



Cointegration Among Asian Stock Exchanges: A Focus on NYSE, NSE, and Shanghai Stock Exchange

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Abstract:

This study explores cointegration among Asian stock exchanges, particularly the NYSE, NSE, and SSE, using extensive historical data. Through Engle-Granger and Johansen cointegration tests, along with VECM models, we reveal significant long-term relationships. These connections imply that these markets are influenced by common global economic trends, trade dynamics, and policy changes. Such findings have substantial implications for global investors and portfolio managers, aiding in portfolio diversification and risk management. We also investigate the dynamic drivers affecting these relationships over time, including economic factors, exchange rate fluctuations, and policy developments. Understanding these interdependencies is vital for informed investment decisions in the evolving global financial landscape.

Key words: Johansen cointegration test, Global financial markets, comparative analysis.

Introduction

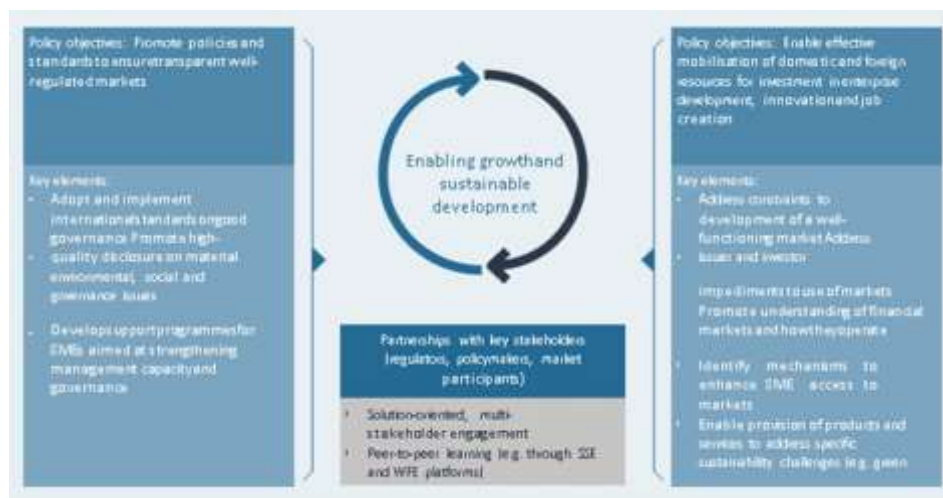
Global economies are based on stock markets. However, their volatility creates a global spatial variance that causes the economy to collapse and fluctuate greatly. The regulatory frameworks, market size, and development of Asian stock markets are very diverse. Major economies such as Japan, China, India, South Korea, and rising markets in Southeast Asia are usually included in the Asian stock markets.

Role of stock exchanges in fostering economic growth

Stock Exchanges have the potential to and do support sustainable development and economic expansion. It has concentrated on the two primary functions of exchanges: encouraging good governance and mobilising resources to support sustainable economic growth and development. Since the primary role of exchanges is the mobilisation of capital, their continued existence can support economic progress and expansion. Additionally, there are chances to expand this financing function in order to improve SME financing accessibility and facilitate capital mobilisation to address important long-term sustainability issues. The idea of globalisation is permeating more and more, leading to deeper links across foreign SMs. The subprime crisis and its aftereffects on the world's financial markets have exposed

the relationships between the financial markets and SMs, which have an impact on both individual and institutional investors' investing decisions. The SM co-movement has emerged as a crucial financial concern in recent times because of its significant influence on hedging methods and portfolio allocations.

The new Corona Virus (COVID-19) has caused significant disruption to the US economy, and the US stock market is witnessing an unparalleled collapse. Typically, a market-wide circuit breaker is implemented in March 2020 in a stepwise fashion to protect US SM from destruction. Many investors suffered enormous losses when the stock prices began to plummet. The anxiety of the crisis began to permeate the worldwide atmosphere, and its effects on the world's economies began to grow. China Daily published an article titled "Coronavirus: US stocks see worst fall since 1987" on March 17, 2020. The article noted that although the US economy was experiencing a historical downturn, other global economies were also seeing a decline.



Source: www.unctad.org

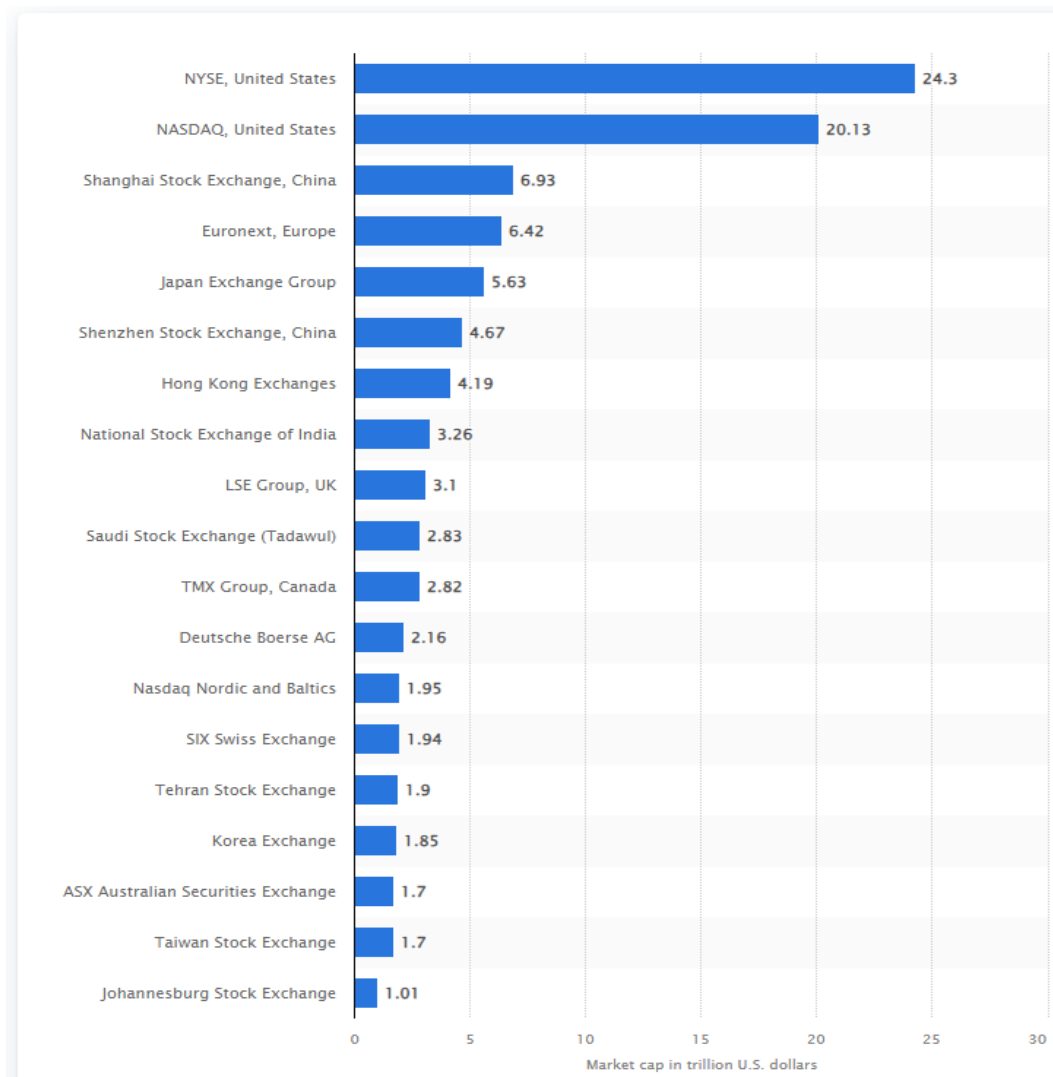
Top 10 stock exchanges in Asia

- Tokyo Stock Exchange, Japan
- Shanghai Stock Exchange, China
- Hong Kong Stock Exchange, Hong Kong
- Shenzhen Stock Exchange, China
- Bombay Stock Exchange, India
- National Stock Exchange, India



- Korea Exchange, South Korea
- Taiwan Exchange, Taiwan
- Singapore Exchange, Singapore
- The Stock Exchange of Thailand, Thailand

The following figure represents performance of Asian stock exchanges during October 2013. New York stock exchange stood as top performer with market capitalisation of 24.3 trillion US \$. Shanghai stock exchange had market capitalisation as 1/3rd of United state stock exchange. National stock exchange of India stood in 8th place with market cap of 3.26 trillion US \$.



Source: www.cmie.com



This research focused on the analysis of 3 major stock exchanges of Asian countries. In this research, Researcher have taken previous five years data of 3 stock exchanges of world.

This study examines global stock markets that differ significantly in terms of geopolitics, socioeconomics, and other variables. It is reasonable to assume that the movement of one stock exchange will affect the movement of other stock exchanges because capital flow into a country has changed dramatically along with the relaxation of bureaucratic restrictions, bringing different stock exchanges closer together in terms of system and regulations. Because of this, researchers have expressed interest in establishing the causal relationship over an extended period of time between the Indian stock markets—specifically, the BSE—and other significant stock exchanges worldwide.

Review of literature:

- Ge Song ,**Zhiqing Xia**, Muhammad Farhan Basheer & Syed Mehmood Ali Shah(2021) examine the co-movement between the two economic powers, namely the USA and China. The authors are mainly interested in examining the dynamics of co-movements during, and in the pre-covid periods. Additionally, they have aimed to examine the volatility spillover between USA and China, during and in the pre-covid periods. In order to achieve the research-based objectives, advanced econometrics models have been applied to the data from July1, 2010, to April 30, 2021. The results show that the sample market is integrated in the long run. The results also indicate that the behaviour of the Chinese market is same as the US market, and offers negligible opportunities for investors for diversification during this time. The findings indicate that the Ganger Causality between the stock markets during crisis is significantly higher than the pre-crisis period.
- **Swetadri Samadder, (2018)** In order to investigate the short- and long-term relationships with the Indian stock market and selected developed stock markets, this study looked into the integration of the stock markets among the major global stock markets, namely, Australia, Canada, France, Germany, India, UK, and USA. Additionally, they look into the potential for portfolio diversification between developed and Indian stock markets. The French and Indian stock markets show little correlation, which suggests that there may be benefits to international diversification. Granger causality test results based on VECM show that both Indian stock market and



USA stock market are associated in the long-run but it would take long time to return to equilibrium.

- **Dhanaraj et al. (2013)** noticed that greater bilateral trade intensity does not result in greater SM integration and that macroeconomic integration in recently industrialised Asian nations does not lead to SM integration. The vector autoregressive (VAR) model was used to estimate the forecast error variance decomposition (FEVD), and time series regression was used to regress the macroeconomic variables on the FEVD.

Objectives:

- To study the trend of indices of New York, Shanghai and India's major stock markets.
- To examine the correlation among the NYSE, SSE and NSE.

Methodology

Research methodology plays a crucial role in investigating cointegration among stock exchanges. Below is a research methodology that outlines the steps and techniques you can use to analyze cointegration among stock exchanges, including those in Asia.

Research Design

- **Data Selection:** Researcher has chosen New York stock exchange, Shanghai Stock Exchange, National Stock Exchange of India as the sample to study Asian stock exchanges.
- **Time Period:** As longer time periods can provide more robust insights into correlation relationships, researcher has chosen monthly data during the period April 2018 to March 2023.
- **Data Collection:** Researcher Collected data, reports from official websites of stock exchanges for Ensuring data consistency, accuracy and adequacy. The entire research was conducted on secondary data only. The study used descriptive statistics to analyse the general characteristic and normality of the data set used. To investigate the correlation between the SMs, the study has employed the correlation test.
- **Table 3: major index of selected countries**

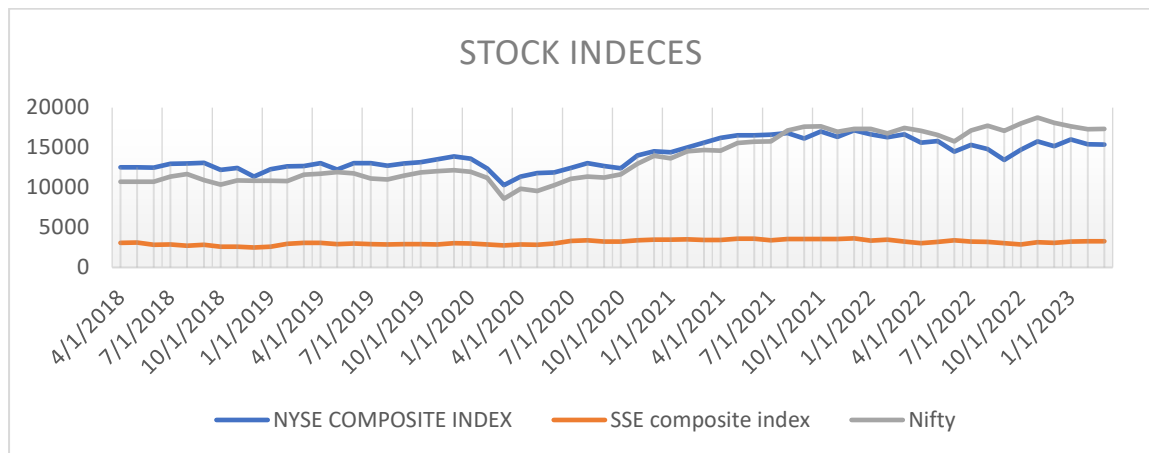


Date	NYSE COMPOSITE INDEX	SSE composite index	Nifty
01-04-2018	12515.36035	3082.231934	10739.35
01-05-2018	12527.13965	3095.474121	10736.15
01-06-2018	12504.25	2847.417969	10714.3
01-07-2018	12963.28027	2876.400879	11356.5
01-08-2018	13016.88965	2725.25	11680.5
01-09-2018	13082.51953	2821.350098	10930.45
01-10-2018	12208.05957	2602.782959	10386.6
01-11-2018	12457.54981	2588.187988	10876.75
01-12-2018	11374.38965	2493.895996	10862.55
01-01-2019	12299.03027	2584.572021	10830.95
01-02-2019	12644.80957	2940.954102	10792.5
01-03-2019	12696.87988	3090.758057	11623.9
01-04-2019	13060.65039	3078.339111	11748.15
01-05-2019	12264.49023	2898.696045	11922.8
01-06-2019	13049.70996	2978.87793	11788.85
01-07-2019	13066.59961	2932.51001	11118
01-08-2019	12736.87988	2886.23999	11023.25
01-09-2019	13004.74023	2905.189941	11474.45
01-10-2019	13171.80957	2929.060059	11877.45
01-11-2019	13545.20996	2871.97998	12056.05
01-12-2019	13913.03027	3050.124023	12168.45
01-01-2020	13614.09961	2976.528076	11962.1
01-02-2020	12380.96973	2880.303955	11201.75
01-03-2020	10301.87012	2750.295898	8597.75
01-04-2020	11372.33984	2860.082031	9859.9
01-05-2020	11802.9502	2852.351074	9580.3
01-06-2020	11893.78027	2984.674072	10302.1
01-07-2020	12465.04981	3310.00708	11073.45
01-08-2020	13045.59961	3395.677979	11387.5
01-09-2020	12701.88965	3218.052002	11247.55



Date	NYSE COMPOSITE INDEX	SSE composite index	Nifty
01-10-2020	12429.33008	3224.532959	11642.4
01-11-2020	14006.45996	3391.76001	12968.95
01-12-2020	14524.79981	3473.069092	13981.75
01-01-2021	14397.2002	3483.069092	13634.6
01-02-2021	15010.46973	3509.080078	14529.15
01-03-2021	15601.74023	3441.909912	14690.7
01-04-2021	16219.33008	3446.860107	14631.1
01-05-2021	16555.66016	3615.47998	15582.8
01-06-2021	16555.34961	3591.199951	15721.5
01-07-2021	16602.28906	3397.360107	15763.05
01-08-2021	16806.43945	3543.939941	17132.2
01-09-2021	16144.91992	3568.169922	17618.15
01-10-2021	17016.41016	3547.340088	17671.65
01-11-2021	16318.96973	3563.889893	16983.2
01-12-2021	17164.13086	3639.780029	17354.05
01-01-2022	16659.76953	3361.439941	17339.85
01-02-2022	16313.88965	3462.310059	16793.9
01-03-2022	16670.91016	3252.199951	17464.75
01-04-2022	15615.25	3047.060059	17102.55
01-05-2022	15827.04981	3186.429932	16584.55
01-06-2022	14487.63965	3398.620117	15780.25
01-07-2022	15327.70996	3253.23999	17158.25
01-08-2022	14801.24023	3202.139893	17759.3
01-09-2022	13472.17969	3024.389893	17094.35
01-10-2022	14747.03027	2893.47998	18012.2
01-11-2022	15780.01953	3151.340088	18758.35
01-12-2022	15184.30957	3089.26001	18105.3
01-01-2023	16036.38965	3255.669922	17662.15
01-02-2023	15428.96973	3279.610107	17303.95
01-03-2023	15374.91016	3272.860107	17359.75

Source: UNCTAD website



The above graph represents the indices of New York stock exchange, Shanghai stock exchange and National stock exchange of India. It is also revealed that SSE has not undergone much fluctuations where as NSE and NYSE positively correlating. The deepest downward trend in NYSE, NSE was observed during March 2020. But no abnormal perks and downs were observed in Shanghai stock exchange composite index.

Descriptive analysis:

Table 4- Descriptive statistics

Variable	Minimum	Maximum	Mean	Std. deviation
NYSE composite index	10301.870	17164.131	14079.377	1768.836
SSE composite index	2493.896	3639.780	3134.596	295.320
Nifty	8597.750	18758.350	13701.751	2967.211

The above table shows that NYSE has average index of 14079.3 points period, Nifty stood in the second position with an average of 13701.7 point and SSE acquire an average of 3134.5 points during the study period.

Table 5- Correlation matrix

	NYSE composite index	SSE composite index	Nifty



NYSE composite index	1.000	0.779	0.900
SSE composite index	0.779	1.000	0.636
Nifty	0.900	0.636	1.000

From the above matrix table, it was observed that NYSE and Nifty had a strong and positive correlation (0.9). SSE had a strong correlation with NYSE and a moderate correlation with NSE.

Conclusion:

The data shows that the US and Chinese markets exhibit similar patterns of behaviour, and given the current state of the economy, there is little chance for investors to diversify their holdings. These findings are critical to investors' decision-making when it comes to diversification opportunities during this crisis. Being the second-largest economic power, China is exposed to external economic pressures, which makes the Chinese stock market susceptible to numerous significant market changes. Even during the Covid period, there have been no notable changes to the China Stock Exchange. On the other hand, the NYSE experienced jerks from March to April 2019. The author's main goal in writing this paper is to investigate the relationship between the financial markets in China, India, and the United States. To further develop the idea, future researchers can look at the transmission pathways that helped the crisis spread throughout the local and regional economies.

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