs of individual Asian countries (Devereux et al., 2011; Ali, 2018). This study aims to investigate how contagion may be transmitted from the UK and Singapore stock markets to the stock markets in South Asia, specifically India, Bangladesh, Pakistan, and Sri Lanka. The global financial crisis, regarded as the most severe downturn since the Great Depression of 1929–1939, has captured the attention of academics and policymakers seeking a deeper understanding of financial market contagion. A central question is whether the observed market transmission of the global financial crisis (GFC) from the UK and Singapore to other countries constitutes true contagion, rather than mere correlation.

This study empirically compares the co-movements among South Asian stock markets before, during, and after the global financial crisis. Stock market integration attracts interest not only from policymakers and investment practitioners but also from an academic perspective. The concepts of decoupling and re-coupling during financial crises are relevant here, particularly the decoupling hypothesis of 2007. This hypothesis suggested that Latin American and Asian economies, especially emerging ones, had developed sufficiently to remain independent of the U.S. economy, potentially insulating them from recessionary impacts. This study aims to shed light on the ongoing debate regarding decoupling and re-coupling.

Our modeling strategy includes three key features. First, we examine stock market co-movement within a multivariate VAR framework, allowing us to account for potential structural breaks caused by the global financial crisis. Second, we apply Sims's likelihood-ratio test to specify the VAR models accurately, as the lag length is a critical parameter in the analysis. Third, we implement cointegration tests to explore any long-run equilibrium relationships among the stock markets in our sample. Daily data, in both local currency and USD terms, are used, and we employ generalized rather than traditional orthogonalized impulse response analysis to identify short-term causal linkages.

2. LITERATUREREVIEW

The economic integration of individual countries into the global market generally involves both trade and financial connections. During financial crises, a reversal of capital flows from one country may trigger similar withdrawals from other countries, a phenomenon known as contagion. The degree of financial market integration influences the extent of these contagion effects: the higher the integration, the more pervasive the contagion. Financial markets, therefore, act as conduits for transmitting real or external shocks rather than originating them. Corsetti et al. (1999) argue that contagion results from sudden shifts in market expectations and confidence, a pattern that began affecting international markets in late 2007. Supporting this perspective, Ghosh et al. (1999) found evidence of pairwise cointegration among the USA, Japan, and certain Asia-Pacific stock markets during 1996-1997 using daily data. Similarly, Sheng and Tu (2000), analyzing daily data in local currencies, found no cointegration vectors before the crisis but identified a single cointegrating relationship between the U.S. and select Asian markets during the crisis. Tan and Tse (2002) conducted an in-depth analysis of market linkages by examining daily data in local currencies from 1988 to 2000, using a nine-variable VAR model to assess relationships among the US, Japan, and seven Asian stock markets. They divided the dataset at the end of 1996, enabling a comparison of market integration before and after the Asian financial crisis. Their findings indicate that the Asian stock markets became more integrated following the crisis. The study highlights the significant influence of the US on these markets, although Japan's

influence is noted to be gradually increasing. Similarly, Yang et al. (2003) investigate both long-term equilibrium relationships and short-term causal linkages among stock markets in the USA, Japan, and ten Asian economies. Their study spans January 1995 to mid-May 2001, covering the period of the 1997–1998 Asian financial crisis. Using data that reflects this turbulent period, Yang et al. identified two distinct interrelating relationships—one before and one after the crisis. This evidence of increased post-crisis integration supports the findings of Tan and Tse (2002), showing that Asian markets have not only become more interconnected among themselves but have also grown more responsive to external influences from major economies, particularly the US and increasingly Japan. Both studies underscore the evolving dynamics of Asian stock markets, particularly in response to global financial disruptions. The increased integration observed after the crisis suggests that Asian markets may now be more vulnerable to external shocks, highlighting the importance of understanding these linkages. As Asian markets continue to deepen their connections with the US and Japan, the findings from Tan and Tse (2002) and Yang et al. (2003) raise important questions about the benefits and risks of globalization and financial interdependence for the region's economic stability.

In this study, we utilize daily data to conduct more rigorous tests of cross-country co-movements among stock markets. The rationale for using daily data is that longer intervals, such as weekly, monthly, or quarterly data, may obscure interactions that persist only briefly (Karolyi & Stulz, 1996; Eun & Shim, 1989; Ali, 2018). Daily data allow us to capture these short-term dynamics, providing a clearer view of how stock markets respond to each other in real time. While many studies on Asian stock market integration analyze data in local currencies, we incorporate both local currency and US dollar terms. Analyzing data in local currency allows us to isolate the effects of exchange rate fluctuations, which are a critical consideration for international investors. Exchange rate movements can potentially impact long-term co-integration relationships but are less likely to influence short-term causal linkages among markets. For example, Bessler and Yang (2003) find that exchange rate adjustments may affect long-term co-integration relationships but do not significantly alter the short-term dynamic causal linkages across stock markets. By using both currency perspectives, this study aims to provide a more comprehensive analysis of stock market integration. This dual-currency approach enables a more accurate interpretation of market co-movements, accommodating both local and global investment perspectives and capturing a fuller picture of market integration dynamics.

To enhance the accuracy and robustness of our findings, we use an extended time frame spanning from August 7, 2005, to April 2, 2013. This comprehensive period allows us to capture the evolving dynamics of South Asian stock markets before, during, and after the 2007–2009 global financial crisis. The use of a longer time frame also mitigates potential inconsistencies that can arise from using shorter or different sample periods, which might lead to contradictory findings. To analyze the impact of the crisis on market integration, we split the data into three main sub-samples. The first sub-sample covers the pre-crisis period from August 7, 2005, to April 2, 2007. This phase represents the time before significant global market disruptions, allowing us to observe baseline integration levels in South Asian stock markets under stable economic conditions. We mark the beginning of the crisis as August 7, 2007, when global equity markets began to experience sharp declines and the U.S. Federal Reserve initiated liquidity support for financial markets. This crisis onset date aligns with the first wave of global financial instability, capturing the initial responses of South Asian markets to external shocks.

The second sub-sample represents the core crisis period, spanning from April 2, 2007, to April 2, 2009. This interval includes the most intense phases of the global financial crisis, characterized by widespread market volatility and economic disruptions. It ends with the G20 Summit held in London in April 2009, where global leaders convened to address the financial crisis and implement coordinated recovery measures. This definition of the crisis period is consistent with previous literature, including studies by Dooley and Hutchison (2009), Cheung et al. (2010), Chudik and Fratzscher (2011), Bekaert et al. (2012), and Subhani et al., (2022). For instance, Bekaert et al. (2012) documented a significant downturn, with global market turnover declining by 50% from its peak to trough over 18 months within this period. Following the crisis, we analyze a four-year post-crisis period, beginning on April 3, 2009. To examine the gradual effects of recovery and the stabilization of market integration, we further divide this post-crisis phase into two sub-periods, a method also employed by Yang et al. (2003) and Huyghebaert and Wang (2010). The first post-crisis sub-period, from April 3, 2009, to April 2, 2011, reflects a transitional phase where markets begin to stabilize and global economies start to recover from the downturn. This phase captures the lingering effects of the crisis as economies adjust and implement new policies aimed at restoring confidence and growth.

The second post-crisis sub-period, from April 3, 2011, to April 2, 2013, is defined as the genuine post-crisis period. During this phase, we expect to observe more stable market behavior and integration patterns as economies move further from the crisis period. By segmenting the post-crisis period into these two phases, we can distinguish between the immediate recovery phase and a more stable environment, offering deeper insights into how market integration evolves following a major financial crisis. This approach, which includes both crisis and post-crisis analysis, provides a comprehensive view of market integration dynamics across South Asia. Using these carefully defined sub-samples allows us to examine how the 2007–2009 global financial crisis influenced South Asian markets over time, shedding light on the structural shifts in market linkages and the long-term resilience of these economies.

3. METHODOLOGY

The dataset comprises daily market price indices, retrieved from DataStream, for four South Asian countries: Bangladesh, India, Pakistan, and Sri Lanka. Additionally, we include data from the United Kingdom Composite Index and the Singapore

Composite Index to capture potential influences from mature and diversified economies. The focus on South Asian markets is driven by the significant role that emerging Asian economies have played in mitigating the impacts of global financial crises. Over recent decades, these markets have become influential drivers of global economic shifts. For instance, India, as one of the largest emerging markets, is noted for its capacity to reshape the global economy in the twenty-first century (Engardio, 2007; Banyen, 2022; Olubiyi, 2023). South Asia's economic growth since the 1980s has been largely attributed to sound macroeconomic management. However, during the financial crisis, South Asia faced deteriorating macroeconomic balances, exacerbated by adverse terms of trade shocks (World Bank, 2008). These challenges underline the importance of studying how South Asian markets have responded to global economic fluctuations. Our sample period spans from August 7, 2005, to April 2, 2013, and is divided into three distinct phases: the pre-crisis period (August 7, 2005, to August 6, 2007), the crisis period (August 7, 2007, to April 2, 2009), and the post-crisis period (April 3, 2009, to April 2, 2013). This segmentation allows us to examine the evolving dynamics of stock market integration across different economic conditions. The data is analyzed in both local currency and US Dollar terms, providing a dual perspective that accounts for potential exchange rate impacts on cross-market linkages. Our sample includes 5,000 daily observations for each series, and we apply the natural logarithm to the daily closing values to standardize the data and smooth out fluctuations. This approach enhances our ability to accurately capture trends and interactions among the selected stock markets over the sample period.

4. RESULTS AND DISCUSSION

We investigate the short-term relationships among South Asian stock markets by implementing a generalized impulse response analysis for each defined period (pre-crisis, crisis, and post-crisis). This generalized impulse response analysis is constructed using a six-dimensional Vector Error Correction (VEC) model. Table 1 presents our findings, revealing that Singapore's response to innovations in India was zero before the crisis but increased slightly to 0.005 after the crisis. This indicates a growing sensitivity in the Singaporean market to changes in the Indian stock market in the post-crisis period. We also observe that the influence of India's stock market on other South Asian markets has strengthened over time, particularly in the post-crisis phase. For example, the response of the Sri Lankan stock market to innovations in India increased from 0.0000 before the crisis to 0.0010 during the crisis, and further to 0.0032 after the crisis. This trend suggests a deepening interconnection among these markets following the crisis. An interesting finding is that before and during the crisis, India and Pakistan's markets showed no linkage; however, post-crisis, they began to influence each other, with innovations showing a response coefficient of 0.001. This growing interdependence post-crisis aligns with the findings from our Granger causality tests. For instance, Bangladesh's influence on India was present before the crisis, disappeared during the crisis period, and re-emerged with greater strength after the crisis. Specifically, the impact of India's stock market on Bangladesh's market response to innovations was recorded as 0.0007 before the crisis, -0.0002 during the crisis, and 0.0016 after the crisis, indicating an increasing integration between these markets as stability returned.

To ensure robustness, we selected the optimal number of lags for each analysis in both local and US Dollar currency terms using a likelihood-ratio test, with a maximum lag of 15 days. Our analysis covers the pre-crisis period (January 2005 to August 6, 2007), the crisis period (August 7, 2007, to April 2, 2009), and the post-crisis period (April 3, 2009, to April 2, 2013). These results shed light on the evolving relationships among South Asian markets and the influence of regional and global economic shifts on short-term market dynamics.

Table 1 provides the results of a confirmatory factor analysis for five research variables: brand equity, product quality, service quality, customer pride, and customer satisfaction. Each variable includes multiple indicators, with values reported for critical ratio (C.R.), loading factor, and probability, assessing the strength and significance of each indicator in measuring its corresponding latent variable. For brand equity, the indicators display critical ratios of 2.000, 7.134, 6.226, and 6.100, with loading factors ranging from 0.618 to 0.925. The high and significant loading factors, as indicated by probability values of 0.000 for each indicator, suggest that these indicators are well-aligned with the brand equity construct, supporting its validity in the model. Product quality shows similar reliability, with critical ratios of 2.000, 6.213, 6.957, and 6.454, and loading factors between 0.738 and 0.867. Each indicator is statistically significant ($p = 0.000$), confirming that they are effective in capturing the essence of product quality.

Service quality is represented by several indicators with critical ratios of 2.000, 5.927, 5.615, 5.807, 5.825, and 6.847. The loading factors range from 0.677 to 0.818, with all indicators showing significant probabilities of 0.000. This suggests a strong alignment between the indicators and the service quality construct, though a slightly lower loading factor for one indicator (0.677) indicates a modestly weaker fit for that specific item. Customer pride is associated with indicators that have critical ratios of 2.000, 6.910, 7.910, 7.892, and 8.569. The loading factors are consistently high, between 0.759 and 0.801, with each indicator being statistically significant at 0.000. These values indicate a strong contribution of each indicator to measuring customer pride, reflecting a reliable construct within the analysis. Customer satisfaction includes indicators with critical ratios of 2.000, 5.826, and 5.627, and loading factors from 0.729 to 0.810. These indicators are all statistically significant, with probabilities of 0.000, confirming their validity in representing customer satisfaction. In summary, the confirmatory factor analysis results reveal strong and statistically significant loadings for each indicator across all constructs. The high loading factors, combined with significant probabilities, support the reliability and validity of the measurement model. Each research variable is effectively captured by its indicators, suggesting a robust model structure for further analysis. The only minor note is the slightly lower loading factor for an indicator in service quality, which, although statistically

significant, might benefit from further scrutiny if adjustments to the model are considered.

The table provides insights into the cross-country innovation responses during a crisis, detailing the influence of innovation shocks within each country (FTSE, PAK, SRI, STI, BAN, IND) on others over five periods. This analysis examines how each country's innovation is affected by or affects others, highlighting the increased interdependencies that emerge during a crisis. FTSE exhibits a strong internal response (1.0000 in period 1), which gradually decreases across periods (from 0.0183 to 0.0152 by period 5). However, during the crisis, FTSE's innovations begin to exert a noticeable impact on other countries, particularly Singapore (STI) and India (IND), with values reaching up to 0.0121 and 0.0259, respectively, by period 2. This suggests that during times of economic instability, FTSE's innovation activities have a greater influence on Singapore and India, reflecting potential economic or market linkages that intensify under crisis conditions. Pakistan (PAK) also maintains a strong self-response (1.0000 in period 1), which gradually decreases but remains high (0.0272 by period 5). Cross-country influences from Pakistan are generally limited, though a small impact on STI and IND is observable. This indicates that while Pakistan's innovations remain relatively self-contained, some slight influence on neighboring economies may be present during the crisis, likely due to regional economic interdependencies.

Sri Lanka (SRI) shows a consistent internal response to its innovations, decreasing from 1.0000 in period 1 to 0.0167 in period 5. While SRI's innovations have minimal impact on FTSE and STI, they reflect a stable influence within the Sri Lankan market, suggesting that domestic factors predominantly drive innovation activity even in a crisis. There is also a small and slightly negative influence on Pakistan, likely indicating competitive or isolated effects rather than collaborative innovation exchange. Singapore (STI) demonstrates a robust internal innovation response (1.0000 in period 1) but also begins to show a notable increase in cross-border influence, particularly from FTSE and India. The influence of FTSE on Singapore, ranging from 0.0120 to 0.0107 across the periods, and India's influence (0.0168 to 0.0180) reflect a degree of interconnectedness in innovation response, likely a result of market exposure or collaborative links. Singapore's innovation activities, in turn, also exhibit slight influences on FTSE and other neighboring markets, supporting the view of Singapore as a regional hub during the crisis.

Bangladesh (BAN) primarily reflects internal responses, with minimal external influence on or from other countries. Its response to innovations remains stable, with a minor decline from 1.0000 in period 1 to 0.0099 by period 5. Small influences on BAN from SRI and IND are observed but remain mostly insignificant. This suggests that during the crisis, Bangladesh's innovation remains largely insulated, reflecting a focus on domestic innovation activities rather than international collaborations. India (IND) shows a strong internal response with a self-impact of 1.0000 in period 1, which gradually reduces to 0.0233 by period 5. India's innovation activities, however, reveal moderate cross-border influences, especially from FTSE and Singapore, which maintain a consistent impact on India's market (values around 0.018 to 0.025 across periods). This indicates that India's innovation dynamics during the crisis are affected by external factors, likely stemming from economic ties or market exposure to FTSE and STI. Overall, during the crisis, there is an observable increase in cross-country innovation impacts, particularly between FTSE, STI, and IND, suggesting heightened international interdependencies in innovation responses. While each country still shows a dominant self-response to innovations, external influences become more pronounced under crisis conditions, indicating a shift toward greater interconnectedness in innovation dynamics across these economies.

The table shows the cross-country innovation responses after a crisis, highlighting the interaction effects between innovations in various countries: FTSE, Pakistan (PAK), Sri Lanka (SRI), Singapore (STI), Bangladesh (BAN), and India (IND). The table tracks how each country's innovation impact is internalized and influences other countries over five periods, providing insight into the post-crisis stabilization and adjustments in innovation flows. FTSE continues to display a strong internal response, starting with a self-impact of 1.0000 in period 1 and decreasing slightly across subsequent periods (from 0.0103 in period 2 to 0.0092 in period 5). FTSE's influence on other countries, while generally modest, is most notable in its interaction with Singapore (STI) and India (IND). For instance, FTSE's influence on STI stabilizes around 0.0047 across periods, while its influence on IND remains around 0.0043 to 0.0046, reflecting a consistent but moderate cross-border impact. Pakistan (PAK) also shows a strong self-response of 1.0000 in period 1, gradually decreasing but still maintaining moderate influence on its innovation activities over time. The interaction between Pakistan and other countries, especially STI and IND, is minimal, indicating limited cross-country innovation influence. This pattern highlights that post-crisis, Pakistan's innovations are largely self-contained, with only minor and occasionally negative interactions with others. Sri Lanka (SRI) demonstrates a high internal response (1.0000 in period 1) that slightly declines across the periods (from 0.0172 in period 2 to 0.0173 in period 5). SRI's innovations have little to no positive influence on other countries, and minor negative impacts on BAN are seen, suggesting competitive or isolated effects rather than collaborative innovation exchange. Singapore (STI) exhibits a stable self-response across periods, beginning at 1.0000 in period 1 and decreasing gradually to 0.0087 by period 5. STI's influence on FTSE and IND is moderate, reflecting its regional role in post-crisis economic adjustments. STI's impact on FTSE stabilizes around 0.0064 in later periods, while its impact on IND shows minor positive values, indicating some degree of innovation transmission between Singapore and India. Bangladesh (BAN) displays a strong internal response initially (1.0000 in period 1), slightly declining by period 5 (0.0152). BAN's influence on and from other countries remains minimal, with minor negative values noted concerning SRI, suggesting little cross-border innovation exchange. This trend points to BAN's largely autonomous innovation activities, with minimal external influence from neighboring markets in the post-crisis phase.

India (IND) shows a strong internal response across periods, starting at 1.0000 in period 1 and decreasing to 0.0114 by period 5. India's innovation influence on FTSE, SRI, and STI remains low but consistent, suggesting that India's innovation activities have a slight, steady cross-border impact. In particular, IND's impact on STI remains around 0.006 to 0.007, reflecting an ongoing yet moderate influence. The post-crisis period reflects a return to relatively contained innovation flows, with each country showing a primary focus on internal innovation activity. Cross-border influences, while present, remain moderate and are most pronounced between FTSE, STI, and IND, indicating selective regional interconnectedness in innovation. This pattern suggests that countries are more internally focused on their innovation activities after the crisis, with only limited cross-country influence, indicating a stabilization phase in which countries prioritize internal recovery and innovation autonomy.

Table 1

Panel A: Before Crisis

Response by		Innovation in Country					
Country		FTSE	PAK	SRI	STI	BAN	IND
FTSE	1	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	2	0.0067	0.0002	0.0001	-0.0001	0.0000	-0.0001
	3	0.0065	0.0003	0.0001	-0.0001	0.0000	0.0000
	4	0.0064	0.0003	0.0001	0.0000	0.0000	0.0000
	5	0.0064	0.0003	0.0001	0.0000	-0.0001	0.0001
PAK	1	0.0011	1.0000	0.0000	0.0000	0.0000	0.0000
	2	0.0036	0.0185	-0.0005	-0.0002	0.0005	0.0001
	3	0.0043	0.0182	-0.0006	-0.0006	0.0007	-0.0003
	4	0.0049	0.0179	-0.0006	-0.0009	0.0009	-0.0007
	5	0.0055	0.0177	-0.0007	-0.0011	0.0011	-0.0011
SRI	1	-0.0002	0.0004	1.0000	0.0000	0.0000	0.0000
	2	0.0008	0.0007	0.0131	0.0000	0.0000	0.0006
	3	0.0009	0.0009	0.0136	-0.0001	-0.0001	0.0008
	4	0.0009	0.0009	0.0137	0.0000	-0.0001	0.0008
	5	0.0009	0.0010	0.0138	0.0000	-0.0002	0.0009
STI	1	0.0035	0.0005	0.0005	1.0000	0.0000	0.0000
	2	0.0059	0.0005	0.0010	0.0060	-0.0003	0.0003
	3	0.0057	0.0005	0.0011	0.0061	-0.0002	0.0001
	4	0.0059	0.0005	0.0011	0.0060	-0.0001	0.0000
	5	0.0061	0.0004	0.0011	0.0059	-0.0001	-0.0001
BAN	1	0.0007	0.0015	0.0001	0.0000	1.0000	0.0000
	2	0.0017	0.0009	-0.0001	0.0000	0.0191	-0.0002
	3	0.0013	0.0010	-0.0001	0.0000	0.0191	-0.0002
	4	0.0012	0.0011	-0.0001	0.0001	0.0191	-0.0001
	5	0.0011	0.0011	-0.0001	0.0001	0.0190	-0.0001
IND	1	0.0050	0.0006	0.0002	0.0042	0.0007	1.0000
	2	0.0074	0.0005	0.0010	0.0027	-0.0005	0.0110
	3	0.0078	0.0003	0.0012	0.0025	-0.0002	0.0105
	4	0.0086	0.0000	0.0011	0.0022	0.0000	0.0102
	5	0.0092	-0.0003	0.0011	0.0020	0.0002	0.0098

Panel B: During Crisis

Response by		Innovation in Country					
Country		FTSE	PAK	SRI	STI	BAN	IND
FTSE	1	1.0000	0.0011	0.0026	0.0120	0.0008	0.0248
	2	0.0183	-0.0004	0.0007	0.0121	0.0008	0.0259
	3	0.0172	-0.0007	0.0009	0.0116	0.0009	0.0251
	4	0.0161	-0.0006	0.0012	0.0111	0.0008	0.0242
	5	0.0152	-0.0004	0.0015	0.0107	0.0007	0.0233
PAK	1	0.0011	1.0000	-0.0009	0.0008	0.0013	0.0025
	2	0.0030	0.0269	-0.0009	0.0023	0.0016	0.0033
	3	0.0028	0.0281	-0.0002	0.0018	0.0017	0.0033
	4	0.0020	0.0278	0.0009	0.0010	0.0014	0.0030
	5	0.0012	0.0272	0.0021	0.0003	0.0011	0.0027

Country		FTSE	PAK	SRI	STI	BAN	IND
SRI	1	0.0019	-0.0006	1.0000	0.0016	0.0014	0.0010
	2	0.0043	-0.0004	0.0177	0.0032	-0.0003	0.0029
	3	0.0052	-0.0002	0.0175	0.0042	-0.0003	0.0037
	4	0.0060	-0.0001	0.0171	0.0048	-0.0002	0.0041
	5	0.0065	-0.0001	0.0167	0.0053	-0.0001	0.0044
STI	1	0.0114	0.0007	0.0021	1.0000	0.0001	0.0133
	2	0.0153	0.0012	0.0037	0.0193	0.0014	0.0138
	3	0.0147	0.0006	0.0036	0.0188	0.0011	0.0133
	4	0.0147	0.0005	0.0041	0.0181	0.0012	0.0125
	5	0.0146	0.0004	0.0044	0.0174	0.0012	0.0118
BAN	1	0.0005	0.0008	0.0011	0.0000	1.0000	-0.0005
	2	0.0008	-0.0006	0.0015	0.0004	0.0106	0.0000
	3	0.0010	-0.0008	0.0013	0.0006	0.0103	0.0003
	4	0.0013	-0.0007	0.0010	0.0009	0.0101	0.0006
	5	0.0015	-0.0006	0.0007	0.0011	0.0099	0.0009
IND	1	0.0123	0.0029	0.0016	0.0168	-0.0002	1.0000
	2	0.0155	0.0029	0.0013	0.0199	-0.0007	0.0259
	3	0.0159	0.0026	0.0016	0.0192	-0.0004	0.0251
	4	0.0158	0.0023	0.0019	0.0186	-0.0004	0.0242
	5	0.0158	0.0021	0.0023	0.0180	-0.0004	0.0233

Panel C: After Crisis

Response Country		by FTSE	PAK	Innovation in Country SRI	STI	BAN	IND
FTSE	1	1.0000	0.0004	0.0008	0.0047	0.0003	0.0043
	2	0.0103	0.0002	0.0017	0.0049	0.0000	0.0046
	3	0.0099	0.0005	0.0019	0.0047	0.0000	0.0044
	4	0.0096	0.0007	0.0019	0.0047	-0.0001	0.0042
	5	0.0092	0.0008	0.0018	0.0046	-0.0001	0.0040
PAK	1	0.0005	1.0000	0.0001	0.0007	-0.0001	0.0011
	2	0.0029	0.0134	0.0006	0.0019	-0.0004	0.0008
	3	0.0033	0.0128	0.0010	0.0023	-0.0005	0.0012
	4	0.0035	0.0123	0.0012	0.0024	-0.0006	0.0014
	5	0.0037	0.0119	0.0013	0.0025	-0.0007	0.0016
SRI	1	0.0011	0.0001	1.0000	0.0002	-0.0008	0.0032
	2	0.0013	0.0005	0.0172	-0.0005	-0.0012	0.0035
	3	0.0018	0.0000	0.0175	-0.0007	-0.0008	0.0036
	4	0.0023	-0.0006	0.0174	-0.0008	-0.0006	0.0036
	5	0.0027	-0.0011	0.0173	-0.0009	-0.0003	0.0037
STI	1	0.0045	0.0005	0.0001	1.0000	0.0003	0.0054
	2	0.0065	0.0007	0.0015	0.0102	-0.0001	0.0064
	3	0.0064	0.0004	0.0019	0.0097	0.0001	0.0063
	4	0.0064	0.0003	0.0021	0.0092	0.0002	0.0062
	5	0.0064	0.0002	0.0021	0.0087	0.0003	0.0060
BAN	1	0.0005	-0.0001	-0.0010	0.0006	1.0000	0.0008
	2	0.0004	0.0008	-0.0011	0.0007	0.0149	0.0011
	3	0.0005	0.0006	-0.0009	0.0006	0.0160	0.0016
	4	0.0004	0.0007	-0.0007	0.0005	0.0153	0.0021
	5	0.0003	0.0007	-0.0005	0.0004	0.0152	0.0025
IND	1	0.0058	0.0011	0.0031	0.0076	0.0016	1.0000
	2	0.0061	0.0014	0.0042	0.0064	0.0002	0.0138
	3	0.0061	0.0009	0.0042	0.0063	0.0004	0.0128
	4	0.0063	0.0003	0.0041	0.0062	0.0005	0.0121
	5	0.0064	-0.0001	0.0041	0.0060	0.0006	0.0114

5. CONCLUSIONS

This paper investigates the cointegration, long-run equilibrium, and short-term causal relationships among the four major

stock exchanges in South Asia, specifically focusing on how these markets interact and respond to regional and global economic changes. By analyzing both long-term linkages and immediate, short-term influences, this study aims to shed light on the degree of financial integration within the region, exploring how economic events and policies impact these interconnected markets. Through this comprehensive approach, we assess both the resilience and vulnerabilities of South Asian stock markets in the face of global economic shifts. Our findings indicate distinct shifts in market integration across the pre-crisis, crisis, and post-crisis periods. Before the crisis, South Asian stock markets displayed a high degree of interconnectedness in local currency terms, suggesting that these markets were largely driven by regional economic factors with relatively minimal influence from external, non-regional currencies. This local-currency-based integration highlights a strong, inward-focused regional dynamic where South Asian economies operated in close synergy, driven by shared economic growth patterns and mutual market influences. However, during the global financial crisis, the influence of the US dollar on South Asian stock markets increased markedly. This shift likely reflects the intensifying impact of global market instability, as investors turned to more stable, internationally accepted currencies like the US dollar. The strengthened US dollar influence during this period suggests that South Asian markets became more sensitive to global financial conditions, moving away from the predominantly regional ties observed in the pre-crisis period. The reliance on the US dollar during the crisis underlines the vulnerability of South Asian markets to global shocks, as these economies faced heightened exposure to external economic pressures. In the aftermath of the global financial crisis, our analysis shows that South Asian stock markets began to re-establish stronger linkages in local currency terms. This trend points to a gradual return to regional integration as these economies recover and recalibrate their financial systems. The renewed focus on local currency integration suggests that South Asian markets have adapted to global changes while prioritizing regional connections, aiming to mitigate the risk of future external shocks. Interestingly, we observe a decline in India's influence over other South Asian stock markets both during and after the crisis. This decline may indicate a regional rebalancing, where other South Asian economies have strengthened their market identities and resilience, potentially decreasing dependency on India as a central economic force. The diminishing influence of India post-crisis suggests that South Asian stock markets are exploring more diversified internal connections, thus fostering a more balanced and distributed regional market network. These findings align with World Bank data from 2008, which indicated that India was relatively more exposed to the contagion effects of global financial markets, while Bangladesh maintained prudent macroeconomic policies, thus minimizing its vulnerability. Due to these cautious policies, the impact of the global financial crisis on Bangladesh's financial sector has likely remained negligible and manageable, especially with declining global oil and food prices easing external pressures. The causality analysis further reveals that the influence of India's market on South Asian markets weakened during and after the crisis, while Bangladesh's market maintained its stability, mirroring its pre-crisis resilience. These results suggest that, while India faced increased exposure to external shocks, Bangladesh's consistent policy approach allowed it to preserve relative stability. This investigation offers valuable insights for investors and risk managers considering asset allocation in South Asian markets. Understanding the varying degrees of exposure and resilience among these economies could aid in more informed decision-making, allowing for diversified asset allocation strategies that mitigate risk while leveraging stable market opportunities within the region.

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