Risk and Return Analysis of Derivative Options on Selected Large-Cap Stocks Using the India VIX Model

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Abstract

The rapid expansion of the derivatives market in India has intensified the need for effective risk–return evaluation tools, particularly in volatile market conditions. This study analyses the risk and return characteristics of derivative options on selected large-cap stocks listed on the National Stock Exchange (NSE), using the India Volatility Index (India VIX) as a proxy for implied market volatility. Ten large-cap companies forming part of the NIFTY 50 index were selected based on liquidity and active options trading. Using secondary data sourced from NSE, Moneycontrol, and India VIX archives, the study employs statistical tools such as average returns, standard deviation, beta, correlation, and regression analysis. The findings indicate that option returns of most selected large-cap stocks exhibit weak and statistically insignificant relationships with India VIX movements. While volatility remains a critical risk indicator, the results suggest that India VIX alone does not significantly explain stock-specific option returns. The study highlights the importance of combining volatility indicators with firm-level and market-specific factors for informed derivative trading and risk management decisions.

Keywords: Derivatives, Options, Risk and Return, India VIX, Large-Cap Stocks, NSE

1. Introduction

The financial system plays a crucial role in mobilising savings and allocating capital efficiently within an economy. Among its components, the stock market provides investors with opportunities to earn returns while exposing them to varying levels of risk. The fundamental principle of finance asserts that higher returns are associated with higher risk, making risk–return analysis central to investment decision-making.

Financial derivatives have emerged as vital instruments for managing and optimising risk. Options, in particular, provide investors with flexibility to hedge, speculate, and enhance portfolio performance. In recent years, increased participation in India's derivatives market has underscored the importance of understanding volatility and its influence on option pricing and returns.

The India Volatility Index (India VIX), introduced by the NSE, measures expected market volatility over the next 30 days based on Nifty 50 option prices. Often referred to as the "fear gauge," India VIX reflects investor sentiment and anticipated market uncertainty. Despite its growing relevance, many investors continue to rely on historical volatility or technical indicators, underutilising implied volatility measures.

This study attempts to bridge this gap by examining the relationship between India VIX and the risk–return behaviour of derivative options on selected large-cap stocks.

2. Review of Literature

Prior research highlights the growing importance of derivatives in risk management and price discovery. Studies by Totalli Sirisha and Kalyan (2021) and Sandra (2021) document the rapid expansion and institutional strengthening of the Indian derivatives market. Narasimhan and Kalra (2014) find that derivative trading improves stock liquidity in the long run, particularly for illiquid stocks.

Ganai (2021) establishes that stock option trading significantly increases the volatility of underlying stocks, while Mishra and Debasish (2020) demonstrate a strong inverse relationship between stock indices and India VIX. Kumar and Rao (2023) emphasise the usefulness of India VIX as a short-term risk indicator in options trading.

However, existing literature largely focuses on index options or market-wide volatility, with limited empirical evidence linking India VIX to stock-specific option returns, particularly for large-cap stocks. This study contributes by addressing this gap.

3. Objectives of the Study

1.   To analyse the return performance of derivative options on selected large-cap stocks.
2.   To evaluate the risk associated with these options using statistical measures.
3.   To examine the relationship between India VIX and option returns.

4. Research Methodology

Research Design

The study adopts a **quantitative and analytical research design**.

Sample Selection

Ten large-cap companies listed on the NIFTY 50 index were selected using **purposive sampling**, based on liquidity and availability of option data.

Data Collection

The study uses **secondary data** collected from:

- National Stock Exchange (NSE)
- Moneycontrol
- India VIX historical data archives

Tools of Analysis

- Average Return
- Standard Deviation and Variance
- Beta and Correlation

- Regression Analysis

Statistical analysis was conducted using **Microsoft Excel and SPSS**.

Hypotheses

- **H_0:** There is no significant relationship between India VIX and derivative option returns.
- **H_1:** There is a significant relationship between India VIX and derivative option returns.

5. Results and Discussion

The empirical analysis reveals that the average returns of derivative options across most selected large-cap stocks are positive but significantly lower than market returns. Risk measures indicate relatively low volatility, with beta values close to zero or negative, suggesting weak sensitivity to overall market movements.

Correlation analysis shows a weak and predominantly negative relationship between option returns and market returns. Regression results further confirm that India VIX explains an insignificant portion of variation in option returns, with most models displaying very low R^2 values and statistically insignificant coefficients.

These findings suggest that while India VIX effectively captures market-wide uncertainty, it does not significantly influence stock-specific option returns for large-cap companies. The stability, strong fundamentals, and institutional participation associated with large-cap stocks may dilute the direct impact of market volatility on their options.

6. Conclusion

The study concludes that derivative options on selected large-cap stocks exhibit moderate risk and stable returns, with limited dependence on implied market volatility as measured by India VIX. The empirical evidence supports the null hypothesis, indicating no significant relationship between India VIX and stock-specific option returns.

While India VIX remains a valuable indicator of overall market sentiment, relying solely on it for option trading decisions may be inadequate. Investors and traders should complement volatility indicators with firm-level analysis, market trends, and strategic risk management tools.

The study contributes to the existing literature by providing stock-level evidence from the Indian derivatives market and offers practical insights for investors, analysts, and academics.

7. Limitations and Scope for Future Research

- The study is limited to ten large-cap stocks and a specific time period.
- Only implied volatility (India VIX) is considered; other volatility models may yield different insights.

Future research may extend the analysis to mid-cap and small-cap stocks, compare index and stock options, or incorporate advanced econometric and machine learning models.

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