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CO-INTEGRATION AND INTER-LINKAGES BETWEEN INDIAN AND LEADING GLOBAL STOCK MARKETS

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ABSTRACT

It has been a major issue for argument amongst the investors, academicians and practitioners for quite some time now as to whether stock markets in India operate independently or its volatility can be attributed to its reaction towards global market cues. In the current era of globalization, a question arises as to whether the free movement of capital in from of FDI, FII and free liberalized system of cross border investments has really led to financial integration of Indian stock markets with other major stock markets of the world or there exists a disintegration amongst the leading global stock markets.

The paper studies the inter-linkages of major stock exchanges in India, the Bombay Stock Exchange (BSE) and the National Stock Exchange of Indian Limited (NSE) with the help of benchmark indices of the Hong Kong Stock Exchange (HSE), New York Stock Exchange (NYSE), Tokyo Stock Exchange (TSE) and Korean Stock exchange (KSE). To study the trends, similarities and patterns of movements in various stock exchanges, correlation analysis is used as a statistical tool for quantitative research. The stock market data for India, Hong Kong, USA, Japan and Korea is taken into consideration for the time period from 1st Jan, 2014 to 30th Sept, 2020. The tests of analysis revealed the stock market interdependencies and dynamic interactions of SENSEX and NIFTY with the indices of the selected major stock exchanges of the world. The analysis revealed that the stock markets under study were influenced by each other which leaves the phenomenon of de-globalization nowhere in near vicinity.
Keywords: Stock Markets, Globalization, Co-integration, Inter-linkage, NSE, BSE

INTRODUCTION

In this current era of globalization, the Indian stock exchanges have to compete at global level with the stock exchanges across the world. In India, there are 24 stock exchanges but the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) are the two Stock Exchanges, which operate across the country. The stock exchanges in India have come a long way in terms of both volume and advancement of technology from the year 1875 when BSE was established as the first stock exchange in India to 1992 when NSE was incorporated. With a view to be at par with international standards and to uplift the level of trading system in the country, stock exchanges in India have truly evolved.

Till the time the Economic Reforms of liberalization, privatization and globalization came into picture in the year 1991, the financial markets functioning in India had strict norms of capital flows with prevalence of segmentation in the market. There was multiplicity of regulatory structures in the financial markets in India. But after the reforms, the Indian economy was opened up and as a result the financial markets became more susceptible to external shocks. This led to the establishment of SEBI as a centralized regulator for functioning of capital markets in the country. The corporate governance rules and code was established which brought in uniformity the various policies and practices followed by the listed companies. The more significant and revolutionary effect of the reform could be seen after 2000 which witnessed robust growth in Indian economy with easing of many regulations to attract the inflow of foreign capital. Norms were relaxed for both FDI and FII leading India towards a maturing economy. As a result, there was increased cross border flow of capital and soon India emerged as an "Investment hot spot" and there was increased integration of Indian markets with global markets.

Exchanges now operate in newer areas by crossing their boundaries and this has led to the increased flow of capital in developing countries as these countries have emerged as profitable investment options. This appeal of the stock exchanges especially in developing countries have increased cross border integration of exchanges across the world. Also companies in one country have now started to list their shares not only in their home country but also in the stock exchanges of various countries across the world. The increased cross border flow of capital in the form of GDR, ADRs and other international capital flows has become part of functioning of global companies across the world.

The Global Financial Stability Reports issued by the IMF in April and October, 2018 predicted that there will be rampant changes in global financial scenario having a direct impact on performance of financial markets across the globe. There is a prevalence of risk and uncertainty in many leading economies both in terms of economic and political scenarios which may give way to global trade tensions.

World Economic Outlook Reports released in October 2018 says that there is more risk of a downward trend in the global growth percentages and it is very unlikely that there will b overall increase in global growth figures. Also the report points it towards unbalances growth and unequal participation of leading economies in growth and expansion.

The study deals with the comparative analysis of the major stock exchanges in India, the Bombay Stock Exchange (BSE) and the National Stock Exchange of Indian Limited (NSE) with the help of benchmark indices of the Hong Kong Stock Exchange (HSE), New York Stock Exchange (NYSE), Tokyo Stock Exchange (TSE) and Korean Stock exchange (KSE). It is intended to analyze and examine the level of integration and inter relationship of these stock exchanges. In today's times, the investors are increasingly keeping track of activities and movements of stock exchanges globally to make investments in the most profitable investment avenues. The study of risk and return relationship also comes into picture at time of cross border trading and investment as a measure to protect from volatility in stock markets. This increased sintegration of stock markets has led to increase of investment options for the investors and reaping of the benefits of diversification of their individual portfolio at the same time.

The New York Stock Exchange (NYSE) is the largest stock exchange in the world, based on the total market capitalization of its listed securities. NYSE also called as Big Board started its operations in 1792 and it is the exchange where many of the oldest U.S. companies are listed. It used advanced sophisticated electronic trading platforms but floor traders are still used to set pricing and deal in high-volume institutional trading.

The Hong Kong Stock Exchange (HKG) is reportedly the fifth largest in the world and has been soaring with huge Chinese investments flowing into the markets. It is a member of the HKEX Group and it merged with the Hong Kong Futures Exchange and the Hong Kong Securities Clearing Company in 2000 to form Hong Kong Exchanges and Clearing Ltd., a publicly-traded company.

The Tokyo Stock Exchange (TSE) was established on May 15, 1878 and has around 3,500 listed companies. Japan's Nikkei 225 Stock Average is the index most popularly used to depict the performance of top blue chip companies of Japan.

The Korea Stock Exchange is open of the largest exchanges in Asia that includes a stock exchange, futures market, and stock market. The exchange has around 2200 listed companies. Korean Composite Stock Price Indexes (KOSPI) is capitalization-weighted market averages based which is used as a barometer for the performance of Korean Stock Exchange.

The following table gives the country and the exchange with the name of its indices:

Table 1: Stock Exchanges and Indices

Country	Stock Exchange Name	Indices Name
India	Bombay Stock Exchange (BSE)	S&P BSE SENSEX (BSESN)
India	National Stock Exchange of Indian Limited (NSE)	NIFTY 50 (NSEI)
Hong Kong	Hong Kong Stock Exchange (HKG)	HANG SENG INDEX (HSI)
USA	New York Stock Exchange (NYSE)	NYSE COMPOSITE (NYA)
Japan	Tokyo Stock Exchange (TSE)	Nikkei 225 (N225)
Korea	Korean Stock exchange (KSE).	KOSPI Composite Index (KS11)

REVIEW OF LITERATURE

Mukherjee, Kedar & K. Mishra, R. (2005) in their study investigates the linkages of the Indian stock market with other major markets with intent to reap the benefits of diversification for the investors. To study the cause and effect relationship between the markets, data is collected from 1996 to 2004 and then the Engel-Granger test of causality and co integration is applied. The results show that only the stock exchanges of Korea, Indonesia, Thailand, Malaysia, Greece and Philippines seem to be integrated with Indian stock market. Other developed and emerging economies show no signs of integration and hence investors can get benefitted by diversification.

Mukherjee Debjiban (2007) studies the comparison of Indian stock market with other leading stock markets in US, Euro region and Asian region from January 1995 to July, 2006. The various stock exchanges have been compared on the parameters of market capitalization, number of listed securities, listing agreements, circuit filters and settlement along with quantitative analysis. He has concluded that the markets have started to integrate after the period of 2000 and Indian market has also followed suit. Also the influence of other stock markets increased on BSE or NSE at a significant level.

M Babu, C Hariharan & S Srinivasan (2016) in their study from April 2009 to March 2014 has mainly focused their attention on Asia Pacific stock markets. They have used Kolmogorov–Smirnov Test (K–S test), Augmented-Dickey Fuller Test, and Phillips–Perron Statistic. The stock exchanges of Australia, India, China, Hong Kong and Japan were selected for the study and the results showed the presence of integration and linkages between various markets of Asia Pacific region.

Arun T C, Akhila T V, Dharmalingam M. (2016) have carried out a comparative analysis of Indian stock markets and other global markets along with the comparison of performance of stock and bond markets. They have found high degree of correlation between the stock markets of India and developed countries in long run although there may be some imbalances in the short run. Also benefits of portfolio diversification can be attained through a combination of investments in stocks of various countries and also in the Government bond market.

Srivastava Anubha (2016) has discussed abut opening up of Indian economy in the nineties and about the period after 2000 that witnessed maturity in the Indian economy and relaxation of rules and regulations. She has emphasized the importance of the Indian stock exchanges at the global stage and has concluded presence of increased integration and cross border flow of capital. An efficient and effective system in the Indian stock markets is in place which is being increasingly impacted by global cues.

Tripathi, Vanita & Sethi, Shruti (2010) in their study bring the aspect of crisis in the picture and study the financial integration and inter dependence in the wake of these crises. The study conducted from 1998 to 2008 show that the crash in stock markets is together at the time of crisis. Engle - Granger co integration test and Granger's causality Test are applied in the study to show that Indian stock markets are not integrated with any of these markets except US but unidirectional causality was found to be prevalent.

RESEARCH METHODOLOGY

Need and objective of the Study

1- To study the correlation between the Indian stock market indices of SENSEX and NIFTY with the indices of the selected major stock exchanges of the world.

2- To analyze the stock market interdependencies and dynamic interactions between major global stock markets as a test of globalization or de-globalization.

Research Question: Test of correlation between the Indian stock market indices of SENSEX and NIFTY with the indices of the selected major stock exchanges of the world.

Data Collection: The study is primarily based upon secondary data collected through official website of BSE, NSE, HSE, NYSE, TSE and KSE along with the various published sources like reports, magazines, journals, newspapers and like etc.

Research Design: Quasi Experimental and Exploratory Design

- Quantitative data has been used for the purpose of analysis.

- The geographical area of the research work is selected countries of the world.

Variables

- Daily Closing Prices of S&P BSE SENSEX (BSESN), NIFTY 50 (NSEI), HANG SENG INDEX (HSI), NYSE COMPOSITE (NYA), Nikkei 225 (N225) and KOSPI Composite Index (KS11)

Duration of the Study: January 1, 2014 to September 30, 2020.

Hypothesis

H_o: There is no significant correlation coefficient between the Indian stock market indices of SENSEX and NIFTY and the indices of HANG SENG INDEX (HSI), NYSE COMPOSITE (NYA), Nikkei 225 (N225) and KOSPI Composite Index (KS11)

H_1: There is significant correlation coefficient between the Indian stock market indices of SENSEX and NIFTY and the indices of HANG SENG INDEX (HSI), NYSE COMPOSITE (NYA), Nikkei 225 (N225) and KOSPI Composite Index (KS11)

Tools Used: Correlation, Time Series Analysis

RESULTS AND DISCUSSIONS

The Pearson correlation coefficient is one of the most important types of correlation coefficients in the field of statistics that measures the strength between variables and relationships. It is used to carry out a statistical test to determine the strength of linear relationship between the two variables. To calculate the Pearson correlation, we need to find out the covariance of the two variables and also calculate each variable's standard deviation. The Pearson correlation (r) is calculated by dividing the covariance by the product of the standard deviations of the two variables.

$$\rho_{xy} = \frac{Cov\ (r_x, r_y)}{\sigma_x \sigma_y}$$

If the value of r is 1.0, it indicates that there is a perfect positive relationship between the two variables. On the other hand if r has a value of -1.0, it indicates that there is a perfect negative relationship between the two variables. Perfect positive relationship means that if one variable is increased then the second variable will also increase whereas perfect negative relationship means for that if one variable increases then there will be a decrease in the second variable. The r value of 0 indicated absence of relationship between the variables. If the coefficient value is a negative number, it shows negative correlation and if the value is a positive number, it depicts positive correlation of relationship between the variables.

To show whether the stock markets are correlated and how much Indian stock market is correlated with other global markets, correlation test is used. The result of correlation is given in table. A total of 1666 daily stock index observations are used for correlation taken for the time period from 1st January, 2014 to 30th Sept, 2020.

Table 2: Correlation Matrix

R	BSE	NSEI	HIS	NYA	N225	KS11
BSE	1.0000	0.9948	0.7389	0.9190	0.8487	0.5032
NSEI	0.9948	1.0000	0.7631	0.9201	0.8603	0.5632
HIS	0.7389	0.7631	1.0000	0.8171	0.7489	0.7797
NYA	0.9190	0.9201	0.8171	1.0000	0.8098	0.6054
N225	0.8487	0.8603	0.7489	0.8098	1.0000	0.6075
KS11	0.5032	0.5632	0.7797	0.6054	0.6075	1.0000

In this table, Karl Pearson's correlation among various indices is calculated and the tabulation shows the cross correlation matrix showing the correlation coefficient between SENSEX and NIFTY with other indices. SENSEX and NIFTY are very highly correlated with NYSE COMPOSITE with the correlation coefficient equal to 0.92 depicting a strong positive relationship between the two indices and NYA. The least correlation of SENSEX and NIFTY is found with KOSPI Composite Index (r= 0.50) but it is still positive and high. Nikkei 225 (N225) and HANG SENG INDEX (HIS) have correlation

coefficients between the two which are again positive and shows high degree of correlation. A graphical presentation of the indices values over the period of the study is given in Figure 1. It can be seen that the indices are broadly moving together.
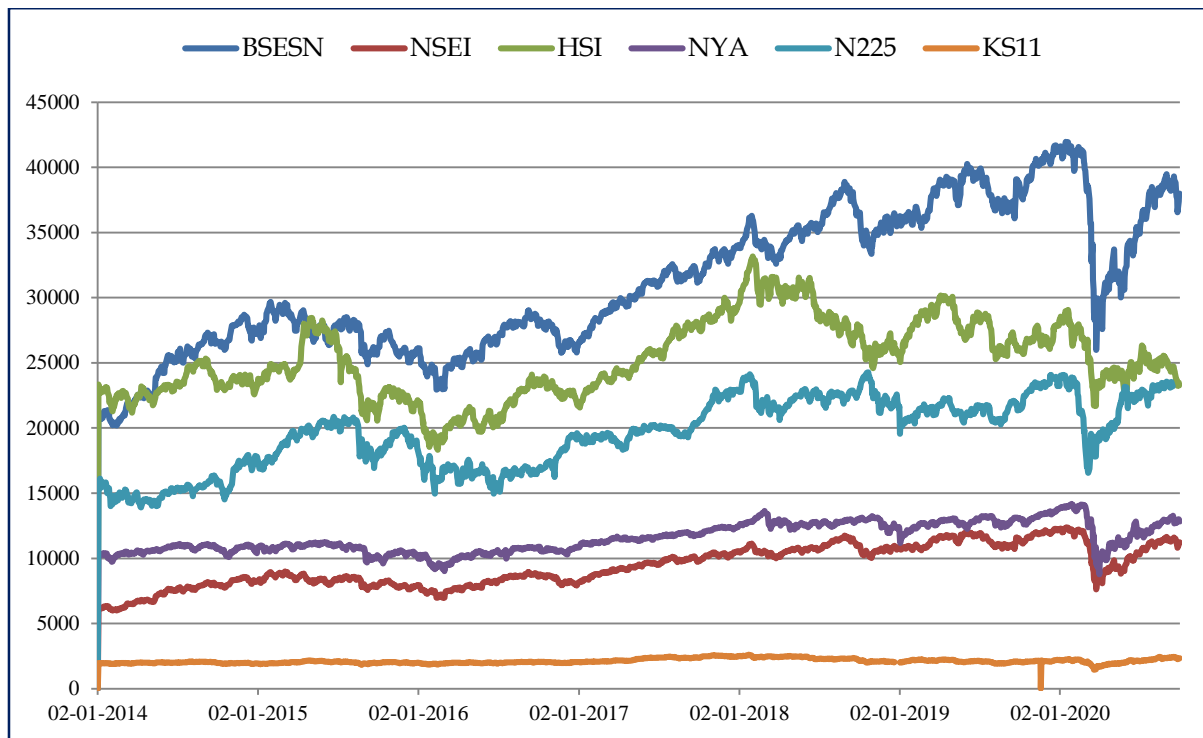

Figure 1: Movement of stock indices (1st January 2014 to 30th September 2020)

FINDINGS

It is found that Indian stock market has a very high correlation with developed stock markets. We have deeply analyzed and examined the level of integration and inter relationship of these stock exchanges and have found that these stock exchanges are highly dependent on each other.

CONCLUSIONS & SUGGESTIONS

The correlation between different indices show that they are highly correlated, though the correlation it can be argued may not be a causal analysis, but it definitely speaks about interdependence. The global trade and other manufacturing and service activities cannot be carried out in isolation, the interdependence will be there no matter what the global political leaders talk. The leaders in the process of sheltering their economy is in fact harming the economy, as the act of shelter will escalate costs and reduce the distribution of factor payments resulting in more skewed economy, resulting in the reduction of consumption and stagnation.

Hence de globalization is a far cry and is not suited for the development of the society and the global village.

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