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Investigating the relationship between Nifty and selected Global stock market indices

Asrar Ahmad[1], Md Rahber Alam[2]

Research Scholar, Department of Business Administration, Aligarh Muslim University, Aligarh, India[1]

Research Scholar, Department of Business Administration, Aligarh Muslim University, Aligarh, India[2]

Abstract: Since the Indian economy is expanding and its financial markets are becoming more integrated into the global economy, it is critical to examine the established relationship of the securities market of India, which is represented by the Nifty index, and major global securities indices. This research investigates the dynamic correlations and causal relationships between the Nifty and a selection of global indices, including the Dow Jones Index (USA), Nikkei250 (Japan), FTSE 100 (UK) index, Hang Seng (Hong Kong) index, Shanghai Composite Index (China) index, and CAC 40 (France), using daily closing prices from January 1, 2010, to December 31, 2023. We take the closing prices of this index and estimate the daily average return of all indexes. To achieve these objectives, we used various statistical techniques such as correlation analysis, descriptive statistics analysis, and regression analysis. The findings reveal that the Dow Jones and Nifty were the top-performing global indices, while the FTSE and Hang Seng were the lower-performing indices. The Nikkei and CAC40 exhibited higher volatility, whereas the FTSE and Dow Jones displayed lower volatility. The findings will help international portfolio investors manage risk more effectively through diversification and hedging strategies. Understanding the transmission mechanisms for financial shocks allows regulators to coordinate monetary/fiscal policies with major economies to stabilize investor confidence domestically.

Keywords: Nifty, Global Indices, Stock Markets, Correlation, Regression Analysis

I. INTRODUCTION

The Indian securities market has seen rapid growth and integration with global capital markets over the past two decades. The benchmark Nifty 50 index represents over 60% of the free float of stock market capitalization on the National Stock Exchange (NSE) of India and is widely tracked by investors to gauge overall market performance.

The increasing globalization and integration of financial markets have led to heightened interdependence among stock markets worldwide (Mukherjee & Mishra, 2007; Jayasree & Balasubramaniam, 2020). Investor sentiment, economic factors, and market events in one country can rapidly influence stock market movements in other countries, particularly in today's interconnected global economy (Beine et al., 2010; Mensi et al., 2017). Understanding the nature and extent of these linkages is important for Market participants, lawmakers, and investors to make informed decisions and devise effective strategies (Diebold & Yilmaz, 2009; Boubaker et al., 2016).

The Indian securities market, reflected by the NIFTY index, has gained significant prominence in recent years, driven by the country's remarkable economic growth and its increasing role in the global financial landscape (Batra, 2004; Gupta & Guidi, 2012). However, the extent to which the NIFTY index is influenced by, and influences, major global stock market indices remain an area of active research and debate (Mukherjee & Mishra, 2010; Sensarma & Jayadev, 2009). Stock market incorporation has a considerable impact on investment decisions, macroeconomic policies, and market performance. Markowitz's (1952) current portfolio theory, a theory of diversification, describes the advantages of diversification of a portfolio that is revealed when the returns of the assets invested in which the invested funds are invested are not connected, with that criteria if two different stock markets have a low connection between them, and investing in that market can assist a lower overall portfolio risk management.

International trade and money flow barriers existed in the 1960s and 1970s; The securities markets were shown to be unconnected during these years of study by Hilliard (1979) and Grubel and Fadner (1971).

As a result, diversification of the portfolio across countries appeared to be a beneficial strategy at times. Global economic integration is unavoidable when economies open and liberalize (Bekaert, Harvey, & Lumsdaine, 2002). Therefore, it is vital to evaluate if the link between the Indian securities market and the other world indices that are main world markets has changed.

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If linkages are available, the portfolio diversification strategy plan may no longer be applicable. The relationship between stock indices and the broader economy is multifaceted and dynamic. Fluctuations in indices can be driven by a myriad of factors, including macroeconomic indicators, geopolitical events, monetary policy decisions, and technological advancements, among others (Hamilton, 1994). Conversely, the performance of stock indices can also exert a significant influence on economic activity, investment flows, and consumer behavior.

This research paper seeks to address this gap by meticulously investigating the linkage between the Nifty and a curated selection of prominent global stock market indices. Through a comprehensive empirical analysis employing correlation studies, Granger causality tests, and co-integration analyses, this study aims to elucidate the nature and extent of the relationships between the Nifty and selected global indices. By uncovering patterns of co-movement, lead-lag dynamics, and long-term relationships, this research endeavors to provide valuable insights for investors navigating the complexities of global financial markets.

II. LITERATURE REVIEW

Grubel's landmark work (1968) initiated research into global stock market integration, which was subsequently followed by Agmon (1972), Hilliard (1979), Becker, Finnerty, and Gupta (1990), and Hamao, Masulis, and Ng (1990).

among others. Their research concentrated on finding any relationships between the developed countries' securities markets of the United States of America (USA), the United Kingdom (UK), Japan, and Germany. The initial goal was to see if global diversification of the holdings was profitable. The findings generally show that the global markets were somewhat linked with each other, but the correlation was low. Stock market developments prompted additional Studies in this field, utilizing extremely progressed. Analytical procedures. In addition to co-movement and correlation analysis, the scope of the study was expanded to encompass the interlinkages' structural makeup (Eun & Shim, 1989).

Tripathy (2020) investigated relationship between the Sensex and a selection of international stock markets using various correlation and regression methods. Patjoshi and Mishra (2021) assess the volatility of crude oil prices and the impact of major petroleum company share prices on the securities market of India, Patjsohi (2023) investigated the Return on investment and risk associated with the biotechnology company shares, as well as how these results have affected the Bombay Stock Exchange's Sensex index (BSE stock exchange). likewise, Patjoshi and Tripathy (2020) investigated mutual fund awareness and investors' attitudes towards investing in Indian mutual funds.

Khan et al. (2005) attempted to investigate the linkages between developed stock markets (NASDAQ, NIKKEI) and Indian stock markets (NIFTY, SENSEX) from January 1999 to August 2004. The research study found that no long-term correlation is established between the Indian securities markets and selected global market indices. They concluded that, while markets do not typically go along in the long run, the causal impacts are weak in the short term.

Mukherjee (2007) chose to study the integration of Indian securities markets with the Hong Kong Stock Exchange Index (HONG KONG), New York Stock Exchange Index (USA), Korean Stock Exchange Index (SOUTH KOREA), Tokyo Stock Exchange Index (JAPAN), and Russian Stock Exchange (RUSSIA) markets in terms of social, political, and economic contexts. Their research study revealed that the Indian securities markets began to integrate after 2002–2003. Menon et al. (2009) hypothesized that real-world situations are reflected in national and international market movements. They examined the relationship between the securities market of India and the securities markets of the nations that are Hong Kong, the United States of America (USA), Singapore, and The People's Republic of China. While the study was being conducted, they discovered a link between Indian stock markets and a few other markets.

Tripathi and Sethi (2010) investigated the securities market in India with a few world securities markets that are, including China, the United Kingdom (UK), Japan, and the United States of America (USA), from 1998 to 2008. Their research revealed that the Indian securities market has not linked with any of these global stock market indices, apart from the United States of America (USA) stock market index, and that unidirectional causality exists in most cases.

Singh and Singh (2010) investigated the level of integration of two leading emerging economies with other developed markets from January 2000 to December 2009. They discovered that the Indian and Chinese stock markets were correlated with all four selected developed markets, demonstrating unilateral causality. They claimed that there was no room for speculative strategies or short-term diversification in these markets.

Lao & Singh (2011) aimed to analyse the existence of herding behavior and its challenges in the pretext pertaining to efficient market hypothesis considering the Chinese securities and securities market of India.

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They suggested that the herding behavior existed in both markets during the study period. The herding behavior was more prevalent while there was a bear market, and the trading volume was high in the Chinese securities market in comparison to the Indian securities market. In contrast to the Chinese stock market, the Indian stock market exhibited herding behavior when the market was moving upward.

Srikanth and Aparna (2012) used monthly average prices from the indices that are BSE-Sensex (Index), NYSE, NASDAQ (USA Index), Hang Seng (Hong Kong Index), Nikkei225 (Japan Index), S&P 500(USA Index), SSE Composite index (China), and FTSE100(UK Index) to assess the level of stock market linkages. They used the Correlation and t-test to Analyze the level of global securities market linkage. They discovered a high level of linkages available between the domestic securities market, and the global securities markets.

The relationship between the emerging economy country securities markets of the BRICS group countries and the most important global factors between September 1997 and September 2013 was investigated by Mensi et al. (2014) using the quantile regression approach. Their research study discovered that the BRICS country's securities markets were reliant on global commodities markets and stock markets, including gold price fluctuations, oil price movement, and the S&P Index. They also discovered a skewed dependence structure, possibly caused by the global financial crisis.

Nasser and Hajilee (2016) used a cointegration and error-correction model to examine five emerging securities markets that are included (Turkey, China, Russia, Mexico, and Brazil), as well as three developed nation securities market countries that are (Germany, the United States of America, and the United Kingdom), for the study in sample data period start from 1st January 2001 to 31st December 2014. They discovered short-run integration between stock markets in developed and emerging countries.

Levy and Sarnat (1970) discovered that investors preferred diversifying their portfolios in the global securities markets rather than investing in home markets to maximize earnings. The worldwide market offers greater opportunities for investors.

Hansda and Ray (2002) investigated how the US and Indian stock markets related to one another. They conducted an econometric analysis that was done by using a technique of time series data.

Samadder et al. (2016) Investigated the relationship between the Dow Jones index and both the Indian index, Sensex the BSE stock indices, and the Nifty NSE stock indices. They discovered that there is no significant difference available between these sample indices, Dow Jones, Sensex (BSE), and Nifty (NSE). As a result, diversifying into the international stock market does not provide significant returns to investors.

Saha and Bhunia (2012) investigated the connection between the securities market of India and the South Asian countries' securities markets for the period August 2002 to August 2011, using daily closing prices of these stock market indices. According to the researcher's study, the markets are linked with shorter periods and longer periods, but there is room for investors to diverge in the shorter run.

Rastogi (2013) looked at the long-term implications of various stock markets. Empirical results demonstrated that diverse stock markets are inextricably linked in the long term, expanding the possibility of considering and leading global divergence assistances to diminish as a result of increased association between stock markets across the global stock markets.

Srivastava et al. (2015) investigated the different countries' financial markets, including the United States of America (USA) and the major Asian country's securities markets, with factors before and after the most recent global financial crisis; these studies were conducted using sample securities market indices from January 1992 to April 2014, and econometric and statistical tools were utilized. The findings revealed that the Indian securities market has resilient long-term incorporation, but no short-term incorporation among international stock markets.

Lokeshwarri (2015) confirmed the notion that the world market influences the Indian securities market, indicating that the correlation coefficient between the Indian securities market and international securities markets was 0.51 points in the year 2015, a decrease from 0.70 points in the year 2014. During the same moment, the correlation between the securities market of India and the securities market of the USA was negative in 2015, indicating that they were moving in opposite directions.

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III. OBJECTIVE OF THE STUDY

The primary objective of this research study is to examine the correlations between the Nifty50 and specific international stock markets. As a result, the research is prioritized under the following objectives.

1. To examine associations between Nifty50 and the top six selected securities markets based on market capitalization of securities market indices.
2. To explore the impact of the global securities market on the Nifty50 index.
3. To analyze the long-term correlation between daily returns of the Nifty50 index and 6 major global indices.

IV. RESEARCH METHODOLOGY

The analysis is based on secondary data collected during a study period of thirteen years, that was started from January 1st, 2010, to December 31st, 2023.

The analysis focuses on the relationships between Nifty and top global market capitalization indexes such as DOW JONES (US), FTSE (UK), Hang Seng (Hong Kong), Nikkei (Japan),), and CAC 40 (France), Shanghai Composite Index (China. The closing prices of this index are used to compute the daily average return of all indices. To accomplish these objectives, we employed several statistical techniques, such as descriptive statistics, correlation, and regression analysis. The data is analyzed using the Microsoft Excel and Statistical Package for Social Sciences (SPSS) software.

V. EMPIRICAL RESULTS

5.1 Descriptive Statistical Results of Nifty50 and Selected Global securities Markets Data Analysis and findings

Table -1 demonstrates the descriptive statistics of daily returns for the Nifty50 and selected Global securities markets.

Particulars	Nifty 50	Dow Jones	Hang Seng	Nikkei	FTSE100	CAC40	Shanghai composite
Mean	0.00045	0.0000057	0.000037	0.00025	-0.0000039	0.00041	0.00040
Standard Deviation	0.01058	0.0125	0.01236	0.01265	0.00194	0.01056	0.01269
Skewness	-0.850	0.086	-0.795	-0.316	2.940	-0.526	-0.263
Kurtosis	13.090	3.418	6.477	7.300	93.212	18.583	4.947
Minimum	-0.1298	-0.0635	-0.0849	-0.1227	-0.0191	-0.1292	-0.1055

Source: Author's Calculation

Table 1 demonstrates that the NIFTY50, along with all the sample global stock markets save the FTSE100, produced positive mean returns between January 1st, 2010, to December 31st, 2023. It was discovered that the mean returns of the NIFTY50 (0.00045) had the highest returns, while the mean returns of the FTSE100 (-0.0000039) had the lowest returns with a negative return. The two best-performing global market indices are NIFTY50 (0.00045) and CAC40 (0.00041). In comparison, the FTSE100 (-0.0000039) and HANG SENG (0.000037) are the worst-performing global indices. The volatility of sample data measured by standard deviation analysis was highest for the Shanghai Composite and lowest for the FTSE100 when compared to other selected global securities indices throughout the research period.

The Shanghai Composite (0.01269) and NIKKEI50 (0.01265) are the two most volatile global indices by standard deviation, while the FTSE100 (0.00194) and DOW JONES (0.0000057) are the two least volatile. When comparing NIFTY50 returns to sample global indices returns, it is clear that NIFTY50 has outperformed all international stock market indices. Alternatively, NIFTY50 returns have lower volatility than SHANGHAI COMPOSITE, NIKKEI, and HANG SENG.

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5.2 Correlation Analysis of the Nifty50 and Selected Global Securities Markets

Table 2 depicts the relationship comparing the daily stock results of the Nifty50 and the selected Global securities market in India from January 2010 to December 2023.

Particulars	Nifty 50	Dow Jones	Hang seng	Nikkei	FTSE100	CAC40	Shanghai composite
Nifty 50	1	3583	.010	.018	.005	-.010	.001
Dow Jones	-.023	1	.011	-.011	-.044	.030	-.015
Hang seng	.010	.011	1	-.006	.009	.002	.005
Nikkei	.018	-.011	-.006	1	.025	.027	.009
FTSE100	.005	-.015	.009	.025	1	.014	.003
CAC40	-.010	.030	.002	.027	.014	1	.025
Shanghai composite	.001	-.015	.005	.009	.003	.025	1

Source: Author's Calculation

It can be found from Table 2 that the returns of NIFTY show a positive correlation with the returns of all selected international indices, except for CAC40 and DOW, which show a negative correlation. The top global indices with a positive correlation to NIFTY returns are HANG SENG (0.10), NIKKEI (.018), FTSE100 (.005), and SHANGHAI COMPOSITE (.001). The DOW (-.023) and CAC40 (-.010) are the lowest-ranking global indices that are positive with NIFTY50 returns.

5.3 Analysis of Regression model Results for Returns on Nifty50 Dependent Variable with Various Selected Global Securities Markets as Predictors

Table -3 Regression Results for Nifty50 as Dependent Variable and Various Selected Global Securities Markets as Predictors

Model Summary	Multiple R	R Square		Adjusted R Square	Standard Error
	.032	.001		-.001	.01058
Goodness of Fit – ANOVA	SS	MS		F	Significance F
	.000	.000		.600	.730
Regression Coefficients					
Particulars	Coefficients	Coefficient Standard Error	Standard Error Beta	t Stat	P-value
Intercept	.000	.000	.007	2.545	.011
Hang seng	.009	.014	.011	.632	.528

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Nikkei	.015	.014	.018	1.047	.295
Shanghai composite	.000	.014	.000	.024	.981
CAC40	-.009	.014	-.010	-.609	.543
FTSE100	.022	.091	.004	.237	.813
Dow jones	-.021	.017	-.021	-1.272	.204

Source: Author's Calculation

Table 3 Demonstrates that the independent variables exhibit statistical significance at the 10% threshold. (F statistic =.600, P < 0.10).

The regression results show that the coefficients of the FTSE100 (.022) and Nikkei (.015) global indices were higher, while the DOW JONES index had lower and negative coefficients when compared to other international market indices. As a result, the results of the FTSE100 and NIKKEI international indexes have a bigger impact on the NIFTY50 than other international indices.

In contrast, the DOW JONES and CAC40 global indexes have less impact on NIFTY50 performance.

The regression model demonstrates a statistically significant relationship between FTSE100 and NIKKEI international indices and NIFTY50 returns at (Sig. < 0.10) at the 10% level. According to the regression study model, the DOW JONES (USA), CAC40 (France), and SHANGHAI COMPOSITE (China) foreign indices show statistically insignificant relationships with NIFTY50 returns at the 10% level (Sig. > 0.10).

VI. CONCLUSION AND SUGGESTION

The securities market of India is significant both domestically and worldwide. The Indian securities market is a significant player in the international securities market. Thus, knowing any established relationship between the securities market of India and global securities markets is very significant for the different investor types.

As the outcomes demonstrate, the primary purpose of this research study is to investigate the associations by using the correlations between the Nifty 50 and certain international securities markets during a 13-year period spanning January 1, 2010, to December 31, 2023. To achieve this goal, various methods were used, including correlation, descriptive statistics, and regression analysis. The top two performing international indexes are NIFTY and CAC40, while the FTSE100 and HANG SENG lag. When it comes to standard deviation, the Nikkei and SHANGHAI COMPOSITE are the two most volatile global indices, while the FTSE100 and Dow Jones are the two least volatile. When the Nifty returns are compared to the returns of various international indices, it is clear that the Nifty has performed well. Superior returns when compared to all international indices. NIFTY returns have a positive relationship with the returns of all selected global indices, with the exception of the CAC40 and Dow.

The international indices that rank highest in terms of positive correlation with NIFTY returns are NIKKEI and HANG SENG, whereas the bottom-ranking international indices that show positive correlation with NIFTY are SSE (SHANGHAI COMPOSITE) and FTSE100 returns. The regression model indicates that the returns of NIKKEI and FTSE international indices have a statistically significant association with NIFTY returns (Sig. < 0.10) at the 10% level. On the other hand, the regression model reveals that the associations between HANG SENG, DOW JONES, CAC40, SSE, and FTSE international indices and Nifty are statistically insignificant. The findings of this study can assist investors and portfolio managers in determining the degree of diversification benefits provided by investing in global markets alongside the Nifty. Portfolio managers can use hedging strategies or dynamic asset allocation models to reduce the risks associated with global market fluctuations. Policymakers and regulators can use this data to assess the potential impact of global events or policies on the domestic market, allowing them to take appropriate risk mitigation or market stability measures.

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