



# Correlation between Indian and International Stock Markets: An Empirical Study

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## Abstract

The stock market is seeing more activity and is becoming increasingly important. This study examines the trends, similarities, and patterns in the activities and movements of the Indian Stock Market in comparison to its foreign equivalents in the current environment of globalization and the consequent integration of global markets. NYSE NASDAQ SHANGHAI and LSE are the subjects of this research. As part of the Indian Stock Market, BSE is utilized in the study. The historical period has been separated into several periods to examine the correlation between the various exchanges to demonstrate that the Indian markets have grown more connected with their global counterparts and that their reactions are in line with those witnessed worldwide.

## INTRODUCTION

Due to the obvious influence of globalization, the interconnectedness between the world's stock markets has grown in strength over the years. The rate of global integration and the strengthening of international economic ties between states is rapid. The future also allows for continued international integration. Money is migrating from one country to another in various ways such as loans, FDI, foreign currency markets, and so on, as financial markets throughout the world have extended outside national borders. With the elimination or easing of limitations on financial flows across national boundaries, deregulation of financial institutions, and international financial innovations, stock interdependence has expanded quickly. In this study, the phrase stock market cointegration refers to determining if two stock markets have a long-term connection.

## Past Studies

Sunil Poshakwale (2002) tested the random walk hypothesis in the growing Indian stock market by utilizing huge disaggregated daily data from the Indian stock market to look for nonlinear dependency. The BSE National Index's 38 actively traded equities were chosen as the sample. He discovered that the Indian market's daily returns do not follow a random walk. Most individual stocks and the equally weighted portfolio

have a considerable non-linear dependency on daily returns. This is in keeping with prior research that has found indications of non-linear dependency in stock market indices and returns. Individual equities in the United States and the United Kingdom are discussed in the Great Lakes Herald – April 2007 Volume 1, Issue 1 by Great Lakes Institute of Management, Chennai. The stock market seasonality in terms of day-of-the-week, month-of-the-year, monthly, and holiday effects in ten Asian stock markets, namely Australia, China, Hong Kong, Japan, India, Indonesia, Malaysia, Singapore, South Korea, and Taiwan, was studied by Noor, Azuddin Yakob, Diana Beal, and Sarath Delpachitra (2006). He concluded that stock markets have seasonality and that this is a global phenomenon.

Masih, M.M. Abul, and Rumi Masih (1997) looked at the dynamic connection patterns between national stock market prices in four Asian rapidly industrialised countries: Taiwan, South Korea, Singapore, and Hong Kong. From January 1982 to June 1994, the sample included end-of-month closing share price indexes of the four NIC stock exchanges. They concluded that studying these markets is not mutually exclusive and that there are substantial short-run connections between them.

### **RESEARCH DESIGN-STATEMENT OF THE PROBLEM**

In general, stock market volatility is highly influenced by cross-border capital flows such as FDI, FII, and other macroeconomic factors. The subprime mortgage crisis in the United States is an expensive lesson for other exchanges that were affected by the crisis in 2008. The recent depreciation of the Chinese yuan has resulted in a stock market crash across Asia. It is unavoidable for stock exchanges to react to variations in worldwide financial markets. This phenomenon is not limited to the Indian stock markets. Understanding the connection and dependency of multiple trades on one another is critical in this situation. This research analyses worldwide stock markets that are fundamentally diverse in terms of geopolitics, socioeconomics, and other factors. Capital flow into a country has changed dramatically, along with the relaxation of bureaucratic restrictions, bringing various stock exchanges closer together in terms of system and regulations; thus, it is reasonable to assume that the movement of one stock exchange will have an impact on the movement of other stock exchanges. In light of this, academics have shown an interest in determining the long-term and causative link between Indian stock markets, particularly the BSE and other major stock exchanges across the world. The researchers have sought to discover solutions to the following questions in this context.

1. Is there a long-term link between the BSE and other stock exchanges?
2. Is there any immediate impact on the BSE from the movement of other stock exchanges?

### **OBJECTIVES OF THE STUDY**

BSE, NYSE, NASDAQ, SHANGHAI, AND LSE indices were chosen, and correlation analysis was performed.

<b>Country</b>	<b>Stock Exchange</b>
India	BSE
USA	NASDAQ
USA	NYSE
China	SHANGHAI
United Kingdom	LONDON

## HYPOTHESIS

H1: The BSE and the major stock exchanges do not have a long-term connection.

H2 (Alternate): There is no causal link between the BSE and the major stock exchanges.

## RESEARCH METHODOLOGY

- Type of Research: Exploratory and Empirical Research
- Source of data: Secondary sources: Bombay Stock Exchange
- Data Analysis tools: Correlation, Rate of Change (ROC), Relative Strength Index(RSI), Moving Average, Moving Average Convergence and Divergence(MACD).

## RESULTS AND DISCUSSION

Results of Moving Average Convergence Divergence, Rate of Change, Relative Strength Index:

Moving Average Convergence Divergence:

MACD= Long term moving average - Short term moving average

- When the MACD line peaks, it indicates that the market will soon turn bearish i.e., it represents an overbought situation.
- Whenever MACD line reaches its bottom, it signifies an oversold situation i.e. the market will start becoming bullish

### Rate of change

The ratio between the current price and the price 'N' number of days in the past measures the ROC. It helps to determine the overbought and oversold located in units.

### Buying Signal:

When ROC is more than one ( $ROC > 1$ ) and moves upward continuously, it indicates that the market is likely to move upward.

**Selling signal:**

When the ROC line has made a peak, it is the identification of an overbought market, and the market is likely to move downwards direction.

**Relative Strength Index**

It's a technical indicator that aids in financial market analysis. It also aids in determining the current and historical strengths and weaknesses of equities, taking into account the most recent price.

$$RSI = 100 - 100 / (1 + RS)$$

$$100 RS = \text{Average gain} / \text{Average loss}$$

**Buying Signal**

- When the RSI line decreases the 50 mark, but the pace of decline has decreased, it indicates that the market is likely to reach the oversold level and after that, it will start rising, an opportunity who can take the risk can buy at this level

**Selling Signal**

- When the RSI line has made a peak at around 70-level, it is the identification of an overbought market, and the market is likely to move downward direction, so one should sell.

**CORRELATION****Correlation between BSE and NYSE**

Indices	Correlation	Level of correlation	Hypothesis
Sensex & S&P 500	0.939462	High degree positive correlation and significant	H1: Accepted

**Hypothesis:**

Null hypothesis (H0): There is no significant correlation between Sensex and S&P 500 indices.

Alternative hypothesis (H1): There is a significant correlation between Sensex and S&P 500 indices.

**Interpretation:**

The correlation between BSE and NYSE is 0.939462, which indicates a high degree of positive correlation that means both the BSE Index and NYSE Index move in the same direction i.e. If there is an increase in the value of BSE on the average and also increases in the value of NYSE and vice-versa. So, the alternative hypothesis is accepted.

**Correlation between BSE and NASDAQ**

Indices	Correlation	Level of correlation	Hypothesis
Sensex & NASDAQ Composite	0.94422	High degree positive correlation and significant	H1: Accepted

**Hypothesis:**

Null hypothesis (H0): There is no significant correlation between Sensex and NASDAQ composite indices.

Alternative hypothesis (H1): There is a significant correlation between Sensex and NASDAQ composite indices.



**Interpretation:**

The correlation between BSE and NASDAQ is 0.94422, which indicates a high degree of positive correlation that means both the BSE Index and NASDAQ Index move in the same direction i.e... If there is an increase in the value of BSE on the average and also increases in the value of NASDAQ and vice-versa. So, the alternative hypothesis is accepted.

**Correlation between BSE and Shanghai Stock Exchange**

Indices	Correlation	Level of correlation	Hypothesis
Sensex & SSE composite	0.602325	High degree positive correlation and significant	H1:Accepted

**Hypothesis:**

Null hypothesis (H0): There is no significant correlation between Sensex and SSE composite indices.

Alternative hypothesis (H1): There is a significant correlation between Sensex and SSE composite indices.

**Interpretation:**

The correlation between BSE and SSE is 0.602325, which indicates a high degree of positive correlation that means both the BSE Index and Shanghai Stock Exchange Index move in the same direction i.e... If there is an increase in the value of BSE on the average and also increases in the value of the Shanghai Stock Exchange and vice-versa. So, the alternative hypothesis is accepted.

**Correlation between BSE and London Stock Exchange**

Indices	Correlation	Level of correlation	Hypothesis
Sensex & FTSE	0.732355	High degree positive correlation and significant	H1:Accepted

**Hypothesis:**

Null hypothesis (H0): There is no significant correlation between Sensex and FTSE indices.

Alternative hypothesis (H1): There is a significant correlation between Sensex and FTSE indices.

**Interpretation:**

The correlation between BSE and London Stock Exchange is 0.732355, which indicates a high degree of positive correlation that means both the BSE Index and London Stock Exchange Index move in the same direction i.e... If there is an increase in the value of BSE on the average and also increases in the value of the London Stock Exchange and vice-versa. So, the alternative hypothesis is accepted.

**Conclusion:**

The relationship between the Bombay Stock Exchange and chosen international stock markets such as the NYSE, NASDAQ, London Stock Exchange, and Shanghai Stock Exchange was investigated in this study. The correlation, rate of change, (ROC), moving average convergence divergence, (MACD), and relative strength index, (RSI) have all been investigated. Hypothesis testing revealed a strong positive association between the BSE Sensex and the S&P 500, NASDAQ Composite, FTSE of the London Stock Exchange, and China's NSSE Composite.

The BSE (Bombay Stock Exchange) of India moves in tandem with other stock exchanges in the world (S&P 500, NASDAQ Composite, FTSE Of London Stock Exchange).

## REFERENCES

1. Chaitanya, C., 2015. Comparative analysis of international stock markets. IRACST–International Journal of Commerce, Business and Management (IJCBM), 4(1), pp.996-998.
2. Gupta, N. and Agarwal, V., 2011. Comparative study of distribution of Indian stock market with other Asian markets. International Journal of Enterprise Computing and Business Systems, 1(2), pp.1-20.
3. Jayashree. S. A: Comparative study of BSE and international stock exchanges with special reference to pharmaceutical industries, IRACST–International Journal of Commerce, 5(2), pp.256-264
4. Karmakar, M., 2009. Price discoveries and volatility spillover's in S&P CNX nifty future and its underlying index CNX nifty. Vikalpa, 34(2), pp.41- 56.
5. Mukherjee, D., 2007. Comparative analysis of Indian stock market with international markets. Great Lakes Herald, 1(1), pp.39-71.
6. Patel, R.J. and Patel, D., 2012. The study on comovement & interdependency of Indian stock market with selected foreign stock markets. International Refereed Research Journal, 3(2), pp.30-42
7. Patil, P.C. and Rajib, P., 2011. Intraday return dynamics and volatility spillover between NSE S&P CNX Nifty stock index and stock index futures. Applied Economics Letters, 18(6), pp.567-574.
8. Rajavat, Y.S., 2013. Study to analyse the impact of dollar on BSE and NYSE. Asian Journal of Management, 4(2), pp.85-88.
9. Sharma, J.L. and Kennedy, R.E., 1977. A comparative analysis of stock price behaviour on Indices Correlation Level of correlation Hypothesis Sensex & Nikkei 0.917914 High degree positive correlation and significant H1:Accepted Indices Correlation Level of correlation Hypothesis Sensex & SSE composite 0.602325 High degree positive correlation and significant H1:Accepted 30 the Bombay, London, and New York stock exchanges. Journal of Financial and Quantitative Analysis, 12(03), pp.391-413.
10. Srikanth, P. and Aparna, K., 2012. Global stock market integration-a study of select world major stock markets. Researchers World, 3(1), pp.203.
10. [http://archive.msruas.ac.in/pdf\\_files/Publications/MCJournals/August2016/Paper5.pdf](http://archive.msruas.ac.in/pdf_files/Publications/MCJournals/August2016/Paper5.pdf)