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Volatility Performance of NSE Indices and Nifty – A Decade of Economic Diagnosis

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ABSTRACT: Over the last decade, the National Stock Exchange (NSE) of India and its flagship index, the Nifty, have been crucial in reflecting the nation's economic trajectory. This study examines the volatility performance of NSE indices and the Nifty, offering insights into India's economic health. By analyzing historical data, we've observed fluctuations in volatility levels across various indices, influenced by economic events, policy changes, and global dynamics. Key economic events like GDP growth rates, inflation, monetary policy decisions, and geopolitical tensions impact market volatility, shaping investor sentiment and risk appetite. Sectoral analysis reveals unique volatility patterns within industries, reflecting sector-specific challenges and growth prospects. Comparative analysis with global indices provides insights for international investors and policymakers. These volatility trends have implications for policymaking, underscoring the need for market stability to support sustainable economic growth. Understanding volatility in NSE indices and the Nifty informs investor decisions, policy formulation, and enriches insights into India's economic landscape. This analysis lays the groundwork for navigating future economic uncertainties and bolstering resilience in India's financial markets.

I. INTRODUCTION

The study of volatility in NSE indices and the Nifty over the past decade is crucial for understanding India's economic and financial landscape. Beyond risk assessment, volatility reflects market sentiments and uncertainties. This study aims to decode the factors driving market fluctuations and their implications for investors, policymakers, and the broader economy. The Nifty, a key benchmark for Indian equities, mirrors both individual companies' performance and broader economic trends. Analyzing its volatility sheds light on the resilience, challenges, and opportunities within the Indian equity market. Significant economic events and structural changes in the past decade have impacted market dynamics, necessitating a systematic analysis to understand their effects on volatility and long-term implications. Understanding Indian indices' performance relative to global counterparts is essential due to increased market integration. Comparative studies provide insights into Indian equities' appeal for international investors, while sectoral analysis offers detailed insights into industry-specific challenges and opportunities, assisting investors and policymakers alike. In summary, this study aims to provide stakeholders with actionable insights to navigate the intricacies of Indian financial markets and promote sustainable economic growth.

Review of Literature

1. Author: Menakshi Goel, Deepti Gupta

Title: "An Empirical Analysis of Volatility in Indian Stock Market with Special Reference to National Stock Exchange"

Objective: To analyze the volatility in the Indian stock market, particularly focusing on the National Stock Exchange (NSE).

Result: The study found that the NSE exhibited higher volatility compared to the Bombay Stock Exchange (BSE) during the period under analysis. Factors such as trading volume, market capitalization, and macroeconomic indicators were identified as significant determinants of volatility.

2. Author: R. Uma Maheswari, G. Amudha

Title: "Volatility of Nifty Index in India: A Study"

Objective: To examine the volatility patterns of the Nifty index in India.

Result: The study revealed that the Nifty index exhibited significant volatility, with periods of both high and low volatility over the analyzed timeframe. Various factors such as macroeconomic indicators, global market trends, and policy decisions were identified as drivers of Nifty volatility.

3. Author: Nidhi Walia, Dr. Neha Mehta

Title: "An Empirical Study on Volatility in Indian Stock Market" Objective: To investigate the volatility characteristics of the Indian stock market.

Result: The study found that the Indian stock market, represented by indices such as Nifty and Sensex, displayed considerable volatility during the analyzed period. Economic indicators, corporate earnings, and external factors were identified as key determinants of market volatility.

4. Author: Dr. P. Madhusudhana Rao, Dr. M. Veera Babu

Title: "An Analysis of Volatility in the Indian Stock Market with Special Reference to NSE"

Objective: To analyze the volatility patterns of the Indian stock market, focusing on the NSE.

Result: The study observed that the NSE exhibited higher volatility compared to other stock exchanges in India. Market turnover, liquidity, and investor sentiment were identified as significant contributors to NSE volatility.

5. Author: Dr. Vijay Kumar Gupta, Manisha Rani

Title: "Volatility and its Impact on Stock Returns of NSE Nifty Companies" Objective: To explore the relationship between volatility and stock returns of companies listed on the Nifty index.

Result: The study found a negative relationship between volatility and stock returns, indicating that higher volatility was associated with lower stock returns for Nifty-listed companies. This highlights the importance of managing volatility for investors seeking to optimize returns.

II. RESEARCH METHODOLOGY

The study on the volatility performance of NSE indices and the Nifty over the past decade is comprehensive, aiming to understand various dimensions of market volatility, economic dynamics, and investor behavior. It seeks to provide nuanced insights into volatility patterns, their determinants, and implications for stakeholders. This includes examining historical volatility trends, analyzing the impact of economic events, conducting sectoral and comparative analyses, and exploring policy implications. The research objectives involve detailed examination of historical volatility trends, sectoral analysis across different industries, and comparative analysis with global benchmarks. For the research design, data collection involves using official NSE databases, economic research institutions, and government publications over the past 10 years with a daily frequency. Sampling is done from the NSE official website, and analytical techniques such as descriptive statistics are employed to summarize volatility data and identify trends. Ethical considerations include ensuring data confidentiality, integrity, and respect for participants' rights, adhering to ethical guidelines, and disclosing conflicts of interest. This approach ensures systematic data collection, analysis, and interpretation to achieve research objectives while upholding ethical principles and standards.

Data Analysis

Descriptive Statistics:

Descriptive statistics play a fundamental role in summarizing and visualizing volatility data for NSE indices and the Nifty. Measures such as mean, median, standard deviation, and percentiles provide insights into the central tendency, variability, and distribution of volatility levels over time. Box plots, histograms, and time series plots can be used to visualize the distribution and temporal patterns of volatility, facilitating the identification of trends, outliers, and cyclical patterns in the data. Descriptive statistics serve as the foundation for further analysis and hypothesis testing in the study of market volatility.

Data Analysis 2014-18

Nifty 50 – 2014-18

Average	1.06%
Variance	0.00154
Standard Deviation	0.04
Beta	1.0

Nifty 50 – 2019-23

Average	1.34%
Variance	0.00296
Standard Deviation	0.05
Beta	1.00

NIFTY AUTO 2014-18

Average	1.21%
Variance	0.00288653
Standard Deviation	0.05372642
Beta	1.14095966
COVARIANCE	0.00178003

NIFTY AUTO 2019-23

Average	1.71%
Variance	0.006008
Standard Deviation	0.077514
BETA	1.112028
COVARIANCE	0.003286

NIFTY BANK 2014-18

Average	1.76%
Variance	0.00341
Standard Deviation	0.05839
Beta	1.29698
COVARIANCE	0.00203

NIFTY BANK 2019-23

Average	1.37%
Variance	0.006535
Standard Deviation	0.080842
BETA	1.309034
COVARIANCE	0.003928

NIFTY FIN 2014-18

Average	1.75%
Variance	0.0006203
Standard Deviation	0.0249063
Beta	0.240774
COVARIANCE	0.0003765

NIFTY FIN 2019-23

Average	1.36%
Variance	0.005397
Standard Deviation	0.073464
BETA	1.248005
COVARIANCE	0.003688

NIFTY FMCG 2014-18

Average	1.01%
Variance	0.00168795
Standard Deviation	0.04108468
Beta	0.73440437
COVARIANCE	0.00114852

NIFTY FMCG 2019-23

Average	1.18%
Variance	0.001557222
Standard Deviation	0.039461649
BETA	0.47613835
COVARIANCE	0.001407006

NIFTY PHARMA 2014-18

Average	0.59%
Variance	0.00343307
Standard Deviation	0.05859243
Beta	0.30529082
COVARIANCE	0.00047744

NIFTY PHARMA 2019-23

Average	1.27%
Variance	0.003729
Standard Deviation	0.061063
BETA	0.62476
COVARIANCE	0.001846

3.2 Interpretation

NIFTY AUTO

Between the years 2014–2018 and 2019–2023, the data shows a significant increase in the Nifty Auto sectors index's volatility. Variance and standard deviation had sizable increases, suggesting greater swings around the average return in subsequent years, even as the average return increased from 1.21% to 1.71%. While beta was mostly constant at just above 1, it indicated more pronounced market-driven fluctuations. Although interpretation is dependent on more market data, covariance also increased. All things considered, even with better average returns, the increased volatility in the 2019–2023 period suggests riskier investing circumstances. Analysis of return distribution patterns, an examination of the causes of this spike in volatility, and a comparison of Nifty Auto's volatility to other market indexes will all be important aspects of the thesis in the future. Integrating this analysis can enrich an understanding of the Nifty Auto sector's risk-return dynamics.

NIFTY BANK

Higher variance (0.003409 to 0.006535) and standard deviation (0.05839 to 0.080842) show that the Nifty Bank index saw more volatility between the 2014–2018 and 2019–2023 periods. There are a number of reasons for this increasing volatility, including macroeconomic developments, changes in regulations, and heightened competition in the banking industry. In order to support the study, a comparison of the volatility of the Nifty Bank to that of the larger Nifty 50 index throughout the two time periods can offer insightful background information that helps identify whether the recent spike in volatility is sector-specific or indicative of a wider market trend. Deeper insights can be obtained by looking into potential reasons more thoroughly, such as industry trends, regulatory changes, and macroeconomic indicators. Furthermore, examining how this volatility affects portfolio management techniques would improve the thesis's argumentation. By incorporating these analyses, a more comprehensive understanding of the volatility dynamics of the Nifty Bank index and its underlying drivers can be presented in the master thesis.

NIFTY FIN

For the Nifty Fin sector, the data shows that between 2014–2018 and 2019–2023, there was a substantial increase in variance and standard deviation but a fall in average return. Events in the market, a rise in uncertainty, and industry-specific elements like legislative changes could all be contributing factors to the current elevated volatility. This emphasises how crucial it is to take volatility into account when making investments in the Nifty Fin sector. Subsequent investigations may focus on particular elements contributing to the elevated volatility and examine the consequences for techniques of portfolio diversification. Understanding Nifty Fin's relative risk profile may be gained by contrasting its volatility with that of other industries or the market as a whole. Nonetheless, constraints encompass the restricted duration examined and the lack of information regarding certain contributing elements.

Integrating this analysis into the master thesis will demonstrate a comprehensive understanding of risk and return dynamics within the Nifty Fin sector.

NIFTY FMCG

The information shows that the Nifty FMCG index was less volatile in 2019–2023 than it was in 2014–2018, as seen by the latter period's lower variance (0.001557) and standard deviation (0.039462 vs. 0.041085). The FMCG sector's maturation, rising investor confidence, and larger macroeconomic considerations are some potential causes of this fall. Visual representations of standard deviation and variance, in-depth examination of Beta values to comprehend the market sensitivity of the industry, statistical tests for significance, and research into exogenous factors such as significant events or policy changes affecting the FMCG industry could all be useful in improving the master's thesis. By taking these recommendations into consideration, volatility variations in the Nifty FMCG index can be interpreted with greater insight.

NIFTY PHARMA

According to the statistics, the Nifty Pharma sectors index will likely see more volatility between 2014 and 2018 and 2019 and 2023. Both variance and standard deviation increased in spite of an increase in average returns, suggesting more variations surrounding the mean return. Additionally, beta increased, showing a higher level of sensitivity to changes in the market, and covariance strengthened, indicating a closer relationship between the index and the market. Larger fluctuations in returns are implied by this increased volatility, which may be impacted by market-wide or industry-specific causes. Additional examination could focus on certain incidents or business patterns that are causing the volatility to rise and investigate the trade-off between risk and reward. Examining how Nifty Pharma and the market changed over these times will also add depth to the conversation.

By integrating this analysis, the master thesis can offer valuable insights into the changing risk profile of the Nifty Pharma sector.

Findings

The analysis of volatility in NSE indices and the Nifty over the past decade has revealed significant insights into market dynamics, determinants, and implications in the Indian financial markets. Utilizing methods like descriptive statistics and econometric modeling, researchers uncovered volatility clustering, indicating non-random fluctuations. Sector-specific volatility changes were notable, with sectors like Nifty Auto experiencing spikes while others like Nifty FMCG saw decreases. Comparative analysis with global benchmarks enriched understanding, influencing investment strategies.

These findings hold crucial managerial implications, informing strategic asset allocation, risk management, and regulatory compliance. Technology plays a pivotal role in enhancing market resilience. Acknowledging limitations in data quality and methodology is essential for research validity. Addressing these through robust methodologies and further research is vital for effective volatility management and fostering a stable financial ecosystem. In conclusion, while volatility analysis offers valuable insights, addressing limitations and conducting further research are vital for effectively managing volatility concerns and supporting sustainable economic growth.

III. CONCLUSIONS

The analysis of volatility trends across various sectoral indices of the Indian stock market reveals significant insights into the risk-return profiles of each sector. Firstly, the Nifty Auto sector potentially witnessed increased volatility between 2014-2018 and 2019-2023, characterized by larger fluctuations in returns around the average, despite an increase in average returns. Secondly, the Nifty Bank index exhibited heightened volatility, suggesting greater fluctuations in returns, likely influenced by macroeconomic events or regulatory changes. Similarly, the Nifty Fin sector experienced increased volatility, indicating substantial fluctuations in returns around the mean, possibly due to

market events or sector-specific factors. Conversely, the Nifty FMCG index showed decreased volatility, implying reduced dispersion of returns around the mean, possibly attributed to a maturing industry or macroeconomic factors. These findings underscore the evolving risk profiles of different sectors and emphasize the importance of considering volatility in investment decisions. Understanding sector-specific volatility dynamics enables investors to make informed decisions and manage risks effectively in the Indian stock market.

REFERENCES

Journals

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2. "Journal of Banking & Finance" - This journal covers a wide range of topics related to banking, finance, and financial markets.
3. "Review of Financial Studies" - As one of the leading academic journals in finance, the Review of Financial Studies publishes rigorous research on theoretical and empirical aspects of financial markets.
4. "Journal of Applied Econometrics" - This journal focuses on applied econometric research, including empirical studies that analyze economic and financial data to address real-world issues.

Websites:

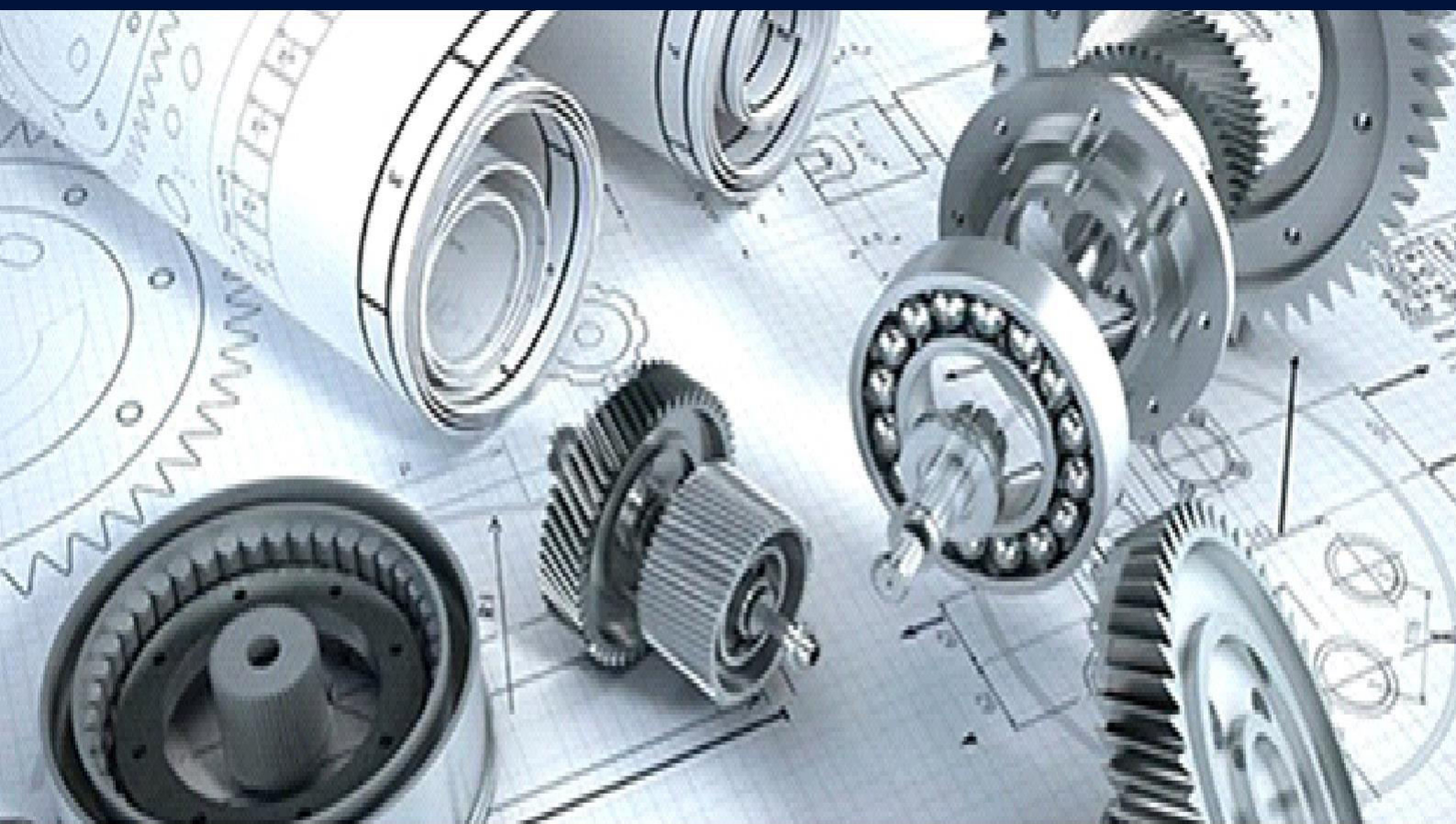
1. Investing.com (<https://www.investing.com/>) - NSE Indices Section: Investing.com offers a dedicated section for NSE indices, including the Nifty, where users can access real-time data, charts, news, and analysis.
2. Investopedia (<https://www.investopedia.com/>) - Provides comprehensive articles on technical analysis, forex trading, and global markets.
3. FXStreet (<https://www.fxstreet.com/>) - Offers news, analysis, and educational resources specifically focused on forex markets.

Books:

1. "Volatility Trading" by Euan Sinclair - This book provides a comprehensive overview of volatility trading strategies in financial markets. It covers topics such as option pricing models, volatility surface analysis, and trading techniques for exploiting volatility dynamics.
2. "Stock Market Volatility" by Robert Engle - Written by a Nobel Prize-winning economist, this book offers a thorough examination of stock market volatility and its implications for financial markets. It discusses various models for measuring and forecasting volatility, as well as the impact of volatility on asset pricing and risk management.
3. "Option Volatility & Pricing: Advanced Trading Strategies and Techniques" by Sheldon Natenberg - This book is a comprehensive guide to understanding option volatility and its role in financial markets. It covers topics such as implied volatility, volatility skew, and volatility trading strategies.
4. "Volatility: Practical Options Theory" by Adam S. Iqbal - This book provides a practical approach to understanding volatility and its implications for options trading. It covers topics such as volatility surface construction, volatility arbitrage, and risk management techniques for volatility-related strategies.

Newspapers & Magazines

1. Bloomberg Markets (<https://www.bloomberg.com>) - Markets Section: Bloomberg's Markets section offers comprehensive coverage of global financial markets, including Indian equity markets and indices like the Nifty.
2. Economic Times (<https://economictimes.indiatimes.com>) - Markets Section: The Markets section of Economic Times provides news, analysis, and insights on Indian financial markets, including NSE indices and the Nifty.



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