

Examining Associations between NIFTY 50 and Selected International Stock Markets

Shanay Shah¹, Nikhil Tamta²

¹High School Student, Dubai International Academy, Dubai, United Arab Emirates
shanayshah09@gmail.com

²Research Supervisor / Academic Mentor

Abstract

In today's globalized economy, the performance of stock markets has become more interconnected. For investors, legislators, and organizations looking to evaluate risk and optimize returns, it is essential to comprehend these connections. The NASDAQ (USA), Nikkei 225 (Japan), FTSE 100 (UK), and Euro Stoxx 50 (Europe) are among the global indices that are examined in this study in relation to the Indian NIFTY 50 index. The study uses statistical techniques like regression analysis, correlation, and descriptive statistics to determine the degree of market interdependence using secondary data from monthly returns over a ten-year period (2015–2025). The results show different levels of correlation between the NIFTY 50 and developed market indices, with the U.S. and European markets showing a stronger degree of integration than their Asian counterparts.

Keywords: NIFTY 50, International Stock Markets, Stock Market Integration, Market Interdependence, Global Equity Markets, Correlation Analysis, Cointegration, Volatility Spillover, Financial Market Linkages, Portfolio Diversification.

1. Introduction

Global market movements have a big impact on stock markets which are indicators of economic performance. With increased capital flows and trade liberalization, a shift in one country's market can have a big impact on others. NIFTY 50 which represents the Indian market has become one of the most active in emerging markets and is attracting more and more international institutional investors. Global investor sentiment is also influenced by developed markets like NASDAQ, Nikkei 225, FTSE 100 and Euro Stoxx 50. As financial systems are getting more interconnected, positive changes or shocks in one area can spread quickly to other areas. For example, changes in US markets affect Asian and European indices which in turn affect the Indian financial system. It is important to see whether NIFTY 50 moves in sync with developed and emerging market indices or is independent given India's growing presence in international trade and investment. With focus on how international markets impact India's market performance, this study attempts to examine the relationship between NIFTY 50 and a few chosen international indices over a 10 year period. The study uses regression and correlation to find co-movement patterns and their

impact on international portfolio diversification. Policymakers, investors and financial managers who have to manage risks and opportunities in a global economy which is getting more interconnected need to have a good understanding of these dynamics.

2. Literature Review

Recent studies on the global stock markets did more than elementary methods and utilizes advanced tools to learn more definitively how India's stock market is connected with any other international markets.

Aggarwal & Saradhi (2024) examined the India peer co-movement with other Asia-Pacific nations (e.g., Malaysia, Singapore, Hong Kong, Japan, China, etc.) over 1991–2021. Employing DCC-GJR-GARCH models along with pooled OLS and random effects regression, they found relatively lower correlations (below 0.5) between India and most of its peers, except for a significantly higher integration with China. Significant macroeconomic differentials such as GDP, interest rate, inflation, and money supply proved to be strong drivers of this integration. Narayana Maharana et al. (2024) investigated the way the COVID-19 pandemic changed the patterns of volatility between India's stock market and certain world economies. The use

of a VAR-BEKK-GARCH model for the period 2016–2024 by the study revealed that the volatility of the Indian market increasingly influenced the markets of Brazil, China, and Mexico. Interestingly, the influence of the U.S. market declined post-pandemic, and Russia continued to have a limited but certain influence only in the later period.

Patel (2017) conducted an exhaustive co-movement study involving 14 global indices, such as BSE (India), NASDAQ, FTSE-100, and Hang Seng, using daily observations during the period 1998–2017. Correlation statistics identified moderate correlations between BSE and indices such as Hang Seng (0.45), FTSE-100 (0.32), NASDAQ (0.24), and Mexico's MXX (0.27). Granger causality and Johansen cointegration techniques also confirmed the presence of long-run relations, more so with FTSE-100 and Mexico.

Haritha P. H. and Rishad (2020) examined the role of investors' sentiment in determining volatility in the Indian stock market. They constructed a sentiment index using statistical analysis and applied it to models between 2000 and 2016. Their findings showed that irrational investor behavior favors market volatility, pointing to inefficiencies in India's emerging market.

Sinha and Pan (2007) used Random Matrix Theory (RMT) to study stock return correlations in the National Stock Exchange of India from 1996 to 2006. They found that the market showed a type of behavior similar to that of developed markets such as the NYSE in general patterns, but with less sector-based clusters. This suggests that in emerging markets such as India, general market trends have greater impact on stocks than sector-specific effects.

2.1 Extended Review and Research Gap

Though various researches have helped in gaining significant insights into the interlinkages that exist between the Indian stock market and international financial markets, the intensity and nature of integration vary and differ according to time and situation. It has been illustrated in various pieces of literature that India's financial market has experienced different degrees of co-motion based on various regions and scenarios that have been taken into account. The developed markets of the United

States and the United Kingdom have a profound influence on emerging markets.

Some studies have pointed out that the reason why emerging markets, such as India, are more sensitive to changes in developed markets is because of the rising foreign institutional investor (FII) presence in these markets. As the FIIs make changes to their investments based on some international macroeconomic changes, such as changes in US interest rates or some geopolitical issues, there may be volatility in the capital flowing into and out of the emerging markets. Such a process makes it easy to transmit shocks to the NIFTY 50 even in the absence of changes in the Indian economy. Additionally, an essential theme covered in existing literature is the distinction between short-term and long-term market integration. A study conducted using high-frequency data, such as daily data, tends to record the transient volatility spillover effects, which could lead to an overestimation of market integration. On the contrary, a study conducted using a long-term dataset, such as a monthly dataset, tends to record the structural linkages based on the trade patterns, long-run capital investment, and macroeconomic convergence. Not many studies have explored the long-run co-movements between the Indian market and a number of advanced markets at the same time, especially after 2015 and the rise of online trading platforms and globalization of financial markets.

Moreover, the extant literature suggests that multicollinearity, with respect to the indices for developed markets, may decrease the explanatory ability of individual markets within the framework of the regression models specified above. Note that European markets tend to share high correlations with each other, thereby impacting their significance, when analyzed together with either US markets or UK markets. It thereby emphasizes the relevance of adopting correlation and regression analysis together for better comprehension on the subject. Given these findings, still a research gap exists in terms of testing the joint effect of major global markets, namely the US, Europe, Japan, and the UK, on the Indian stock market. The objective of this research is to fill the gap by providing new empirical findings on the extent of integration between NIFTY 50, as well as other international

indices, from 2015 to 2025. Finding these answers to the research question will allow an increased understanding of the extent of market linkages around the world, providing invaluable practical information for international diversification for financial market participants, as well as policymakers on financial stability issues.

3. Objectives of the Study

The purpose of this study is to understand the correlation of the Indian equity market with leading international indices. The specific goals of this research are:

- a. To examine the connection between the NIFTY 50 and leading world stock indexes.
- b. To explore the level of influence that changes in the world markets have on the performance of the NIFTY 50.

4. Methodology and Analytical Framework

For the purpose of this study, NIFTY 50 index (Indian market) and a few world stock indices have been taken into consideration to measure their interlinkages. The global indices included in the exercise are: NASDAQ Composite (US), Euro Stoxx 50 (Europe), Nikkei 225 (Japan), and FTSE 100 (UK).

The data set contains monthly closing values of these indices, collected from sound financial databases over a 10-year timeframe (2015–2025). The data is collected from secondary sources, which has ensured reliability and authenticity.

To try to achieve the research objectives, the study uses both descriptive statistical and inferential statistical methods. Specifically, the analysis encompasses:

- Descriptive Statistics to emphasize the patterns of the data.
- Correlation Analysis to assess the direction and strength of relationships among the indices.
- Regression Analysis to determine how much the global stock indices influence the NIFTY 50.
- Statistical procedures were performed using Excel, enabling complete and organized

examination of international market interdependencies.

4.1 Frequency of Data Reasoning and Analysis Assumptions

Monthly frequency in this study is chosen to capture underlying structural relationships between international equity markets beyond the short-term speculative movements. Monthly returns smooth out transitory fluctuations arising out of daily news releases, market microstructure effects, and short-lived investor reactions, thus providing a clearer view of sustained co-movement patterns across markets. This approach is particularly relevant when examining long-horizon integration between an emerging market such as India and major developed economies.

The period of this study falls within an era of rising financial globalization, surged cross-border portfolio flows, and greater participation of foreign investors in the Indian equity market. During this period, international markets were influenced by significant macro-financial developments, including shifts in global monetary policy, evolving trade relationships, and episodes of market uncertainty. Based on analysis of this period, the study is able to gauge the nature of contribution these broader forces make toward international stock market interdependence.

In an empirical framework, the analytical model assumes a stable linear relationship among the chosen markets during the sample period. Although regime shifts or structural changes can occur in financial markets, the fact that both the correlation and multiple regression analysis is applied allows capturing those directional relationships consistently and the order of their relative influences among the indices. The possible overlap of information content is also granted among indices of developed markets, given the high level of integration among European markets, which could have impacts on individual coefficient significance of multivariate models. The above analysis supplements the methodological aspect of the research to delineate on the issues of the frequency selection rationale and major assumptions taken

during the analysis without repeating the basic methodological section presented earlier.

5. Empirical Results

5.1 Descriptive Statistics Results of NIFTY 50 and Selected International Stock Markets

Table-1 presents the descriptive statistics of daily returns for NIFTY 50, NASDAQ, EURO STOXX 50, NIKKEI 225, and FTSE 100 over the sample period (120 observations).

Particulars	Mean	Standard Deviation	Kurtosis	Skewness	Minimum
NIFTY 50	0.0105	0.0465	5.5490	-0.8778	-0.2324
NASDAQ	0.0139	0.0531	0.2052	-0.3063	-0.1326
NIKKEI 225	0.0079	0.0472	0.1916	-0.2501	-0.1052
FTSE 100	0.0037	0.0341	2.7274	-0.4958	-0.1380
EURO STOXX 50	0.0052	0.0476	1.5687	0.0974	-0.1629

It can be observed that all the indices have recorded positive mean returns, with NASDAQ (0.0139) recording the highest average monthly return, and then NIFTY 50 (0.0105). At the same time, FTSE 100 (0.0037) registered the lowest mean returns. The results suggest that out of the selected markets, NASDAQ has been stronger in the context of average returns, but FTSE 100 has been relatively weaker. On the front of volatility, as measured by standard deviation, NASDAQ (0.0531) and EURO STOXX 50 (0.0476) were more volatile, while FTSE 100 (0.0341) indicated relatively lower

volatility. What this implies is that U.S. and European markets were more volatile than the UK market. Based on the kurtosis values, NIFTY 50 (5.55) indicates a leptokurtic distribution, meaning its returns are more extreme in their ups and downs compared to a normal distribution. On the contrary, indices such as NASDAQ (0.21) and NIKKEI 225 (0.19) are closer to a normal distribution, meaning there were fewer extreme values. All indices are negatively skewed, meaning they experienced more frequent negative returns. The EURO STOXX 50 is lightly positively skewed (0.097), meaning a slight leaning towards positive returns.

5.2 Analysis of Correlation between NIFTY50 and Selected International Stock Markets

Table 2 presents the correlation coefficients among the monthly returns of NIFTY50 and selected global indices – NASDAQ (USA), Euro Stoxx 50 (Europe), Nikkei 225 (Japan), and FTSE 100 (UK) – over the last ten years.

	NIFTY 50	NASDAQ	EURO STOXX 50	NIKKEI 225	FTSE 100
NIFTY 50	1.00				
NASDAQ	0.51	1.00			
EURO STOXX 50	0.50	0.69	1.00		
NIKKEI 225	0.47	0.69	0.70	1.00	
FTSE 100	0.49	0.51	0.77	0.49	1.00

As can be observed from Table 2, NIFTY50 returns are positively correlated with all the selected international indices. NIFTY50's highest correlation is with NASDAQ (0.51) and Euro Stoxx 50 (0.50), which indicates Indian markets follow the direction of US and European markets. FTSE 100 (0.49) and Nikkei 225 (0.47) have moderate correlations.

Amongst the global indices, the strongest inter-market correlation is of Euro Stoxx 50 and FTSE 100 (0.77) that reflects the close integration of European markets. NASDAQ, however, exhibits strong co-movements with Nikkei 225 (0.69) and Euro Stoxx 50 (0.69), reflecting the spillover of US market action around the world.

Overall, the results show that while NIFTY50 shows a positive relationship with all the international indices selected, the strength varies in

degree, with the US and European indices exerting the greatest influence over the Indian stock market.

5.3 Analysis of Regression Results for Returns on NIFTY 50 as Dependent Variable and Selected International Stock Markets as Predictors

Table 3: Regression Results for NIFTY 50 as Dependent Variable and Selected International Stock Markets as Predictors

Model Summary				
Multiple R	R square	Adjusted R Square	Standard Error	
0.583	0.340	0.317	0.0384	
Goodness of Fit – ANOVA				
Source	SS	MS	F	Significance F
Regression	0.0877	0.0219	14.83	0.0000
Residual	0.1699	0.0015		
Total	0.2576			

Particulars	Coefficients	Standard Error	t Stat	P-value
Intercept	0.0047	0.0037	1.29	0.198
NASDAQ	0.2299	0.0999	2.30	0.023
EURO Stoxx 50	0.0018	0.1496	0.01	0.990
Nikkei 225	0.1447	0.1150	1.26	0.210
FTSE 100	0.3825	0.1635	2.34	0.021

Table 4 shows the multiple-regression of NIFTY 50 monthly returns on the selected global indices (NASDAQ, Euro Stoxx 50, Nikkei 225, and FTSE 100). The model is statistically significant overall ($\beta = 14.83$, $p < 0.001$) and explains about 34% of the NIFTY 50 return variation ($R^2 = 0.340$; Adjusted $R^2 = 0.318$).

Relating to the slope estimates, the coefficients are all positive but NASDAQ ($\beta = 0.2299$, $p = 0.023$) and FTSE 100 ($\beta = 0.3825$, $p = 0.021$) are significant at traditional levels while the rest, Euro Stoxx 50 ($\beta \approx 0.0018$, $p = 0.990$) and Nikkei 225 ($\beta = 0.1447$, $p = 0.210$), lack incremental explanatory power when the other indices are controlled for in the model. Of the predictors with significant size, FTSE 100 has the largest partial effect, followed by NASDAQ having a significant contribution to contemporaneous movements of NIFTY 50.

Overall, the findings indicate that during the sample period the U.S. and UK markets were most strongly correlated with Indian equity returns, whilst the Euro area and Japan failed to provide statistically

significant information over and above the other indices. This is consistent with the correlation patterns (e.g., the high Euro Stoxx 50–FTSE 100 correlation), which weaken the independent role of Euro Stoxx 50 in a multivariate framework.

6. Limitations and Future Research Opportunities

Although this study has generated significant meaning and insight with regard to the relationship between the Indian equity market and a series of international equity markets, it also has a number of limitations. Firstly, it has only taken a narrow series of equity market indices into consideration, which may not be a fully representative indicator of the series of international markets which may have an impact upon the equity market for India.

Second, the relationship highlighted here is based on long-term co-movement patterns and does not attempt to represent the shorter-term reactions to global economic announcements or geopolitical events. Although the identification of structural patterns is appropriate for the current analysis, the

intensity and speed of shock transmission could be analyzed using higher frequency data.

Third, the empirical framework uses linear statistical methods that work with a constant structure across time. However, financial markets are considered to be dynamic systems and may change regime during a period of financial crisis and structural change. For future research, advanced models may be utilized, such as time-varying parameters or volatility models. Lastly, future studies may include macroeconomic factors such as interest rates, exchange rates, and direct investment flows, and the study could lead to even better results since it will help understand the underlying processes behind the movement of stock markets across countries.

7. Conclusion

The Indian stock market, as represented by the NIFTY 50 index, is of significant significance not only domestically in India but also to the international financial system. Determining the connection between the Indian market and foreign stock indices is important to investors, policymakers, and researchers. The primary intent of this study was to examine the correlation between NIFTY 50 and the said global indices, i.e., NASDAQ (USA), Euro Stoxx 50 (Europe), Nikkei 225 (Japan), and FTSE 100 (UK), over a period of 10 years with the help of monthly observations. For this purpose, descriptive statistics, correlation analysis, and regression analysis were adopted. The descriptive statistics revealed that NASDAQ and NIFTY 50 were the indices that reported higher performing returns, while Euro Stoxx 50 and Nikkei 225 revealed relatively weaker returns. In terms of volatility, NASDAQ revealed higher volatility, while FTSE 100 revealed relatively lower volatility over the sample period.

The correlation study indicated positive correlations of NIFTY 50 returns with all the selected international indices, with the strongest correlation with NASDAQ, suggesting stronger integration with the U.S. market. The weakest correlation was observed with Euro Stoxx 50, suggesting relatively weaker linkages with European markets.

Regression analysis also confirmed that NASDAQ and FTSE 100 indices exert statistically significant effects on NIFTY 50 returns at the 5% significance level ($p < 0.05$). However, Euro Stoxx 50 and Nikkei 225 indices were statistically insignificant in explaining variation in NIFTY 50 returns ($p > 0.10$). It indicates that the Indian stock market is significantly interlinked with that of the U.S. and U.K. markets, but that of European and Japanese indices remains restricted. In conclusion, the findings of this study reveal the increasing integration of the Indian stock market with developed markets, particularly the United States and the United Kingdom. This has far-reaching investment implications on the global front because shocks in these markets have the potential to transmit to India and, therefore, influence domestic returns.

8. Author Contributions

The research design, data collection, statistical analysis, and manuscript drafting were all handled by Shanay Shah.

In order to increase academic rigor and clarity, Nikhil Tamta oversaw the research process, gave methodological advice, examined the analysis, and helped with important changes.

References

- [1] Sinha, S., & Pan, R. K. (2007). Uncovering the internal structure of the Indian financial market: large cross-correlation behavior in the NSE. In *Springer eBooks* (pp. 3–19). https://doi.org/10.1007/978-88-470-0665-2_1
- [2] H, H. P., & Rishad, A. (2020). An empirical examination of investor sentiment and stock market volatility: evidence from India. *Financial Innovation*, 6(1). <https://doi.org/10.1186/s40854-020-00198-x>
- [3] Patel, R. J. (2017). Co-Movement and Integration among Stock Markets : A study of 14 countries. *Indian Journal of Finance*, 11(9), 53. <https://doi.org/10.17010/ijf/2017/v11i9/118089>
- [4] Khushboo Aggarwal, V. Raveendra Saradhi; A study on the co-movement and influencing factors of stock markets between India and the other Asia-Pacific countries. *International Journal of Emerging Markets* 25 July 2025; 20 (8): 3193–3228. <https://doi.org/10.1108/IJOEM-06-2023-0965>

[5] Nasdaq, “NASDAQ Composite Index Historical Data,” *Nasdaq.com*. Available: <https://www.nasdaq.com>
[6] STOXX, “EURO STOXX 50 Index Factsheet,” *STOXX Ltd.* Available: <https://www.stoxx.com>

[7] Nikkei Inc., “Nikkei 225 Index Overview,” *Nikkei.com*. Available: <https://indexes.nikkei.co.jp>
[8] FTSE Russell, “FTSE 100 Index Factsheet,” *FTSE Russell*. Available: <https://www.ftserussell.com>