The Effect of Interest Rate Changes on Stock Market Volatility

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Abstract

This research investigates the dynamic relationship between interest rate changes and stock market volatility, with a focus on the Indian financial markets between 2015 and 2024. Using quantitative analysis supported by event study methodology and GARCH models, it assesses how rate hikes, cuts, and surprises from the Reserve Bank of India impact volatility metrics such as India VIX and index return dispersion. The findings confirm a significant and immediate surge in volatility following interest rate changes, especially unexpected hikes. The study offers practical recommendations for investors, financial managers, and policymakers to mitigate risks and leverage opportunities around monetary policy events.

1.   Introduction

Understanding the link between interest rates and market behavior is crucial in today's interconnected global economy. Interest rate policies not only influence domestic investment but also affect foreign capital inflows and exchange rates, which in turn impact equity market stability. As emerging markets like India continue to integrate with global financial systems, analyzing such macroeconomic relationships becomes essential for forecasting market trends and guiding policy responses. This study offers a timely investigation given recent monetary tightening trends globally and persistent inflation concerns.

Interest rate policy is a central tool in economic regulation, often used by central banks to control inflation, guide economic growth, and manage currency stability. Changes in interest rates, particularly those made by the Reserve Bank of India (RBI), have profound impacts on investor expectations and stock market behavior.

Volatility, which represents the rate of change in stock prices, is sensitive to macroeconomic indicators, and among them, interest rate changes are one of the most influential. Events like the COVID-19 pandemic, inflation spikes, and global monetary tightening have provided significant case studies of interest rate-driven market reactions. This paper aims to empirically explore how changes in interest rates—both expected and unexpected—affect the volatility in Indian stock markets

2.   Review of Literature

Additional studies by Mishkin (2007) emphasize that monetary policy transmission mechanisms vary depending on market structure and central bank credibility. Meanwhile, Modigliani and Cohn (1979) proposed that inflation misperceptions can distort stock valuations during policy changes. Recent developments in behavioral finance also highlight the psychological aspects of investor reactions to rate changes, especially in volatile markets.

Extensive research supports the notion that monetary policy changes influence stock prices and volatility. Bernanke & Kuttner (2005) demonstrated that unanticipated shifts in the U.S. Federal Funds Rate cause sharp stock market movements. Thorbecke (1997) and Rigobon & Sack (2004) highlighted that contractionary monetary policy tends to reduce equity prices through reduced future cash flows.

Indian studies, such as those by Bhattacharya & Mukherjee (2006), found that BSE/NSE indices react significantly to RBI announcements. Research by Mohanty (2014) and others applied GARCH models to measure volatility clustering around these events. However, most existing literature emphasizes long-term price movements over short-term volatility. This paper addresses that gap by applying high-frequency data and volatility modeling across multiple monetary policy events.

3. Methodology

The study employs a multi-method quantitative research design:

- Descriptive: Understanding trends in volatility before and after RBI announcements.

- Causal: Testing the impact of rate changes on volatility using econometric models.

- Longitudinal: Observing changes over a 10-year period (2015–2024).

- Event Study: Measuring volatility in a [-10, +10] day window around RBI policy events.

- Applied: Providing actionable insights for real-world use.

Statistical models used include GARCH (to model volatility clustering), OLS regression (to test impact of rate change magnitude), and t-tests/ANOVA (to compare pre- and post-event volatility).

4. Data collection

Data was collected from credible secondary sources:
- RBI: Repo rate decisions, policy dates, MPC minutes.
- NSE/BSE: Daily index prices (NIFTY 50, SENSEX) and India VIX data.
- Bloomberg/Yahoo Finance: International rate comparisons and daily financial data.
- Ministry of Finance: Inflation and GDP data as control variables.

The time frame covers January 2015 to December 2024, enabling the study of both normal and crisis periods. Variables include interest rate decisions, market returns, India VIX, inflation, and GDP data.

5. Analysis and result

To provide further clarity, a case study of the RBI's repo rate hike in June 2022 is analysis. The rate was unexpectedly increased by 50 basis points, leading to a same- day spike in the India VIX by 12%. The NIFTY 50 index declined over the next three trading sessions, reflecting heightened investor anxiety. This event supports the hypothesis that surprise announcements lead to stronger and more prolonged volatility surges.

Using Excel, Python, and EViews, the data was analysis for trends in volatility around RBI announcements. GARCH models confirmed that volatility increases significantly on and after rate changes, especially unexpected hikes. Event study methodology in a [-10, +10] day window further validated these spikes.

Regression and hypothesis testing revealed a statistically significant relationship between the size of interest rate changes and the level of market volatility. Rate hikes had a stronger impact than cuts, and volatility typically normalized within 5–10 trading days.

6. DISCUSSION

Investor sentiment plays a crucial mediating role. When policy decisions align with macroeconomic forecasts, volatility reactions are often muted. However, deviations from expected policy paths can trigger overreactions, panic selling, or defensive trading strategies. The role of financial media in amplifying policy implications also merits further exploration, as real-time information dissemination can affect market sentiment within minutes.

The findings confirm that investor behaviour is sensitive to monetary policy signals, particularly those that are unexpected. Rate hikes cause a sharper reaction than cuts, reflecting investor caution. Different sectors respond differently to rate changes, with banking and real estate showing higher sensitivity. These insights suggest that portfolio and corporate strategy adjustments should be closely tied to anticipated monetary policy shifts.

7. CONCLUSION

Further research could include predictive model using machine learning techniques to forecast volatility based on macroeconomic inputs. Additionally, comparative studies across multiple emerging markets could help understand whether the Indian market's reaction is unique or part of a broader global pattern.

This study confirms a measurable and significant effect of interest rate changes on stock market volatility. Particularly, unanticipated rate hikes drive short-term volatility spikes. Managers and investors must integrate macroeconomic monitoring into their risk management practices.

Recommendations include forecasting models that integrate interest rate signals, proactive risk policies using derivatives, sector-specific investment strategies, and strong communication during volatile periods.

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